THE RELATIONSHIP BETWEEN LEARNING, HEALTH BELIEFS, WEIGHT GAIN, ALCOHOL CONSUMPTION, AND TOBACCO USE OF PREGNANT WOMEN

by

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ABSTRACT

Understanding how women learn during pregnancy is the foundation for planning prenatal education programs. To date, adult educators have not investigated, in any depth, the learning process during pregnancy. The purpose of this study was to examine learning during pregnancy and relate this learning to learning outcomes. The principal research questions were: "What are the learning patterns of pregnant women?" and "What is the relationship between learning and health behavior of pregnant women?"

It is unknown whether learning during pregnancy is directly associated with behavior or mediated through health beliefs. The objectives of this research were to identify pregnant women's health behaviors, learning patterns, and health beliefs. The three health behaviors examined in this study were eating, drinking, and smoking. These behaviors were operationalized in terms of their outcomes: weight gain, alcohol consumption, and tobacco use. These factors are amenable to an education intervention and are behavioral risk factors associated with low birth weight. The process of investigating learning patterns consisted of identifying: what was learned during the pregnancy, which resources were utilized, what advice was given, what amount of time was spent in learning, who initiated the learning episodes, and what learning transaction types emerged. Determining learning transaction types was based upon an adaptation of Tough's (1979) concept of planners and Knowles's concept of self-directed learners. The process of investigating health beliefs consisted of identifying pregnant women's concerns, perceived risk, perceived use of the information, and perceived barriers, defined according to an adaptation of the Health Belief Model.

The principal hypotheses of the study were: (1) self-initiated learning will be positively correlated with knowledge scores, (2) self-initiated learning will be positively correlated with ideal health behaviors, and (3) health beliefs will be positively correlated with ideal health behaviors: ideal weight gain during pregnancy, reduced alcohol consumption, and reduced cigarette smoking.

The research, an ex post facto design, involved a one hour structured interview with women within the week following delivery of their infants in hospital. A proportional sample of 120 primigravidas was selected from seven hospitals with average number of monthly births greater than 100. Reporting of results was based upon 120 interviews conducted as part of the main sample and eight interviews conducted during the pilot study. Pilot responses were included because these responses were similar to responses provided by the main sample, with the exception of health belief data. One case was excluded from the sample, making for N=127.

Data analyses were based upon the entire sample N=127, with the exception of health belief measures. Since alcohol and smoking health belief questions were administered to drinkers and smokers and since health belief measures related to weight gain, alcohol, and smoking were missing data, health belief analyses were based upon N=123 for weight gain, N=88 for alcohol, and N=43 for smoking.

Women had spent an average of forty-one hours learning about weight gain, alcohol consumption, and tobacco use during pregnancy. The principal resources used were: reading materials, physicians, family members, and prenatal classes. The majority of pregnant women had engaged in other-initiated learning episodes in the one to one setting, that is with a health professional, family member, or friend.

Self-initiated learning about weight gain was associated with higher knowledge scores and ideal prenatal weight gain ($p \leq 0.05$); and, weight gain health beliefs were negatively correlated with ideal prenatal weight gain ($p \leq 0.05$). Finding a negative correlation, in contrast to the predicted positive correlation, may have been due to the fact that in a retrospective study the behavior precipitated reporting of health beliefs. *Other-initiated* learning about alcohol was associated with higher knowledge scores and reduced alcohol intake ($p \leq 0.05$); however, alcohol health beliefs were not associated with reduced alcohol intake. For smoking, neither self-initiated nor other-initiated learning was associated with knowledge scores or reduced cigarette smoking; however, a low degree of perceived risk was predictive of reduced cigarette smoking ($p \leq 0.05$). Knowledge about tobacco use was positively correlated with health beliefs, suggesting that learning may be indirectly related to smoking behaviors.

This study contributes to the knowledge about learning during pregnancy by providing a descriptive profile of learning patterns during pregnancy, and by examining the relationship between learning, health beliefs, and behavior. Fostering a learning environment which stimulates self-initiated learning may assist women reach ideal weight gain during pregnancy. For alcohol, encouraging health professionals, family members, and friends to initiate learning about the hazards of consuming alcohol during pregnancy seems warranted. Self-initiated learning may not be superior to other-initiated learning but may be topic specific, due to the nature of the health behaviors examined. Identification of women's smoking health beliefs seems warranted during prenatal education. Further research is required to better understand the role of learning with respect to changing smoking behaviors during pregnancy.

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CHAPTER I

THE RESEARCH PROBLEM

Pregnancy is a time when numerous changes affect a woman's physical, psychological, and social disposition. These changes coupled with a desire to have a healthy pregnancy outcome are powerful motivating forces for pregnant women to engage in learning. Understanding the nature and scope of learning during pregnancy is the basis upon which educators can assist pregnant women during their learning as well as have a positive effect on pregnancy outcome.

There are numerous factors that influence a pregnancy outcome. Some of these include the pregnant woman's age, parity, obstetrical history, race, socioeconomic status, health status, use of the health care system, nutrition, weight gain, alcohol, smoking, and drug use (Worthington-Roberts, Vermeersch, and Williams, 1985). The complex interrelationships among these variables have not been clearly delineated in the literature. Nevertheless, several factors are amenable to intervention, and more specifically an education intervention. These variables include nutritional status, alcohol consumption, and smoking practices. Furthermore, these variables are three primary behavioral risk factors associated with low birth weight, a principal predictor of perinatal mortality (Institute of Medicine, 1985).

The purpose of this study is to examine learning behaviors during pregnancy with regard to those variables that are amenable to an education intervention and are associated with a healthy pregnancy outcome. The principal research questions are "What are the learning patterns of pregnant women?" and "What is the relationship between learning and health behavior of pregnant women?"

In order to develop the principal research questions posed, the first section of Chapter I contains the background of the problem; the second section consists of identifying the gravity of the problem; the third section contains a definition of the terms used in this study; and, the final section contains a summary of Chapter I and an outline of this dissertation.

Background of the Problem

Health educators are concerned about the learning patterns and behaviors of pregnant women regarding nutritional practices, alcohol consumption, and tobacco use. What individuals choose to eat, what amounts they choose to drink, and what amounts they choose to smoke are all voluntary decisions and thus may be amenable to an education intervention. In some cases poverty or other environmental factors may restrict options open to pregnant women but these might also be regarded as conditions calling for increased educational efforts.

The purpose of health education is to change behavior and therefore professional health educators dealing with pregnant women strive for optimal behavior associated with healthy pregnancy outcome. The medical literature (Butler and Alberman, 1969; Metcoff et al., 1981; Naeye, 1979; Little, 1977; and Sexton and Hebel, 1984) provides evidence that poor maternal weight gain, alcohol consumption, and tobacco use are all associated with an increased incidence of low birth weight, a principal predictor of perinatal mortality (Piekkala et al., 1985). Low birth weight is defined by the World Health Organization (1984) as a birth weight of less than 2,500 grams. Low birth weight is an important determinant of the infant's chances of survival and healthy development.

Because of the association of low maternal weight gain, alcohol consumption, and tobacco use with increased incidence of low birth weight, the learning that occurs about weight gain, alcohol consumption, and tobacco use and its relationship with health behaviors of pregnant women is of particular interest to educators. Therefore two important components need to be examined for the purpose of clarifying the background of the research problem. Component one is learning and component two is health behavior. The problems and focus of the research on learning during pregnancy and behavior are described as follows.

Learning

People engage in learning for a multitude of reasons and the learning transactions undertaken by adults are complex as well as multifaceted. Every individual enters a learning activity with previous experience and prior learning which mesh with the activity undertaken. Therefore educators can never predict with total certainty how each adult will respond to new information and experiences (Brookfield, 1986). The multifaceted nature of the learning process should challenge researchers to obtain a better understanding of learning, and in this case, learning experiences during pregnancy.

In an attempt to better understand the learning that occurs among adults, Tough (1979), in his work "The Adult's Learning Projects", addressed the question of how adults learn. Specifically he examined the decision and planning aspects of learning and focused on what adults learn, why they learn it, and the types of planners involved in learning. The results of research in several studies reported by Tough (1978) indicate that about 73 percent of highly deliberate attempts to learn are planned by learners themselves (self-planned learning projects), and approximately 20 percent are planned by professionals on a one-to-one basis or in a group setting.

To date, much of the research reported in the medical, nursing, and nutrition literature on learning during pregnancy has been diverse and has focused on:

providing a descriptive profile of women attending prenatal educational opportunities; examining pregnant women's sources of information; and, describing media campaigns encouraging healthy behaviors. By utilizing Tough's framework for examining planners of the learning, attention is shifted from evaluating learning in one particular educational setting to obtaining a more global view of learning during pregnancy. At the same time, it shifts attention away from examining only professionally guided learning to examining learning that occurs in all settings. Often health professionals assume that adult learning is restricted to educational programs provided by government agencies, physicians, and other health professionals. The extent of individual learning and of learning with nonprofessionals has yet to be documented.

Adult learning is a phenomenon and a process that can take place in any setting. Tough (1982) found that learning outside the institutional setting was not perceived by learners to be as useful or valuable as learning within the institutional setting. Although a great deal of value is placed on professionally guided learning, the purpose of this study is not restricted to examining learning in the institutional setting. Instead, the purpose is to examine the learning that occurs among pregnant women in any setting.

The extent of group guided learning during pregnancy can be identified by examining attendance at prenatal classes. British Columbian data from Moricky (1985) indicate that approximately 70 percent of women experiencing their first pregnancy and approximately 40 percent of women experiencing their second or subsequent pregnancy attend B.C. Ministry of Health prenatal classes, an organized learning activity.

The extent of individually guided learning by pregnant women has not been documented. A potential indirect measure of this type of learning could be the amount of prenatal care a woman obtains. Although no evidence exists to establish the association between amount of prenatal care obtained and the extent of learning, one could surmise that learning might occur during a visit with the physician, nurse, or dietitian/nutritionist. The extent and quality of learning would vary greatly. In the United States, 1984 data from the Advance Report of Final Natality Statistics (National Centre for Health Statistics, 1986) indicate that approximately 75 percent of women begin their prenatal care during the first three months of pregnancy; approximately 17 percent of women begin their prenatal care during the fourth, fifth, and sixth month of pregnancy; approximately 4 percent of women begin their prenatal care during their seventh, eighth, and ninth month of pregnancy; approximately 2 percent of women had no prenatal care; and, approximately 2 percent of women had an unknown amount of prenatal care. Furthermore, the median number of visits made by women to obtain prenatal care was twelve.

The extent of learning with nonprofessionals and the extent of learning that occurs through reading and viewing audiovisual productions during pregnancy has also not been examined or addressed. Educators and health professionals have focused their attention primarily on professionally guided learning. Although professionally guided learning during pregnancy is an important phenomenon, the relative importance of learning with nonprofessionals is not known.

This study is an investigation of the learning of pregnant women from a new perspective, one that provides educators with an understanding of learning in all settings, and of how pregnant women learn. To date this type of study identifying how women learn has not been conducted with the pregnant population. In this research, Tough's view of learning and his concept of planners serves as the basis for the identification of how pregnant women learn.

Health Behavior

The second component of the research problem focuses on health behaviors of pregnant women. Much of the research in this area has focused on describing health behaviors of pregnant women and has focused on examining the effect of intervention strategies by health professionals on behaviors of pregnant women. Intervention strategies havé included smoking cessation programs for pregnant women, nutrition counselling programs for pregnant women, and alcohol programs for pregnant problem drinkers.

What factors influence behavior is a question that has perplexed educators over the centuries. Personality variables, situational characteristics, and norms all play a role in determining an individual's behavior. Numerous forces interact to determine behavior and this study focuses on examining the relationship between learning and behavior of pregnant women.

Experience in the health care field tells us that pregnant women not only deliberately seek information about their pregnancy but also are given information deliberately or incidentally by health professionals. Knowles (1975) assumes that individuals who self-direct or self-initiate their learning efforts will make better use of the information than individuals whose learning is initiated by others. Therefore a profile of the learning episodes of pregnant women might reveal pertinent information about learning and its relationship with health behavior.

It is unknown whether learning during pregnancy is directly associated with health behaviors or whether learning is mediated through health beliefs. The Health Belief Model was developed by Hochbaum, Kegles, Rosenstock, and Leventhal (Rosenstock, 1974b) to explain preventive health behaviors. Women monitoring their weight gain, and changing their alcohol and smoking practices during pregnancy would be taking preventive action to increase their chances of having a healthy pregnancy outcome. The model indicates that mass media campaigns, advice from others, and newspaper or magazine articles can potentially influence beliefs (Janz and Becker, 1984). Learning during pregnancy may be mediated through health beliefs.

The measurement of learning as well as health beliefs may provide useful insights towards understanding the outcomes of learning during pregnancy. Little work has been done to understand the phenomenon of learning during pregnancy, and the relationship between learning and behavior as well as between health beliefs and behavior. This phenomenon is explored in this research.

Gravity of the Problem

There are two aspects which underlie the gravity of the research problem. First, adult educators have not examined, in any depth, the learning process during pregnancy. Second, those studies which have examined how adults learn have not related this learning to learning outcomes. The gravity of not having adult educators examine learning during pregnancy is embedded in the fact that certain health behaviors, amenable to an education intervention, are associated with pregnancy outcome. Each of these aspects is expanded upon in order to describe the underpinnings of studying the process of how pregnant women learn and relating this learning to outcome.

Understanding how women learn, specifically during pregnancy, has not been a high priority among adult educators. It has been included as an incidental activity when learning had been studied. For example, Cross and Valley (1974) examining learning of non-traditional education programs found that 31 percent of 1,893 respondents in a national probability sample in the United States were engaged in some form of adult learning. More specifically, 56 percent indicated that they would be interested in learning about home and family living and 54 percent in learning about personal development. The topic of pregnancy was not mentioned as a separate category. Similarly, Waniewicz (1976) in his study of part-time learners in Ontario had also not included pregnancy as a subject area. More recently, Devereaux (1985) reported in "The Survey of Adult Education in Canada" that 23 percent of adult learners had taken a course for "personal development/general interest." Included as one sub category of "personal development/general interest" was a catch-all division of "other" comprising marriage preparation, prenatal instruction, driver training, and first aid. Although it is recognized that a small percentage of the population are pregnant at any given time, it is an important period of learning, one that can potentially influence the next generation.

Brookfield (1984) has been critical of the research studies which have examined how adults learn, specifically self-planned learning. He has cited lack of attention to the quality of learning as a serious omission. Tough (1982) in his more recent research efforts examined intentional changes among adults, and focused on identifying what changes had occurred and how that process was implemented primarily from a learning perspective. Tough attempted to evaluate whether individuals had attained their goal by asking "What percentage of your desired change did you actually achieve?" This type of questioning is a beginning step in evaluating behavior change and its relationship to learning. More objective criteria are required.

Adult educators have primarily studied the process of how adults learn and have not related learning to objective outcomes. In contrast, health professionals have primarily focused on learning outcomes and have not examined the process of learning in any depth. For example, health studies (Robitaille and Kramer, 1985; and Thordarson and Costanzo, 1976) have identified birth weight outcome of prenatal class participants and nonparticipants, however these studies have not addressed the dynamics of that learning process. Health professionals would be interested in understanding how women learn during pregnancy and the association between learning and health behaviors, but this interest would primarily be grounded in final outcomes, reduction of low birth weight incidence.

The literature on the health aspects of low birth weight is extensive. Although low birth weight is not the primary focus of this study, the problems associated with low birth weight are addressed. This presentation is intended to strengthen the rationale for examining the learning that occurs about three primary behavioral risk factors associated with low birth weight: inadequate weight gain, alcohol consumption, and tobacco use.

The problems of mortality associated with low birth weight are clearly identified in the classical study, the 1958 British Perinatal Mortality Survey. Butler and Alberman (1969) demonstrated that there were 227.0 deaths per 1,000 infants born weighing under 2,500 grams; compared with 28.2 deaths per 1,000 infants born weighing between 2,500 and 3,000 grams; and, compared with 12.4 deaths per 1,000 infants born weighing above 3,000 grams. More recently, Lee et al. (1980) as well as Saugstad (1981) found that low birth weight was an excellent predictor of perinatal mortality.

The problems of increased morbidity associated with low birth weight incidence are documented in the Surgeon General's Report on Health Promotion and Disease Prevention (U.S. Department of Health, Education, and Welfare, 1979) and in the Institute of Medicine's (1985) report on Preventing Low Birthweight. Problems identified included increased occurrence of mental retardation, birth defects, growth and development problems, respiratory tract conditions, blindness, autism, cerebral palsy, and epilepsy. The incidence of each of these problems, as a result of low birth weight, has not been clearly identified in the literature.

The proportion of infants weighing 2,500 grams or less at birth in 1984 was 5.7 percent for all of Canada and 5.1 percent in British Columbia. These percentages translate into 20,997 infants in Canada as a whole and 2,206 infants in British Columbia (B.C. Ministry of Health, 1985). Variations exist across the province of British Columbia in the incidence of low birth weight. The range was from a 3.4 percent incidence in the Upper Fraser Valley Health District to a 6.0 percent incidence in the East Kootenay Health District. The Upper Fraser Valley Health District has a large Mormon community, a group of individuals who do not smoke or consume alcoholic beverages. The low birth weight incidence may reflect the health behaviors of the population of this health district. In the East Kootenay Health District, as a result of the high low birth weight incidence, the Kamloops low birth weight study was conducted by the B.C. Ministry of Health (Carlson and Phillon, 1985). A media campaign was organized along with production of two publications "Birth Weight & Why It's Important" and "Low Birth Weight Infants, Recognition and Preventive Management of High Risk Mothers." The low birth weight incidence in the East Kootenay Health District dropped to a 4.5 percent level in 1985. Although conclusive evidence is not available, one could speculate about the benefits of the education campaign in the East Kootenay District.

Reduction of low birth weight incidence is a priority at both the federal and provincial governmental levels. The B.C. Ministry of Health has as one of its objectives to reduce the incidence of low birth weight to a 3 percent level (Fisher, 1984). This objective is close to the Swedish incidence of low birth weight which in 1981 was 3.4 percent (World Health Organization, 1984), the lowest reported incidence in the world. In 1983, The Canadian Department of Health & Welfare developed a "Five Year Federal-Provincial Plan on Nutrition in Health Promotion for

Pregnant Women" (Report of the Federal-Provincial Advisory Committee on Health Promotion, 1983). The purpose of the plan was to improve and maintain maternal and infant health through nutrition intervention in an attempt to decrease the incidence of low birth weight, thereby reducing infant morbidity and mortality rates.

Health care costs associated with the problems of low birth weight have been one of the underlying incentives for the federal and provincial governments to focus on reducing low birth weight incidence. Budiansky (1986) reports that the Institute of Medicine, National Academy of Science, estimates the annual cost of neonatal intensive care to be approximately $2 billion in the United States. One stay in an intensive care unit can range from $15,000 to over $100,000. Other health care costs associated with low birth weight range from treating developmental problems to treating mental retardation. The costs of supporting a severely handicapped child throughout his lifetime is estimated by the Manitoba Community Task Force on Maternal and Child Health to be $750,000 (Fisher, 1984). Behrman (1985) estimates the unit cost of initial hospitalization of a low birth weight baby to be approximately $13,616 per low birth weight infant; the unit cost of rehospitalization to be approximately $372 per day per rehospitalized low birth weight infant; and, the unit cost for one year of ambulatory medical care for noninstitutionalized infants with morbidity to be approximately $1,805 per child. Documentation exists on the costs of neonatal intensive care units and other health care expenditures related to low birth weight, however, the psychological and social costs of long term disability and anxiety of parents are an intangible consideration (Papernik et al., 1985).

Problems of increased morbidity and mortality associated with low birth weight, coupled with health care and social costs associated with low birth weight provide strong support for educators to pursue the study of learning related to weight gain, alcohol consumption, and tobacco use of pregnant women.

The goal of educators is to better understand the learning process during pregnancy and its relationship with health behavior, whereas the goal of health professionals is to ultimately reduce the low birth weight incidence. In this study, the goals of educators and health professionals are linked as schematically conceptualized in Figure 1.

LEARNING AND HEALTH BELIEFS OF PREGNANT -------> WOMEN	RELATIONSHIP WITH WOMEN'S HEALTH BEHAVIORS	
	-weight gain -alcohol consumption ------> -tobacco use	RELATIONSHIP WITH LOW BIRTH WEIGHT INCIDENCE

Fig. 1. The Link Between the Goals of Educators and Health Professionals

In order to mesh the goals of educators and health professionals in this research study, the following questions are asked: (1) What are the learning patterns of pregnant women, that is: "What are pregnant women learning about weight gain, alcohol consumption, and tobacco use?" and "How do pregnant women learn about weight gain, alcohol consumption, and tobacco use?", (2) "What is the relationship between learning and behavior of pregnant women?", and (3) "What is the relationship between health beliefs and behavior of pregnant women?" Knowing what women learn and how they learn, along with the association of learning, health beliefs, and behaviors, provides educators with the tools to assist pregnant women during their learning. As well, it can assist educators plan prenatal education programs for women.

Definition of Terms

A definition of the education terms used in this study is listed below. A description of the medical terms used is contained in Appendix 1.

Education: A process by which human beings seek to improve themselves by increasing their skill, knowledge, or sensitiveness (Houle, 1972). Education is a condition established to facilitate learning.

Knowledge: A cognitive or intellectual component acquired and retained through education or experience (Houle, 1972).

Learning: A change in human disposition or capacity not ascribable to growth (Gagné, 1970).

(Learning) Incident: An occurrence which may include a discussion, reading, or observation and whose end result is learning.

(Learning) Episode: A series of learning incidents.

(Learning) Transaction: The event of carrying through a learning incident with another individual, a group, or a nonhuman resource.

Self-Directed Learning: A process whereby individuals take the initiative, with or without the help of others, to learn .(Adapted from Knowles, 1975).

Self-Planned Learning: A process whereby individuals themselves are responsible for more than half of the detailed planning and deciding during learning (Tough, 1979).

Resource: Any object or person which can be used for support in or help during the learning process.

Summary and Organization of the Dissertation

In summary, Chapter I contains the rationale as to why educators are concerned about the relationship between learning during pregnancy and weight gain, alcohol consumption, and tobacco use. A brief overview of the two major components of the research problem, learning and health behaviors, was also provided. The research questions were identified, and definitions of the education and medical terms used in this text were provided. Chapter II consists of a review of the literature on learning, learning during pregnancy, behaviors related to perinatal outcomes, and behaviors related to health beliefs during pregnancy. Chapter III is a presentation of the conceptual framework of the study drawing primarily upon Tough's (1979) report "The Adult's Learning Projects," Knowles's concept of self-directed learning, and the Health Belief Model developed by Hochbaum, Kegeles, Leventhal, and Rosenstock (Rosenstock, 1974b). These works provide a framework for answering the research questions asked. This conceptual framework leads to a statement of the hypotheses of the study. Chapter IV outlines the methodology of the study and includes a description of the research design, population and sample, data collection procedures, interview schedule, and data analyses. Chapter V contains a description of the data collection and the sample characteristics. Participation rate, demographic characteristics, and health behaviors constitute the framework for describing the sample of this research study. Chapter VI is a presentation of the learning patterns and health beliefs of pregnant women as they relate to the research questions identified. Chapter VII is a report of the findings of the hypotheses tested. Chapter VIII is a discussion of the results. In addition, the significance and limitations of the study along with the conclusions and recommendations for theory, practice, and research are provided.

CHAPTER II

REVIEW OF THE LITERATURE

The review of the literature consists of five principal sections. Section one begins with an overview of adult learning and section two consists of an overview of learning opportunities during pregnancy. Section three specifically addresses the literature describing health behaviors of pregnant women and studies of learning about these health behaviors. Section four addresses the literature related to health behaviors and their association with perinatal outcome. Section five addresses the literature describing health beliefs and their association with behavior of pregnant women. The three health behaviors addressed in this dissertation are eating, drinking, and smoking. The final section is a summary of Chapter II.

Learning

Adults learn continuously throughout their lives. Havighurst (1969) pointed out that learning is necessary throughout life because of new developmental tasks that occur during the life cycle. The greatest changes in life prompt learning, and preparation for childbirth would be no exception. Learning, as defined by Gagné (1970), is a change in human disposition or capacity, which is not ascribable to growth, and that definition has been adopted for this study.

Learning can occur in numerous settings and Jensen (Verner, 1964) has classified these settings into two major categories: (1) the natural societal setting, and (2) the formal instructional setting. In the natural societal setting learning may result from the day to day experiences of participating in the regular activities of life. Learning in this setting can be casual and incidental or it may be intentional.

Learning in the formal instructional setting occurs under the auspicies of an agent who has the task of inducing change in behavior (Verner, 1964). Little (1980) has further extended these two categories identified by Jensen and states that learning in the *natural societal setting* can be either (1) fortuitous, that is occurring by chance, or (2) intentional. Learning in the *formal instructional setting* can be either (1) education directed by self, or (2) education directed by others. In this classification Little distinguishes between learning and education. The educational process is a set of selected actions which systematically establish and maintain conditions that contribute to the achievement of learning objectives. Learning occurs entirely within the individual, whereas education occurs outside the individual and is a condition established to facilitate learning.

Participation of adults in various educational situations has been extensively studied in the adult education literature, and the first major study of participation was the landmark work by Johnstone and Rivera in 1962-63. Comprehensive information about learning habits and practices of adults was obtained on a national probability sample of 11,957 households in the United States. Johnstone and Rivera (1964) estimated that one in five persons in the United States had been active in at least one form of learning during the twelve month period prior to the year of the study. Results showed that 15.0 percent of adults had been enrolled in courses on a part-time basis; 7.9 percent had been engaged in independent study; and, 2.3 percent had been full-time students. People were also asked if they had ever undertaken an educational course since leaving high school, and as many as 47 percent said they had. Approximately 38 percent recalled at least one occasion where they had tried to teach themselves something on their own.

Research on participation rates of adults in learning activities has been reported to be between 12 and 98 percent of adults over the age of seventeen

(Cross, 1982). Cross attributes the wide discrepancy in participation rates to the different definitions of learning activities used in these studies. The U.S. Bureau of Census reported that 12 percent of adults were engaged in some form of organized adult education, defined to consist of courses and activities organized by a teacher or sponsoring agency (Cross, 1982). Taking a different approach, Tough examined learning activities from a new perspective, one that began with the individual learner. Tough examined deliberate learning efforts which he defined as learning projects. In a 1970 study of sixty-six individuals, Tough (1979) found that the typical person engaged in about eight learning projects per year with 98 percent of his sample having engaged in at least one learning project in the year prior to the actual study. These figures are higher than participation rates of other surveys of adult learning and Tough attributed these differences to the intensive probing questions asked by the interviewers to assist adults in recalling their learning activities. Tough had devised a methodology for the investigation of learning which was subsequently replicated by other researchers in different settings. By 1980 nearly fifty surveys had been conducted in Australia, the United Kingdom, the United States, Israel, Jamacia, New Zealand, and Zaire. Tough (The International Encyclopedia of Education, 1985) summarized the results of these studies and indicated that approximately 90 percent of all individuals had conducted at least one learning project a year with the average or typical adult learner conducting five learning projects in one year. He estimated that the typical learner spends an average of approximately 100 hours per learning project for a total of 500 hours per year or ten hours a week. Of those learning projects undertaken, about 73 percent were planned by the learner, 7 percent planned by a nonprofessional, and 20 percent planned by a professional educator or a guided set of materials.

The largest national survey using Tough's framework to examine the extent of learning in the population was that conducted by Penland (1977) on a national probability sample in the United States. The sample was not totally representative of the adult population. Five thousand four hundred and ninety-three households were initially contacted. No more than two contacts per household were made. Of the contacts made, 1,501 individuals completed the interview and 1,193 refused to participate. Some household members could not be reached, and some households eligible for a second call did not actually receive one since interviewers were instructed to stop interviewing in a location after completing a specific number of interviews. Penland categorized the 1,501 participants in the study into four groups and found that: 60 percent were self-initiating learners planning their own learning projects; 16 percent were combination learners involved in self-planned learning and course-like activities; 3 percent were learning for credit; and, 21 percent were nonlearners. Although it cannot be stated that the total adult population is engaged in learning, there is evidence that a great deal of the population is engaged in learning outside the organizational setting.

A question that remains to be answered is "What is the extent of learning that is occurring during pregnancy, and what is the relationship between this learning and a pregnant woman's health behavior?" To the best knowledge of this researcher, no in-depth study on learning during pregnancy exists in the literature. One related study was conducted by Cobb (1978) to determine whether prospective parents were engaged in self-directed learning about parenting. The findings revealed that 97 percent of the sample were engaged in self-directed learning, however the author acknowledges that the results cannot be generalized to all prospective parents since the sample consisted of eighty-six parents enrolled in Lamaze Childbirth Education Classes, a formal education program appealing to middle and upper class adults.

In summary, learning can occur in numerous settings and consists of a change in human disposition or capacity not ascribable to growth. Participation of adults in various learning activities has been reported to range from 12 to 98 percent, depending on the definition of learning activity used in the study. Tough reported that a large percentage of the population is engaged in learning activities outside the organizational setting. An unanswered question is: "What is the extent of learning that occurs among the pregnant population?"

Learning Opportunities During Pregnancy

Numerous opportunities are available to pregnant women to engage in learning. Learning with family members, learning with friends, learning with a health professional, learning at prenatal classes, and individual learning are some examples. Houle's typology of educational design situations is the framework used to classify these learning opportunities.

Houle (1972) in his Design of Education states as one of his assumptions that *"Any episode of learning occurs in a specific situation and is profoundly influenced by that fact".* [1] Houle defines episode as a related succession of acts, making an educational whole. He identifies eleven categories of educational design situations during which learning can occur. These eleven categories are described on the following page.

In classifying various learning opportunities during pregnancy according to Houle's eleven educational design situations, four categories seem to dominate prenatal learning activities. These include: Category 1, an individual designs an activity for herself. This could include individual learning opportunities such as reading or viewing

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[1] Cyril O. Houle, The Design of Education, (San Francisco: Jossey Bass, 1972), p. 32.

MAJOR CATEGORIES OF EDUCATIONAL DESIGN SITUATIONS

INDIVIDUAL

C-1 An individual designs an activity for himself
C-2 An individual or group designs an activity for another individual

GROUP

C-3 A group (with or without a continuing leader) designs an activity for itself
C-4 A teacher or group of teachers designs an activity for, and often with, a group of students
C-5 A committee designs an activity for a larger group
C-6 Two or more groups design an activity which will enhance their combined programs of service

INSTITUTION

C-7 A new institution is designed
C-8 An institution designs an activity in a new format
C-9 An institution designs a new activity in an established format
C-10 Two or more institutions design an activity which will enhance their programs of service

MASS

C-11 An individual, group, or institution designs an activity for a mass audience [2]

an audiovisual production about prenatal issues; Category 2, an individual designs an activity for another individual. Individuals designing an activity for pregnant women could include learning opportunities organized by the physician, dietitian/nutritionist, nurse, family members, or friends. A group designing an activity for an individual could include The Healthiest Babies Possible Program whereby a group of health professionals design a program to provide individual counselling to women unable to speak English or those living on a limited income; Category 5, a committee designs an activity for a larger group. This category could include prenatal and childbirth education classes; and Category 11, an individual, group, or institution designs an activity for a mass audience. This could include programs produced for cablevision, or mass media campaigns produced in the United States on drinking during pregnancy.

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[2] Cyril O. Houle, The Design of Education, (San Francisco: Jossey Bass, 1972), p. 44.

A more in-depth description of these prenatal educational design situations, according to Houle's classification, is now presented. The purpose of this description is to demonstrate that any learning episode is influenced by the situation in which it occurs.

C-1 Individual Learning. To date no evidence exists on the extent of learning during pregnancy where an individual designs an activity for herself. It can be inferred that the woman designs her own learning activity with the use of books, articles, and pamphlets available on the subject of pregnancy, or by viewing audiovisual productions.

C-2 Learning with the Physician. The physician is considered the center of prenatal care for the pregnant woman for the following reasons: (1) the physician is responsible for the primary care of the pregnant woman, (2) the physician is the only professional able to admit the woman to the hospital, and (3) the physician sees the pregnant woman on numerous office visits during the prenatal period. Obstetrical visits are usually recommended monthly until the thirty-second week of gestation; biweekly until the thirty-sixth week of gestation; and, weekly until delivery (Backman, 1983). The American College of Obstetricians and Gynecologists recommend that a pregnant woman make about thirteen visits for prenatal care during the course of a normal pregnancy (National Centre for Health Statistics, 1986). The physician may provide information directly to the pregnant woman and/or refer her to other health professionals. Some women lack access to physicians for a variety of reasons, but in the United States only 2 percent of women in 1984 had no prenatal care during their pregnancy (National Centre for Health Statistics, 1986).

C-2 Learning with the Dietitian. Outpatient hospital dietitians accept referrals for prenatal nutrition counselling from physicians for the at-risk pregnant woman. This service is free of charge to the woman in British Columbia and is covered by the

B.C. Ministry of Health hospital program budget. Sixty-three of the seventy-eight acute care hospitals in British Columbia enlist the services of an outpatient dietitian (Schwartz, Bell, and Webber, 1987).

C-2 Learning with the Public Health Nurse. The public health nurse has close contact with the members in her community district and therefore may be in contact with women having financial, family, or health problems. A home visit may occur and learning could potentially take place during this visit. A second way in which learning with the public health nurse may arise is as a follow-up to prenatal classes. Women attending prenatal classes are asked to complete a brief questionnaire in the publication "You and Your Baby," a prenatal assessment form. Questions are related to dietary habits, alcohol consumption, tobacco use, medication use, stress, and other health concerns. Responses are evaluated by the public health nurse and if follow up contact is deemed necessary, a home visit is conducted.

C-2 Learning with Family Members and Friends. The influence and extent of learning during pregnancy with family members and friends is not documented. It is known that in many Asiatic cultures the words and advice of mothers, grandmothers, or elder women in the family play significant roles in learning about health issues. Some cultures deal with health problems by first consulting the elders in the family and will only resort to the medical profession if they are unable to resolve their own health problems (Wood, 1985).

C-2 Learning at the Healthiest Babies Possible Program. Healthiest Babies Possible is a Vancouver Health Department outreach prenatal program that provides nutrition counselling to pregnant women who live within the Vancouver City limits. The service is aimed at women with a low income and those who do not speak English. Counselling, which takes place in the woman's own home, is conducted by either a dietitian or a nutrition aide and when necessary an interpreter is made available.

These counsellors help the pregnant woman decide what and how much to eat during pregnancy, how to plan balanced meals on a limited budget, how to incorporate traditional or ethnic foods into the diet, and how to consider other life style habits which may affect the developing baby (Healthiest Babies Possible, 1979 and 1985). Self referral, physician referral, and other health professional referrals are accepted as long as the woman meets the eligibility criteria of the program, low income or English as a second language.

C-5 Learning at Prenatal Classes. The B.C. Ministry of Health offers prenatal classes to pregnant women. The majority of health units in British Columbia conduct two classes for women in their first trimester of pregnancy, often referred to as the "early bird series." Nutrition, alcohol consumption, and tobacco use are the primary topics discussed in most early bird classes. Health units also conduct labor and delivery classes for women during the latter part of their pregnancy, often referred to as the "regular series." The number of classes in the regular series can range from two to six depending on the health district policy. The number of classes as well as the content of the classes varies with each health unit, and therefore the classes are not standardized. During the series, the women are asked to complete a screening pamphlet and if indicated, follow up individual counselling is done or arranged by a public health nurse. If a nutrition problem arises in health units where a nutritionist is available, the woman is referred for nutrition intervention.

The Vancouver Childbirth Association is a voluntary nonprofit organization that offers prenatal classes in five areas of the Lower Mainland: Burnaby, Coquitlam, Surrey, North Vancouver, and Vancouver. Their series consists of two "early bird" classes, eight pre-labor classes, and one postpartum class. The instructors do not have to be qualified health professionals but must undergo a training program provided by the Association. Following training, the instructors are required to pass an examination which makes them eligible to become "qualified childbirth educators." There is, however, a prerequisite that all instructors must have given birth (Brown, 1985).

Some of the other prenatal classes that are available to pregnant women include: Grace Hospital prenatal classes, Saint Paul's Hospital prenatal classes, Surrey Memorial Hospital prenatal classes, Kwantlen College prenatal classes, and private prenatal classes organized by midwives. Burnaby Health Department, North Shore Health Department, Richmond Health Department, and the Vancouver City Health Department also offer prenatal classes. There are some differences between services offered by the B.C. Ministry of Health and those of the Burnaby, North Shore, Richmond, and Vancouver Health Departments, as these are primarily under municipal jurisdiction. One of the differences is that the majority of health units within the Vancouver City Health Department do not offer "early bird" prenatal classes. Instead, a kit containing both information pamphlets and a screening pamphlet is available to pregnant women who call the health unit. Women are asked to complete and return the screening pamphlet to the health unit, and follow up intervention is conducted if the woman is identified as being at-risk.

C-11 <u>Learning Designed for a Mass Audience</u>. An example of an activity designed for a mass audience is a set of Prenatal Education Videotapes produced by the Vancouver City Health department in Cantonese, Hindi, and Punjabi languages. The programs were broadcast on cablevision from July to December of 1982 (Kendall, 1983).

By categorizing learning activities during pregnancy according to Houle's educational design situations, one can obtain a sense of the diversity of the learning opportunities available and identify the different focus each activity has to offer. Much of the research conducted on learning during pregnancy has examined the prenatal class educational design category. Kendall (1985) surveyed twenty-two urban Canadian Health Departments to identify how many provide prenatal programs, and to identify the types of program objectives and evaluation procedures. Kendall found that all the health departments he studied offered prenatal programs. The percentage of pregnant women receiving service ranged from 25 to 75 percent. Ten departments estimated that they saw 25 percent to 50 percent of their pregnant population.

Only four of the twenty-two health departments surveyed by Kendall (1985) had specific measurable objectives for their programs. Examples of two measurable objectives cited were: The pregnant woman who attends prenatal class will gain twenty to thirty pounds, and the pregnant woman who attends prenatal class will give birth to an infant weighing 3,300 grams or more. General goal statements for prenatal classes included:

> *1) to assist expectant families to prepare for and to anticipate labour and delivery with confidence; 2) to encourage expectant parents to prepare physically for childbearing; 3) to help each woman achieve her optimum physical, mental, and emotional level of health throughout pregnancy; 4) to give parents instructions in methods of relaxation, posture, muscle tone and breathing for a healthier and more comfortable pregnancy, labour and post delivery period; 5) to help both expectant parents acquire an appreciation of the changes each will experience as a result of the pregnancy and birth; 6) to assist expectant parents in understanding the needs of their own newborn and to encourage beginning skills in the care and feeding of their newborn; 7) to reinforce the importance of the husband-wife relationship as it enhances the development of responsible parenthood; 8) to provide the concept of healthful life style.* [3]

Regarding evaluation of prenatal programs, only seven of the twenty-two health departments had formally assessed their programs. The types of evaluation used were primarily to review attendance percentages of the total population, and to review perceived utility of the information provided. The majority of program evaluations were directed to level three and level four of Bennett's seven level hierarchy for program evaluation (Boyle, 1981). Bennett's level three is directed at

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[3] Perry R. Kendall, "Survey of Canadian Urban Public Health Prenatal Programs Goals Objects, Populations Served and Outcome Measures," Canadian Journal of Public Health 76 (July/August 1985): 270.

evaluating participation rates; level four is directed at evaluating personal reactions of the participants; level five is directed at evaluating knowledge, attitude, skill, and aspiration change; level six is directed at evaluating practice or behavior change; and, level seven is directed at evaluating end results, an example being birth weight of the infant. Kendall is critical of the lack of measurable objectives and stringent evaluation measures. He comments that existing prenatal classes meet public demand, are exceedingly popular, and may increase parents' confidence levels in preparation for birth. However, at the same time he questions whether these reasons are sufficient justification for resource allocation in financially difficult times. He suggests that resources be redirected to programs with more clearly defined goals which are linked to pregnancy outcome.

Kendall's comments about the efficacy of prenatal classes are partly supported in a recent study conducted in Montreal by Robitaille and Kramer (1985). In a prospective epidemiologic survey of 1,676 primiparous women delivering in four Montreal Hospitals during an eight month period, the researchers concluded that participation in prenatal classes was not associated with maternal weight gain or infant birth weight outcome, once adjustments had been made for age and socioeconomic status. On the other hand, reduction in cigarette smoking was greater for prenatal class participants even when age and socioeconomic status had been controlled for in the analysis. However, before concluding that prenatal classes are not efficacious, one needs to question whether learning activities during pregnancy in other settings may have masked the differences observed between participants and nonparticipants.

Results of studies which examined the relationship between attendance at prenatal classes with attitudes and confidence levels toward coping with labor and delivery have been mixed. McCraw and Abplanalp (1984) found that participation in a childbirth education class did not affect maternal attitudes toward labor and delivery along with other maternal attitudes as identified in Schaefer and Manheimer's Pregnancy Research Questionnaire; whereas, Walker and Erdman (1984) found that participation in a childbirth education class significantly decreased primiparous women's self-reported ratings of anxiety to cope with labor.

Robitaille and Kramer (1985) found that primigravidas who participated in prenatal classes in Montreal were older, of higher socioeconomic status, and less likely to be smokers than were pregnant nonparticipants. These findings are consistent with Thordarson and Costanzo's (1976) examination of participants of prenatal classes in the Vancouver area. Prenatal class attendance in Vancouver was found to be lower among younger, poorer, and less educated women. Vinal (1981), on the other hand, identified prenatal class participants as being young and well educated, while nonparticipants had experienced more pregnancies and had been married considerably longer. This profile of participants in prenatal classes is consistent with the adult education literature on participation in organized learning activities. Darkenwald and Merriam (1982), upon examining the results of the "National Centre for Education Statistics, Participation in Adult Education Final Report," concluded that participants of organized learning activities in contrast to nonparticipants were younger, white, better educated, and more affluent. Selwood (1984), in a study examining the impact of prenatal education on the conduct of second stage labor conducted at Grace Hospital in Vancouver, the largest maternity hospital in British Columbia as well as in Canada, described the fifteen women in her study who had not participated in prenatal classes. Of the nonparticipants, one had been born in North America and the other fourteen individuals had been born in one of the following Asiatic Countries: the Philippines, Hong Kong, Vietnam, and China. Although the study was not designed to provide a profile of participants and nonparticipants attending prenatal classes, this demographic information is of interest since it is a Vancouver based study. Furthermore Selwood noted that individuals who had resided in Canada longer than ten years were more likely to have attended prenatal classes.

In summary, the research examining learning that occurs during pregnancy has primarily focused on participation in prenatal classes. Participants of prenatal classes can be described as older women of childbearing age, better educated women of a higher socioeconomic status, and non-smoking women experiencing their first pregnancy. Although most research studies have focused on learning at prenatal classes, if learning activities are categorized according to Houle's educational design situations, it becomes evident that learning during pregnancy is not limited to prenatal classes. There are numerous learning opportunities available to the pregnant population.

Description of Health Behaviors and Learning about Health Behaviors

Eating, drinking, and smoking constitute the three health behaviors examined. For the purposes of this dissertation, these behaviors are operationalized in terms of their outcomes, that is: weight gain, alcohol consumption, and tobacco use of pregnant women. Research studies which have described women's health behaviors during pregnancy are reviewed, and learning about these health behaviors presented.

Weight Gain: Behaviors and Learning

Research conducted on describing weight gain of pregnant women and learning about weight gain has taken diverse directions. Weight gain has usually not been studied in isolation and has been included in studies which have focused on examining dietary practices of pregnant women. The learning that occurs about weight gain or dietary practices during pregnancy has focused on reporting pregnant women's sources of nutrition information and assessing the effectiveness of intervention strategies to improve birth weight through nutrition counselling. Dietary practices and learning about weight gain are described as follows.

Behaviors: Weight Gain and Dietary Practices

The Nutrition Canada Survey (Food Consumption Patterns Report, 1977) found that 92 percent of pregnant women participating in the survey had made dietary changes during their pregnancy. Sixty-seven percent of these changes were self-initiated, and only 19 percent of these changes had been made on the advice of a doctor or clinic. Fruit and milk were the foods in which the greatest changes in consumption were seen. Sixty-one percent of pregnant women had increased their fruit consumption and 59 percent had increased their milk consumption. The pregnant women's self-reported dietary changes were confirmed by comparing the mean dietary intake from data collected on pregnant women with those on nonpregnant twenty to thirty-nine year old females participating in the study. A total of 894 pregnant women across Canada were involved in the survey, and it must be noted that those pregnant women who participated had been referred by local health authorities. As such, the data may be biased to show a superior picture of health and motivation compared to a random sample of the pregnant population.

Johnston, Hyson, and Blackmere (1985) recently conducted a study to determine weight gain and related characteristics of pregnant Nova Scotia women. Five hundred and two women participated in the study. Questionnaires were voluntarily completed by maternity patients in eighteen hospitals throughout Nova Scotia for a one month period in 1982. Increased consumption for all the basic food groups was reported, with milk and milk products, and fruits and vegetables showing the greatest increases. Specifically, 70 percent of the sample had increased their milk and dairy intake and 62 percent had increased their fruit and vegetable intake. Sixty-one percent of the women indicated they had eaten to satisfy hunger, 38 percent had reported experiencing cravings, and 22 percent had indicated aversions to particular foods. Furthermore, approximately 80 percent of those responding indicated that the information they had received during pregnancy had influenced their dietary habits. In contrast, Halliday (1978) reported that only 32 percent of seventy-three pregnant women attending a two hour prenatal nutrition class in Saskachewan had changed their dietary habits as a result of the prenatal class. Orr and Simmons (1979), on the other hand, interviewed ninety-two pregnant women in an outpatient hospital setting in Boston. Approximately 66 percent of these women had made dietary changes attributable mainly to dietary advice given by a dietitian. Although no statistically significant relationship was found, a not surprising trend was observed, indicating that women who had expressed a desire for nutrition advice were more likely to make changes in their diets.

In a Vancouver study, Kiss (1983) described the health behaviors of prenatal class participants. Smoking, alcohol, nonprescription drug use, caffeine, and diet were examined. Women registered at "early bird" classes at six health units with the Vancouver City Health Department were approached to participate in the study. The sample consisted of two hundred and twenty women. Women completed the prenatal assessment form provided at the classes as well as a health habits questionnaire designed for the study. Ninety-nine percent of the women had reported changing their dietary intake. Of these women, 94 percent had increased their milk intake, 84 percent had increased their fruit and vegetable intake, 49 percent had increased their meat intake, 45 percent had increased their bread and cereal intake, and 41 percent had decreased their intake of sweets. Although the majority of women had reported increasing their food intake, actual number of servings consumed from each of the food groups in Canada's Food Guide were less than adequate. Only 37 percent reported having four or more servings of milk and milk products. Eighty-three percent reported having at least two servings of meat or alternates, 79 percent reported having at least four servings of fruits and vegetables, and 65 percent reported having at least four servings of breads and cereals. When all the food groups were combined, 81 percent of women had diets which did *not* meet the minimum requirements of Canada's Food Guide.

Women in the Kiss (1983) study were also asked to check the factors which had influenced them the most in making their dietary changes. A list of influencing factors was provided on the questionnaire and the following results were obtained: 67 percent stated that their own personal knowledge had influenced their dietary changes; 50 percent stated that books-magazines-pamphlets had influenced their dietary changes; 48 percent stated that cravings and appetite had influenced their dietary changes; 42 percent stated that their doctor had influenced their dietary changes; 36 percent stated that attending prenatal classes had influenced their dietary changes; 25 percent stated that the public health nurse had influenced their dietary changes; 25 percent stated that their tolerance to food had influenced their dietary changes; 19 percent stated that their family members and friends had influenced their dietary changes; 11 percent stated that a nutritionist had influenced their dietary changes; and, 1 percent stated that the media had influenced their dietary changes. Although 67 percent of the women had stated that their own personal knowledge had influenced their dietary changes, it is not known from which resources they had obtained their information. Print material, cravings and appetite, and the physician had also been cited as influencing women's dietary changes during pregnancy, however public health personnel had played secondary roles.

A study of attitude toward weight gain was conducted by Palmer, Jennings, and Massey (1985) to determine whether attitudes toward slimness affect weight gain during pregnancy. The concern of women to retain a slim figure during pregnancy may prejudice prospective mothers against normal prenatal weight gain. The sample of this study consisted of twenty-nine pregnant women enrolled in childbirth classes in Washington State. The women were of a middle class background with at least high school education. Although the sample was not representative of the pregnant population, a statistically significant relationship was found between weight gain and: (1) a positive attitude towards weight gain, (2) physician recommendations, and (3) knowledge of appropriate weight gain. It is of interest to note that 41 percent of the women in the sample had a negative attitude toward weight gain during pregnancy. Since attitude and knowledge were both found to be associated with appropriate weight gain, the authors recommend that professionals dealing with pregnant women include an assessment of attitudes and knowledge.

Pomerance et al. (1980) surveyed 195 pregnant women at two medical centers in California to assess attitudes towards recommended amounts of weight gain. Thirty-seven percent of patients believed they should gain less than twenty pounds during their pregnancy, and 4 percent believed they should gain more than thirty pounds. Eighty-eight percent of the patients thought their doctors would be concerned with too much weight gain, and 39 percent thought their doctors would be concerned with too little weight gain. These results are contrary to the medical literature which indicate that too little weight gain is associated with having a low birth weight infant, rather than too much weight gain. Patients' perceptions about weight gain were not compared to actual weight gain. A different pattern of perceptions about prenatal weight gain emerged from the Johnston, Hyson, and Blackmere study (1985). Although only 8 percent of 502 pregnant women believed that they should gain fewer than twenty pounds, 13 percent of the pregnant women in the study actually gained less than twenty pounds.

The B.C. Ministry of Health (McCarthy and Mackay, 1984) weight gain recommendations are twenty-five to twenty-seven pounds for the normal weight healthy pregnant woman, thirty to thirty-two pounds for the underweight woman, and sixteen to twenty pounds for the overweight woman. The studies of Pomerance et al. (1980), and Johnston, Hyson, and Blackmere (1985) did not ascertain whether the women who perceived that they should gain less than twenty pounds were actually overweight women. If the women were overweight, then these perceptions would be consistent with health professionals' recommendations about weight gain, otherwise the women's perceptions would be contrary to health professional recommendations and potentially place the fetus at risk. A discrepancy between perceived self evaluation and health professional evaluation was found in the Orr and Simmons (1979) study. Those individuals who stated that they had no need for nutrition advice during pregnancy were those individuals who tended to be underweight, as defined by the Chicago Build and Blood Pressure Study, and had low hematocrit readings, as defined by the Interdepartmental Committee on Nutrition for National Defense (Orr and Simmons, 1979).

Taffel and Keppel (1986) examined data of 7,704 pregnant women who had participated in the 1980 National Natality Survey conducted in the United States. All these women were married and had received prenatal care during their pregnancy. Sixty percent of these women reported that their doctors had suggested a weight gain limit during pregnancy. Forty-eight percent of the doctors had suggested a twenty-two to twenty-seven pound limit, 22 percent had suggested a twenty-eight to thirty-four pound limit, 23 percent had suggested a sixteen to twenty-one pound limit, 4 percent had suggested a gain of less than sixteen pounds, and 3 percent had suggested a gain of more than thirty-four pounds. If all the women who had received recommendations to gain less than twenty-one pounds had been obese, then these recommendations would have been appropriate. Otherwise, these recommendations would have been contrary to weight gain recommendations for underweight women and women of normal weight. The association between reported weight gain advice and actual weight gain was also examined. Women who had reported receiving no weight gain limit were more likely to gain less than twenty-two pounds. Furthermore, the more stringent the weight limit reported, the more likely a woman would gain less than twenty-two pounds. The results suggest that reported weight gain advice and actual weight gain are associated.

In summary, research which examines weight gain during pregnancy and dietary practices indicate that the majority of women attempt to change their dietary habits with increases in milk, fruits, and vegetables showing the greatest improvements. Key factors which are reported to influence dietary change include: women's knowledge, print material, hunger, and the physician. Physician recommendations were found to be associated with appropriate weight gain. However in one study, 27 percent of women had received advice from physicians to gain less than twenty pounds during pregnancy, an amount contrary to recommended weight gain for average healthy women. As well, between 8 and 37 percent of pregnant women believed they should gain less than twenty pounds during pregnancy, and 41 percent had a negative attitude toward weight gain during pregnancy. Perceptions, attitudes, and knowledge about weight gain, as well as advice from health professionals are potential influencing factors on whether women achieve ideal weight gain during their pregnancy.

Learning about Weight Gain: Information Sources and Intervention Strategies

The research related to learning about weight gain during pregnancy has been primarily focused on reporting pregnant women's sources of nutrition information. In a study conducted at the Vancouver General Hospital by Schwartz and Barr (1977), 150 new mothers volunteered to participate. It was found that the physician was named by 63 percent of the women to be the most helpful *human source* of nutrition information during their pregnancy. The physician was followed by the husband at 35 percent, and the prenatal class instructor at 30 percent. The authors classified past education and experience to be the most helpful *material source* of nutrition information during pregnancy. Past education and experience were named by 63 percent of the women, followed by prenatal class booklets at 44 percent, and pocket books at 28 percent. Because more than one source of information was given by some of the pregnant women, the total percentages exceed 100.

Johnston, Hyson, and Blackmere (1985) also reported that the family doctor was the most frequently mentioned source of nutrition information at 58 percent. This was followed by prenatal classes at 47 percent, books at 40 percent, public health nurses at 28 percent, and family members at 27 percent. The total percentages exceed 100 because more than one major source of information was listed by these pregnant women. Five percent of the women in the Johnston study indicated they had not received *any* nutrition information during their pregnancy. Whether these women had previously obtained adequate information remains unknown.

Orr and Simmons (1979), on the other hand, reported that the dietitian was the major source of nutrition information during pregnancy. The subjects of their study, however, were women being seen in an outpatient clinic of a large obstetrical hospital. Certification of prenatal dietary instruction by the dietitian was necessary for payment of additional welfare allotments. Since welfare recipients comprised 55 percent of the subjects in this study, it is understandable that the dietitian was cited as the primary source of nutrition information. Furthermore, 50 percent of the pregnant women in the Orr and Simmons study said they felt they had not needed professional dietary instruction. The reasons women gave for not needing the instruction were as follows: 39 percent felt that they had sufficient information from previous prenatal information received; 35 percent felt that their general knowledge was sufficient; 11 percent said they had obtained their information from reading; and, 15 percent reported they had obtained their information from advice of mothers or friends.

Palmer, Jennings, and Massey (1985) had asked the twenty-nine participants in their study how much weight should be gained during pregnancy. Sixty-six percent of these pregnant women responded that weight gain should be between twenty and twenty-six pounds, an answer deemed by the authors to be the "correct" response.

Research examining the effect of nutrition counselling on maternal weight gain has usually included measurement of the efficacy of nutrition counselling in relation to birth weight. Orstead et al. (1985) studied the effect of *intensive nutrition counselling* on weight gain and low birth weight incidence, in comparison to the effect of a *single nutrition class* on weight gain and low birth weight incidence. Although the authors conclude that intensive nutrition counselling results in a superior pregnancy outcome, there is a research design flaw in the study. The *control group* attended one prenatal class lecture and consisted of pregnant patients attending a Chicago hospital clinic between *1975 and 1977*, whereas the *test group* attended one prenatal class *along with* intensive nutrition counselling, and consisted of pregnant patients attending the same hospital clinic between *1979 and 1980*. The fact that the control group data came from the 1975-1977 period and the test group data came from the 1979-1980 period makes it difficult to establish whether these two groups can be considered comparable. Differences in instructors conducting prenatal classes could potentially exist and the extent of knowledge and information available to the medical community between these two time periods lead one to question the validity of the results.

McDonald and Newson (1986) examined the dietary changes made by 430 nutritionally high risk pregnant women who received nutrition intervention from the Prince Edward Island Department of Health and Social Services. Dietary histories were taken at entrance to and throughout the counselling program. Average daily energy and protein intakes were determined by averaging the diet histories taken during the entire intervention period. Energy and protein intakes during the intervention period were significantly higher during intervention in comparison with initial energy and protein intakes. What is of particular importance to note is that those women who entered the program after twenty weeks gestation, classified as late referrals, had higher initial energy and protein intakes than women referred prior to twenty weeks gestation. This difference suggests that some form of change occurred during early pregnancy. Whether these changes were due to physiological increases in appetite, self-initiated change, or change recommended by a health professional remains unknown. Even though initial energy and protein intakes were higher for late referrals, a significant difference was found between initial intake of late referrals and average intake during late intervention. The results of this study support the notion that nutrition intervention can significantly increase caloric and protein intake, however the research design of the study did not examine the effect of nutrition intervention on birth weight outcome.

Ershoff et al. (1983) evaluated a prenatal health education program conducted within a Health Maintenance Organization (HMO) in Southern California. The experimental group consisted of fifty-seven pregnant smokers who received individual nutrition counselling and a home correspondence smoking cessation program. These women's behavior was evaluated against outcomes of the control group, seventy-two pregnant smokers receiving standard prenatal care. The control group had a slightly higher percentage of white women, women with less than high school education, and women with family incomes of less than $15,000 per year. The experimental group, on the other hand, had a higher percentage of women who had had one or more miscarriages, as well as a higher incidence of toxemia and premature deliveries during previous pregnancies. The results indicated that a significantly greater percentage of women in the experimental group had adjusted their diets than women in the control group (91 percent versus 68 percent, $p<0.01$). As well, 90 percent of the women in the experimental group had gained at least twenty-four pounds during pregnancy, in contrast to 77 percent of women in the control group ($p<0.10$). Analyses of birth weight data revealed that infants born to women in the experimental group had a significantly higher mean birth weight than infants born to women in the control group ($p<0.05$). Furthermore, low birth weight incidence was 7.0 percent in the experimental group and 9.7 percent in the control group (statistically non-significant).

The Montreal Diet Dispensary program (Higgins, 1976) and the Special Supplemental Food Program for Women, Infants, and Children (WIC) in the United States (Collins, Demellier, and Leeper, 1985) have also attempted to examine the effect of nutrition intervention strategies coupled with food supplementation on maternal weight gain and low birth weight incidence. The authors however were unable to separate the effects of nutrition counselling from those caused by the food supplementation on the final outcomes.

In summary, research on learning about weight gain has primarily focused on enumerating the sources of information utilized by pregnant women. The physician dominates as the major source of nutrition information during pregnancy. Past education and experience as well as prenatal classes were also cited as information sources. Reports of the effect of nutrition counselling on maternal weight gain and infant birth weight have been mixed. Because numerous factors can potentially influence maternal weight gain and infant birth weight outcome, methodologic problems exist in this type of research. Despite these problems, intervention strategies related to nutrition counselling show an association with improved pregnancy outcome.

Alcohol Consumption: Behaviors and Learning

Alcohol intake of the pregnant population received little attention prior to the interest shown in Fetal Alcohol Syndrome, a syndrome which was first described by Jones and Smith in 1973 (Cushner, 1981). It was after this time that researchers focused on describing drinking behaviors of pregnant women. Learning about alcohol during pregnancy has primarily focused on media campaigns targeting the general population, and intervention strategies targeting pregnant problem drinkers. Very few studies have reported women's sources of information on the topic. Behaviors and learning about alcohol are described as follows.

Behaviors: Alcohol Consumption

One of the earlier studies which examined drinking patterns during pregnancy was conducted by Little, Schultz, and Mandell in 1976 in Seattle, Washington. One hundred and sixty-two women were interviewed during their fourth month of pregnancy, and of these, 156 women were available for a second interview during their eighth month of pregnancy. Ninety-five percent of the women were white and of a middle class background. The interviews produced estimates of alcohol consumption during three consecutive time periods: six months before pregnancy, the first four months of pregnancy (early pregnancy), and the last four months of pregnancy (late pregnancy). Fifteen percent of the women had abstained from consuming alcohol before pregnancy, 19 percent had abstained from consuming alcohol during early pregnancy, and 23 percent had abstained from consuming alcohol during late pregnancy. The magnitude of the decrease in alcohol consumption during the early pregnancy period was directly proportional to the level of consumption before pregnancy period ($r=0.71$, $p<0.001$). Approximately 66 percent had consumed less alcohol during their first four months of pregnancy in comparison to prepregnant levels. However during the last four months of pregnancy, 36 percent of the women were drinking more and 40 percent were drinking less than the amounts reported during the first four months of pregnancy. Although it is not reported in the article, it is assumed that 24 percent of the women had consumed the same amounts of alcohol during the last four months as in the first four months. These data tell us that a decrease in alcohol consumption had occurred from before pregnancy to early pregnancy, and an increase in alcohol consumption had occurred from early pregnancy to late pregnancy. Women were also asked why they had changed their alcohol consumption during pregnancy. Over half of the women who reported a decrease in the use of alcoholic beverages during pregnancy had related the change to a physiologic effect such as nausea, stomach irritation, headache, or the bad taste of alcohol rather than to health reasons such as fetal welfare or other health considerations.

A comparison of drinking patterns among pregnant women in Seattle, Washington was conducted by Streissguth et al. (1983) who evaluated changes in drinking and smoking patterns from 1974/75 to 1980/81. The subjects were two cohorts of pregnant women who were interviewed at six months gestation at two Seattle hospitals. Response rates were not reported. Sample size for 1974/75 was 1,529 women, and for 1980/81 was 1,413 women. Alcohol consumption levels were reported in ounces of absolute alcohol. One ounce of absolute alcohol is equivalent to approximately two drinks of wine, beer, or liquor. In 1974/75 *prior to pregnancy*, 20 percent had abstained from drinking; 73 percent had consumed less than an average of one ounce of absolute alcohol per day; and, 7 percent had consumed greater than an average of one ounce of absolute alcohol per day. In 1980/81 *prior to pregnancy*, 35 percent had abstained from drinking; 59 percent had consumed less than an average of one ounce of absolute alcohol per day; and, 6 percent had consumed greater than an average of one ounce of absolute alcohol per day. In 1974/75 *during pregnancy*, 19 percent had abstained from drinking; 79 percent had consumed less than an average of one ounce of absolute alcohol per day; and, 2 percent had consumed greater than an average of one ounce of absolute alcohol per day. In 1980/81 *during pregnancy*, 58 percent had abstained from drinking; 41 percent had consumed less than an average of one ounce of absolute alcohol per day; and, 1 percent had consumed greater than an average of one ounce of absolute alcohol per day. Although the proportion of heavy drinkers who consumed alcohol during pregnancy had decreased over the six year period from 2 percent in 1974/75 to 1 percent in 1980/81, the proportion of heavy drinkers among those who consumed alcohol had not decreased. For women who had consumed more than an average of one ounce of absolute alcohol per day, the most dramatic decreases were found in higher educated and older women. There was a significant reduction in the number of drinkers who reported consuming five or more drinks on a single occasion during pregnancy, referred to as "binge drinkers." In 1974/75, 19 percent had engaged in binge drinking prior to pregnancy and this figure decreased to 12 percent during pregnancy. In 1980/81, 17 percent had engaged in binge drinking prior to pregnancy and this figure decreased to 8 percent during pregnancy.

Streissguth and associates (1983) also reported the type of alcoholic beverages consumed. In 1974/75 the beverages of choice were wine and liquor, whereas in 1980/81 wine was the most popular beverage consumed. Further examination of the types of beverages consumed by women who stopped drinking after learning they were pregnant in 1980/81 revealed that the use of liquor had dropped by 50 percent, the use of wine had dropped by 40 percent, whereas the use of beer had dropped by only 30 percent. The authors raise the question of whether beer drinkers are a different population. In this study beer drinkers were poorly educated and of lower social class. Those women who had decreased their alcohol consumption were more likely to be highly educated and older women. The decrease in alcohol consumption over the six year interval is attributed by the authors to the large two year media campaigns and research conducted on Fetal Alcohol Syndrome in the Seattle, Washington area in the late seventies. The authors state that one could not conclude that the low incidence of heavy use of alcohol reported in 1980/81 in Seattle was typical of other cities in the United States.

Prager et al. (1984) examined data from the National Natality and Fetal Mortality Surveys in the United States and described drinking patterns of married pregnant women who delivered live births in 1980. A sample of 4,405 women responded to a mailed questionnaire sent to them six months after delivery. The response rate was 56 percent. Those who consumed alcoholic beverages were more likely to be white women, older than twenty-five, and to have more than a high school education. Before pregnancy, 55 percent of the women in this study had consumed alcoholic beverages. More specifically, 58 percent of white women, 40 percent of hispanic women, and 39 percent of black women had consumed alcoholic beverages prior to becoming pregnant. The amount of alcohol consumed also had decreased during pregnancy. *Prior to pregnancy*, 45 percent of the sample had abstained from drinking or had consumed less than one drink per month, 39 percent had consumed less than an average of three drinks per week, and 16 percent had consumed an average of three or more drinks per week. *During pregnancy*, 61 percent had abstained from drinking or had consumed less than one drink per month, 36 percent had consumed less than an average of three drinks per week, and 3 percent had consumed an average of three or more drinks per week. Nearly 30 percent of white and hispanic women had stopped drinking during pregnancy, and almost 40 percent of black women had stopped drinking during pregnancy. Older women were less likely to stop drinking than younger women. However no significant differences by education were observed in the portion who had stopped drinking.

Lillien, Huber, and Rajala (1982) reported on dietary and ethanol intakes of 889 pregnant women who gave birth in a Massachusetts maternity hospital during a nine month period in 1979-80. Almost all the women participating in this study, 91 percent, had consumed alcohol before becoming pregnant. Alcohol intake was reported as number of ounces of ethanol consumed per month. One ounce of ethanol is equivalent to approximately twenty-two ounces of beer, eight ounces of wine, or two and one-half ounces of an 80-proof liquor. *Prior to pregnancy*, 9 percent had abstained from consuming alcohol, 61 percent had consumed between 0.1-9.9 ounces of ethanol per month, 14 percent had consumed between 10.0-19.9 ounces of ethanol per month, and 16 percent had consumed 20.0 or more ounces of ethanol per month. *During pregnancy*, 18 percent had abstained from consuming alcohol, 76 percent had consumed between 0.1-9.9 ounces of ethanol per month, 3 percent had consumed 10.0-19.9 ounces of ethanol per month, and 3 percent had consumed 20.0 or more ounces of ethanol per month. The authors reported that: 27 percent of teenagers had abstained from consuming alcohol during pregnancy, whereas only 17 percent of older women had abstained from consuming alcohol during pregnancy ($p<0.10$); 28 percent of unmarried women had abstained from consuming alcohol during pregnancy, whereas only 15 percent of married women had abstained from consuming alcohol during pregnancy ($p<0.005$); and, 26 percent of women with less than twelve years of schooling had abstained from consuming alcohol during pregnancy, whereas 16 percent of women with more than twelve years of schooling had abstained from consuming alcohol during pregnancy ($p<0.025$). Teenagers, unmarried women, and women with less than grade twelve education were more likely to abstain from drinking alcohol during pregnancy.

Total amount of monthly alcohol consumption was related to age and income in the Lillien, Huber, and Rajala study (1982). Fourteen percent of women thirty years or older had consumed seven or more ounces of ethanol per month, whereas only 8 percent of women under thirty years of age had consumed seven or more ounces of ethanol per month ($p < 0.10$); and, 16 percent of women with yearly incomes of $20,000 or more had consumed seven or more ounces of ethanol per month, whereas only 8 percent of women with yearly incomes of less than $20,000 had consumed seven or more ounces of ethanol per month ($p < 0.025$). Large monthly ethanol volumes were common among older and wealthier women.

Kruse, Le Fevre, and Zwieg (1986) examined changes in smoking and drinking behaviors during pregnancy of 255 married women residents of Callaway County, Missouri. The population of the study was obtained from birth certificate data provided by the State of Missouri. A questionnaire was mailed to these women three to twelve months following delivery. A 69 percent response rate was obtained. Nonrespondents were younger and had less education. As part of the study, women had been asked whether they had consumed alcoholic beverages before and during pregnancy. Forty-nine percent of the respondents reported consuming at least one drink before pregnancy. *Prior to pregnancy*, 51 percent of the women had abstained from consuming alcohol, 31 percent had consumed one drink per week, 13 percent had consumed between two and four drinks per week, 4 percent had consumed between five and nine drinks per week, and 1 percent had consumed more than nine drinks per week. *During pregnancy*, 77 percent of the women had abstained from consuming alcohol, 19 percent had consumed one drink per week, and 4 percent had consumed between two and four drinks per week. No one in the sample reported having consumed more than four drinks per week during pregnancy.

In comparison to other research studies reviewed in this dissertation, a larger percent of the married women in the Kruse study had abstained from drinking during pregnancy. Of the women who drank prior to pregnancy, eighty-nine individuals said they had decreased their alcohol consumption during pregnancy. Of these eighty-nine women, sixty-six individuals or 53 percent of drinkers said they had stopped drinking completely. No association was found between decreasing alcohol intake and education level. In comparing women who drank before pregnancy with non-drinkers, no significant association was found between alcohol consumption and age, education level, or income.

In the Kiss, Le Fevre, and Zweig study women were also asked to rate on a scale of one to five the importance of various factors which had influenced their reduction of alcohol consumption during pregnancy (one=not at all important, two=not important, three=neutral, four=important, and five=very important). Fear for infant's health was cited as important or very important by 95 percent of the women; advice from the doctor was cited as important or very important by 67 percent of the women; printed media was cited as important or very important by 53 percent of the women; advice of family was cited as important or very important by 47 percent of the women; and, alcohol making patients sick was cited as important or very important by 17 percent of the women. The authors conclude that fear for their infant's health was the most important factor in the woman's decision to curtail drinking and various sources of information seemed less important. This conclusion may in fact be misleading since the authors have combined health beliefs (fear for infant's health) and sources of information (advice from physicians, family, and friends) in their measurement tool of examining the importance of various factors which influence women's reduction in alcohol intake. Without a more in-depth examination of these factors, it is not known whether fear for the infant's health originated from the various sources of information or came from some other undesignated source.

Kiss (1983) examined alcohol consumption of 220 prenatal class participants in Vancouver, and reported that 58 percent of participants had consumed alcohol before becoming pregnant. *Prior to pregnancy*, 42 percent had abstained from consuming alcohol, 11 percent had consumed less than one drink per week, 33 percent had consumed between one and six drinks per week, 12 percent had consumed between seven and fourteen drinks per week, and 2 percent had consumed more than fourteen drinks per week. *During pregnancy*, at the time of completion of the health habits questionnaire, 52 percent had abstained from consuming alcohol, 18 percent had consumed less than one drink per week, 28 percent had consumed between one and six drinks per week, 2 percent had consumed between seven and fourteen drinks per week. No one had consumed more than fourteen drinks per week during pregnancy. Overall, 16 percent of drinkers had quit consuming alcoholic beverages during pregnancy, 82 percent had reduced their alcohol intake, and 2 percent had not changed their alcohol intake. Women had also been asked to check off from a given list, the factors which had influenced a change in their alcohol intake. Ninety percent had checked their own personal knowledge, 43 percent had checked books-magazines-pamphlets, 36 percent had checked a change in cravings, 22 percent had checked the doctor, 17 percent had checked prenatal classes, 12 percent had checked the public health nurse, 7 percent had checked the media, 6 percent had checked social pressure, and 3 percent had checked a change in personal stress levels. Knowledge and print materials were important factors which had influenced women to change their alcohol consumption during pregnancy.

In summary, research about alcohol consumption behaviors during pregnancy indicates that 49 to 91 percent of pregnant women had consumed alcohol prior to becoming pregnant. During pregnancy, 15 to 77 percent of women had abstained from consuming alcohol and 18 to 98 percent had reduced their intake. The amount of alcohol consumed prior to and during pregnancy varies from study to study. Up to 18 percent of women had consumed large amounts of alcohol prior to pregnancy, a period of time when women usually do not know they are pregnant, and up to

12 percent of women had consumed large amounts of alcohol during pregnancy. Women who were older and of a higher education level were more likely to consume large amounts of alcohol prior to pregnancy. However, mixed results were noted for association between demographic information and reduction of or abstention from alcohol during pregnancy. One study reported no associations between demographics and reduction, another study reported that better educated and older women were more likely to reduce their alcohol consumption during pregnancy, and yet another study reported that teenagers, unmarried women, and women with less education were more likely to abstain from consuming alcohol during pregnancy. Some studies found that women who consumed alcohol prior to pregnancy were more likely to be white, older, and of a higher education level, whereas other studies found no association between demographics and alcohol consumption. Factors which had influenced women to change their alcohol intake during pregnancy included: infant health, personal knowledge, reading material, cravings, and the physician. All in all the research results in this area are inconclusive.

Learning about Alcohol: Media Campaigns, Intervention Strategies, and Information Sources

In 1984, "National Fetal Alcohol Syndrome Awareness Week" was declared in the United States in recognition of the potential for serious consequences of fetal exposure to alcohol, and in the interest of increasing both public and professional awareness of the preventability of these consequences (U.S. Department of Health and Human Services, 1984). In 1985, The National Institute on Alcohol Abuse and Alcoholism conducted a U.S. nationwide media campaign based on the message that the safest choice was not to drink during pregnancy (Worthington-Roberts, Vermeersch, and Williams, 1985). Another major campaign launched in New York, sponsored by the governor's task force, was built on the message that to be perfectly safe women should abstain from alcohol consumption during pregnancy. Television and radio public service announcements and printed materials as well as suggested content for local radio and television shows were distributed (Worthington-Roberts, Vermeersch, and Williams, 1985). In Seattle, a two year media campaign was conducted in the early eighties. The campaign had included access to a twenty-four hour hot line on fetal alcohol and drug effects and an open clinic for pregnant women and mothers to discuss offspring problems related to alcohol (Streissguth et al., 1983). Currently in Ontario (Newbery, 1987) the Addiction Research Foundation has a toll free number to call for confidential information about alcohol or drugs such as cocaine and marijuana. There are more than sixty audio tapes to listen to and two of these tapes include "The Effects of Alcohol on an Unborn Child" and "Drugs and Pregnancy."

Public awareness and knowledge about the risks of drinking during pregnancy were examined in Multnomah County, Oregon (Little et al., 1981). The study consisted of a telephone survey of 550 households. A 78 percent response rate was obtained. One of the research questions asked was "What beverages might a pregnant woman drink which could have an undesirable effect on her unborn child?" Ninety percent included one type of alcoholic beverage as their response. One fourth of all respondents who felt alcohol was harmful said that women should abstain from drinking during pregnancy. The other respondents stated that a safe level of alcohol was three drinks per day (mean value). Younger respondents, under twenty years of age, were more likely to endorse higher levels of drinking. Male respondents recommended significantly higher levels of alcohol than female respondents. Seventy-three percent of respondents who felt alcohol was harmful could name at least one effect on the fetus. There was, however, no significant relationship between the ability to name an effect of alcohol on the fetus and the ability to identify a safe level of use.

In 1985, the National Health Interview Survey was conducted in the United States (Williams, Dufour, and Bertolucci, 1986) on a probability sample of civilian noninstitutionalized individuals. The sample consisted of 87,649,000 females and 78,142,000 males (weighted data). It was found that 80 percent of female respondents, aged eighteen to forty-four years, knew that heavy drinking increased the chance of adverse pregnancy outcomes, and 62 percent of female respondents had heard of fetal alcohol syndrome. However a little more than 70 percent of those who had heard of Fetal Alcohol Syndrome described it as a newborn addicted to alcohol rather than a child born with certain birth defects.

With regard to intervention strategies, Larsson (1983) conducted a study at four Maternal Health Clinics in Sweden to identify maternal alcoholic abusers, and to offer treatment for problem drinkers. Three of the four clinics were situated in socially deprived suburbs in Stockholm. Results showed that 89 percent of pregnant women were classified as occasional drinkers, defined as drinking an average of less than 30 grams of pure alcohol per day; 7 percent of the pregnant women were classified as excessive drinkers, defined as drinking an average of 30 to 125 grams of pure alcohol per day; and, 4 percent of the pregnant women were classified as alcohol abusers, defined as drinking an average of greater than 125 grams of pure alcohol per day. In contrast to Lillien, Huber, and Rajala (1982), Larsson (1983) states that excessive drinkers cannot be identified by socioeconomic characteristics, and therefore a profile on drinking habits of all pregnant women should be obtained. The author also concludes that a discussion about alcohol and the effects on the fetus was sufficient to persuade women who were not addicted to alcohol to change their drinking habits. Alcoholic women, on the other hand, required intensive counselling. Percentages of women who had stopped drinking or had reduced their intake during pregnancy as a result of attending the clinics was, unfortunately, not reported.

Therapy for women drinking heavily during pregnancy was integrated with routine prenatal care at the Boston City Hospital women's clinic (Rosett, Weiner, and Edelin, 1983). Heavy drinking was defined as consuming more than forty-five drinks a month with at least five drinks on some occasions. From the survey conducted between 1974 and 1979 at Boston City Hospital, 162 of the 1,711 women in the study reported heavy drinking. Of these 162 women, forty-nine continued to receive prenatal care at the Boston City Hospital. Of the forty-nine women in the treatment program, thirty-three women (67 percent) abstained or markedly reduced alcohol intake before the third trimester. Of these thirty-nine women, nineteen attained total abstinence. In this study, women who reduced their alcohol intake were younger and nulliparous. Frequency and quantity of alcohol intake were not predictive of therapeutic success. The authors classified problem drinkers as those with a social problem, symptom problem, or dependence problem. Women experiencing *social drinking problems* drank primarily due to social pressures from friends and relatives. Women experiencing *symptom problems* drank primarily to relieve a range of psychological symptoms and to alter mood and perceptions. For many, pregnancy was a time that exacerbated stressful situations in their lives. The added physicial and social responsibilities created ambivalent feelings toward motherhood. Women experiencing *alcohol dependency problems* drank between one-half and one liter of liquor or its equivalent per day. Rosett, Weiner, and Edelin (1983) state that intensive counselling is needed for alcoholics since few alcoholics appear to change their patterns in response to mass media campaigns.

With regard to women's sources of alcohol information, Black (1983) interviewed twenty-five women attending a clinic for pregnant women in Leicester, England. The interview took place during the fourth month of pregnancy. Sixteen of the twenty-five women had consumed an alcoholic beverage during the week prior to the interview. Thirteen of the twenty-five women stated that they had received information about alcohol during their pregnancy. Their sources of alcohol information were newspapers, magazines, television, radio, friends, doctors, midwives, and health visitors. The majority had obtained their information from the media, and only two women reported having obtained information from a physician or other health professional. Kruse, Le Fevre, and Zwieg (1986) in their study examining smoking and drinking behaviors of 255 married women in Callaway County, Missouri, reported that 75 percent of the women had discussed their smoking and drinking habits at some point during pregnancy with their physician.

In summary, learning about alcohol has primarily focused on media campaigns encouraging pregnant women not to consume alcohol during their pregnancy. Intervention strategies for pregnant problem drinkers include intensive counselling sessions as it appears alcoholic women do not respond to media campaigns in the same way as non-alcoholic women. From the few studies which have examined sources of information on alcohol, it appears that health professionals do not dominate as a principal resource reaching the total pregnant population.

Tobacco Use: Behaviors and Learning

Research studies which have examined smoking behaviors among pregnant women, and identified effectiveness of intervention strategies in assisting pregnant women to quit smoking are not new. As with alcohol, very few studies have reported women's sources of information about smoking. Behaviors and learning about tobacco use are described as follows.

Behaviors: Tobacco Use

The incidence of smoking among pregnant women varies with their ethnic origin, age, marital status, and level of education. McIntosh (1984) conducted a literature review of smoking incidence during pregnancy including twenty-eight published research studies from 1953 to 1976 from Canada, U.S.A., Great Britain, Europe, Australia, and Israel. He reported that of the total 225,025 women in these studies, 42 percent smoked during their pregnancy. The percentage of smokers ranged from 14 percent in American Orientals to 61 percent in U.S. whites. The quantity of cigarettes smoked was not reported. Overall, the percentage of pregnant women who smoke is lower than the percentage of pregnant women who drink.

Prager et al. (1984) examined data from the 1980 National Natality and Fetal Mortality Surveys in the United States and described smoking behaviors before and during pregnancy of married women older than twenty years of age giving birth to live infants. A sample of 4,405 women responded to a mailed questionnaire sent to them six months after delivery. The response rate was 56 percent. Smokers were typically white, under twenty-five years of age, and had a high school education or less. The prevalence of smoking before pregnancy was highest among white mothers at 32 percent; compared with black mothers at 25 percent; hispanic mothers at 23 percent; and, other races at 20 percent. Overall, 69 percent of the women participating in the survey had abstained from smoking before pregnancy, and 31 percent had smoked. More specifically, 9 percent had smoked between one and ten cigarettes a day, and 22 percent had smoked eleven or more cigarettes a day. During pregnancy, 75 percent of the women in the sample had abstained from smoking, 12 percent had smoked between one and ten cigarettes a day, and 13 percent had smoked eleven or more cigarettes a day. Over 10 percent of women are heavy smokers during their pregnancy. Of those women who *smoked one to ten cigarettes a day prior to their pregnancy*, 31 percent had stopped smoking during pregnancy, 66 percent had continued to smoke between one and ten cigarettes a day during pregnancy, and 3 percent had increased their smoking to eleven or more cigarettes a day during pregnancy. Of those women who *smoked eleven or more cigarettes a day prior to their pregnancy*, 12 percent had stopped smoking during pregnancy, 27 percent had reduced their cigarette smoking to less than eleven cigarettes a day during pregnancy, and 61 percent continued to smoke eleven or more cigarettes a day during pregnancy. Fewer women who smoked more than ten cigarettes a day before pregnancy were able to abstain or reduce their cigarette smoking during pregnancy. Overall 18 percent of smokers had stopped smoking during pregnancy. The tendency to stop smoking during pregnancy was directly related to educational level.

In 1980 Cresswell-Jones (1983) conducted a study of smoking patterns among pregnant women in Simcoe, Ontario. An anonymous self-reporting questionnnaire was completed by 132 volunteer pregnant women who were eighteen to thirty-five years of age, of high educational level, and from a wide range of occupations. Forty-nine percent of women had smoked before pregnancy, and this figure decreased to 35 percent during pregnancy. The two major reasons given by the pregnant women for the decrease in cigarette smoking were: 1) less desire, and 2) concern for the baby. Perceptions of the women about smoking were also investigated. The women were asked "In your opinion, can your baby be affected by your tobacco use?" The response was as follows: 80 percent said yes, 11 percent said no, 6 percent said maybe, and 3 percent didn't know. Fairly similar responses were obtained in a 1978 study by Luce and Schweitzer (Fielding and Yankauer, 1978b), who reported that two thirds of young nonpregnant women smokers believed that smoking can harm the newborn. Although the majority of women are aware that smoking can affect the newborn, over 20 percent are not aware of the hazards of smoking during pregnancy.

Smoking incidence during pregnancy in Seattle, Washington decreased slightly from 1974/75 to 1980/81. Streissguth et al. (1983) evaluated changes in smoking and drinking patterns of Seattle women over this six year interval. The subjects were two cohorts of pregnant women who were interviewed at six months gestation at two Seattle hospitals. Response rates were not reported. Sample size for 1974/75 was 1,529 women, and for 1980/81 was 1,413 women. In 1974/75 the incidence of smokers was 25 percent and in 1980/81 the incidence of smoking had decreased to 22 percent. During pregnancy in 1974/75, 75 percent had not smoked, 14 percent had smoked less than sixteen cigarettes a day and 11 percent had smoked sixteen or more cigarettes a day. During pregnancy in 1980/91, 78 percent had not smoked, 16 percent had smoked less than sixteen cigarettes a day and 6 percent had smoked sixteen or more cigarettes a day. The authors report that the incidence of smokers in this study is low in comparison with other previously reported research studies.

A 1983 population based hospital survey of 3,628 women in their postpartum period was conducted in the Ottawa-Carleton region of Ontario (Stewart and Dunkley, 1985). The authors reported that this was the first population based study to be conducted in Canada to determine: the incidence of smoking before and during pregnancy; the demographic and socioeconomic characteristics of smoking pregnant women; and, the use of health care services by pregnant women. The sample included 3,296 women, and a 91 percent response rate was obtained. A self-report questionnaire was used which had a test-retest reliability coefficient value of 0.90. The percentage of smokers before pregnancy was 37 and at the time of delivery was 26 percent. Of the smokers, 39 percent reported that they had not changed their smoking habits, 31 percent reported that they had stopped during their pregnancy, 28 percent said they had decreased the amount smoked, and 2 percent stated they had increased the amount smoked. Nearly 40 percent of smokers reported that they had not changed their level of cigarette use during pregnancy. Changing smoking behaviors during pregnancy appears to be a problem among pregnant women. The highest cessation rates were among women who had smoked only one to five cigarettes per day before pregnancy. Most women who stopped smoking did so as soon as they found out they were pregnant. Of the women who smoked *prior to pregnancy*, 13 percent had reported smoking between one and five cigarettes a day, 31 percent had reported smoking between six and fifteen cigarettes a day, 47 percent had reported smoking between sixteen and thirty cigarettes a day, and 9 percent had reported smoking more than thirty cigarettes a day. *During pregnancy*, 31 percent of smokers had reported quitting smoking, 4 percent of smokers had reported smoking between one and five cigarettes a day, 20 percent of smokers had reported smoking between six and fifteen cigarettes a day, 38 percent of smokers had reported smoking between sixteen and thirty cigarettes a day, and 7 percent of smokers had reported smoking more than thirty cigarettes a day. A large percentage of women continued to smoke heavily during pregnancy, more specifically, 45 percent continued to smoke over fifteen cigarettes per day. Assisting women to change their smoking behaviors during pregnancy remains a challenge for health professionals. A step-wise regression analysis was used to identify factors associated with cessation of smoking during the first trimester of pregnancy. Fewer number of cigarettes smoked before pregnancy, higher level of education, less use of alcohol before pregnancy, multiparity, and less use of marijuana before pregnancy were found to be associated with smoking cessation. Subgroups which had particularly high rates of smokers were teenagers, single women, women living common law, and women with lower education levels. Among the primiparous women, prenatal classes were attended by 62 percent of smokers, compared with 86 percent of non-smokers.

On a smaller sample of 430 pregnant women classified as nutritionally high risk referred to the Prince Edward Island Department of Health and Social Services, McDonald and Newson (1986) reported that 60 percent were smokers. Reduction of the incidence of smoking was not reported. Nutritionally high risk women had been defined as women who had had one of the following conditions: underweight status at conception; low weight gain during pregnancy; poor obsterical record during a previous pregnancy; pernicious vomiting; medical problems with nutritional implications (e.g. diabetes, heart disease); personal stress; or, expecting twins.

Kruse, Le Fevre, and Zwieg (1986) examined changes in smoking and drinking behaviors during pregnancy of 255 married women residents of Callaway County, Missouri. The population of the study was obtained from birth certificate data provided by the State of Missouri. A questionnaire was mailed to these women three to twelve months following delivery. A 69 percent response rate was obtained. Nonrespondents were younger and had less education. Twenty-eight percent of the respondents had reported smoking at least one cigarette a day before pregnancy. *Prior to pregnancy*, 72 percent of the women in the sample had not smoked, 10 percent had smoked between one and nineteen cigarettes a day and 18 percent had smoked more than nineteen cigarettes a day. *During pregnancy*, 77 percent of the women in the sample had not smoked, 13 percent had smoked between one and nineteen cigarettes a day, and 10 percent had smoked more than nineteen cigarettes a day. Of the women who smoked before pregnancy, 33 percent had decreased their cigarette smoking during pregnancy and only 17 percent had stopped completely. It was not reported whether the remaining 50 percent of smokers had changed their smoking habits. As has been previously noted, cigarette smoking is a major health concern during pregnancy. Women more likely to smoke were under thirty years of age, had lower incomes, and had lower educational levels. Women who were more likely to decrease their cigarette smoking were those who had had some education beyond high school. In this study women were also asked to rate on a scale of one to five the importance of various factors which had influenced their reduction in cigarette smoking during pregnancy (one=not at all important, two=not important, three=neutral, four=important, and five=very important). Fear for infant's health was cited as important or very important by 96 percent of the women; advice from the doctor was cited as important or very important by 67 percent of the women;

advice of family was cited as important or very important by 50 percent of the women; printed media was cited as important or very important by 46 percent of the women; media was cited as important or very important by 38 percent of the women; and, smoking making patients sick was cited as important or very important by 33 percent of the women. Health concern was a major factor in influencing women to reduce their cigarette smoking during pregnancy. Advice from the physician had also played a major role.

Kiss (1983) examined smoking behaviors of 220 prenatal class participants in Vancouver, and reported that 31 percent of participants had smoked before becoming pregnant. *Prior to pregnancy*, 69 percent had not smoked, 7 percent had smoked between one and six cigarettes a day, 16 percent had smoked between seven and twenty-four cigarettes a day, and 8 percent had smoked more than twenty-four cigarettes a day. *During pregnancy*, at the time of completion of the health habits questionnaire, 85 percent had not smoked, 5 percent had smoked between one and six cigarettes a day, 9 percent had smoked between seven and twenty-four cigarettes a day, and 1 percent had smoked more than twenty-four cigarettes a day. Overall, 91 percent of smokers had decreased their cigarette smoking, 6 percent had not changed their cigarette smoking, and 3 percent had increased their cigarette smoking. In comparison to other research studies which examined smoking behaviors during pregnancy, women participating in the Kiss study had substantially changed their smoking behaviors. Women had also been asked to check off from a given list, the factors which had influenced a change in their cigarette smoking. Eighty-seven percent had checked their own personal knowledge, 46 percent had checked books-magazines-pamphlets, 46 percent had checked the doctor, 30 percent had checked family members and friends, 24 percent had checked a change in cravings, 22 percent had checked prenatal classes, 19 percent had checked social pressures, 14 percent had checked the public health nurse, and 3 percent had checked stress.

Knowledge and print material had primarily influenced women to change their smoking behavior.

Although alcohol and smoking behaviors are reported in this dissertation separately, there is some relationship between the two behaviors. Prager et al. (1984) reported that *before pregnancy* 35 percent of women were both non-smokers and non-drinkers; 21 percent were both smokers and drinkers; 34 percent were drinkers only; and, 10 percent were smokers only. *During pregnancy* 47 percent of women were both non-smokers and non-drinkers; 12 percent were both smokers and drinkers; 27 percent were drinkers only; and, 14 percent were smokers only. Although the prevalence of drinking was higher than the prevalence of smoking, reduction in drinking was more pronounced than reduction in smoking. Norman (1985) studied the inter-relationships among health behaviors of 412 university students at Memorial University in Newfoundland. Statistically significant correlations between smoking and alcohol behaviors were found. Similar results were also found in the National Health Interview Survey conducted in the United States (Williams, Dufour, and Bertolucci, 1986). Although a relationship between smoking and drinking exists, Fox, Sexton, and Hebel (1987) reported that enrollment in a smoking cessation intervention program for pregnant smokers had not influenced these women's alcohol intake, although changes in their smoking habits were documented.

In summary, the results of the studies which have investigated prenatal smoking behaviors indicate that smoking during pregnancy remains a challenge for the health professional. Approximately 30 to 40 percent of pregnant women smoke prior to pregnancy, and the incidence varies with ethnic background, education level, marital status, and age. Approximately 15 to 35 percent of women continue to smoke during their pregnancy. The number of cigarettes smoked was also high, and varied from study to study. Up to 56 percent of smokers smoked more than sixteen cigarettes a day before pregnancy and up to 45 percent of smokers smoked more than sixteen cigarettes a day during pregnancy. Smoking is a major health concern during pregnancy. Those women who are most likely to abstain or decrease their cigarette smoking are those who smoked fewer cigarettes at the beginning of pregnancy, and women of a higher education level. Smokers were more likely to be of a lower education level, lower socioeconomic level, white, unmarried, and less likely to attend prenatal classes. Factors which had influenced women to change their cigarette smoking included: concern for infant health, reading print material, and receiving advice from a doctor, family members, and friends.

Learning about Tobacco: Intervention Strategies and Information Sources

Although the negative effects of smoking during pregnancy had been documented prior to 1970, in 1978 Fielding and Yankauer (1978b) reported that relatively few efforts focused on the pregnant woman as a target group for smoking intervention. One early smoking intervention study was conducted by Donovan (1977) who measured the effects of intensive individual anti-smoking advice given by physicians during prenatal visits at maternity units in the hospital setting. Women who were eligible for the study had to smoke more than five cigarettes a day, had to be less than thirty weeks pregnant, and had to be less than thirty-five years of age. These women were randomly assigned to a control group, which received antenatal care usually provided for in the hospital and which included anti-smoking advice routinely given; and, to a treatment group, which received intensive individual anti-smoking advice from a physician. Two hundred and sixty-three women in the treatment group had received intensive anti-smoking advice and this group's mean number of cigarettes decreased from twenty per day before pregnancy to nine per day by the end of the pregnancy. The mean number of cigarettes smoked in the control group was eighteen per day before pregnancy and sixteen per day at the end of the pregnancy. The author, however, reports that any interpretation of these findings was made uncertain by the biased recall identified in the treatment group. One hundred and seventy-four women in the treatment group had been interviewed postnatally, and of these women fifty-four admitted smoking at the end of their pregnancy although they had originally reported that they had quit.

Another early smoking cessation program was conducted by Danaher, Shisslak, Thompson, and Ford (1978) with eleven volunteer pregnant women. Participants were involved in six, two-hour group sessions over a seven week period. All women received: a document outlining the risks of smoking during pregnancy; self monitoring tasks; deep muscular relaxation techniques; and, coping strategies for smoking urges. The range of cigarettes smoked at the onset of pregnancy was fifteen to thirty-five cigarettes daily. The minimum and the maximum number of cigarettes smoked daily were reduced to zero to twenty-five cigarettes by the first week of the program, and to zero to twenty cigarettes by the seventh week of the program. Nine of the eleven women had reported reducing the number of cigarettes smoked once they became pregnant, and further reductions were observed during the course of the program, except for three participants. The authors acknowledged that these results are based on a small number of volunteers, that there was no control to measure "spontaneous" quitting during pregnancy, and that there was no control to assess effects of the intervention strategy.

More recently, Langford, Thompson, and Tripp (1983) evaluated the impact of health education on smoking during pregnancy among smokers attending prenatal classes in Metropolitan Toronto between 1977 and 1978. A total of 116 women participated in the study, and this figure represents 79 percent of the total number of women attending the classes. The participants were in their seventh month of pregnancy. The control group attended the regular prenatal class series. The experimental group attended the regular prenatal class series and received an additional one-half hour presentation on smoking and a pamphlet on smoking during pregnancy. The experimental group had originally consisted of two experimental groups. In addition to the aforementioned activities, women in the second experimental group had been scheduled to receive a follow-up home visit by the public health nurse to reinforce the class presentation. However it was difficult to ensure that all members in the second experimental group had received the home visit and therefore the researchers decided to amalgamate the two experimental groups for data analyses. Therefore some of the women in the experimental group had a follow-up home visit by the public health nurse whereas others did not. The results of the study did not reveal a significant difference between the control and treatment groups until one year after delivery when 23 percent of the experimental group were non-smokers, compared to 5 percent of the control group. The authors tried to account for the fact that no significant differences were found between the control and the experimental groups by stating that the women who were still smoking by the seventh month of pregnancy appeared to be recalcitrant smokers. Giving these women information about the health effects of smoking during the seventh month of pregnancy had provoked angry reactions from women or their partners because they had not been given the information earlier. During pregnancy, approximately three-quarters of all women had reported some smoking reduction or cessation, and most of these women had reduced their smoking by at least 50 percent.

Recently, encouraging results on smoking intervention strategies have been obtained in well controlled studies by Sexton and Hebel (1984), and Windsor et al. (1985).

Sexton and Hebel (1984) conducted a prospective, randomized, controlled experiment that was designed to examine the effect of smoking on birth weight outcome. Women eligible for the study were those who had smoked more than ten cigarettes a day before their pregnancy and had not passed their eighteenth week of gestation. The majority of women were recruited from fifty-two private obstetrical practices and a large university hospital in Baltimore. A total of 935 women were enrolled over a two and one-half year period, and of those enrolled 463 were randomly assigned to an intervention treatment group. The intervention strategy described was intensive, and included numerous activities such as: personal contact; group contact; mail contact; telephone contact; monetary rewards; and, receiving "quit packets" containing: information on smoking cessation techniques and health risks associated with smoking during pregnancy, chewing gum as an oral substitute for cigarettes, and a pencil to record number of cigarettes smoked daily. No comparative evaluation of the different kinds of activities was made. A complete account of the intervention strategy was described by Nowicki et al. (1984). The mean number of cigarettes smoked before pregnancy was reported to be twenty-one cigarettes per day for the total sample, and eleven cigarettes per day for the total sample at the time of randomization. Therefore a reduction in cigarette consumption was noted prior to the intervention program. The results of the intervention strategy indicated that 20 percent of the control group had quit smoking and 43 percent of the treatment group had quit smoking. Furthermore 14 percent of the control group had reported smoking more than twenty cigarettes a day; whereas, only 4 percent of the treatment group had reported smoking more than twenty cigarettes a day. The mean number of cigarettes smoked per day in the control group was thirteen and the mean number of cigarettes smoked in the treatment group was six ($p < 0.01$). Self-reports of smoking behaviors were confirmed by salivary thiocyanate levels.

Windsor et al. (1985) conducted a study to determine the effectiveness of three smoking cessation methods on women attending Public Health Maternity Clinics in Birmingham, Alabama. Of the 1,838 women attending the clinics between October

1983 and September 1984, 25 percent were identified as smokers. Eighty percent of the smoking pregnant women agreed to participate in the study. The pregnant smokers were randomly assigned to three groups. Group one was the control, receiving smoking cessation advice routinely given at maternity clinics. In addition to routine advice given about the dangers of smoking during pregnancy, group two received a booklet on the dangers and risks of smoking during pregnancy; attended a ten minute counselling session; and, were taught how to use the "Freedom from Smoking Program Manual" of the American Lung Association. This manual consisted of a seventeen day self-directed plan to quit smoking. Group three received the same information booklet and counselling session as group two, but were taught to use a different self-help manual "A Pregnant Woman's Guide to Quit Smoking." A statistically significant difference was found between quitting rates and decreases in cigarettes smoked with the control group and groups two and three; however, no difference was found between the groups using different self-help manuals. Nine percent of group one (control) had quit or had reduced their cigarette smoking; 20 percent of group two had quit or had reduced their cigarette smoking; and, 31 percent of group three had quit or had reduced their cigarette smoking. Oral reports of smoking behavior were confirmed by salivary thiocyanate levels and only 3 percent of the women provided inaccurate information.

Very few studies have addressed women's sources of information about tobacco use. Kruse, Le Fevre, and Zweig (1986) documented that 75 percent of 255 married women in Callaway County, Missouri had discussed their smoking and drinking habits at some point during pregnancy with their physician. Lincoln (1986) however noted that women are getting mixed messages about smoking. He refers to Virginia Ernsler's comments: On one hand, women are told by health professionals that cigarettes are deleterious to health and reproduction, yet on the other hand, cigarette advertisements are associated with seductiveness and liberation. The Canadian Tobacco

Maufacturer's Council has voluntarily withdrawn broadcast advertising and adopted an industry code of practice, including health hazard warning labels. However, there is increased pressure that advertisement of tobacco be restricted by legislation. The steering committee for the National Program to Reduce Tobacco in Canada (1987) is advocating regulatory control over tobacco promotion and distribution. In the United States, it is required that four rotating warnings be included on cigarette packages and all advertising. One of these warnings includes the Surgeon General's Warning that smoking by pregnant women may result in fetal injury, premature birth, and low birth weight (Edwards, 1986).

In summary, learning about tobacco has primarily focused on the effectiveness of smoking intervention strategies for pregnant women. An intensive comprehensive approach assisting pregnant women to quit smoking has been found to be effective. However messages from health professionals compete with advertising by tobacco manufacturers. Intensive comprehensive strategies are required to assist women to stop smoking as well as to stop drinking during pregnancy.

Health Behaviors and Perinatal Outcomes

It is well documented that inadequate weight gain, alcohol consumption, and tobacco use are associated with poor pregnancy outcomes (Institute of Medicine, 1985). The relationship between these three factors and perinatal outcome, including low birth weight, is presented so as to provide for a better understanding of the serious risks attached to women's health practices that are less than optimal, and to provide the basis for what pregnant women should know about weight gain, alcohol consumption, and tobacco use.

Weight Gain and Perinatal Outcome

Prior to 1970 it was common medical practice to minimize weight gain during pregnancy so as to promote an easy delivery. Furthermore it was believed that excessive weight gain led to the development of toxemia and other obstetrical problems. However, by the seventies, it had become apparent that severe dietary restrictions during pregnancy resulted in a higher risk of having a low birth weight infant (Taffel and Keppel, 1986). A major turning point was the review of the literature conducted by the Committee on Maternal Nutrition of the National Research Council (1970). The committee members in their report concluded that a gain of twenty to twenty-five pounds was associated with the most favorable outcome of pregnancy and that there was no scientific justification for routinely limiting weight gain to less than twenty pounds.

The association between pregravid weight status and birth weight outcome was first documented by Tompkins, Wiehl, and Mitchell in 1955. If women at the beginning of pregnancy were 20 percent or more underweight, the incidence of low birth weight was *15.4 percent*; if women at the beginning of pregnancy were 5 to 19 percent underweight, the incidence of low birth weight was *8.3 percent*; if women at the beginning of pregnancy were at a weight appropriate for their height, the incidence of low birth weight was *5.7 percent*; if women at the beginning of pregnancy were 5 to 19 percent overweight, the incident of low birth weight was *4.4 percent*; and, if women at the beginning of pregnancy were greater than 20 percent overweight, the incidence of low birth weight was *3.8 percent.* The classification of women according to their weight status at the beginning of pregnancy was based on the Metropolitan Life Insurance Height and Weight Tables of 1942. By examining pregravid weight status, maternal weight gain, and pre and postpartum weight status, Tompkins and associates found that underweight women had a greater net body increment in weight after delivery than normal weight women. As such, underweight women had added weight to their own tissue mass at some sacrifice to the fetus. Simpson, Lawless, and Mitchell (1975) found similar associations.

Naeye (1979) examined data from the Collaborative Perinatal Project which prospectively followed 53,518 pregnancies in twelve U.S. hospitals between 1959 and 1966. Women's prepregnant weight for height status was calculated using the Metropolitan Life Insurance Tables of 1959. If prepregnant body weight was less than 90 percent of the Metropolitan Life Insurance desirable weight values, the optimal weight gain for these underweight women was found to be thirty pounds to achieve the fewest fetal and neonatal deaths. If prepregnant body weight was between 90 and 135 percent of the desirable values, the optimal weight gain for these normal weight women was found to be twenty-four to twenty-seven pounds to achieve the fewest fetal and neonatal deaths. If prepregnant body weight was greater than 135 percent of the desirable values, the optimal weight gain for these overweight women was found to be fifteen to sixteen pounds to achieve the fewest fetal and neonatal deaths. Maternal caloric intake had the greatest effect on prenatal weight gain.

Brown et al. (1981) examined 399 women's health records at a major hospital in St. Paul's Minnesota. The mean birth weight of infants born to mothers who were "very underweight," women weighing less than 80 percent of their standard weight, was 2,976 grams; low birth weight incidence was 12.9 percent. The mean birth weight of infants born to mothers who were "moderately underweight," women weighing between 80 and 90 percent of their standard weight, was 3,020 grams; low birth weight incidence was 16.5 percent. The mean birth weight of infants born to mothers who were of "normal weight," women weighing between 90 and 120 percent of their standard weight, was 3,234 grams; low birth weight incidence was 6.9

percent. All three groups of women had equivalent mean prenatal weight gains, 12.6 pounds, 12.9 pounds, and 12.6 pounds. The incidence of low birth weight was approximately twice as high among infants born to underweight women than to women of normal weight with the same weight gain. The incidence of low birth weight was 7.2 percent among infants born to women gaining more than twenty pounds, whereas the incidence of low birth weight was 27.8 percent among infants born to mothers gaining less than twenty pounds. An average weight gain of thirty-five pounds for the underweight woman was associated with a birth weight of 3,600 grams or more.

The pattern of weight gain is also an important factor to consider. Van den Berg (1981), in examining data on 15,000 women who were members of the Kaiser Foundation Health Plan in California, found that a weekly weight gain during the second half of pregnancy of less than 0.5 pounds more than doubles the likelihood of low birth weight incidence among infants. The effect is even more pronounced when the prepregnant weight is less than optimal.

The National Guidelines on Nutrition During Pregnancy (Health and Welfare Canada, 1987) state that optimal weight gain during pregnancy varies and is dependent on a woman's prepregnant weight for height. A practical range of gain for women is ten to fourteen kilograms (twenty-two to thirty-one pounds). A gain of one to three kilograms (two to seven pounds) is recommended by the end of the first trimester. A goal of four kilograms (nine pounds) by the twentieth week gestation is also suggested. Underweight women should be encouraged to attain their standard weight in addition to gaining normal pregnancy weight gain requirements. Weight gains of thirteen to sixteen kilograms (twenty-nine to thirty-five pounds) have been associated with good perinatal outcomes. For overweight women a gain of seven to nine kilograms (fifteen to twenty pounds) has been associated with good perinatal outcomes.

The B.C. Ministry of Health (McCarthy and Mackay, 1984) stress that weight gain varies with every individual. They state that the average weight gain for healthy primiparous women is 12.5 kilograms (27.5 pounds), and 11.6 kilograms (25.5 pounds) for multiparous women. Underweight women need to correct for their underweight status and a gain of 13.6 to 14.5 kilograms (30 to 32 pounds) is recommended. Overweight women do not need to gain as much weight during pregnancy as women of normal weight, and a gain of 7.3 to 9 kilograms (16 to 20 pounds) is sufficient. Recommendations for the rate of gain throughout the pregnancy are also provided. These recommendations include: a gain of one to two kilograms (two to four pounds) by the end of the first trimester, followed by a gain of 0.40-0.45 kilograms (0.88-0.99 pounds) per week with a deceleration of gain to 0.35 kilograms (0.77 pounds) per week toward the end of the pregnancy.

The Society of Obstetricians and Gynaecologists of Canada, (Perinatal Medicine Committee, 1980) state that weight gain should approximate three kilograms (seven pounds) by the twentieth week gestation, followed by one kilogram (two pounds) every two weeks during the latter half of the pregnancy. A range of gain was not provided but rather caloric requirements during pregnancy are given. Restriction of weight gain through nutritional methods is contraindicated.

In summary, inadequate maternal weight gain and low prepregnant weight for height are associated with a twofold increase in the risk of having a low birth weight infant. Gains associated with a healthy outcome include: eleven to fourteen kilograms (twenty-four to thirty pounds) for women of normal weight, fourteen to sixteen kilograms (thirty to thirty-five pounds) for underweight women, and seven to nine kilograms (fifteen to twenty pounds) for overweight women. By the end of the first trimester, a gain of one to two kilograms (two to four pounds) is suggested, and by the end of the twentieth week gestation a gain of no less than four kilograms (nine pounds) is recommended. Weekly weight gains during the second and third trimesters range from 0.35 to 0.45 kilograms (0.77-0.99 pounds). A gain of less than 0.22 kilograms (0.5 pounds) per week during the second half of pregnancy is associated with an increased risk of having a low birth weight infant. Calorie restricting diets are not advised during pregnancy.

Alcohol Consumption and Perinatal Outcome

Although wine and beer have been staples of virtually all human societies, it is interesting that what we know about the effects of alcohol on the fetus has only recently been discovered (Fielding and Yankauer, 1978a). Alcohol has the biochemical potential to cause a wide range of effects on the fetus. It crosses the placenta freely and attains the same concentration in the fetus as in the mother (Rosett, Weiner, and Edelin, 1981). Exposure of the fetus at critical stages of development can result in malformation. During the first eight weeks of pregnancy, the formation and development of body organs from embryonic tissue occurs, and alcohol may alter the cell membranes and the embryonic organization of these tissues. Unfortunately, many women do not know they are pregnant when organ development occurs, a time period in which the embryo is particularly sensitive to the effect of toxic chemicals. Throughout gestation, the drinking of alcohol may retard cell growth and division. The third trimester is the time of the most rapid brain growth. Reduction of heavy alcohol consumption by mid-pregnancy can modify some of the adverse effects. While structural malformations occurring in early pregnancy will still persist, delays in growth may be reversible (Rosett, Weiner, and Edelin, 1983).

The problems associated with excessive alcohol consumption are well documented and result in a condition called "Fetal Alcohol Syndrome." Infants born to mothers who abuse alcohol during pregnancy exhibit: anomalies of the eyes, nose, heart, and central nervous system; growth retardation; small head circumference; and, mental retardation (Worthington-Roberts, Vermeersch, and Williams, 1985). The Fetal Alcohol Study Group of the Research Society on Alcoholism (Rosett, Weiner, and Edelin, 1981) concluded that diagnosis of Fetal Alcohol Syndrome should only be made if the infant has signs in each of the following categories: (1) growth retardation when corrected for gestational age (2) central nervous symptoms, and (3) two of three designated signs of facial dysmorphia. Fetal Alcohol Syndrome is not limited to infants of alcoholic women, but has also been identified in infants where the pregnant woman had consumed four to five drinks per day and an average of at least forty-five drinks per month (Iber, 1980). The effect of alcohol is varied by a combination of genetic susceptibility, maternal nutrition, and intensity of the insult.

Cushner (1981) attributes the designation of the term Fetal Alcohol Syndrome to Jones and Smith in 1973. Since that time, several hundred cases have been reported in the literature. Depending upon the population studied, the incidence of Fetal Alcohol Syndrome has ranged from 1 in 300 to 1 in 2,000 live births, and 30-40 percent in infants of alcoholic mothers (Worthington-Roberts, Vermeersch, and Williams, 1985). Estimates as high as one in fifty live births have been made for some Indian Reservations in the United States (Rosett, Weiner, and Edelin, 1981).

Wright et al. (1983) noted that in a sample of 900 women drinking more than 100 grams of alcohol a week (approximately ten drinks per week) there was a twofold risk of delivering a baby on or below the tenth centile of the Castleman Centile Weight Chart in comparison to those women who drank less than 50 grams a week. The authors recommend decreasing alcohol consumption before pregnancy to reduce the risk of low birth weight.

In 1977 Little studied 263 pregnant women and found that ingestion of one ounce of absolute alcohol daily (approximately two drinks per day) one month *before* pregnancy was associated with an average decrease in birth weight of 91 grams, and the ingestion of one ounce of absolute alcohol *during* the later part of pregnancy was associated with a decrease in birth weight of 160 grams. These associations were independent of tobacco use.

In 1981 the Surgeon General of the United States issued an advisory warning on drinking during pregnancy, recommending abstinence for pregnant women (Streissguth et al., 1983). Guidelines prepared by the Perinatal Medicine Committee (1984a) of The Society of Obstetricians and Gynaecologists of Canada recommend that alcoholic beverages during pregnancy should be avoided or limited to less than four drinks per week. One drink was defined as being equivalent to one glass of wine, one ounce of liquor, or one bottle of beer. The National Guidelines on Nutrition During Pregnancy (Health and Welfare Canada, 1987) suggest that reduction of alcohol intake with a view to abstention should be the goal during pregnancy.

In summary, large amounts of alcohol consumption result in a condition called Fetal Alcohol Syndrome. Infants born to mothers who consume large amounts of alcohol can exibit anomalies of the eyes, ears, nose, heart, and central nervous system, as well as subnormal growth and mental retardation. Recently small amounts of alcohol consumption during pregnancy were found to be associated with lower birth weights. Ingestion of two alcoholic drinks per day before pregnancy was found to be associated with lower birth weight, and ingestion of ten alcoholic drinks per week during pregnancy was also associated with having a smaller infant. No safe limits of alcohol intake are established and therefore abstinence is recommended.

Tobacco Use and Perinatal Outcome

The association between maternal smoking and fetal growth retardation was first documented in 1957 (Donovan, 1977). There are over 4,000 chemical compounds in tobacco smoke and the detrimental effects of smoking are known. Although the mechanism of how these compounds affect the fetus is still unknown, smoking has been shown to slow fetal growth, increase the risk of stillbirth, and double the chance of low birth weight. The Surgeon General's Report on Health Promotion and Disease Prevention suggests that 20 to 40 percent of low birth weight infants born in Canada and the United States can be attributable to their mothers' smoking (U.S. Department of Health, Education, and Welfare, 1979).

Simpson (1957) first reported that infants born to women who smoked during pregnancy weighed on the average 170-250 grams less than infants born to women who did not smoke. This finding has been confirmed in more than forty-five studies of more than half a million births, and has been reported in the Surgeon General's Report "The Health Consequences of Smoking for Women" (U.S. Department of Health and Human Services, 1980). Furthermore there is a dose-response relationship between smoking and birth weight outcome. The more women smoke, the greater the reduction of birth weight. Butler, Golstein, and Ross (1972) reported from data of the British Perinatal Mortality Survey of 16,994 singleton live births, that women who stopped smoking by their fourth month of pregnancy were at no more risk than non-smokers. No significant differences in birth weight were found between non-smokers and women who had stopped smoking by their fourth month of pregnancy.

There has been, however, some controversy in the literature as to whether this decrease in birth weight is independent of maternal weight gain. Luke, Hawkins, and Petrie (1981), and Papoz et al. (1982) reported that a higher weight gain by the woman was a protective factor against the detrimental effects of smoking. Rantakallio and Hartikainen-Sorri (1981) provide contrary evidence. In their report of 12,068 births in Northern Finland, the effect of smoking on birth weight was found to be independent of maternal weight gain. Until further investigations are conducted, extra weight gain should not be considered a protective factor to reduce the deleterious effects of smoking.

Smoking during pregnancy also affects low birth weight *incidence.* It has been shown that low birth weight incidence doubles among pregnant women who are smokers. This finding has received extensive support in the literature (Meyer, Jonas, and Tonascia 1976; and U.S. Department of Health and Human Services, 1980). Other effects of smoking during pregnancy include a higher risk of: spontaneous abortion; fetal or neonatal death; and, obstetrical complications such as abruptio placentae, placenta previa, bleeding in early or late pregnancy, and preterm delivery (U.S. Department of Health and Human Services, 1980).

Guidelines prepared by the Perinatal Committee (1984b) of The Society of Obstetricians and Gynaecologists of Canada advise that smoking during pregnancy should be strongly and severely discouraged. For women who "foolishly refuse" to desist from smoking during pregnancy, attempts to reduce cigarette smoking should be encouraged. The National Guidelines for Nutrition During Pregnancy (Health and Welfare Canada, 1987) discuss the detrimental effects of cigarette smoking during pregnancy and feebly state that women should be encouraged to stop smoking during pregnancy or at least reduce their use of cigarettes.

In summary, smoking during pregnancy is known to lower birth weight, increase the risk of fetal death, and increase the risk of prematurity and other obstetrical complications. There is a dose-response relationship between smoking and birth weight outcome. As well, the risk of lower birth weight is less when smokers stop smoking by the fourth month of pregnancy. There is a strong advisory warning from the medical profession for women to stop smoking during pregnancy.

Health Beliefs of Pregnant Women and Behaviors

The Health Belief Model has been the focus of considerable research within the past twenty years. Very few studies, however, have examined the relationship between health beliefs with weight gain, alcohol consumption, and tobacco use of pregnant women.

Reading et al. (1982) examined smoking and drinking behaviors of primiparous women. The study was based upon the view that a triggering mechanism was required to translate health beliefs into action. This triggering mechanism was seen as a reinforcement to the personal relevance of the information assimilated. Reading and associates stated that ultrasound feedback of the fetus in utero may serve as this triggering mechanism. One hundred and twenty-nine women were randomly assigned to two groups. Group one, the high feedback group, were shown the ultrasound monitor screen and were provided with specific verbal feedback to fetal size, shape, and movement. Group two, the low feedback group, received a comparable examination with the exception that they did not see the monitor and as such did not receive feedback about the growing fetus. A total of twenty women had smoked in the high feedback group and a total of twenty women had smoked in the low feedback group. A greater number of women receiving feedback had stopped smoking in comparison to those women who had not received feedback ($\chi^2=5.6$, $df=2$, $p<0.06$). Fifteen women stated that they had stopped smoking because they had been concerned about the health of their baby, and only four women stated that they had stopped smoking because of nausea. Of the women who continued to smoke during pregnancy, 50 percent of the high feedback group as compared with 35 percent of the low feedback group reported having reduced their cigarette use.

For alcohol consumption, Reading and associates (1983) reported that 36 percent of the sample had abstained from alcoholic beverages prior to their pregnancy and a further 33 percent had abstained upon discovering they were pregnant. Two reasons women had given for changing their drinking behaviors were: the harmful effects on the fetus, and no longer feeling like drinking. A greater number of women receiving feedback had stopped drinking in comparison to those women who had not received feedback ($\chi^2=5.5$, $df=2$, $p<0.06$). Reading and associates concluded that it may be possible to promote adherence to health care recommendations during pregnancy via feedback by ultrasonography, as the salience and perceived relevance of advice may be increased.

Windsor et al. (1985) had examined the effectiveness of smoking cessation programs designed for pregnant women. This study has previously been described on page 63. One of the intervention strategies cited in this study had women use a self-help manual entitled "A Pregnant Woman's Self-Help Guide to Quit Smoking." This guide had been developed by Windsor (1987), and it was based upon the assumption that information alone was not effective in changing smoking behavior. Pregnant smokers must strongly believe that smoking is harmful to their health and the health of their unborn child (Windsor, 1987). Thirty-one percent of the women in the study using Windsor's self-help manual had either quit or had reduced their cigarette smoking during pregnancy; whereas, only 9 percent of the women receiving smoking cessation advice routinely given at hospital clinics had quit or had reduced their cigarette smoking during pregnancy. Windsor et al. (1985) concluded that information and advice alone were not effective in changing smoking behaviors of pregnant women.

Faragalla (1983) studied adherence to a prescribed prenatal care regimen and its relationship with perceived benefits, one of six components of the Health Belief Model. A scale had been developed to measure adherence to a prenatal care regimen. This scale had originally consisted of items relating to: rest and sleep, cigarette smoking, physical exercise, diet, vaginal douches, marijuana use, drinking, using unprescribed medications, and dental check-ups. Some items were deleted from the measure due to low item - total score correlations. The revised scale used in hypothesis testing consisted of items relating to: rest and sleep, cigarette smoking, physical exercise, and diet. A second scale was constructed to measure perceived benefits, pertaining to participants' beliefs that adherence to a prenatal care regimen was beneficial to their well-being during pregnancy. The perceived benefits scale had originally consisted of items that were similar to those identified in the original adherence scale. As was done with the adherence scale, several items had to be deleted from the measure because of inadequate internal consistency coefficients. The revised perceived benefits scale used in hypothesis testing included items pertaining to beliefs about: rest and sleep, cigarette smoking, physical exercise, diet, vaginal douches, taking unprescribed medication, and dental check-ups. No significant differences were found between adherence to prenatal care and perceived benefits ($r=0.007$, $df=86$, $p=0.475$). The two measures used in hypothesis testing actually had measured different behaviors, most likely accounting for the non-significant results found.

To the best knowledge of this researcher, the relationship between beliefs and prenatal weight gain have not been reported in the literature. As previously stated, studies by Pomerance et al. (1980), and Palmer, Jennings, and Massey (1985) had examined attitudes toward prenatal weight gain. Beliefs had not been addressed.

In summary, very few studies have examined the relationship between health beliefs and behaviors of pregnant women. There are, however, some encouraging results to indicate that beliefs may be one important component associated with changing smoking behaviors during pregnancy.

Summary of Chapter II

There are numerous learning opportunities that are available to pregnant women. Learning with health professionals, family members, and friends, as well as reading and viewing audiovisual productions are all possibilities. Most of the studies about learning during pregnancy have focused on describing prenatal class participants and examining the effects of one education intervention strategy on health behaviors of pregnant women.

A review of the research studies which described health behaviors of pregnant women and the learning that occurred about weight gain, alcohol consumption, and tobacco use was presented. With regard to weight gain and dietary practices, changes in eating behaviors were mostly associated with increased milk, fruit, and vegetable intake. The physician dominated as the principal source of nutrition information. Factors which influenced women's changes in dietary intake included personal knowledge, print material, appetite, and the doctor. With regard to alcohol consumption, 49 to 91 percent of women had consumed alcohol prior to pregnancy, and 15 to 77 percent of women had consumed alcohol during pregnancy. Furthermore, up to 12 percent of women continued to consume large amounts of alcohol during pregnancy. In the majority of studies, drinkers were more likely to be white and older women of a higher education level. Factors which influenced women's changes in alcohol intake included health of the infant, personal knowledge, and reading materials. Several media campaigns about Fetal Alcohol Syndrome have been conducted in the United States targeting the general population. With regard to smoking, 20 to 60 percent of women had smoked prior to their pregnancy. In a population based study conducted with pregnant women in the Ottawa-Carleton region of Ontario, 37 percent of women had smoked prior to their pregnancy. Up to 35 percent of women had smoked during pregnancy, and up to 45 percent of smokers had continued to smoke more than sixteen cigarettes a day during pregnancy. In the majority of studies, smokers were more likely to be white, of a lower education level, of a lower socioeconomic level, unmarried, and less likely to attend prenatal classes. Factors which influenced women's changes in cigarette smoking included personal knowledge, health of the infant, reading materials, and the physician. Intensive and comprehensive smoking cessation programs have reduced the incidence of smoking during pregnancy. However women are receiving mixed messages about smoking. The medical profession states that smoking is harmful to health of the women and fetus, whereas advertisement by tobacco manufacturers allude to smoking as denoting seductiveness and liberation.

Optimal health behavior is the goal of prenatal education since it is well documented that inadequate weight gain, alcohol consumption, and tobacco use are associated with increased risk of having a low birth weight infant as well as other perinatal complications. Women's health behaviors are amenable to an education intervention, and as such the learning that occurs about these behaviors is significant. Questions remaining to be answered: "Are pregnant women knowledgeable about the risks of poor health practices?", "What is the relationship between learning and weight gain, alcohol consumption, and tobacco use of pregnant women?", and "What is the relationship between health beliefs and behavior of pregnant women?".

CHAPTER III

THE CONCEPTUAL FRAMEWORK

The objectives of this research are to identify the learning patterns of pregnant women and to identify the relationship between learning and behavior as well as between health beliefs and behavior. To explain the objectives of this study, Chapter III consists of two principal sections. Section one is a presentation of the framework of the study and includes an elaboration of the research questions identified in Chapter I. Tough's concept of learning projects, Knowles's concept of self-directed learning, and the Health Belief Model form the basis of the conceptual framework. Section two describes the hypotheses to be tested. The final section is a summary of Chapter III.

Framework of the Study

What a woman learns during her pregnancy, how she learns it, and whether her learning and health beliefs influence her behavior would seem to comprise the essence of the learning process during pregnancy. This described learning process seems to be consistent and compatible with Gagnē's definition of learning which is as follows: *"Learning is a change in human disposition or capacity, which can be retained, and which is not simply ascribable to the process of growth."*[4]

The conceptual framework of this study is developed drawing upon adaptations of the work of Tough's (1979) report "The Adult's Learning Projects," Knowles's concept of self-directed learning, and Hochbaum, Kegeles, Leventhal, and Rosenstock's

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4 Robert M. Gagnē, The Conditions of Learning, 2nd ed. (New York: Holt, Reinhart, and Winston, 1970), p. 3.

"Health Belief Model" (Rosenstock, 1974b). Although the underlying assumptions of each of these works may not be totally compatible, each could potentially contribute to the total understanding of the learning process during pregnancy. The three works are described and the underlying assumptions and incompatibilities outlined. The presentation of the conceptual framework is divided into three sections: (1) the learning component, (2) the health beliefs component, and (3) the identification of the research questions.

The Learning Component

Tough examined how adults learn. He identified how adults go about planning and carrying out their learning activities and reported these processes in considerable detail (Tough, 1978). Tough's approach to understanding the practices of adult learners is unique. He studied adults' highly deliberate efforts to learn. He identified and defined these efforts as "Learning Projects." Tough's precise definition of a learning project is as follows:

> *A learning project is simply a major, highly deliberate effort to gain certain knowledge and skill (or to change in some other way). Some learning projects are efforts to gain new knowledge, insight or understanding. Others are attempts to improve one's skill or performance, or to change one's attitudes or emotional reactions. Others involve efforts to change one's overt behavior or to break a habit.* [5]

The concept of Tough's learning project excludes incidental learning, which is a frequent occurrence in our day to day lives. Tough focused on deliberate learning because he stated that he did not want to examine the multitude of phenomena and forces that produce change in a person without that person's having a strong desire to learn. However, to neglect incidental learning during pregnancy may be a serious omission. As noted in Chapter II, there are numerous opportunities available to pregnant women to engage in learning. Many of these opportunities occur incidentally.

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[5] Allen Tough, The Adult's Learning Projects, 2nd ed. (Toronto: The Ontario Institute for Studies in Education, 1979), p. 1.

For example, during a visit with a family member or friend, the topic of alcohol consumption may be brought up by chance occurrence. An exchange of information may occur, resulting in learning by the pregnant woman. As well, a woman may happen to come across a television program on an educational network that focuses on smoking during pregnancy. At that point she decides to watch the program; however, there had been no deliberate attempt to seek out an audiovisual production on the hazards of smoking during pregnancy. Because of the unique learning opportunities available to pregnant women, it is the position of this researcher that both deliberate and incidental learning opportunities must be examined. The individual has the final choice to withdraw from the conversation, to change the subject, and in the case of reading or viewing audiovisual productions, not engage in such activities.

Tough quantified highly deliberate attempts at learning and defined a learning project as involving at least seven hours of intentional learning within a six month time period. A learning project could be comprised of several learning episodes each of which has to be a minimum of ten minutes in duration. Tough defined an episode as a period of time devoted to activities such as reading, listening, or watching. The activities during an episode include all the person's experiences: doing, thinking, feeling, and seeing. Because of the fact that Tough's quantification of a learning project was arbitrary, and because opportunities for learning during pregnancy are unique and include medical intervention, and because learning about weight gain, alcohol consumption, and tobacco use is an unexplored area, it might be premature to quantify a learning project in this study as requiring a specified time period. For example, learning could potentially occur about tobacco use with a physician in less than ten minutes. It is feasible to expand upon the detrimental effects of smoking during pregnancy in a few minutes. The message however could be reinforced by the physician in subsequent visits. As well, the limit of a six month time period is expanded in this study to include the entire pregnancy, nine months in duration.

Pregnancy is a significant period of time for women and as such it is not unreasonable to address the learning which occurs during the entire nine months. Accordingly, no attempt is made in this research to differentiate between: learning projects occurring within the past six months and those occurring during the nine months of pregnancy; learning projects of more than seven hours in duration and those of less than seven hours in duration; and, learning episodes of more than ten minutes in duration and those of less than ten minutes in duration.

One of Tough's contributions in identifying the processes of how adults learn is his elaboration of the types of planners for various learning projects. Tough viewed the planner as:

> *the person or thing responsible for more than half of the detailed day-to-day planning and deciding in a learning project. That is, the planner makes the majority of decisions about what to learn (the detailed knowledge and skill) in each learning episode, and/or about how to learn (the detailed strategy, activities, and resources). In addition, the planner may also decide when to begin each learning episode, and the pace at which to proceed.* [6]

Tough distinguished among five different types of learning projects as outlined in Table 1. In a **self-planned learning project** the individual retains the major responsibility for the decisions regarding content and strategies of the learning (greater than 50 percent of the planning). In a **group-planned learning project** a class or group of individuals retains the major responsibility for the decisions regarding content and strategies of the learning (greater than 50 percent of the planning). The class or group directs the learner's learning activities. In a **one to one-planned learning project** a friend, family member, or professional retains the major responsibility for the decisions regarding content and strategies of the learning (greater than 50 percent of the planning). The professional or nonprofessional directs

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[6] Allen Tough, The Adult's Learning Projects, 2nd ed. (Toronto: The Ontario Institute for Studies in Education, 1979), p. 77.

TABLE 1

Tough's Typology of Planners in Learning

Types of Planners	Types of Learning Projects
The learner	Self-planned learning project
A group or its leader-instructor	Group-planned learning project
One person in a one to one situation	One to one-planned learning project
A nonhuman resource	Nonhuman-planned learning project
Mixed (no dominant type of planner)	Mixed-planned learning project

the learner's learning activities. In a **nonhuman resource-planned learning project** a nonhuman resource provides the content and strategies of the learning (greater than 50 percent of the planning). The learner uses items such as programmed instructional materials to provide the direction for the learning activities. In a **mixed-planned learning project** no one person, group, or object retains the major responsibility (less than 50 percent of the planning) for the learning activities. A succession of planners exists.

Tough developed a methodology to identify the planners of learning projects. It is comprised of probing questions asked by the interviewer to arrive at who planned the learning project. The interviewees are provided with a sheet containing a description of the types of planners, and they are asked by the interviewer to identify which description best matches their learning project. A dialogue between the interviewer and the interviewees follows. On the sheet given to the interviewees, group-planning was described as having a group or a class or a conference decide on the activities and detailed subject matter of the learning project. A group was identified as being more than five individuals. One to one-planning was described as having one person (instructor, teacher, expert, or friend) decide on the activities and detailed subject matter of the learning project. Private music lessons, individual lessons with a golf pro, or being taught to drive by a family member were given as examples. Nonhuman resource-planning was described as having an object provide the activities and detailed subject matter of the learning project. For example, a set of programmed instruction materials, a workbook, a series of television programs were identified as nonhuman planners. The learner follows the program or materials. Self-planning was described as a situation where the learner decides on the learning activities and detailed subject matter of the learning project. The learner could get advice from various people and use a variety of materials and resources, but it is the learner who decides and retains the responsibility for identifying the subject matter and resources utilized.

From examining Tough's conceptualization of planners, the concept of self-planner can be extended to include the learner deciding on conducting a learning project in a group setting, in a one to one setting, or in a nonhuman setting. A definitional problem with Tough's planners is therefore brought to surface when the self-planner is described. It may be difficult for individuals to identify whether their learning project was planned by one other individual or whether the learning project was self-planned using another individual as a resource. Spear and Mocker (1984) conducted in-depth interviews with 158 individuals who had not earned a high school diploma to identify the motivating or triggering events that set learning projects into motion. Evidence was found that preplanning had not occurred except in rare instances and then only in a vague fashion. Furthermore, it was the environmental circumstances which structured or organized the learning process. Resources were utilized that were available in the environment. If one attempts to apply Tough's typology of planners to learning during pregnancy, and specifically to the topics of weight gain, alcohol consumption, and tobacco use, it is clear that a substantial adaptation of Tough's typology of planners is required to consider the environmental circumstances of how pregnant women go about their learning as well as to allow for the possibility that preplanning may not occur.

In the literature, criticism of Tough's typology of the different types of planners has been voiced by Boshier (Brookfield, 1984) who believes that Tough's self-planned learning projects should be more precisely defined as self-education. Boshier argues that the term education describes the process of managing external conditions which would facilitate internal change or learning. Boshier views Tough's definition of self-planned learning as encompassing the process of managing external conditions. This semantic confusion and distinction between learning and education is acknowledged. However, for the purpose of clarity and internal consistency, the terminology employed by Tough is used in this dissertation.

In his original research, Tough found that of all the projects undertaken by learners 68 percent were self-planned, 12 percent group-planned, 8 percent one to one-planned, 3 percent nonhuman resource-planned, and 9 percent mixed-planned. These results were of particular significance to educators since there was awareness of the existence of self-planned learning reported by Johnstone and Rivera in 1964 (Brookfield, 1984), however the occurrence was not thought to be as widespread as reported by Tough.

Tough's research has led to numerous verification studies (Cobb, 1978; Hiemstra, 1976; Penland, 1979; and Shackleford, 1983), since Tough's original work was based on a small select unrepresentative sample of sixty-six individuals. Tough (The International Encyclopedia of Education, 1985) reported that nearly fifty surveys have been conducted in North America, the United Kingdom, Australia, and New Zealand, as well as in Africa, Israel, and the Caribbean. He estimated that approximately 73 percent of all learning projects are self-planned, 14 percent are group-planned, 10 percent are one to one-planned, and 3 percent are nonhuman resource-planned. The verification studies have also been subjected to criticism by Brookfield (1984) as dealing with the middle class population; however, Caffarella

(1985) states that studies by Leean and Sisco, examining learning among under educated adults in rural Vermont, and by Shackleford, examining learning among black adults in Havana, Florida, are examples which suggest that self-planned learning exists even in hard to reach populations.

Because of the specificity of the topics being investigated in this dissertation (weight gain, alcohol consumption, and tobacco use), and because preplanning may not occur for learning projects (Spear and Mocker, 1984) the process of how women actually go about planning their learning will not be examined but the end results of how women have learned during pregnancy are the focus of this research study. An adaptation of Tough's conceptualization of how adults learn can be seen as a useful tool to examine learning during pregnancy. However, using only the work of Tough to identify the learning patterns of pregnant women would seem to be limiting, as it does not concern itself with the quality of learning. As has been mentioned previously, Tough's work has been criticized by Brookfield (1984) as not dealing with the quality of learning, that is, learning in terms of some external measure of its effectiveness. Measurement of the quality of learning in this study will be addressed by identifying knowledge levels of pregnant women and by identifying the association between learning and health behavior.

Tough does not assume that any single type of learning project is superior to any other. Neither does he view learning guided by an instructor or group as better than any other form of learning. This is in contrast to Knowles (1975) who views self-initiated, self-planned learning as the best way to learn. Knowles's underlying assumptions are that the self-initiating, self-planned learner will learn more, will learn better, and will retain and make better use of the learning. There exists, however, no research evidence to substantiate these assumptions. Knowles (1975) defined self-directed learning as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human resources and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.

Knowles views the concept of self-directed learning as being an important phenomenon in an era of knowledge explosion and technological revolution. The faith in the power of transmitted knowledge is no longer appropriate (Knowles, 1980). People become ready to learn when they experience the need to learn, one of Knowles's assumptions about learners. If pregnant women are not ready to learn about the effects of weight gain, alcohol consumption, and tobacco use on the fetus, it is unlikely that they will modify their behavior to reflect current health recommendations.

One means of measuring Knowles's concept of self-directedness, as it relates to learning during pregnancy, is to identify whether women had initiated the learning episodes or whether someone else had initiated the learning episodes about the topics of weight gain, alcohol consumption, and tobacco use. Knowles's assumption of self-initiated learning will be tested, that is: self-initiating learners will learn more (higher knowledge levels) and self-initiating learners will make better use of the information (ideal health behaviors) than individuals whose learning is initiated by others.

Tough's concept of time in learning, resources utilized and settings of learning, as well as Knowles's concept of initiators of learning can serve as the basis for identifying the learning patterns of pregnant women. More specifically, the following components will be identified to better understand how pregnant women learn: resources utilized, advice given by each resource, amount of time spent in learning, and initiators of the learning episodes. Because it is not feasible to identify planners of learning for specific topics such as weight gain, alcohol consumption, and tobacco use, learning transaction types will be developed instead. Learning transaction types will provide a profile of where and how women spend most of their time in learning and the circumstances of this learning, that is: engagement in self-initiated learning episodes in the group setting, in the one to one setting, and in the nonhuman setting; and, other-initiated learning episodes in the group setting, in the one to one setting, and in the nonhuman setting. As such a composite picture of learning during pregnancy can be identified. What pregnant women learn, how they learn, and the association between learning and behavior form the basis upon which the key research questions are developed.

In summary, Tough has provided a perspective on how adults go about learning. It encompasses an examination of learning projects upon their completion to obtain a sense of what has transpired during deliberate learning. The majority of learning projects are planned by the learners themselves, that is the learners decide on the learning strategies and detailed content. Tough's work has, however, been criticized in the literature as failing to examine the quality and outcome of learning. Because the topics examined in this dissertation are specific, and because learning during pregnancy may be influenced by the environmental circumstances of learning opportunities available to pregnant women, and because learning may be incidental as well as deliberate, an adaptation of Tough's view of how adults learn and Knowles's concept of self-directed learning are required for describing the methodology of this study. Having presented the learning component of the conceptual framework, it is appropriate to turn to the second component, health beliefs.

The Health Beliefs Component

The Health Belief Model grew out of an independent set of applied research problems which a group of investigators, Hochbaum, Kegeles, Leventhal, and Rosenstock, were confronted with in the 1950's (Rosenstock, 1974b). The widespread failure of people to accept disease preventives or screening tests for early detection of asymptomatic disease was the basis for development of the model. The Health Belief Model is concerned with the subjective world of the acting individual and was developed to explain *preventive health behavior* (Maiman and Becker, 1974). Health behavior is defined as any activity undertaken by persons who believe themselves to be healthy for the purpose of preventing disease or detecting disease in an asymptomatic stage (Rosenstock, 1974a). The definition of health behavior focuses on healthy individuals and may be appropriately applied to the behaviors of pregnant women since pregnancy is a normal physiological process and women follow certain health recommendations in their attempt to have healthy babies. More specifically, women monitoring their weight gain, and controlling their alcohol and smoking practices during pregnancy to conform to current health recommendations would be taking preventive action to increase their chances of having a healthy pregnancy outcome.

People have innumerable beliefs, but they may not act in accordance with or in recognition of their beliefs. For the Health Belief Model, activation of pertinent beliefs was necessary (Kirscht, 1974). Belief was defined by Kirscht to mean any proposition or hypothesis held by a person relative to two or more psychological elements or objects.

Rosenstock (1974b) states that there are two central elements of the Health Belief Model, consisting of four components. The first element is the individual's readiness to take action as determined by the person's perception of the susceptibility or vulnerability to a particular condition (component one), and by the person's perceived severity of the consequences of contracting the condition (component two). The second element is the individual's evaluation of the advocated health action in terms of its feasibility and benefit (component three) weighted against the person's perceptions of the psychological and other barriers or costs of the proposed action (component four). The four key components of the Health Belief Model are: *perceived susceptibility*, *perceived severity*, *perceived benefits*, and *perceived barriers*. The combined levels of susceptibility and severity provide the force for an individual to act and the perception of benefits, minus the barriers, provide an individual with a preferred path of action (Rosenstock, 1974a). In addition Rosenstock states that another component, cue to action, is necessary for activating this process into motion. *Cue to action* is described as a triggering mechanism defined as either an internal or external stimulus. Internal stimuli can be perceptions of bodily states and external stimuli can be mass media campaigns or advice from others. The condition of cue to action can be met during pregnancy, for the perceptions of bodily states (internal stimuli) are common among pregnant women. Women are particularly aware of the physical, psychological, and social changes which occur during their pregnancy. The learning that occurs during pregnancy can act as external stimulus. Cue to action, however, has not been systematically studied. During the seventies, another component was introduced into the model. Becker introduced the notion of health motivation on the basis that motives selectively determine an individual's perception of the environment (Mikhail, 1981). Health *motivation* is referred to by Becker as an individual's degree of interest in and concern about health matters (Mikhail, 1981). Motivation is referred to by Rosenstock (1982) as representing the need or desire for achieving health related goals. According to the Health Belief Model, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and motivation (concern) are important components for predicting whether individuals will seek health care or follow health recommendations.

Rosenstock (1982) acknowledges that the Health Belief Model cannot account for all factors affecting behavior. Some behaviors such as smoking have a substantial habitual component, and some health behaviors are undertaken for nonhealth reasons

(Janz and Becker, 1984). However, empirical support for the Model exists for preventive health behaviors such as: accepting immunization for polio vaccination (Rosenstock, Derryberry, and Carrigen, 1959); complying with a medical regime for asthma (Becker et al., 1978); participating in genetic screening programs (Becker et al., 1975); and, parents' adhering to preparing diets prescribed for their obese children (Becker et al., 1977). However, the research has not always supported the model, and Hochbaum (1958), Kegeles (1963) and Kirscht, Kegeles, and Rosenstock (1966) were unable to demonstrate support for the condition of *perceived severity.* Rosenstock (1974a) suggests that the role of perceived severity is clearer in studies of illness and sick role behavior. Other limitations of the research conducted with the health belief model, as reported by Rosenstock, have included: (1) the different operational definitions of the variables which are specific to each study, (2) the small sample size of the studies, (3) the middle class bias of the model, since the concept of health beliefs implies orientation to the future, and (4) the stability of beliefs over time.

Janz and Becker (1984) reviewed forty-six research studies which used the Health Belief Model. The majority of these studies employed correlational analyses to determine the association between the components of the model and health behaviors. Only a few studies employed path analyses based upon the presentation of the model. Because the primary purpose of this present research study is to examine learning during pregnancy, and since learning is not a key component of the Health Belief Model, correlational analyses between components of the Health Belief Model and health behavior are used.

The following components of the Health Belief Model are adapted and incorporated as part of the conceptual framework in this research study: (1) concern, defined as concern about prenatal health behaviors, (2) perceived susceptibility, defined as perceived risk to the woman's unborn child in relation to prenatal health behaviors, (3) perceived benefits, defined as perceived usefulness of the information received in managing prenatal health behaviors, and (4) perceived barriers, defined as perceived obstacles or problems in managing prenatal health behaviors. Since the primary focus of this study is learning, the benefits component is operationalized in terms of learning benefits. The perceived severity component is excluded from this study, based upon the inconsistent evidence in the literature for the support of this component for predicting preventive health behaviors (Rosenstock, 1974a), and the sensitive nature of the questions that would have to be asked of women who may have given birth to an infant with health problems. The condition of cue to action is assumed to be present because of the physical, psychological, and social changes occurring during pregnancy as well as the learning which occurs during pregnancy.

In summary, the Health Belief Model was developed in the 1950's to explain preventive health behaviors. It is concerned with the subjective world of the individual, to take action for the purpose of preventing disease or health problems. Women monitoring their weight gain and changing their alcohol and smoking practices during pregnancy would be taking preventive action to increase their chances of having a healthy pregnancy outcome. For the purposes of this research study concern, perceived susceptibility, perceived benefits, and perceived barriers are examined in relation to prenatal health behaviors.

The Research Questions

In this investigation of learning during pregnancy, the following questions are raised:

1. What are the learning patterns of pregnant women?
    a. What are pregnant women learning about weight gain, alcohol consumption,

and tobacco use?

b. How do pregnant women learn?

1) Which resources are utilized?

2) What advice is given by each resource?

3) What amount of time is spent in learning?

4) Who initiates the learning episodes?

5) What learning transaction types emerge?

2. What is the relationship between self-initiated learning with health behaviors of pregnant women?

3. What is the relationship between health beliefs (concern, perceived susceptibility, perceived benefits, and perceived barriers) with health behaviors of pregnant women?

Answers to these questions would provide educators with a composite description about how pregnant women learn, and about factors associated with ideal health behaviors.

Hypotheses of the Study

As an extension of the conceptual framework and from the current literature reviewed, and an extension of the process of learning as viewed by this researcher, six sets of hypotheses are proposed for testing. The rationale for including each hypothesis is first presented, followed by an enumeration of the hypotheses to be tested.

At the beginning of the pregnancy women become aware that they are pregnant. This awareness can have its origin in either a planned or an unplanned pregnancy. The concept of a planned pregnancy in the eighties takes on new meaning with more older, well educated women planning to become pregnant (Zouves, 1986). Whether planning a pregnancy is a triggering mechanism for women to engage in more learning than those women not planning a pregnancy is unknown. The relationship between planning the pregnancy with time spent in learning and number of resources utilized will be examined in hypothesis one. Hypothesis one was included to determine the association between learning and engagement in learning. However, since Darkenwald and Merriam (1982) state that age and level of education are the most important sociodemographic factors in predicting participation in learning activities, these variables will be controlled in the analyses.

During the early stages of the pregnancy, when one becomes aware of the pregnancy, concern may develop about health habits. The awareness of increased body weight, the awareness of drinking and smoking habits, which now not only affect the women but also can affect the fetus, come to the forefront. The question is whether the degree of concern over these health issues is associated with spending more time in learning or seeking more resources about these issues. Hypothesis two will examine the relationship between concern about health behavior and time spent in learning. Hypothesis three will examine the relationship between concern about health behavior and number of resources utilized.

As previously described in the learning component of the conceptual framework, Knowles assumes that self-initiated learners will learn more. The relationship between self-initiated learning and knowledge levels will be tested in hypothesis four. Knowles also assumes that self-initiated learners will make better use of the information. The relationship between self-initiated learning and ideal health behavior will be tested in hypothesis five.

Because it is not known whether learning during pregnancy is directly associated with ideal health behavior, and because there is evidence in the literature that health beliefs may be important determinants of behavior, the association between beliefs and behavior will be examined in hypothesis six.

Statement of Hypotheses

The principal hypotheses of this study are: (1) self-inititated learning will be correlated with higher knowledge scores, (2) self-initiated learning will be corrrelated with ideal health behaviors, and (3) health beliefs will be correlated with ideal health behaviors.

1 (a) "Women whose pregnancies were planned will have spent significantly more hours in learning than women whose pregnancies were unplanned."

1 (b) "Women whose pregnancies were planned will have utilized significantly more resources than women whose pregnancies were unplanned."

2 (a) "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with hours in learning about weight gain."

2 (b) "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with hours in learning about alcohol consumption."

2 (c) "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with hours in learning about tobacco use."

3 (a) "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with number of resources utilized for the topic of weight gain."

3 (b) "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with number of resources utilized for the topic of alcohol consumption."

3 (c) "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with number of resources utilized for the topic of tobacco use."

4 (a) "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with scores on a knowledge test about weight gain."

4 (b) "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with scores on a knowledge test about alcohol consumption."

4 (c) "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with scores on a knowledge test about tobacco use."

5 (a) "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with a measure of ideal weight gain during pregnancy."

5 (b) "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with reduced alcohol consumption during pregnancy."

5 (c) "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with reduced cigarette smoking during pregnancy."

6 (a) "Scores on a 'Weight Gain Health Belief Measure' will be significantly positively correlated with a measure of ideal weight gain during pregnancy."

6 (b) "Scores on an 'Alcohol Health Belief Measure' will be significantly positively correlated with reduced alcohol consumption during pregnancy."

6 (c) "Scores on a 'Smoking Health Belief Measure' will be significantly positively correlated with reduced cigarette smoking during pregnancy."

Summary of Chapter III

In Chapter III, the framework of this study was described. The framework consists of an adaptation of Tough's (1979) concept of planners, Knowles's concept of self-directed learners, and an adaptation of the components of the Health Belief Model developed by Hochbaum, Kegeles, Leventhal, and Rosenstock (Rosenstock, 1974b). This framework led to the identification of the research questions. The research questions are: "What are the learning patterns of pregnant women and what is the relationship between learning and behavior as well as between health beliefs and behavior of pregnant women?" The research hypotheses are as follows: (1) women whose pregnancies were planned will have spent more hours in learning and will have utilized more resources, (2) concern about health behaviors will be positively correlated with hours in learning, (3) concern about health behaviors will be positively correlated with number of resources utilized, (4) self-initiated learning will be positively correlated with knowledge scores, (5) self-initiated learning will be positively correlated with ideal health behaviors, and (6) health beliefs will be positively correlated with ideal health behaviors. At this point it is appropriate to turn to a consideration of the methodology of data collection and analyses.

CHAPTER IV

METHODOLOGY

The methodology of this study was designed to answer the research questions identified in Chapter III: "What are the learning patterns of pregnant women, and what is the relationship between learning and behavior as well as between health beliefs and behavior of pregnant women?" The process of investigating learning patterns consisted of identifying: (1) what women knew about weight gain, alcohol consumption, and tobacco use, (2) which resources were utilized, (3) what advice was given by each resource, (4) what amount of time was spent in learning, (5) who initiated the learning episodes, and (6) what learning transaction types emerged. Determining learning transaction types was based upon an adaptation of Tough's (1979) typology of planners, and Knowles's concept of self-directed learners. The process of identifying health beliefs consisted of questioning pregnant women regarding their concerns, perceived susceptibility, perceived benefits, and perceived barriers, defined according to an adaptation of the Health Belief Model developed by Hochbaum, Kegeles, Leventhal, and Rosenstock (Rosenstock, 1974b).

The study consisted of an ex post facto research design. An interview schedule, developed for the purposes of this study, was the principal instrument used for data collection. It was selected in order to obtain information about alcohol and smoking behaviors from subjects, which they might not have revealed through other forms of data collection. Interviews were conducted with 120 women, who were interviewed within the week following the delivery of their infants at hospitals in the Lower Mainland of British Columbia. All hospitals with average monthly births of greater than 100 participated. The structured interviews were approximately one hour in duration.

Chapter IV consists of six sections. Section one provides the rationale for selecting the research design. Section two describes the population and sample, and section three outlines the data collection procedures. Section four provides a description of the development, content, and reliability of the interview schedule, and section five identifies data analyses appropriate for the stated hypotheses. The final section is a summary of Chapter IV.

Research Design

An ex post facto design was selected because it was the most feasible design for the purposes of this study. As stated in Chapter III, the primary purpose was to examine learning that occurred in all settings, that is, how women learned during their pregnancy. The ex post facto design was selected rather than an experimental design since it would be impossible to observe prospectively the phenomena of learning without influencing the results. For example, if one were to follow women during their pregnancy and ask them to describe what they were learning, the women might have a tendency to seek more information so they would be able to report this information to the researcher. Problems associated with a prospective study on learning during pregnancy include the following: (1) The external validity of the research design would be seriously threatened due to the Hawthorne Effect. Attempting to conceal the purpose of the study from the research subjects, so as to control for the Hawthorne Effect, would be in violation of Ethical Guidelines for Research with Human Subjects (Social Sciences and Humanities Research Council of Canada, 1979); (2) Identifying women immediately upon conception so as to begin the experiment at the same period of time for all participants would not be feasible. Variation exists for the time at which women become aware they are pregnant, as well as the time at which they seek prenatal care; and (3) The pretest may direct women to learn the responses to the pretest knowledge questions. Borg and Gall (1983) report that an experimental group receiving a pretest are more likely to perform at a higher level on the posttest than a corresponding experimental group that does not receive a pretest. Even when the posttest is different from the pretest, the problem of pretest sensitization remains. A secondary reason for selecting an ex post factum design was that Tough's framework, upon which this study was based, involved examining completed learning projects. Thus, a retrospective study was most appropriate for identifying learning patterns of pregnant women.

Although the ex post facto design was suited for the purposes of this study, there are several limitations inherent in this design. First, recall was required by the research subjects. In Tough's studies on the phenomena of learning, recall was required of the learner for the past six to nine months. Tough and his associates successfully assisted subjects to identify learning projects from that time period. They reported that for those individuals with difficulty recalling their learning, the interview schedule included probing questions (Tough, 1979). Because of the specificity of the questions asked of the subjects in this present study, and because pregnancy is usually a significant time in a woman's life, it was assumed that memory deficiencies would not have compromised the results of this study. Second, identification of subjects' concerns, perceived susceptibilities, perceived benefits, and perceived barriers was a problem. In a retrospective study, beliefs and behaviors are identified at the same time and it may be that the decision to act modifies individuals' beliefs. Rosenstock (1974a) points out that the Health Belief Model predicts health behaviors, and it ideally should be tested where beliefs are known to have existed prior to the behavior which they are intended to predict. Janz and Becker (1984), in a critical review of the research conducted with the Health Belief Model, state that greater prediction has been obtained in some prospective studies, although both prospective and retrospective studies have yielded substantial empirical evidence to support the dimensions of the Health Belief Model. Even though there is a limitation of using the retrospective study to identify health beliefs, the ex post facto design was selected since the primary focus of this study was learning and the ex post facto design was the most feasible design to examine learning during pregnancy.

In summary, the ex post facto research design was chosen as the most feasible approach to study the phenomena of learning among pregnant women. Discovering significant relationships among the variables in this study represents a valuable contribution to knowledge regarding learning during pregnancy, even given the limitations inherent in retrospective research.

Population and Sample

The population of this study was women who gave birth to their first infant between June and October of 1986 at hospitals in the Lower Mainland of British Columbia with average monthly births of greater than 100. The study was limited to women experiencing their first pregnancy in order to control for the confounding variable of learning experiences from previous pregnancies. Hospitals with more than 100 births per month were selected in order to avoid waiting for women to deliver in the hospitals with smaller maternity wards. Hospitals in the Lower Mainland with more than an average of 100 births per month were: Grace, Royal Columbian, Surrey Memorial, Burnaby, Lion's Gate, Richmond, and Saint Paul's. Although obtaining a sample of women from one hospital in Vancouver would have been more efficient, it would not be representative of the pregnant population because of the differences within the hospital maternity ward regulations which might attract different women. For example, some hospitals are non-smoking hospitals and do not provide a smoking lounge for patients who are smokers.

Women excluded from the sample of this study were: (1) those identified by the medical staff as having emotional complications as a result of the pregnancy or birth, (2) those unwilling to participate, (3) those unable to provide oral information in English, (4) those unable to read the written consent form in English, (5) those experiencing their second or subsequent pregnancy, and (6) those having a multiple birth.

A proportional sample of 120 women was selected from the seven selected hospitals. The annual and average monthly delivery numbers, as well as the number of research subjects required from each hospital are outlined in Table 2. Annual delivery numbers are reported for 1984, since 1985 statistics were not available at the time of data collection during the summer of '86.

TABLE 2

Annual and Monthly Delivery Numbers of Hospitals Participating in the Study with Corresponding Number of Research Subjects

Hospitals	Annual Births in BC: 1984		Average Monthly Number Births	Research Subjects	
	No.	%*	(Number)	No.	%**
Grace	7403	16.8	617	50	42
Royal Columbian	2583	5.9	215	17	14
Surrey	2310	5.2	193	15	13
Burnaby	1626	3.8	136	11	9
Lion's Gate	1510	3.4	126	10	8
Richmond	1368	3.1	114	9	7
St. Paul's	1213	2.8	101	8	7
Total	18,013	41%	1502	120	100%

* Percentage of the total number of births in B.C.: 44,404 births in 1984.
** Percentage of the total sample in this research study.

The number of subjects required from each hospital to make a proportional sample of 120 was calculated using the following formula: ([average monthly number of births for the hospital multiplied by 120] divided by the total average monthly births for all seven hospitals). An example calculation is as follows: Lion's Gate hospital with an average of 126 monthly births ($[126 \times 120] \div 1502 = 10$ subjects).

A sample size of 120 women was selected for two reasons. First, the statistical analyses used in this study for hypotheses testing were primarily correlational analyses, for which a minimum of thirty subjects is desirable (Borg and Gall, 1983). Since approximately 30 to 40 percent of Canadian women smoke, a minimum of 100 subjects was required for testing of the smoking hypotheses using correlational analyses. The larger the sample, the less likely it is that a Type II error will occur, that is, failing to reject the null hypothesis when it is false. Second, multiple regression analyses were used to examine the relationships among health beliefs and ideal health behaviors. The health belief measure consisted of four components: concern, perceived susceptibility, perceived benefits, and perceived barriers (four independent variables). A sample of fifteen to thirty subjects per independent variable is desirable. In order to have sufficient numbers for the correlational and multiple regression analyses, a sample size of 120 subjects was targeted for this study.

In summary, the population of this study were women who gave birth to their first infant between June and October of 1986 at hospitals in the Lower Mainland of British Columbia with average monthly births of greater than 100. A proportional sample of 120 women was selected from the following seven hospitals: Grace (fifty subjects), Royal Columbian (seventeen subjects), Surrey (fifteen subjects), Burnaby (eleven subjects), Lion's Gate (ten subjects), Richmond (nine subjects), and St. Paul's (eight subjects).

Data Collection Procedures

Administrators of the selected hospitals in the Lower Mainland were approached to request hospital endorsement of the research study. Initial contact was made by telephone requesting an interview with the administrator or other appropriate hospital personnel. A Research Information Package (Appendix 2), approved by the "The University of British Columbia Behavioural Sciences Screening Committee" (Appendix 3), was made available to each hospital. The package included: a Letter of Introduction to Hospitals (Appendix 4), Initial Introduction to Research Participants (Appendix 5), Letter of Introduction to Participants (Appendix 6), Research Consent Form (Appendix 7), Research Study Summary Statement (Appendix 8), and Learning Patterns of Pregnant Women Interview Schedule (Appendix 9).

The following data collection procedures were proposed to each hospital: The researcher would request from Admissions Department the names of nulliparous women admitted to the maternity ward on the preceding day. Subjects would be randomly selected from this information using a table of random numbers. Following, the researcher would approach the charge nurse or other appointed hospital personnel to determine whether the women randomly selected met eligibility criteria of the study. If the women met eligibility criteria, they would be advised by the attending physician or hospital personnel that a researcher from The University of British Columbia was interested in meeting with them to request their participation in a study about learning during pregnancy. If the women granted permission for the researcher to approach them, a time convenient to both hospital personnel and each woman would be established so that the researcher could meet with the woman in her hospital room to request her participation in the study. A letter of introduction would be given to the woman. It would be made explicit that participation was voluntary and she could withdraw from the study at any time. Before conducting the interview, the woman would be asked to sign a written consent form. Following the interview, the researcher would approach the nursing staff or other appointed hospital personnel to obtain the birth weight and gestational age of the fetus (as documented by physician examination) from medical records. The woman and hospital staff would be thanked for their cooperation. Modifications to these procedures were made during data collection as reported in Chapter V, "Sample Characteristics."

In summary, the administrators of selected hospitals were contacted and asked for hospital endorsement of this study. Each administrator received a research information package describing the study and proposed procedures for data collection. Prospective research subjects would be provided with a letter describing the study and it would be made clear that their participation was voluntary. Birth weight and gestational age of the fetus would be obtained from medical records. A written consent form would be signed by the research subjects prior to the interview and release of information from medical records.

Interview Schedule

An interview schedule was constructed as the principal instrument used in this study. Weight gain, alcohol consumption, and tobacco use were the topics addressed in this dissertation, and because of their specific focus a "structured" interview schedule was developed. The primary reason for selecting the interview was to obtain information that subjects would probably not reveal through other forms of data collection, such as the self-administered questionnaire (Borg and Gall, 1983). This reason is significant since with interviews it would be possible to obtain more accurate information about alcohol and smoking behaviors of pregnant women. By using the interview technique in preference to the self-administered questionnaire, the validity of the data related to health behaviors was maximized. Since it was not feasible to validate alcohol and smoking behaviors by an external observer, the method of data collection was crucial in obtaining a response which best represented actual health behaviors. Another reason for selecting the interview, in preference to the self-administered questionnaire, was to avoid having women consult other individuals when responding to the questions asked. Cross-consultation would have seriously jeopardized the knowledge test response data (Sudman and Bradburn, 1982). Further support for selecting the interview was the extensive data base required for the study. For self-administered questionnaires, Sudman and Bradburn (1982) suggest that questionnaires be limited to two to four pages for nonsalient topics and approximately sixteen pages for salient topics. The interview schedule developed for the purposes of this study was forty-three pages in length and required one hour to complete. For salient topics, Sudman and Bradburn (1982) state that personal interviews can last for an hour or an hour and a half. Furthermore, the process of responding to interview questions would be easier than completing a lengthy questionnaire. Following the experience of giving birth, many women feel fatigued and therefore the task of completing a long written questionnaire may have been physically demanding. As well, women may be excited about their new arrival and thus eager to discuss their learning experience in the interview setting. Final support for selecting the interview, in preference to the self-administered questionnaire, is that the research conducted by Tough (1979) and subsequent verification studies (Penland, 1979) successfully utilized interview schedules for identification of adult learning projects. In conclusion, the interview schedule was considered to be the most appropriate data collection instrument for this study.

Although the interview was suited for the content and nature of the questions asked, there were several limitations in using the interview. The greatest limitation was the possible bias resulting from interactions between the subjects and the interviewer (Borg and Gall, 1983). Sources of bias between the interviewer and the subjects included: (1) eagerness of the subject to please the interviewer, and (2) tendency of the interviewer to seek out answers that support the researcher's preconceived notions. Controlling for the tendency of subjects to give inaccurate or socially acceptable information, defined as response effect (Borg and Gall, 1983), was managed by ensuring that the sequencing of questions in the interview schedule was such that it did not lead the subjects to provide socially or medically accepted answers. For example, the knowledge test questions were placed after obtaining health behavior data. As well, three interviews were tape recorded so as to determine whether the interviewer, this investigator, led the respondents or solicited certain answers from the respondents. The tape recorded interviews were conducted with three volunteers, outside the hospital setting. These three volunteers were colleagues of this researcher, since it was decided that it would be less threatening to ask colleagues for consent to tape record the interview. These three interviews were conducted within three weeks of the birth of their infants. The investigator's research supervisor had listened to these three tape recordings and noted that during the first recorded interview, the interviewer gave approval for answers to two knowledge test questions. No other leading or approving comments were made by the interviewer during the other two tape recorded sessions. There were close to 300 questions asked during every interview. Since the interviewer gave approval to only two out of approximately 300 responses, the degree of error due to interviewer's bias was less than 1 percent.

The revised interview schedule, entitled "The Learning Patterns of Pregnant Women Interview Schedule" (Appendix 9), was developed and revised for the purposes of this research study. In the following sub-sections, the development, the content, and the reliability of the research instrument are addressed.

Development of the Research Instrument

The development of the Learning Patterns of Pregnant Women Interview Schedule consisted of two phases, the prepilot study and the pilot study. The interview schedule was constructed as an assignment in the Educational Psychology Course #529 "Test Construction" at The University of British Columbia.

Prepilot Study

The prepilot consisted of interviewing three primiparous women who had given birth at the Maple Ridge Hospital. The three subjects were patients of physicians with "Valley Medical Group," a family practice unit in Maple Ridge. This location was selected because this researcher had worked as a Nutritionist with the Central Fraser Valley Health Unit in Maple Ridge, and as such had had previous contact with the Valley Medical Group Physicians. With the time constraints of Course #529, the prepilot study had to be conducted prior to April, 1986. Valley Medical Group Physicians were able to accommodate this time constraint. In addition, the Maple Ridge Hospital was a suitable location for the prepilot study as this hospital was not part of the population of the research study.

The interview required fifty minutes with subject one, fifty-five minutes with subject two, and sixty minutes with subject three. Interview time included greetings with the new mother, explanation of the study and the interview schedule, signing of the consent form, and conducting the interview.

Subject one was a twenty-six year old, college educated, married woman who worked as a waitress, and whose husband was a carpenter. She was a non-smoker and non-drinker. She also was an avid reader throughout her pregnancy. *Subject two* was a twenty-five year old, grade ten educated woman, married during her fourth month of pregnancy, who worked as a kitchen aid, and whose husband was a salesman. During her pregnancy she reduced her alcohol intake by 85 percent and decreased her cigarette smoking by 50 percent. Subject two was unable to quit smoking. She did little reading except for the materials that were given to her about smoking. Her husband and her employer tried to persuade her to quit smoking. *Subject three* was a twenty-eight year old, university educated, living common law for the past ten years, who worked as an activity supervisor for juveniles, and whose partner was a contractor. Subject three had been a smoker prior to pregnancy and reduced her cigarette smoking by 66 percent. She also reduced her alcohol intake after she knew about her pregnancy and drank a total of four glasses of wine during the remainder of the pregnancy. She read extensively, but to a lesser extent than subject one. The major differences among the three subjects became evident to this researcher during the introduction period, at the time of presenting the written consent form. Subject one was concerned about the formality of signing the consent form and had her husband present during the interview. Subject two showed some apprehension about participating in the study, and this researcher had to provide a more comprehensive description of the interview questions. Subject two was assured that the interview could be stopped at any time if she chose not to answer any of the questions. Once the interview began, subject two had no concerns about the nature of the questions and the interview proceeded well. Subject three showed no apprehension about participating in the study and was eager to begin.

Upon reflection, it is the opinion of this researcher that subject two was most reluctant to participate in the study because she was a smoker who continued to smoke during pregnancy. Her employer, a nurse, had discussed the hazards of smoking, daily, at <u>every</u> coffee break. Subject two had reported that this nurse repeatedly told her "it was bad to smoke" and "she'd have a smaller, a sick and unhealthy baby." Subject two subsequently stopped going to coffee breaks. This demonstrated the importance of having the interviewer take a nonjudgemental attitude toward the subject's report about her weight gain, alcohol consumption, and tobacco use. The counselling background and the work experience of this researcher in dealing with nutritional health behaviors were valuable in placing the women at ease during the interview.

The educational backgrounds of these three subjects were diverse and proved useful in alerting this researcher to modify the interview questions. For subject two, the questions were frequently reworded so that she could easily understand what was being asked. For example: "What was your occupation prior to your pregnancy?" was simplified to "Did you work before you were pregnant?" and "What was your occupation?" As a result, the questions of the interview schedule were reworded and simplified. The questions that needed little modifications were the knowledge test questions. The word "ideally" was added to the knowledge questions about weight gain, in order to eliminate women recounting their personal experiences about weight gain. The sequence of questions was also changed as a result of the prepilot study. Demographic information was moved to the end of the interview schedule so as to be less obtrusive (Sudman and Bradburn, 1982). Knowledge questions about weight gain were placed following the alcohol and smoking questions. The weight gain knowledge test contained thirteen items in contrast to the four and five item alcohol and tobacco knowledge tests. This change in sequence was made because subject two felt discouraged when she was unable to answer many of the weight gain questions, and the investigator sought to reduce or eliminate conditions that caused the interviewee any discomfort. The coded response of "don't know" was subsequently added as a possible answer to every knowledge test item.

Questions regarding self-initiated and other-initiated learning were condensed and the recording format modified, since this researcher found it difficult to record the information being obtained from the subjects based upon the wording of questions used in the prepilot study. The prepilot questions consisted of three questions to identify whether the learning episodes were self-initiated or other-initiated: (1) "Did the doctor initiate the discussion about weight?", (2) [If no] "Did you have specific questions you wanted to ask the doctor about weight gain?", and (3) [If no] "How did the discussion come about?" Questions identifying whether the learning episodes were self-initiated or other-initiated were subsequently changed to: (1) "Did you discuss prenatal weight gain with your family doctor?", and (2) [If yes] "Who brought up the topic?" These questions were repeated for discussion with the obstetrician, nurse, dietitian, family members, and friends. As well, the questions were asked for the topics of alcohol and smoking. In future, when questions are repeated for various individuals and topics the following presentation format will be used in this dissertation: "Did you discuss prenatal weight gain /or/ alcohol /or/ smoking with your family doctor /or/ obstetrician /or/ nurse /or/ dietitian /or/ family member /or/ friend?"

An unanticipated event occurred during the prepilot interviews. Subject one's husband was present during the interview. In responding to many of the questions subject one would answer "we." Because this situation was so unexpected, this researcher did not think to ask the subject to respond as one individual. This circumstance posed a measurement problem because women might not reveal all their drinking or smoking habits in the presence of their partner. As a result of this occurrence, it was decided that research participants would be asked that their partners not be present during the interview. However, this was not an essential condition for participation in the study. It was documented whether the partner was present.

Following the interview, each subject in the prepilot study was asked if she felt that the questions were an invasion of privacy. All replied "no" without hesitation. Other comments were: "interesting questions", "why did you not discuss caffeine", "I hadn't realized how much discussion I had about weight gain with my family." One subject suggested that the interview be done several days before delivery while waiting to be admitted to hospital. Another subject suggested having the questions in advance so that she could have more time to recall her learning experiences.

All three women in the prepilot were asked to comment on the length of the interview. Each said that she did not find it long, although subject one showed visible signs of fatigue on her face approximately forty minutes into the fifty minute interview. Because two of the three interviews were conducted in the lounge area, this researcher felt it important for subsequent interviews to be done at bedside for those individuals still weary after delivery.

Major changes made in the interview schedule as a result of the prepilot study included rewording questions for clarity and simplicity and changing the sequence of the questions. As well, procedures for conducting the interviews were standardized to take place at the bedside of the women and preferably without the partner's presence. The prepilot proved to be a valuable activity in the development of this research instrument.

Pilot Study

The pilot study consisted of interviewing eight women at Langley Memorial Hospital. Langley hospital was not part of the population of the research study. It had an average of seventy-eight births per month. Although the hospital in Abbotsford had an average of ninety-eight births per month, the Langley location was preferred because it was thirty kilometers closer to Vancouver, and this researcher was known in the Langley District because of previous employment with the Central

Fraser Valley Health Unit. During the pilot study, the only changes made to the interview questions related to the health belief measure.

The questions developed and adapted from the Health Belief Model posed the greatest interpretation problems of the entire interview schedule. The prepilot questions regarding the perceived benefits component consisted of "Consider the information you obtained about weight gain /or/ alcohol /or/ smoking, to what degree did you find this information useful in planning for your baby's health?" This question was simplified to "Thinking about all the information you obtained about weight gain /or/ alcohol /or/ smoking, how useful was it?", and then subsequently modified to "Thinking about all the information you had about weight gain /or/ alcohol /or/ smoking, how useful was the information in influencing the way you managed your weight /or/ alcohol consumption /or/ smoking habits?" The second question of the health belief measure that required revision was related to the perceived barriers component: "To what degree in percentages did you gain the weight you hoped you would?", "To what degree in percentages did you change your alcohol practices as you hoped you would?", and "To what degree in percentages did you change your smoking practices as you hoped you would?" The questions were subsequently reworded to: "Thinking back to the beginning of your pregnancy, how much weight were you aiming to gain?", "Thinking back to the beginning of your pregnancy, what changes in your alcohol intake were you aiming to achieve?", and "Thinking back to the beginning of your pregnancy, what changes in your smoking habits were you aiming to achieve?" These questions measured the degree of perceived behavior change rather than an individual's perceived barriers. As such the questions had to be reworded for a third time during the pilot study to read "What obstacles did you experience in managing your weight /or/ alcohol consumption /or/ smoking habits?" followed by, "How difficult was the first obstacle for you?"

The pilot study, consisting of interviewing eight women at Langley Memorial Hospital, was useful in clarifying the health belief questions. The questions concerning perceived usefulness and barriers were modified on the basis of insights gained during the interviewing process.

Content of the Research Instrument

The interview schedule consisted of five sections: (1) Health Behaviors of Pregnant Women (2) Learning Patterns of Pregnant Women (3) Health Beliefs of Pregnant Women (4) Demographic Information, and (5) Newborn Information. Each section is described as follows:

Health Behaviors of Pregnant Women

As previously stated, eating, drinking, and smoking constitute the three behaviors examined. These behaviors are operationalized in terms of their outcomes, that is: weight gain, alcohol consumption, and tobacco use.

Weight Gain

Weight gain consisted of actual weight gain during pregnancy compared with recommended weight gain. Actual weight gain was obtained by subtracting self-report measures of weight before delivery from prepregnant weight. Self-report measures were utilized since hospital records did not include these two values. A validity study of self-report height and weight data was conducted by Pirie et al. (1981) who found that only 0.3 percent of 1,799 women reported that they were two or more inches taller than they actually were, and 1.2 percent reported themselves to be two inches shorter than they actually were. On the other hand, a greater discrepancy for self-reported weight and actual weight measures was found. Thirty-seven percent of the women under-reported their weight by more than five pounds. Since weight gain data were not readily available to this researcher, the limitations of the self-report measure are acknowledged as a limitation of this study.

Recommended weight gain was calculated for every individual and based upon Rosso's (1985) newly devised chart to monitor maternal weight gain. The chart establishes a desirable weight near term equivalent to 120 percent of women's prepregnant standard weight. Rosso based maternal weight at term on the premise that average increment of weight gain during pregnancy is 20 percent. Jelliffe (1966) reports that healthy well fed women gain approximately 15 to 25 percent of their prepregnant body weight. Rosso corrects for underweight status by suggesting that women who are less than 100 percent of their standard weight, the amount they are under 100 percent be added to the 20 percent increment. The chart can be used for women with a prepregnant weight of up to 130 percent of their standard weight. Women who exceed this limit are advised to gain seven kilograms (15.4 pounds). Rosso's calculations for recommended weight gain offer the advantages of not overestimating or underestimating weight gain recommendations for underweight and overweight women. Furthermore, it provides a continuous measure of recommended weight gains for the sample in this study. Because of these advantages, Rosso's calculations were used in preference to the B. C. Ministry of Health weight gain recommendations (McCarthy and Mackay, 1984), which group women into three categories. Recommended gains for healthy primiparous women were 12.5 kilograms (twenty-seven pounds), 13.6 to 14.5 kilograms (thirty to thirty two-pounds) for underweight women, and 7.3 to 9 kilograms (sixteen to twenty pounds) for overweight women.

Standard weight for every individual was obtained using the 1959 Metropolitan Life Insurance Company Desirable Weight Table for Women (1969). This Table presents a range in weight for a given height based upon small, medium and large frames. Midpoints of these values were selected as individuals' standard weights. The 1959 Metropolitan Life Insurance Company Tables were used to identify standard weight since the majority of studies examining the relationship between maternal gain and low birth weight have used these tables.

The Metropolitan Life Insurance Company Tables have been revised, and these were published in 1983. The 1983 standard weights are higher values than the 1959 weight values. There was a 9 percent weight increment reported for short women, a 6 percent weight increment for medium height women, and 2 percent increment for tall women. No reasons for the reported weight increments were stated (Nutrition Today Staff Report, 1983). The 1959 tables were based on data from the 1959 Build and Blood Pressure Study of the Society of Actuaries (1959) and the 1983 tables were developed from new data contained in a similar study conducted by the Society of Actuaries and the insurance company medical directors. In the 1959 tables there were no instructions on how frame size should be measured, whereas in the 1983 tables frame size was determined by elbow measurements. Frame size measures should provide an estimate of fat free mass and should have little or no association with body fat. Himes and Bouchard (1985) conducted a study utilizing six frame measures and found that wrist and ankle breadths were not associated with total body fat while shoulder, elbow, hip, and knee breadth were associated with body fat. Based upon this evidence, measurement using wrist circumference to determine frame size was used in this research study. Procedures for measuring wrist circumference (Grant and DeHoog, 1985) are described as follows: (1) The subject's right wrist is selected for measurement. The subject's fingers should be extended. (2) The measuring tape should be placed around the smallest part of the wrist below the wrist bone. Disposable paper tapes should be used as nonstretch tapes are not recommended for anthropometric measurement. Linder's Chart combining wrist circumference and height was utilized in this study to estimate frame size (Grant and DeHoog, 1985).

In order to calculate recommended weight gain as well as actual weight gain during pregnancy, women's height, prepregnant weight, weight before delivery, and right wrist circumference was included in the interview schedule.

Alcohol Consumption

Alcohol consumption practices were documented prior to the pregnancy and during each trimester of pregnancy. Alcohol intake was obtained by asking the following questions: "What type of beverages did you usually drink?", "How many drinks of beer /or/ cider /or/ wine /or/ liquor /or/ liqueurs did you usually have at a time?", and "How many times per week did you drink beer /or/ cider /or/ wine /or/ liquor /or/ liqueurs?" Type, amount, and frequency of beverages consumed were recorded. One drink was defined as one bottle of beer (11 oz, 335 ml), one bottle of cider (11 oz, 335 ml), one glass of wine (5 oz, 150 ml), one drink of liquor (1.5 oz, 45 ml), or one drink of liqueur (1.5 oz, 45 ml). Alcohol consumption practices consisted of identifying the average number of alcoholic drinks consumed one month prior to pregnancy, and the average monthly number of alcoholic drinks consumed during each trimester of pregnancy.

The adequacy of self-report measures has been questioned in the literature by Williams, Aitken, and Malin (1985). There are, however, few, if any, feasible alternatives to self-report measures in assessing variation in alcohol consumption among individuals. In a study of alcohol consumption among seventy-eight pregnant women, Streissguth, Martin, and Buffington (1976) conducted initial and follow up interviews one week apart to examine alcohol intake recall. A test-retest reliability coefficient of 0.90 was obtained for report of the period *during pregnancy*, and a 0.89 test-retest reliability coefficient was obtained for report of the period *prior to pregnancy*. Rosett, Weiner, and Edelin (1981), in a study providing therapy for women reporting heavy alcohol consumption, compared self-report of alcohol consumption provided to the researcher and self-report of alcohol consumption provided to the clinical staff. Of the 171 women in that study, ten reported heavy drinking to the researcher and only eight reported heavy drinking to the clinical staff. One woman who denied drinking to the researcher reported it, however, to the clinical staff. Self-report measures were utilized in this study as the method of data collection, as an external validation source was not available. Limitations of self-report are acknowledged.

Average monthly number of alcoholic drinks consumed during the month prior to pregnancy and during each trimester of pregnancy was included in the interview schedule. Type of beverage consumed, such as beer, cider, wine, liquor, and liqueur, was also identified through the interview.

Tobacco Use

Cigarette smoking was documented prior to the pregnancy and during each trimester of pregnancy. Tobacco use was obtained by asking the following questions: "On the average, how many cigarettes did you smoke per day one month before you became pregnant?", "On the average, how many cigarettes did you smoke per day during the first three months of pregnancy?", "On the average, how many cigarettes did you smoke per day during the fourth, fifth, and sixth months of pregnancy?", and "On the average, how many cigarettes did you smoke per day during the seventh, eight, and ninth months of pregnancy?" Smoking practices consisted of identifying the average number of cigarettes smoked one month prior to pregnancy, and the average monthly number of cigarettes smoked during each trimester of pregnancy.

The majority of studies which have examined smoking cessation programs have relied upon self-report. In a literature review of twenty-eight published articles on compliance with physician advice to quit smoking, Pederson (1982) found that only two of these twenty-eight studies examined included objective verification of oral reports of non smoking. Of these two studies, one revealed a 23 percent deception rate whereas the other study revealed a low deception rate. Windsor et al. (1985) examined smoking habits of pregnant women and reported a 3 percent deception rate. Salivary thiocyanate levels were measured to reflect hydrogen cyanide gas, a toxic agent present in high concentrations in cigarette smoke, thus providing an estimate of tobacco use (Pechacek et al., 1984). Because this study was not a medical research project examining the effects of smoking and because this objective form of data collection was not readily available to this researcher, self-report measures were utilized as the method of data collection. Self-report measures are acknowledged as a limitation of this study.

Average monthly numbers of cigarettes smoked during the month prior to pregnancy and during each trimester of pregnancy were included in the interview schedule.

Learning Patterns of Pregnant Women

Learning patterns of pregnant women included identification of: knowledge levels, resources utilized, advice from resources, time spent in learning, initiators of the learning, and learning transaction types. Each of these learning aspects was identified as follows:

Knowledge Levels

Knowledge was assessed by women's responses to three tests developed for the purposes of this research study: weight gain knowledge test, alcohol knowledge test, and tobacco knowledge test. Answers to the knowledge tests were developed from the current literature reported in Chapter II. As such, it would be known whether pregnant women were learning about or knew about the information that health professions deemed essential in ensuring a healthy pregnancy outcome. The weight gain knowledge test consisted of thirteen items encompassing knowledge about: ideal weight gain for women of normal weight; weight loss during pregnancy; ideal gain for underweight women; ideal gain for overweight women; ideal weight gain during the first trimester; ideal weekly weight gain during the second trimester; ideal weekly weight gain during the third trimester; minimum total amount of weight gain during pregnancy; minimum weekly weight gain during the second trimester; minimum weekly weight gain during the third trimester; importance of weight gain; relationship between maternal weight gain and birth weight of the infant; and, potential health problems associated with low birth weight. The alcohol knowledge test consisted of four items encompassing knowledge about: safe levels of alcohol consumption during pregnancy; overall affect of consuming alcohol during pregnancy; possible effects of small quantities of alcohol on the fetus; and, possible effects of large quantities of alcohol on the fetus. The tobacco knowledge test consisted of five items encompassing knowledge about: safe levels of smoking during pregnancy; overall affect of smoking during pregnancy; possible effects of small amounts of tobacco on the fetus; possible effects of large amounts of tobacco on the fetus; and, whether smokers who stop smoking by the fourth month of pregnancy were at the same risk as non-smokers.

Optimal responses to the weight gain knowledge test are provided in the interview schedule (Appendix 9) following questions twenty-four to thirty-five and thirty-seven; optimal responses to the alcohol knowledge test are provided in the interview schedule following questions fifteen to eighteen; and, optimal responses to the tobacco knowledge test are provided in the interview schedule following questions nineteen to twenty-three. The maximum score that could be obtained for the weight gain knowledge test was thirty-one; twenty-two for the alcohol knowledge test; and, twenty-two for the tobacco knowledge test.

Resources Utilized

Determining the resources utilized was ascertained by asking the women if they had attended prenatal classes; if they had discussed prenatal weight gain /or/ alcohol /or/ smoking issues with a family doctor /or/ obstetrician /or/ nurse /or/ dietitian /or/ family member /or/ friend; if they had read any books /or/ articles /or/ pamphlets about prenatal weight gain /or/ alcohol /or/ smoking; and if they had watched /or/ listened to any television /or/ video /or/ radio programs about prenatal weight gain /or/ alcohol /or/ smoking issues.

Advice from Resources

Identifying advice given by the various resources was ascertained by asking the women: "What advice was given to you at prenatal classes about weight gain /or/ alcohol /or/ smoking?", "What advice did the family doctor /or/ obstetrician /or/ nurse /or/ dietitian /or/ family member /or/ friend give you about weight gain /or/ alcohol /or/ smoking?" If the women could not provide an answer to the advice question, this researcher asked: "What did you discuss about the topic.., How did the conversation go?" Other questions asking about advice included: "From all the books, magazine and newspaper articles, and pamphlets you read, what recommendations did you obtain about weight gain /or/ alcohol /or/ smoking?", and "From all the television, video, and radio programs that you watched or listened to, what recommendations did you obtain about weight gain /or/ alcohol /or/ smoking?"

Time in Learning

Determining the time spent in learning was ascertained by asking the women "Approximately how much time was spent discussing prenatal weight gain /or/ alcohol /or/ smoking issues at prenatal classes /or/ with a family doctor /or/ with the obstetrician /or/ with a nurse /or/ with a dietitian /or/ with a family member /or/

with a friend?" Time spent reading about weight gain, alcohol, and smoking issues was ascertained by asking the women "Typically, how many days each month did you spend reading about prenatal issues?" and "In how many months of your pregnancy did you spend reading about prenatal issues?" Total number of reading days was subsequently calculated by multiplying reading days per month times number of reading months during the pregnancy. To identify the amount of time spent reading about weight gain, alcohol, and smoking issues the women were asked "Approximately what percentage of your reading time did you spend on prenatal weight gain /or/ alcohol /or/ smoking issues?" Total number of reading days was then multiplied by the percentage of time spent reading about weight gain, alcohol, or smoking issues. Self-report was utilized as the method of data collection to estimate time spent in learning, as an external validation source was not available. Furthermore, since only one administration of the interview was possible, test-retest reliability could not be determined. Limitations of self-report are acknowledged.

The frequency of the discussions were determined by asking "How frequently was weight gain /or/ alcohol /or/ smoking discussed?" The frequency of discussions about weight gain, alcohol, and smoking issues were recorded as a relative value and classified into four sets of responses: (1) once, (2) two to three times, (3) more than three times, and (4) at every prenatal class /or/ at every visit to a doctor [if applicable]. Time spent in learning was documented as the total number of minutes and/or hours spent in learning as well as the frequency of discussion about the topics of weight gain, alcohol consumption, and tobacco use.

Initiators of Learning

Determining whether the learning was self-initiated or other-initiated was ascertained by asking "Whose idea was it that you attend prenatal classes?", "Who brought up the topic?" [when speaking to a family doctor /or/ obstetrician /or/ nurse

/or/ dietitian /or/ family member /or/ friend about weight gain /or/ alcohol /or/ smoking issues], "Whose idea was it that you read book.........../or/ article.........../or/ pamphlet.............?", and "Whose idea was it that you watch television program........../or/ video program........../or/ radio program...........?" If the women replied that they themselves brought up the topic or they themselves decided to read the book, it was recorded as a self-initiated learning episode whereas if the women replied that someone else brought up the topic or suggested that they read the book, it was recorded as an other-initiated learning episode. If the women replied that the topic just came up in conversation or that both people brought up the topic, it was recorded as an other-initiated learning episode since the women did not give themselves credit for initiating the episode.

Learning Transaction Types

Learning transaction types were determined by an indirect method, based upon a modification of Tough's (1979) typology of planners. Tough asked his interviewees to identify who had planned their learning projects, that is, who was responsible for deciding the content, strategies, and resources of that project. As stated in Chapter III, because of the specificity of the topics being investigated, and because preplanning may not occur (Spear and Mocker, 1984), the process of how women actually go about planning their learning was not examined. Asking women who planned their learning for the topics of weight gain, alcohol consumption, and tobacco use would have resulted in poor face validity. An indirect method was used to identify how women learned during pregnancy. As described in Chapter III, a framework for identifying learning transaction types was developed based upon: the settings of the learning, the time spent learning, and the initiators of the learning episodes. This framework is presented in Table 3.

TABLE 3

Learning Transaction Types

Settings	Self-Initiated Episodes	Other-Initiated Episodes
Group Setting	Cell A	Cell B
One to One Setting	Cell C	Cell D
Nonhuman Setting	Cell E	Cell F

Cells A and B represent the learner's interacting in a group setting, that is with a group resource such as prenatal classes. Cells C and D represent the learner's interacting in a one to one setting, that is with an individual resource such as the family doctor, obstetrician, nurse, dietitian, family member, and/or friend. Cells E and F represent the learner's interacting in the nonhuman setting, that is with a nonhuman resource such as print materials (books, articles, pamphlets) and/or audiovisual productions (television, video, radio).

Each cell represents the time in that learning setting divided by the total learning time in all settings. For example, Cell A represents the amount of time spent in learning at prenatal classes (for those individuals who self-initiated or decided themselves that they should attend prenatal classes) divided by the total time in learning (Cells A+B+C+D+E+F). Cell C represents the total amount of time spent in learning with one other individual including the family doctor, obstetrician, nurse, dietitian, family members, and friends (for those individuals who self-initiated or who brought up the topic of weight gain, alcohol, or smoking issues themselves) divided by the total time in learning (Cells A+B+C+D+E+F). Cell E represents the total amount of time spent in learning by reading print material and viewing audiovisual productions (that the individual self-initiated, or decided themselves that they should read or view) divided by the total time in learning (Cells A+B+C+D+E+F). The amount of time in learning in each cell was calculated for every individual in the sample. The cell which contained the highest amount of learning time was considered to be the "dominant" learning transaction type for that individual. Cell A is labelled as a self-initiated learning transaction type in the group setting, Cell B is labelled as an other-initiated learning transaction type in the group setting, Cell C is labelled as a self-initiated learning transaction type in the one to one setting, Cell D is labelled as an other-initiated learning transaction type in the one to one setting, Cell E is labelled as a self-initiated learning transaction type in the nonhuman setting, and Cell F is labelled as an other-initiated learning transaction type in the nonhuman setting.

Health Beliefs of Pregnant Women

Health beliefs of pregnant women were assessed based upon an adaptation of Hochbaum, Rosenstock, Leventhal, and Kegeles' Health Belief Model (Rosenstock, 1974b). The affective measure of health beliefs consisted of four components: concern, perceived susceptibility, perceived benefits, and perceived barriers. Concern was defined in terms of women's concerns about their health behaviors. Questions asked were: "Did you have concerns about your weight change during your pregnancy?", "Did you have concerns about your alcohol intake during your pregnancy?", "Did you have concerns about your smoking habits during your pregnancy?", and "Did you have concerns about second hand smoke?" A seven point rating scale was utilized, with a zero value indicating no concern and a six indicating high concern.

Perceived susceptibility was defined in terms of women's perceived risk levels of their unborn child in relation to their health behaviors. Questions asked were "Did you ever think that your baby was at risk because of your weight change?", "Did you ever think that your baby was at risk because of your alcohol consumption?", and "Did you ever think that your baby was at risk because of your smoking habits?" Again, a zero value on the scale indicated no risk and a six indicated high risk.

Perceived benefit was defined in terms of women's perceived usefulness of the information received, in relation to managing their health behaviors. Questions asked were: "Thinking about all the information you obtained about weight gain, how useful was the information in influencing the way you managed your weight?", "Thinking about all the information you obtained about alcohol, how useful was the information in influencing your alcohol consumption?", and "Thinking about all the information you obtained about smoking, how useful was the information in influencing your smoking habits?" A zero value on the scale indicated no utility and a six indicated high utility.

Perceived barrier was defined in terms of women's perceived obstacles or problems in managing their health behaviors. Questions asked were: "What obstacles did you experience in managing your weight during your pregnancy?", "What obstacles did you experience in managing your alcohol consumption during your pregnancy?", and "What obstacles did you experience in managing your smoking habits during your pregnancy?" If the woman reported that she had obstacles, she was then asked: "Looking at the first obstacle, how difficult was it for you?" A zero value on the scale indicated that the obstacle was not difficult and a six indicated that the obstacle was very difficult. For women citing more than one obstacle, the highest score was recorded as the perceived barrier score. Women who perceived that they had no obstacles were given a score of zero.

The health belief measure was the summation of the scores on each of the four components described above. Prior to the addition of the perceived barriers component with the other three components, the polarity of each perceived barrier score was changed: a score of six for perceived barriers was changed to a score of zero; a score of five was changed to a score of one; a score of four was changed to a score of two; a score of three remained the same; a score of two was changed to a score of four; a score of one was changed to a score of five; and, a score of zero was changed to a score of six. Therefore, those individuals who had high concern, high perceived degree of risk, high perceived degree of use of the information, and no barriers or obstacles would be those individuals, who would have optimal health behaviors. Weight gain health beliefs were a four component measure, consisting of four items: concern for weight gain; perceived weight gain risk; perceived usefulness of weight gain information; and, perceived barriers to managing weight during pregnancy. Alcohol health beliefs were a four component measure, consisting of four items: concern for alcohol behavior; perceived alcohol risk; perceived usefulness of alcohol information; and, perceived barriers to managing alcohol behavior. Smoking health beliefs were a four component measure, consisting of five items: concern for smoking behavior; concern for second hand smoke; perceived smoking risk; perceived usefulness of smoking information; and, perceived barriers to managing smoking behavior. During the interview, the women were shown index cards with the health belief questions written in large print. The rating scales were also included on the cards, so as to assist women in providing a response to this rating scale using the interview technique (see health belief questions in the interview schedule: numbers seventy-one to seventy-nine, eighty-two to eighty-three, and eighty-six to eighty-seven).

Demographic Information

Demographic information included the identification of the woman's age, occupation, marital status, level of education, and husband's or partner's occupation. Occupations were classified according to Blishen's socioeconomic index for occupations in Canada (Blishen and McRoberts, 1976), based on the 1971 Canadian Census Data. Blishen's index based on the 1981 Canadian Census was not available at the time of data analyses. The index for each occupation was calculated using the average income and average number of years of schooling for that occupation. The standard scores of the average income and years of schooling were combined and each occupation subsequently ranked according to the combined score (Blishen, 1958). The scale (Blishen and McRoberts, 1976) consisted of 480 occupational titles and was divided into six socioeconomic classes. Class one included a socioeconomic index equal to and greater than 70; Class two between 60 and 69.99; Class three between 50 and 59.99; Class four between 40 and 49.99; Class five between 30 and 39.99; and, Class six below 30.

Newborn Information

Newborn information included identification of the gestational age, gender, and birth weight of the infant. Average birth weight and incidence of low birth weight of the sample were identified. Low birth weight, as reported by the Vital Statistics of the Province of British Columbia, is a birth weight of 2,500 grams or less. The term low birth weight encompasses three interrelated conditions resulting from pregnancy: (1) preterm delivery, (2) intrauterine growth retardation, and (3) a combination of these two conditions (Behrman, 1985). Low maternal weight gain, alcohol consumption, and tobacco use are associated with intrauterine growth retardation, defined as a delay in growth and development of the fetus in utero. Usher and McLean (1969) developed fetal growth curves and provided mean birth weight values corresponding with weeks of gestation. *Small for gestational age* was defined as a birth weight two standard deviations below the mean birth weight for the given gestational age. *Appropriate for gestational age* was defined as a birth weight that is within two standard deviations of the corresponding gestational age weight as given in Usher and McLean's Fetal Growth Table (1969). For example, the mean birth weight of an infant born at forty weeks gestation would be 3,477 grams according to Usher and McLean Fetal Growth Table (1969), with one standard deviation being 461 grams. An infant born at forty weeks gestation weighing less than 2,555 grams (3,477-[2x461]) would be classified as being small for gestational age. An infant born at forty weeks gestation weighing 2,555 grams or more would be classified as appropriate for gestational age. In order to differentiate between appropriate for gestational age and small for gestational age, the gestational age of the fetus and birth weight in grams were included in the interview schedule. These two values were verified from medical hospital records.

Reliability of the Research Instrument

Reliability is concerned with the precision of the measurement instrument and reflects the extent to which a test is free of measurement error. Sources of measurement error can include interviewees, the testing situation, interviewers, and the test content (Lyman, 1986).

Interviewees can differ in their degree of motivation, in their physical health, mental alertness, stamina, and willingness to answer questions. These differences among respondents can lower reliability values. Since the interviews were conducted in hospital after women had given birth to an infant, it was expected that women would vary in their degree of physical health and stamina, conditions which cannot be controlled for in this research.

Another source of measurement error can include the testing situation. Disruptions, noise level, and lighting are part of the testing circumstances and differences can also lower reliability values. Since the interviews were conducted in the hospital setting and since this investigator had to comply with hospital routine, interruptions by the medical staff during the interviews were unavoidable. As well, some hospitals only permitted interviews to be conducted during visiting hours, therefore, interruptions by visitors were also unavoidable.

A third source of measurement error can include interviewers. The study, however, had only one interviewer, this investigator, and as such differences among interviewers was not a measurement problem in this research. As noted earlier in Chapter IV (p. 108), three interviews were tape recorded so as to determine whether the interviewer led respondents or solicited certain answers from respondents, thereby influencing test results and reliability values. Less than a 1 percent error was identified.

A fourth source of measurement error can include the content of the test. A means of identifying this source of error was to use an internal consistency measure of reliability (Lyman, 1986). Hoyt's analysis of variance procedure was selected as the empirical method to identify internal consistency, since this method was appropriate for tests with continuous scores (Ghiselli, Campbell, and Zedeck, 1981).

Hoyt's analysis of variance procedure was used in this study to identify reliability coefficients for the knowledge tests and the health belief measures. Reliability coefficients for the weight gain, alcohol, and tobacco knowledge tests and health belief measures are reported in Table 4. Reliability coefficients for the three knowledge tests and for the weight gain health belief measure were calculated using the total sample; the reliability coefficient for the alcohol health belief measure was calculated for women who had consumed alcohol one month prior to becoming pregnant; and, the reliability coefficient for the smoking health belief measure was calculated for women who had smoked one month prior to becoming pregnant. Sample size, number of drinkers, and number of smokers is provided in Chapter V on pages 158-159.

TABLE 4

Hoyt's Estimate of Reliability for the Knowledge and Health Belief Measures

Topics	Knowledge Measures		Health Belief Measures	
	Reliability Coefficients	Number of Test Items	Reliability Coefficients	Number of Test Items
Weight Gain	0.69	13	0.38	3
Alcohol	0.37	4	0.62	3
Tobacco	0.41	5	0.35	4

Although no definite rule can be stated as to how high reliability coefficients should be for any given test, Nunnally (1970) suggests that a test have a coefficient greater than 0.80, with essay type tests having a reliability of 0.70. The nature of the knowledge test item was free response and therefore a reliability coefficient of 0.69 for the thirteen item weight gain knowledge test was acceptable according to Nunnally's criteria. Low reliability for alcohol and tobacco knowledge tests were found (0.37 and 0.41), and these results may have been a function of the small number of test items. One can project what the reliability coefficients would be for the alcohol and tobacco knowledge tests if the length of the tests were increased. This projection can be determined using the Spearman-Brown formula. By using the formula, the reliability coefficient for the alcohol knowledge test would be 0.80, if the test were tripled in length to make for a twelve item test. As well, the reliability coefficient for the tobacco knowledge test would be 0.87, if the test were tripled in length to make for a fifteen item test. The accuracy of the Spearman-Brown formula is dependent on the assumption that the hypothetical items added to the measure are parallel to those already in the test (Ghiselli, Campbell, and Zedeck, 1981).

The low reliability values for the alcohol and tobacco knowledge test may also have been due to the fact that the items were not highly inter-related. Nunnally (1970) states that when components of a test are not inter-related, reliability coefficients of greater than 0.30 cannot be expected. In a study conducted by Little et al. (1981), no relationship was found between ability to name at least one effect of alcohol on the fetus and safe levels of alcohol consumption during pregnancy. The alcohol knowledge test in this study was comprised of similar items dealing with knowledge about the effects of alcohol on the fetus and safe levels of alcohol consumption during pregnancy. Low reliability coefficients can affect the results of hypotheses testing by suppressing the maximum correlation coefficient that might be attained. Tests which have low reliability coefficients may prevent investigators from obtaining significant results when a relationship would have been found to exist if the reliability coefficients had been higher (Nunnally, 1970).

The health belief measures for weight gain, alcohol, and smoking originally consisted of four components: concern, perceived risk, perceived use of the information, and perceived barriers. When item analyses were performed, the weight gain and smoking perceived barriers components had a zero correlation with the total weight gain and the total smoking health belief measures, and the alcohol perceived barriers component had a low correlation with the total alcohol health belief measure. Similar results of low internal consistency measures have been found by Becker et al. (1977) in a study using the health belief model to predict dietary compliance in a weight loss program. Becker and associates noted that items tapping the benefits and barriers components yielded the lowest consistency measures in relation to the other dimensions of the health belief model. In this research study, when the perceived barriers component was retained in the health belief measure, Hoyt's estimate of reliability coefficients for the weight gain and smoking health belief measures were zero, and 0.52 for the alcohol health belief measure. Because of the inadequate internal consistency of the reliability coefficients for the weight gain and smoking measures, perceived barriers was excluded as a component from the "Weight Gain Health Belief Measure," the "Alcohol Health Belief Measure," and the "Smoking Health Belief Measure." These measures were used in hypotheses testing. Because the perceived barriers component was not included in the health belief measure, perceived barriers scores were reported separately in this study.

In summary, reliability values were determined using Hoyt's analysis of variance procedure. Reliability coefficients for the thirteen item weight gain knowledge test was 0.69; for the four item alcohol knowledge test was 0.37; and, for the five item tobacco knowledge test was 0.41. Low reliability coefficients for the alcohol and tobacco knowledge tests were found, and these results were most likely due to the small number of items in these tests.

Reliability values of the health belief measures were problematic. The perceived barriers component was excluded from the health belief measure for hypotheses testing because of its low correlation with the other components of the health belief measure. It, therefore, was examined separately in this study. The reliability coefficient for the "Weight Gain Health Belief Measure," including concern for weight gain, perceived weight gain risk, and perceived usefulness of weight gain information, was 0.38. The reliability coefficient for the "Alcohol Health Belief Measure," including concern for alcohol behavior, perceived alcohol risk, and perceived usefulness of alcohol information, was 0.62. The reliability coefficient for the "Smoking Health Belief Measure," including concern for smoking behavior, concern for second hand smoke, perceived smoking risk, and perceived usefulness of smoking information, was 0.35. Other research studies examining health beliefs also reported finding low correlations between the barriers component with the other dimensions of the health belief model.

Data Analyses

To describe the data analyses, each hypothesis was re-stated from Chapter III, the dependent and independent variables identified and described, and the corresponding statistical analysis outlined. The level of significance was set at the conventional $\alpha = 0.05$. One-tailed tests were used in hypotheses testing. Where the direction of results was opposite to that hypothesized, the hypotheses were rejected and a significance of the negative results was evaluated using a two-tailed test.

Hypothesis 1 (a)

1 (a) "Women whose pregnancies were planned will have spent significantly more hours in learning than women whose pregnancies were unplanned."

The *dependent variable* of hypothesis 1 (a) was total hours in learning about weight gain, alcohol, and tobacco issues. The *independent variable* of hypothesis 1 (a) was planned/unplanned pregnancy. *Analysis of covariance* was utilized to determine presence of a statistically significant relationship between a planned/unplanned pregnancy and total hours in learning. Age and socioeconomic status, reflecting level of education and occupation, were the covariates in this analysis.

Hypothesis 1 (b)

1 (b) "Women whose pregnancies were planned will have utilized significantly more resources than women whose pregnancies were unplanned."

The *dependent variable* of hypothesis 1 (b) was the total number of resources utilized for the topics weight gain, alcohol, and tobacco issues. Calculation of the total number of resources is outlined following a description of the statistical analysis. The *independent variable* of hypothesis 1 (b) was planned/unplanned pregnancy. *Analysis of covariance* was utilized to determine presence of a statistically significant relationship between a planned/unplanned pregnancy and resources utilized. Age and socioeconomic status, reflecting level of education and occupation, were the covariates in this analysis.

Resources Measure: Total number of weight gain resources was calculated as follows: count one if weight was discussed at prenatal classes, count one if weight was discussed with a family doctor, count one if weight was discussed with an obstetrician, count one if weight was discussed with a nurse, count one if weight was discussed with a dietitian, count one if weight was discussed with a family member/s, count one if weight was discussed with a friend/s, count one if weight issues were read in a book/s, count one if weight issues were read in an article/s, count one if weight issues were read in a pamphlet/s, count one if weight issues were viewed during a television program/s, count one if weight issues were heard during a radio program/s, (video programs were excluded because in all the cases, except one, video programs were part of prenatal classes). The number of weight gain resources was the sum of the aforementioned counts. Alcohol and tobacco resources were calculated in a similar fashion. The total number of resources, the dependent variable of hypothesis one (b), was the sum of the weight gain, alcohol, and tobacco resources.

Hypothesis 2 (a)

2 (a) "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with hours in learning about weight gain."

The *dependent variable* of hypothesis 2 (a) was total hours in learning about weight gain during pregnancy. The *independent variable* of hypothesis 2 (a) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and hours in learning about weight gain.

Hypothesis 2 (b)

2 (b) "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with hours in learning about alcohol consumption."

The *dependent variable* of hypothesis 2 (b) was total hours in learning about alcohol consumption during pregnancy. The *independent variable* of hypothesis 2 (b) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and hours in learning about alcohol consumption.

Hypothesis 2 (c)

2 (c) "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with hours in learning about tobacco use."

The *dependent variable* of hypothesis 2 (c) was total hours in learning about tobacco use during pregnancy. The *independent variable* of hypothesis 2 (c) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and hours in learning about tobacco use.

Hypothesis 3 (a)

3 (a) "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with number of resources utilized for the topic of weight gain."

The *dependent variable* of hypothesis 3 (a) was the total number of resources utilized for the topic of weight gain. Calculation of weight gain resources was described in hypothesis 1 (b). The *independent variable* of hypothesis 3 (a) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and weight gain resources utilized.

Hypothesis 3 (b)

3 (b) "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with number of resources utilized for the topic of alcohol consumption."

The *dependent variable* of hypothesis 3 (b) was the total number of resources utilized for the topic of alcohol consumption. Calculation of alcohol resources was described in hypothesis 1 (b). The *independent variable* of hypothesis 3 (b) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and alcohol resources utilized.

Hypothesis 3 (c)

3 (c) "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with number of resources utilized for the topic of tobacco use."

The *dependent variable* of hypothesis 3 (c) was the total number of resources utilized for the topic of tobacco use. Calculation of tobacco resources was described in hypothesis 1 (b). The *independent variable* of hypothesis 3 (c) was degree of health concern. Health concern was expressed as a score on a seven point rating scale, with a zero score indicating no concern and a six indicating high concern. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between degree of health concern and tobacco resources utilized.

Hypothesis 4 (a)

4 (a) "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with scores on a knowledge test about weight gain."

The *dependent variable* of hypothesis 4 (a) was knowledge level. Knowledge level consisted of a test score obtained from the women's knowledge about weight gain. The *independent variable* of hypothesis 4 (a) was a measure of self-initiated learning regarding weight gain during pregnancy. This measure was expressed as a ratio composed of both self-initiated and other-initiated learning episodes. The ratio was calculated as the number of self-initiated learning episodes divided by the total number of self-initiated and other-initiated learning episodes. A high score on the measure indicated engagement in predominantly self-initiated learning episodes and a low score on the measure indicated engagement in predominantly other-initiated learning episodes. Calculation of this measure is outlined following a description of the statistical analysis. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about weight gain and knowledge levels about weight gain.

Weight Gain Learning Episodes Measure: Calculation of the total number of learning episodes that occurred related to the topic of weight gain is addressed. The first problem encountered was the unavailable data on the precise frequency of learning episodes. Although it was known how many books, articles, and pamphlets were read, the *frequency* of discussion at prenatal classes, with physicians, nurses, dietitians, family members, and friends was a relative value. Frequency of discussion fell into one of four categories: once, two to three times, more than three times, or every prenatal class or visit to a doctor [if applicable]. A way to combine all these aspects into one measure had to be devised. The first step was to identify the means and standard deviations for each resource, and these are reported in Table 5.

TABLE 5

Means and Standard Deviations of the Weight Gain Learning Episode Measure

Episodes	Means	Standard Deviations
Number prenatal classes	6	1.9
Frequency discussion: prenatal classes	2 to 3 times	1.2
Number doctor visits	14	3.7
Frequency discussion: family doctor	more 3 times	1.1
Frequency discussion: obstetrician	more 3 times	1.3
Frequency discussion: nurse	more 3 times	1.2
Frequency discussion: dietitian	once	0.9
Frequency discussion: 4 family members	more 3 times	0.7
Frequency discussion: 3 friends	more 3 times	0.7
Number reading materials	5.3	6.0
Number audiovisuals	1.5	0.9

There were large differences in the standard deviations among the variables to be added in the learning episode measure. Adjustments therefore had to made, from a measurement perspective, as items of a different nature should only be combined if the means and standard deviations are similar (Glass and Hopkins, 1984). Considering the means and standard deviations of the frequency of each type of learning episode, the following calculation for measuring the number of learning episodes was devised:

Episodes at Prenatal Classes: If the woman reported discussing weight gain "once" at prenatal classes, this was assigned as one learning incident. If she reported discussing weight "two to three times" at prenatal classes, this was assigned as three learning incidents. If she reported discussing weight at "more than three prenatal classes," this was assigned as the mid-point value between three and the total number of prenatal classes attended by the individual. If she reported discussing weight at "every prenatal class," this was assigned as a value equal to the total number of prenatal classes attended by the individual.

Episodes with the Family Doctor: If the woman reported discussing weight "once" with the family doctor, this was assigned as one learning incident. If she reported discussing weight "two to three times" with the family doctor, this was assigned as three learning incidents. If she reported discussing weight at "more than three doctor visits," this was assigned as the mid-point value between three and her total number of doctor visits. If she reported discussing weight at "every visit to the doctor," this was assigned as a value equal to her total number of doctor visits.

Episodes with the Obstetrician: If the woman had not discussed weight gain with her family doctor and only discussed weight with the obstetrician, the number of learning episodes was calculated in the same way as for the family doctor. If however, she had spoken to her family doctor *and* obstetrician, calculation of the learning episodes for the obstetrician was as follows: If the woman reported discussing weight "once" with the obstetrician, this was assigned as one learning incident. If she reported discussing weight "two to three times" with the obstetrician, this was assigned as two learning incidents. If she reported discussing weight at "more than three obstetrician visits," this was assigned as three learning incidents. If she reported discussing weight at "every visit to the obstetrician," this was assigned as four learning incidents. These adjustments had to be made since only the total number of doctor visits was available, and not a separate number for family doctor visits and obstetrician visits.

Episodes with the Nurse: If the woman reported discussing weight "once" with the nurse, this was assigned as one learning incident. If she reported discussing weight "two to three times" with the nurse, this was assigned as three learning incidents. If she reported discussing weight on "more than three occasions" with the nurse, this was assigned as the mid-point value between three and her total number of doctor visits. If she reported discussing weight at "every visit to the doctor" with the nurse, this was assigned as a value equal to her total number of doctor visits. The number of doctor visits could be included in this calculation as those individuals who spoke to a nurse on more than three occasions spoke to nurses at their doctor's office.

Episodes with the Dietitian /or/ First Family Member /or/ Second Family Member /or/ Third Family Member /or/ Fourth Family Member /or/ First Friend /or/ Second Friend /or/ Third Friend: If the woman reported discussing weight "once" with the dietitian /or/ family members /or/ friends, this was assigned as one learning incident. If she reported discussing weight "two to three times" with the dietitian /or/ family members /or/ friends, this was assigned as three learning incidents. If she reported discussing weight on "more than three occasions" with the dietitian/ family members/ friends, this was assigned as five learning incidents.

Episodes for Reading Materials: If the woman had read one to two reading materials (either books, articles, or pamphlets) about weight gain, this was assigned as one learning incident. If the woman had read three to four reading materials (either books, articles, or pamphlets) about weight gain, this was assigned as two learning incidents. If the woman had read five to six reading materials (either books, articles, or pamphlets) about weight gain, this was assigned as three learning incidents. If the woman had read seven to eight reading materials (either books, articles, or pamphlets) about weight gain, this was assigned as four learning incidents. If the woman had read more than nine reading materials (either books, articles, or pamphlets) about weight gain, this was assigned as five learning incidents. The actual number of reading materials was not included for two reasons: (1) the larger mean and standard deviation of the reading materials in comparison to the other dimensions of this measure, and (2) the fact that in most cases women could not precisely recall the name, content, and source of reading materials. Only two of these three recall components were required to be included as a learning incident.

Episodes for Audiovisual Materials: Since the range of seeing audiovisual productions ranged from zero to five, the actual number of productions was used as the number of learning incidents.

As discussed earlier in Chapter IV, learning episodes were identified as being self-initiated when the women themselves brought up the topic with the various resources, or when the women themselves decided to read the books, articles, or pamphlets containing weight information. The measure used in hypothesis 4 (a) was calculated by dividing the total number of self-initiated learning incidents regarding weight gain by the total number of self-initiated and other-initiated learning incidents. The scores on this measure ranged from zero to one, with a zero score indicating engagement in only other-initiated learning episodes and a one score indicating engagement in only self-initiated learning episodes. A score greater than 0.5 indicated engagement in predominantly self-initiated learning episodes, and a score below 0.5 indicated engagement in predominantly other-initiated learning episodes. The mean score for the weight gain measure for the entire sample was found to be 0.51 and the median score 0.60. The range was from zero to one. Twenty individuals had a score of zero and two individuals had a score of one.

Hypothesis 4 (b)

4 (b) "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with scores on a knowledge test about alcohol consumption."

The *dependent variable* of hypothesis 4 (b) was knowledge level. Knowledge level consisted of a test score obtained from the women's knowledge about alcohol consumption. The *independent variable* of hypothesis 4 (b) was a measure of self-initiated learning regarding alcohol consumption during pregnancy. This measure was calculated in a similar way to the weight gain learning episode measure described in hypothesis 4 (a). The means and standard deviations for the components of the alcohol learning episode measure are outlined in Table 6. The mean score for the alcohol measure was found to be 0.33 and the median score 0.29. The range was from zero to one. Twenty-six individuals had a score of zero and one individual had a score of one. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about alcohol consumption and knowledge levels about alcohol consumption.

TABLE 6

Means and Standard Deviations of the Alcohol Learning Episode Measure

Episodes	Means	Standard Deviations
Number prenatal classes	6	1.9
Frequency discussion: prenatal classes	2 to 3 times	0.8
Number doctor visits	14	3.7
Frequency discussion: family doctor	once	0.3
Frequency discussion: obstetrician	once	0.0
Frequency discussion: nurse	once	0.5
Frequency discussion: dietitian	once	0.0
Frequency discussion: 4 family members	2 to 3 times	0.8
Frequency discussion: 3 friends	2 to 3 times	0.7
Number reading materials	5.3	5.3
Number audiovisuals	1.4	0.8

Hypothesis 4 (c)

4 (c) "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with scores on a knowledge test about tobacco use." The *dependent variable* of hypothesis 4 (c) was knowledge level. Knowledge level consisted of a test score obtained from the women's knowledge about tobacco use. The *independent variable* of hypothesis 4 (c) was a measure of self-initiated learning

regarding tobacco use during pregnancy. This measure was calculated in a similar way to the weight gain learning episode measure described in hypothesis 4 (a). The means and standard deviations for the components of the tobacco learning episode measure are outlined in Table 7. The mean score for the tobacco measure was found to be 0.36 and the median score 0.33. The range was from zero to one. Twenty-three individuals had a score of zero and one individual had a score of one. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about tobacco use and knowledge levels about tobacco use.

TABLE 7

Means and Standard Deviations of the Tobacco Learning Episode Measure

Episodes	Means	Standard Deviations
Number prenatal classes	6	1.9
Frequency discussion: prenatal classes	2 to 3 times	0.9
Number doctor visits	14	3.7
Frequency discussion: family doctor	2 to 3 times	1.0
Frequency discussion: obstetrician	once	0.2
Frequency discussion: nurse	2 to 3 times	0.4
Frequency discussion: dietitian	once	0.5
Frequency discussion: 4 family members	2 to 3 times	0.9
Frequency discussion: 3 friends	2 to 3 times	0.7
Number reading materials	5.7	5.5
Number audiovisuals	1.5	0.8

Hypothesis 5 (a)

5 (a) "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with a measure of ideal weight gain during pregnancy."

The *dependent variable* of hypothesis 5 (a) was a measure of ideal weight gain during pregnancy. This measure was expressed as a ratio of actual weight gain during pregnancy divided by recommended weight gain. Calculation of this measure is outlined following a description of the statistical analysis. The *independent variable* of hypothesis 5 (a) was a measure of self-initiated learning regarding weight gain, defined in the same way as outlined in hypothesis 4 (a). *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about weight gain and ideal weight gain during pregnancy.

Weight Gain Ratio Measure: Actual weight gain during pregnancy was calculated by subtracting prepregnant weight from weight at delivery. Recommended weight gain during pregnancy, calculated for every individual, was 20 percent of the individual's standard weight (Rosso, 1985), as described previously in this chapter (p. 116). An example calculation of the weight gain ratio is as follows: "Woman A" was 140 pounds prepregnant weight, 170 pounds at term, sixty-six inches in height, and had a medium frame size. Her desirable weight, based on a height of sixty-six inches and a medium frame size, according to the 1959 Metropolitan Height and Weight Tables was 136 pounds. Her recommended weight gain would be (desirable weight multiplied by 20 percent: [136x0.20]) 27.2 pounds. Her actual prenatal weight gain was thirty pounds and thus her weight gain ratio would be (actual gain divided by recommended gain: [30÷27.2]) a 1.1 value. In this study the weight gain ratios for the sample ranged from a 0.07 value to a 2.4 value. A 0.07 value on the weight gain ratio measurement scale reflected insufficient weight gain, a one value reflected ideal weight gain, and a 2.4 value reflected excessive weight gain. For hypotheses testing, a measurement scale was required whereby a one value indicated ideal weight gain and a zero value indicated less than ideal weight gain. For the weight gain ratio to be converted mathematically so that the scale ranged from zero to one, the weight gain ratio was rescaled using the following formula for those weight gain ratios that were greater than one: 1-(2[weight ratio-1]÷3). For example, an individual with a weight gain ratio of 1.43 would end up with an adjusted weight gain ratio of 1-(2[1.43-1]÷3)=0.714. The individual with a weight gain ratio of 0.74 would remain as 0.74 for the adjusted weight gain ratio. The concept of adjusted weight gain ratio is depicted in Figure 2.

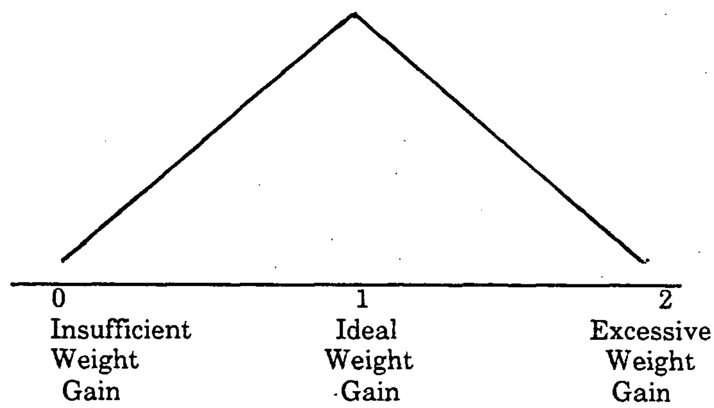

Fig. 2. Concept of Adjusted Weight Gain Ratio

The adjusted weight gain ratio on a scale of zero to one includes both insufficient and excessive weight gain, defined as "less than ideal weight gain." Since the concept of ideal weight gain was to be correlated with a measure of self-initiated learning and a measure of health belief, it was acceptable in this particular study and analyses to combine two medically different risk factors, insufficient and excessive gain, on one scale. In subsequent discussions, WEIGHT GAIN RATIO will refer to actual weight gain during pregnancy divided by recommended weight gain, and ADJUSTED WEIGHT GAIN RATIO will refer to the rescaled weight gain measure using the 1-(2[weight ratio-1]/3) formula if the weight gain ratio was greater than one. The adjusted weight gain ratio was the dependent variable for hypothesis 5 (a).

Concurrent validity was established for the Weight Gain Ratio Measure. The calculated correlation between the weight gain ratio and birth weight was $r=0.33$, $df=125$, $p<0.001$. This correlation is identical to the correlation that Rosso (1985) obtained between maternal weight gain and birth weight $r=0.33$, $df=260$, $p<0.001$).

Hypothesis 5 (b)

5 (b) "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with reduced alcohol consumption during pregnancy."

The *dependent variable* of hypothesis 5 (b) was reduced alcohol consumption. Alcohol consumption was calculated as the average number of alcoholic drinks consumed one month prior to pregnancy and the average monthly number of alcoholic drinks consumed during all three trimesters of pregnancy. Reduction in alcohol consumption was calculated as a ratio of the average monthly number of drinks consumed during pregnancy divided by the average monthly number of drinks consumed one month before pregnancy. The formula for this ratio is as follows: ([average monthly number of alcoholic drinks consumed during the first trimester + average monthly number of alcoholic drinks consumed during the second trimester + average monthly number of alcoholic drinks consumed during the third trimester] ÷ 3) ÷ number of alcoholic drinks consumed one month prior to pregnancy. The *independent variable* of hypothesis 5 (b) was a measure of self-initiated learning, defined in the same way as outlined in hypothesis 4 (b). *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about alcohol consumption and reduced alcohol consumption during pregnancy.

Hypothesis 5 (c)

5 (c) "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with reduced cigarette smoking during pregnancy."

The *dependent variable* of hypothesis 5 (c) was reduction in cigarette smoking. Cigarette smoking was calculated as the average number of cigarettes smoked one month prior to pregnancy and the average monthly number of cigarettes smoked during all three trimesters of pregnancy. Reduction in cigarette smoking was calculated as a ratio of the average monthly number of cigarettes smoked during pregnancy divided by the average monthly number of cigarettes smoked one month before pregnancy. The formula for this ratio is as follows: ([average monthly number of cigarettes smoked during the first trimester + average monthly number of cigarettes smoked during the second trimester + average monthly number of cigarettes smoked during the third trimester] ÷ 3) ÷ number of cigarettes smoked one month prior to pregnancy. The *independent variable* of hypothesis 5 (c) was a measure of self-initiated learning about tobacco use, defined in the same way as outlined in hypothesis 4 (c). *Correlational analysis* was utilized to determine presence of a statistically significant relationship between self-initiated learning about tobacco use and reduced cigarette smoking during pregnancy.

Hypothesis 6 (a)

6 (a) "Scores on a 'Weight Gain Health Belief Measure' will be significantly positively correlated with a measure of ideal weight gain during pregnancy."

The *dependent variable* of hypothesis 6 (a) was a measure of ideal weight gain during pregnancy, defined in the same way as outlined in hypothesis 5 (a). The *independent variable* of hypothesis 6 (a) was a composite score on an affective measure regarding women's weight gain health beliefs consisting of weight gain concern, perceived weight gain risk, and perceived usefulness of weight gain information, defined according to an adaptation of the Health Belief Model. As previously stated, the perceived barriers component was excluded from this measure because of low reliability values obtained. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between the "Weight Gain Health Belief Measure" and ideal weight gain during pregnancy. As well, perceived barriers scores were correlated with ideal weight gain during pregnancy. Multiple regression analysis was also conducted using the three components of the "Weight Gain Health Belief Measure" as the three independent variables in the multiple regression equation, and ideal weight gain as the dependent variable in the multiple regression equation.

Hypothesis 6 (b)

6 (b) "Scores on an 'Alcohol Health Belief Measure' will be significantly positively correlated with reduced alcohol consumption during pregnancy."

The *dependent variable* of hypothesis 6 (b) was reduced alcohol consumption, defined in the same way as outlined in hypothesis 5 (b). The *independent variable* of hypothesis 6 (b) was a composite score on an affective measure regarding women's alcohol health beliefs consisting of concern for alcohol behavior, perceived alcohol risk, and perceived usefulness of alcohol information, defined according to an adaptation of the Health Belief Model. As previously stated, the perceived barriers component was excluded from this measure because of low reliability values obtained. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between the "Alcohol Health Belief Measure" and reduced alcohol consumption during pregnancy. As well, perceived barriers scores were correlated with reduced alcohol consumption. Multiple regression analysis was also conducted using the three components of the "Alcohol Health Belief Measure" as the independent variables in the multiple regression equation, and reduced alcohol consumption as the dependent variable in the multiple regression equation.

Hypothesis 6 (c)

6 (c) "Scores on a 'Smoking Health Belief Measure' will be significantly positively correlated with reduced cigarette smoking during pregnancy."

The *dependent variable* of hypothesis 6 (c) was reduced cigarette smoking, defined in the same way as outlined in hypothesis 5 (c). The *independent variable* of hypothesis 6 (c) was a composite score on an affective measure regarding women's smoking health beliefs consisting of concern for smoking behavior, concern for second hand smoke, perceived smoking risk, and perceived usefulness of the smoking information, defined according to an adaptation of the Health Belief Model. As previously stated, the perceived barriers component was excluded from this measure because of low reliability values obtained. *Correlational analysis* was utilized to determine presence of a statistically significant relationship between the "Smoking Health Belief Measure" and reduced cigarette smoking during pregnancy. As well, perceived barriers scores were correlated with reduced cigarette smoking. Multiple regression analysis was also conducted using the three components (four items) of the "Smoking Health Belief Measure" as the four independent variables in the multiple regression equation, and reduced cigarettes smoking as the dependent variable in the multiple regression equation.

Pearson product-moment correlation was used as the technique of correlational analyses in hypotheses testing. Although the terms dependent and independent were used to describe the variables in correlational analyses, justification for using these terms was based upon theoretical rationale.

The corresponding questions on the interview schedule that are associated with the dependent and independent variables are outlined in Appendix 10. Other questions on the interview schedule provide descriptive and demographic information and are outlined in Appendix 11.

During the reporting of results, health behaviors will be related to demographic characteristics so as to compare the results of this research with other studies examining health behaviors of pregnant women. To test the associations among demographic characteristics and health behaviors, two-tailed tests were employed.

Summary of Chapter IV

Chapter IV described the methodology of this study. The research, an ex post facto design, involved a one hour interview with primiparous women following delivery of their infants in hospital. A proportional sample of 120 women was selected from seven hospitals in the Lower Mainland of British Columbia with average monthly births of greater than 100. The content of the interview schedule included: health behaviors of pregnant women, learning patterns of pregnant women, health beliefs of pregnant women, demographic information, and newborn information. The principal hypotheses of the study were as follows: (1) Self-initiated learning will be positively correlated with knowledge test scores, (2) Self-initiated learning will be positively correlated with ideal weight gain, reduced alcohol consumption, and reduced cigarette smoking, and (3) Health beliefs will be positively correlated with ideal weight gain, reduced alcohol consumption, and reduced cigarette smoking. Correlational analysis was the primary method of statistical analysis used in this study. Findings of this study are reported in Chapters' V "Sample Characteristics," VI "Learning Patterns and Health Beliefs of Primiparous Women," and VII "Results of Hypotheses Testing."

CHAPTER V

SAMPLE CHARACTERISTICS

Describing how the research study was conducted and characteristics of the sample provide a framework for identifying the generalizability of the results to the B.C. population of primiparous women. Section one consists of a report of the data collection. Section two outlines the participation rate, and contains a description of the demographic characteristics and health behaviors of research participants.

Data Collection

A total of eight hospital administrators were contacted, all endorsing the research study. Of these eight hospitals, seven were part of the main study and one was part of the pilot study. The procedures for obtaining potential research participants were modified from those outlined in Chapter IV. The original procedures were designed to obtain the names of primiparous women from hospital admission departments. However nursing administrators at the first three hospitals contacted suggested that the head nurse of the maternity ward could provide the list of primiparous women, and as such streamline data collection procedures. The head nurse, or charge nurse in her absence, then became the contact between this investigator and potential research participants. In three of the eight hospitals, the head nurse approached the new mother to see if she was interested in seeing a researcher from The University of British Columbia to be asked to participate in a study. In the other five hospitals, the head nurse and researcher both entered the room of the new mother, at which time the head nurse introduced the researcher who proceeded to outline the study and request the woman's participation. There were also differences among hospitals as to how potential research participants' physicians were notified of their patients' involvement in the study. In five hospitals, patients' physicians were directly notified of the research study and were asked if they had any objections to having their patients' participate. In the other three hospitals, the Director of Medical Services or Director of Obstetrics notified all physicians of the conduct of this study. Decisions regarding physician notification were made by hospital personnel.

Several individuals were excluded by the head or charge nurses from being approached to participate in the study. In the seven hospitals with the smaller maternity wards, two potential subjects were excluded for the following reasons: (1) drug addiction and psychiatric problems, and (2) emotional complications as a result of the mother having had a low birth weight infant. Furthermore, because there were few deliveries by primiparous women in these smaller hospitals, the head nurse permitted the researcher to approach all women who were on the wards during interview days. The circumstances were such that the head nurses and researcher were waiting for primiparous women to deliver. However in the hospital with the largest maternity ward a different set of circumstances were present because a choice was available as to who could be approached. The head nurses, and more frequently the charge nurses, excluded a higher percentage of potential subjects than the head nurses in the smaller hospitals. This occurrence could have been a function of the fact that in the larger hospital this researcher was in contact with several charge nurses, and the rapport between this researcher and the charge nurses did not have the opportunity to develop to the same extent as with nurses in the smaller hospitals. The charge nurses at the larger hospital excluded twelve potential subjects: a sixteen year old who was giving up her infant for adoption, three women who had medical problems (blood transfusions, etc.), three women who were upset because their infants were in intensive care, and three women who were deemed by the charge nurses to be "not good candidates" (no further information could be solicited). More judgment calls were made by the charge nurses in the larger hospital regarding selection of potential research participants. It would have been advisable, therefore, to have adhered to the proposed data collection procedure of obtaining names from the admissions department. This unfortunately was not possible. Judgment calls made by the nursing staff may have biased the sample by not including women whose infants were in intensive care, infants weighing less than 2,500 grams.

Time restraints were imposed by nursing personnel at two hospitals as to when the interviews could be conducted. In one of these hospitals a request was made that the interviews be conducted only during family visiting hours between 4:00 P.M. and 7:00 P.M., and on the weekends between 11:30 A.M. and 12:30 P.M.. In the other hospital the request was made that only one interview be conducted daily at 10:00 A.M.. However mid-way into data collection in this hospital, and once rapport had been established with the head nurse, the interviews were increased to two per day. In the other remaining six hospitals, no time restraints were imposed and the interviews were conducted between 9:00 A.M. and 3:00 P.M.. Interviews were not conducted during scheduled hospital exercise classes, breast feeding classes, or infant care classes. In the hospital where a specific hour was allocated for the interview time, no interruptions during the actual interview were experienced. However, in all other hospitals the interviews were interrupted by nurses performing their duties, physicians visiting, and other visitors. In the majority of cases these interruptions did not break the trend of thought of the new mother, however in some of the interviews the women took longer to respond to the research questions after a lengthy visit by a family member (more than ten minutes and up to sixty minutes). Once the woman's attention was again focused on the study, she resumed answering the questions at her previous rate.

There were eight occasions when the fathers were present during the entire interview. In three of these cases the woman responded to the questions, and then the husband provided a different response. The first response by the woman was recorded. Because of the infrequent occurrence of husband's providing an alternative response and because the woman's first response was recorded, these three cases were not eliminated from the study. An interesting event related to the presence of the father during the interview process was the discussion by one of the research participants who reported that she continued to smoke during her pregnancy but had concealed that fact from her husband. This discussion occurred at the time of signing the consent form when confidentiality was discussed. Of the women who were interviewed when the fathers were present, two of the eight had smoked and five of the eight had consumed alcoholic beverages prior to their pregnancy. Further, two of the five drinkers had reported consuming less than five drinks per month prior to their becoming pregnant. All had had infants weighing more than 3,000 grams. From examining drinking and smoking behaviors of these women and their infants' birth weights, it does not appear that their husbands' presence seriously influenced reporting of their health behaviors.

Another interesting event that had occurred during the interviewing process was the discovery that two women reported having had a miscarriage prior to the birth of their first infant. This fact became known when discussing the resources these women had utilized. The two women had reported reading about weight gain/alcohol/smoking during their first pregnancy which never reached term. As such, these two women may have been more motivated to engage in learning or more receptive to the information received. However, since only two women had reported having had a previous miscarriage, it was decided to retain these two individuals as part of the total sample. The reading they had done during their pregnancy which had ended in a miscarriage was included as part of their total reading time in this study.

Judgment calls made by the nursing staff, regarding selection of potential research participants, may have biased the sample by excluding women who had had low birth weight infants. However, the study would not have been conducted without discretionary decisions by the medical staff in excluding potential research participants for health reasons. Data collection took five months to complete. Hospital administrators and directors of nursing were sent letters of appreciation for their cooperation and assistance in making this study possible (Appendix 12).

Sample Description

The description of this sample is presented in three sections: (1) Participation Rate, (2) Demographic Characteristics, and (3) Health Behaviors of Pregnant Women. A profile of women participating in the study was essential in determining whether this sample was representative of the B.C. population of primiparous women.

Participation Rate

The participation rate of this study was 87 percent. Table 8 outlines the number of women interviewed, the number of refusals, and participation rates at each hospital. Grace hospital, the largest maternity hospital, had the lowest participation rate, at 79 percent.

TABLE 8

Participation Rate

Hospital	Number Interviewed	Number of Refusals	Participation Rate (%)*
Grace	50	13	79
Royal Columbian	17	1	94
Surrey	15	0	100
Burnaby	11	1	83
Lion's Gate	10	2	83
Richmond	9	1	90
St Paul's	8	0	100
Langley	8	1	89
	Total=128	Total=19	Overall=**87** %

*Participation Rate=No. Interviewed÷(No. Interviewed+No. of Refusals)x100

Grace hospital had six maternity wards, referred to as "modules." Two of these modules were for high risk pregnant women. Four women had been interviewed in these high risk modules and their participation rate was 57 percent. This low rate may have been due to the medical conditions of the women or the circumstances surrounding the medical risk. Participation rates in the other four modules were as follows: 65 percent in module one, 77 percent in module two, 94 percent in module three, and 100 percent in module four. There was a higher refusal rate in modules one and two than in modules three and four. After discussion of the participation rates in modules one and two with the director of postpartum nursing at Grace hospital, no plausible explanation could be provided except for chance occurrence.

As had been previously explained, the population of this study were women who had given birth to their first infant in seven hospitals in the Lower Mainland of British Columbia with average monthly births of greater than 100. The total number of interviews conducted were as follows: (1) 120 interviews conducted at seven hospitals in the Lower Mainland with average monthly births of greater than 100, (2) eight interviews conducted at Langley Memorial Hospital as part of the pilot study, and (3) three interviews conducted at the Maple Ridge Hospital as part of the prepilot study. Reporting of results was based upon the 120 interviews conducted at seven hospitals with average monthly births greater than 100, and the eight interviews conducted during the pilot study, for a total of 128 cases at eight hospitals. The decision to include the women in the pilot study as part of the total sample was made in order to obtain a sufficiently large sample for the statistical analyses regarding smoking behaviors. As well, the pilot responses were similar to the responses provided by the main sample, with the exception of health belief data. For one of the 128 cases in the total sample, a father of Asiatic origin insisted on responding to the interview questions on behalf of his wife. Because of these unusual circumstances, this case was excluded from the sample, reducing the usable interviews 127.

All analyses were based upon N=127 with the exception of the analyses of Health Belief Measures. The weight gain health belief questions were administered to the total sample. The alcohol health belief questions were administered to the ninety-five women who reported having consumed alcoholic beverages one month before pregnancy. The smoking health belief questions were administered to the fifty women who reported having smoked cigarettes one month before pregnancy. Because questions pertaining to Health Belief Measures were under revision during the pilot study in Langley, health belief data were not available for four of these cases (all of these four individuals were drinkers, and three of these individuals were smokers).

Furthermore, this investigator forgot to collect health belief data for three other drinkers and four other smokers. Therefore analyses using the weight gain health belief measure were based upon 123 individuals, analyses using the alcohol health belief measure were based upon eighty-eight individuals, and analyses using the smoking health belief measure were based upon forty-three individuals.

In summary, an 87 percent response rate was obtained. The sample consisted of 127 volunteer participants who had just experienced their first pregnancy. Data analyses were based upon N=127, with the exception of the analyses of Health Belief Measures. Health belief analyses for weight gain were based upon N=123, health belief analyses for alcohol were based upon N=88, and health belief analyses for tobacco were based upon N=43.

Demographic Characteristics

The ages of the women in this study ranged from sixteen to forty-six years. Their mean age was 26.5 years, and the median was 26.0 years. In British Columbia the average age of all women giving birth in 1984 was slightly under twenty-seven years, and the average age of primiparous women giving birth was approximately twenty-five years (Vital Statistics of the Province of British Columbia, 1985). The age distribution of women giving birth to their first infant in this study and the B.C. population of primigravidas is presented in Table 9. In comparison to the age of women giving birth to their first infant in British Columbia, this sample consisted of fewer women under nineteen years of age, and more women from thirty to thirty-four years of age. Age distribution for twenty to twenty-nine year olds and women over thirty-five years of age were similar.

Seventy-seven percent of the women in this study were married, 11 percent were single, 10 percent were living common law, and 2 percent were separated. Births to single, separated, and divorced primiparous and multiparous women in British Columbia during 1982 was 15.7 percent (Statistics Canada: Fertility in Canada, 1984), and 13 percent in this study of

TABLE 9

Age Distribution of the Sample and the B.C. Population

Age (years)	B.C. Primigravidas* (%)	Sample (%)
19 and under	11	6
20 - 24	35	33
25 - 29	35	34
30 - 34	15	20
35 - 39	3	5
40 and over	1	2
Total	100 %	100 %

*Source: Vital Statistics of the Province of British Columbia, 1985

primiparous women. Vital Statistics Report for the Province of British Columbia (1985) provided 1984 data for out-of-wedlock births, defined to include single, common law, and divorced women. In British Columbia out-of-wedlock births for primiparous women accounted for 23 percent of all births and in this study accounted for 21 percent. The number of births to single, common law, and separated women in this study was similar to the B.C. population of primiparous women.

The education level of women in this study ranged from grade eight to a master's degree. More specifically, 12 percent had less than senior matriculation; 42 percent had senior matriculation; 32 percent had post secondary education; and, 14 percent had post secondary degree/s. Comparable data on education levels of pregnant women were not available from British Columbia Vital Statistics reports or Statistics Canada reports. In the United States, the education level for both primiparous and multiparous women of all races was reported by the National Center for Health Statistics (1986). Data were obtained from 100 percent of birth certificates from forty-six states and 50 percent of birth certificates from the remaining areas. In 1984, 21 percent had less than senior matriculation, 42 percent had senior matriculation, 20 percent had post secondary education, and 16 percent had post secondary degrees (National

Center for Health Statistics, 1986). In comparison to U.S. data, fewer women in this study had less than senior matriculation.

The socioeconomic status of the women in this study was determined using Blishen's scale (Blishen and McRoberts, 1976), a scale which combines education and income levels. The mean socioeconomic index for the sample was 48.9, the median index was 48.7, and the range was from 24.6 to 74.4. Blishen's scale is based upon a standard scale with a mean of fifty. For married women and women living common law, the socioeconomic index value used in this study was the highest index of the family, whether that was the male or female of the household. Of the women who reported occupation of their husband/partner, 49 percent had a higher socioeconomic index than their partner's, 42 percent had a lower socioeconomic index than their partner's, and 9 percent had the same socioeconomic index as their partner's.

Ethnicity of the sample varied reflecting Vancouver's cosmopolitan nature. Eighty-three percent of the women were of North American or European descent, 6 percent of Chinese descent, 4 percent of East Indian descent, 3 percent of Fijian descent, 1 percent of Philippine descent, 1 percent of Japanese descent, 1 percent of Vietnamese descent, and 1 percent of Native Indian descent. For the purpose of data analyses, the sample was divided into two groups. The first group is referred to as "caucasian origin" and included women of North American, European, and Native Indian descent. The second group is referred to as "Asiatic origin" and included women of Chinese, East Indian, Fijian, Philippine, Japanese, and Vietnamese descent. Ethnicity of women giving birth is not recorded on birth notices and as such comparable data were not available for the pregnant population in British Columbia. In the 1981 Census of Canada (Statistics Canada: Census Tract, 1982), the percentage of the population in the Lower Mainland whose mother tongue (language first learned and still understood) other than English was 22 percent. The area surveyed in the 1981 census was defined as the CMA, Community Municipal Area, and has a similar geographic area to the one surveyed in this study.

Twenty-two percent of the women in this study had a cesarean section. Cesarean sections accounted for approximately 16 percent of all deliveries reported in 1980-81 in Canada (Statistics Canada: Surgical Procedures and Treatment, 1984). Tonkin (1981), in his report "Child Health Profile: Births Events and Infant Outcomes," provided unpublished 1977 data from the B.C. Ministry of Health Department of Vital Statistics, and reported that approximately 16 percent of deliveries in British Columbia were cesarean sections, and 78 percent of these were primary or first sections. Tonkin stated that cesarean section rates vary widely from one part of the province to the other and from hospital to hospital. The number of cesarean sections was higher in this study than other British Columbia and Canadian data. This occurrence was most likely due to the fact that women with a cesarean section would remain in hospital longer and as such were more accessible to this investigator.

In this study 60 percent of the women had given birth to a boy and 40 percent had given birth to a girl whereas in 1984, 52 percent of the B.C. pregnant population had given birth to a boy and 48 percent had given birth to a girl (Vital Statistics of the Province of British Columbia, 1985).

The mean birth weight of the infants in this study was 3,422 grams (7.6 pounds), and 3,444 grams (7.7 pounds) for the B.C. population (Vital Statistics of the Province of British Columbia, 1985). The median birth weight in this study was 3,400 grams (7.5 pounds). Seven of the infants in this study weighed 2,500 grams or less for a low birth weight incidence of 5.5 percent, and in 1984 in British Columbia 2,242 infants weighed 2,500 grams or less for a low birth weight incidence of 5.1 percent (Vital Statistics of the Province of British Columbia, 1985). In the United States (National Center for Health Statistics, 1986), low birth weight incidence in 1984 was 6.7 percent. The United States also provides a breakdown of low birth weight incidence based upon racial origin, data unavailable in British Columbia or Canada. Low birth weight incidence in the United States was 5.6 percent for the "white" population, 12.4 percent for the "black" population, 6.2 percent for the "American Indian" population, 5.1 percent for the

"Chinese" population, 6.1 percent for the "Japanese" population, 7.6 percent for the "Filipino" population, and 6.4 percent for other "National Origin Groups." In this research study, low birth weight incidence for infants of caucasian origin was 3.7 percent and their mean birth weight was 3,493 grams, whereas low birth weight incidence for infants of Asiatic origin was 9.5 percent and their mean birth weight was 3,062 grams. A statistically significant difference in birth weight of infants of caucasian and Asiatic origin was found ($t=3.52$, $df=125$, $p=0.001$).

Birth weight of the infants ranged from 1,720 grams (3.8 pounds) to 4,680 grams (10.4 pounds), and in British Columbia the relative range was from less than 500 grams to greater than 4,500 grams (Vital Statistics of the Province of British Columbia, 1985). The percentage of infants in the various birth weight categories outlined by Vital Statistics for 1984 British Columbian data are compared to this sample and the results are reported in Table 10. Although the low birth weight incidence of the sample and the B.C. population are similar, this sample of primigravidas had no births in the less than 1,500 grams category in comparison to the British Columbian data for all births. Furthermore the sample contained slightly fewer births over 4,500 grams.

TABLE 10

Births by Weight Categories for the Sample and the B.C. Population

Birth Weight (grams)	B.C. Population* (%)	Sample (%)
Less than 1500	1	0
1500-2000	1	1
2001-2500	3	5
2501-3000	14	16
3001-3500	36	34
3501-4000	32	31
4001-4500	11	12
Over 4500	2	1
	100 %	100 %

*Source: Unpublished Data: B.C. Ministry of Health, 1985 (Primigravidas and Mutigravidas)

One of the seven infants weighing 2,500 grams or less was small for gestational age, defined according to Usher and McLean's Fetal Growth Tables (1969), and the other six were appropriate for gestational age. The Institute of Medicine (1985) reports that when low birth weight incidence is less than 10 percent for any given population, the majority of infants born under 2,500 grams are appropriate for gestational age. Similar results were obtained in this research study. Four percent of the infants were premature (delivered prior to thirty-seven weeks gestation), 85 percent of the infants were term (delivered between thirty-seven and forty-one weeks gestation), and 11 percent of the infants were overdue (delivered at forty-two weeks gestation). Birth weight was significantly correlated with gestational age ($r=0.53$, $df=125$, $p<0.001$). In the United States, 40 percent of infants born prior to thirty-seven weeks weighed less than 2,500 grams (National Center for Health Statistics, 1984) and in this study 60 percent of infants born prior to thirty-seven weeks weighed less than 2,500 grams. A comparison of the gestational ages of the infants in this sample and the British Columbian population is contained in Table 11. In comparison with British Columbia data, there were slightly more women in this study whose gestational age was over forty-one weeks. Primigravidity is associated with an increased incidence of prolongation of pregnancy (Dewhurst, 1981), thereby accounting for the differences found.

The mean number of doctor's visits made by women in this study was fourteen, and the median number of visits was also fourteen. Ninety percent of first visits were made during the first trimester of pregnancy. Comparable British Columbian or Canadian data are not available. The mean number of doctor visits reported by the National Center for Health Statistics (1986) in the United States during 1984 was twelve and the median number of visits was fourteen.

Sixty-one percent of the women reported they had planned their pregnancy. Women who had planned their pregnancy were older ($t=3.61$, $df=125$, $p<0.001$), married ($\chi^2=30.44$, $df=2$, $p<0.001$), of a higher education level ($\chi^2=8.3$, $df=3$, $p=0.04$), and of a higher socioeconomic status ($t=4.16$, $df=125$, $p<0.001$). It was not unexpected to find that planning

TABLE 11

Gestational Age Distribution of the Sample and the B.C. Population

Gestational Age (weeks)	B.C. Population* (%)	Sample (%)
Less than 32	1	0
32-34	2	2
35-37	9	9
38-41	79	78
Over 41	9	11
Total	100 %	100 %

*Source: Vital Statistics of the Province of British Columbia, 1985 (Primigravidas and Multigravidas)

the pregnancy was associated with marriage, and older women of a higher level of education; however, the question that remains to be answered is whether planning the pregnancy was associated with engagement in learning and ideal health behaviors. The mean age of women who had planned their pregnancy was 27.8 years, whereas the mean age of women who had not planned their pregnancy was 24.5 years. The mean socioeconomic index of those who had planned their pregnancy was 52.3, whereas the mean socioeconomic index of those who had not planned their pregnancy was 43.8. No differences were found between ethnic origin and planning the pregnancy.

Seventy percent of the sample had requested a summary report of the findings of this research study. Requesting a summary report was not found to be associated with age, marital status, education level, or socioeconomic status. However, women of Asiatic origin were less likely to request a summary report ($\chi^2 = 7.4$, $df = 1$, $p = 0.006$).

The demographic characteristics of this sample are summarized as follows: The average age of primigravidas in this study was 26.5 years, and the average age of primigravidas in British Columbia was approximately twenty-five years. There were fewer women in this study under nineteen years of age in comparison to the B.C. population of primigravidas. This occurrence may have been due to exclusion by hospital nursing staff of potential research participants. The percentage of out-of-wedlock births in this study was 21 and 23 percent in British Columbia. Forty-four percent of participants had post secondary education or degrees. Sixteen percent were of Asiatic descent, reflecting Vancouver's cosmopolitan nature. The mean socioeconomic index of the sample was 48.9, a value that approximates the mean index of Blishen's Scale, 50.0. No comparable data for education level, socioeconomic status, and ethnicity of the B.C. pregnant population are available. Sixty-one percent of the sample reported planning their pregnancy. Older, married women of a higher education level and socioeconomic status were more likely to plan their pregnancy ($p \leq 0.05$). Mean birth weight of the sample was 3,422 grams and 3,444 grams in British Columbia, almost identical values. Low birth weight incidents were also comparable, 5.5 percent in this study and 5.1 percent in B.C.. Even though it was anticipated that decisions made by nursing staff to exclude potential research participants may have influenced low birth weight incidence, values for the sample and B.C. population were similar. However, there were fewer births in this study that were under 2,000 grams and prior to thirty-five weeks gestation than the B.C. population of pregnant women. The purpose of having compared the demographic characteristics of this sample with the B.C. population was to determine whether the sample was representative of primigravidas in British Columbia. Although comparable data regarding education level, socioeconomic status, and ethnicity were not available for primiparous women in British Columbia, the average age, average birth weight, low birth weight incidence, and marital status of this sample were similar. The sample of this study is therefore representative of the British Columbian population of primiparous women.

Health Behaviors of Pregnant Women

The health behaviors of primiparous women in this study are described in relation to their weight gain, alcohol consumption, and tobacco use. The description of these health behaviors begins with an examination of women's actual health behaviors. Following, behavior change during pregnancy in relation to ideal behavior, and the relationships among health behaviors and demographic characteristics are presented. Demographic characteristics include: age, marital status, education level, socioeconomic status, ethnic origin, and birth weight.

Weight Gain

The women in the sample had gained an average of thirty-four pounds during their pregnancy (SD=9.6 pounds). Range of gain was from two to fifty-eight pounds. Two percent of the women had gained less than ten pounds, 5 percent had gained between ten and nineteen pounds, 25 percent had gained between twenty and twenty-nine pounds, 38 percent had gained between thirty and thirty-nine pounds, 25 percent had gained between forty and forty-nine pounds, and 5 percent had gained over fifty pounds. Underweight women in this sample (N=45), defined as being less than 90 percent of their desirable weight based upon the 1959 Metropolitan Life Insurance Desirable Weight Tables, had gained an average of thirty-three pounds (SD=7.8 pounds). Normal weight women in this sample (N=77), defined as being between 90 and 120 percent of their desirable weight, had gained an average of thirty-four pounds (SD=9.5 pounds). Overweight women in this sample (N=5), defined as being greater than 120 percent of their desirable weight, had gained an average of thirty-one pounds (SD=7.8 pounds). As was previously noted, the B.C. Ministry of Health average weight gain recommendations are thirty to thirty-two pounds for underweight women, twenty-seven pounds for primiparous women of normal weight, and sixteen to twenty pounds for overweight women. On the average, normal and overweight women in this sample had gained more than the average recommended prenatal weight gains for their prepregnant height and weight. A more in-depth profile of weight gain patterns for underweight, normal weight, and overweight women is outlined in Table 12.

From Table 12 it can be noted that all the overweight women in this sample had gained more than the recommended weight gain for overweight women. Because of the difficulty of

TABLE 12

Weight Gain Patterns of Under, Normal, and Over Weight Women

Weight Gain (pounds)	Underweight (%)	Normal Weight (%)	Overweight (%)
Less than 10	0	3	0
10-19	4	5	0
20-29	33	19	40
30-39	38	39	40
40-49	16	31	20
Over 50	9	3	0
Total	100 %	100 %	100 %

losing weight postpartum, gaining more than is required during pregnancy further aggravates the weight problem of overweight women. In addition, 73 percent of the normal weight women had gained more than average recommendations. Although it is recognized that each case must be evaluated individually, the figures indicate that a large percentage of women are gaining more than required. There, however, remain a number of individuals in this study who had gained less than the recommended amounts, and as such had placed themselves in a higher risk category for having a low birth weight infant. Eight percent of normal weight women and 4 percent of underweight women had gained less than twenty pounds during their pregnancy. As previously stated in Chapter II, Review of the Literature, women gaining less than twenty pounds during their pregnancy quadruple their risk of having a low birth weight infant. As such, insufficient weight gain during pregnancy continues to be a serious concern for some pregnant women as well as health professionals counselling these women.

Ninety-four percent of the sample had reported changing their eating habits. A description of the type of changes made is summarized in Table 13. Woman reported making more than one type of dietary change, and as such the total percentage is greater than 100.

TABLE 13

Changes in Eating Habits

Type of Change	Number of Individuals	Percentage of Total Sample
Increased Milk Intake	48	38
Increased Fruit Intake	37	29
Decreased Sweets, Empty Calorie Foods	30	24
Increased Vegetable Intake	26	20
Three Meals a Day	22	17
Balanced Meals, Four Food Groups	18	14
Increased Protein	12	9
Decreased Caffeine	11	8

The most frequent changes made in eating habits during pregnancy included increasing food products such as milk, fruit, and vegetables; decreasing sweets and empty calorie foods; and, having three meals a day. Other changes in eating habits that were reported included: smaller meals (7 individuals); use of vitamins (7 individuals); increased fluids (7 individuals); increased fiber (6 individuals); decreased fat (5 individuals); decreased quantity of food (4 individuals); increased sweets (4 individuals); increased snacks (2 individuals); use of bland foods (2 individuals); decreased salt (2 individuals); decreased milk (1 individual); decreased snacks (1 individual); decreased meat (1 individual); avoided "acid" foods (1 individual); increased bread and cereals (1 individual); avoided spicy foods (1 individual); avoided aspartame sweetner (1 individual); and, followed diet given by dietitian (1 individual). Information on the context or the circumstances of the changes made in this research study was not requested. For example, it is not known whether the women in this study who had increased their milk intake were those who had been consuming inadequate amounts of milk prior to their pregnancy. Furthermore it is not known whether these changes had been carried out during the entire pregnancy or only for a limited time period.

Reasons women had reported changing their eating habits included: health of the baby (58 percent); health of the mother and baby (9 percent); recommendations of the Doctor /or/ Dietitian /or/ Prenatal Class (7 percent); previously poor eating habits (6 percent); not feeling well enough to eat (6 percent); to gain weight (3 percent); not to get fat (2 percent); avoiding constipation /or/ heartburn /or/ morning sickness (2 percent); mother's health (1 percent); cravings (1 percent); afraid of delivery (1 percent); results of computer diet analyses (1 percent); gestational diabetes (1 percent); and, getting away with eating more (1 percent). The primary reason women had given for changing their eating habits was for the health of the baby. Awareness of the growing fetus is an important reason underlying behavior change during pregnancy. Secondary reasons for changing eating habits had included recommendations by health professionals and not feeling well enough to eat. What is not known is the indirect influence that health professionals had in increasing women's awareness of the relationship between good eating habits and its influence on the growing fetus.

Ideal Weight Gain

A measure was devised and described in Chapter IV to compare actual amount of weight gained during pregnancy with recommended weight gain. This measure, WEIGHT GAIN RATIO, was defined as actual weight gain during pregnancy divided by recommended weight gain. Recommended weight gain, calculated for every individual, was 20 percent of the individual's desirable weight (Rosso, 1985). As explained in Chapter IV, for women who were less than 100 percent of their desirable weight, the amount under 100 percent was added to the 20 percent increment. Women with an ideal weight gain during pregnancy would have a weight gain ratio value of one. Women gaining less than their recommended weight gain would have a weight gain ratio of less than one, and women gaining more than their recommended weight gain would have a weight gain ratio of greater than one.

In this study the weight gain ratio values for the sample ranged from 0.07 to 2.40. The mean weight gain ratio value was 0.94 and the median value was 0.90. On the average women had gained 94 percent of their recommended weight gain. Table 14 contains a profile of the amount of weight gained in reference to recommended weight gain.

TABLE 14

Sample Distribution of Weight Gain Ratio Values

Weight Gain Ratio Values	Sample (%)
Less than 0.25	2
0.25 - 0.49	5
0.50 - 0.74	25
0.75 - 0.99	27
1.00 - 1.24	21
1.25 - 1.49	13
1.50 - 1.74	5
Over 1.74	2
Total	100 %

Thirty-two percent of the sample had gained less than 75 percent of their recommended weight gain. For example, if their recommended weight gain had been twenty-seven pounds, 32 percent would have gained less than twenty pounds. As previously stated, insufficient weight gain increases the likelihood of having a low birth weight infant. Twenty percent of the sample had gained more than 125 percent of their recommended weight gain. Similarly, if their recommended weight gain had been twenty-seven pounds, 20 percent of the sample would have gained more than thirty-four pounds during pregnancy. Even when weight gain was compared to recommended weight gain, calculated for every individual, 20 percent of the sample had gained more than recommended. Although risks associated with insufficient weight gain during pregnancy were originally documented in Tompkins's study of 1955, it has only been recently that risks associated with excessive gain in women of normal prepregnant stature have been examined. Shepard, Hellenbrand, and Bracken (1986) reported that excessive weight gain was found to be associated with an increase risk of gestational hypertension, preeclampsia, cesarean section, and infants weighing over 4,000 grams at birth. Excessive or insufficient weight gains during pregnancy are not recommended.

Weight Gain and Demographic Characteristics

The amount of weight gained in relation to the recommended weight gain (WEIGHT GAIN RATIO) was not significantly associated with age, marital status, education level, or socioeconomic status. Weight gain ratio was however significantly associated with ethnic origin ($t=2.63$, $df=125$, $p=0.01$). Women of caucasian origin had an average weight gain ratio value of 0.97, whereas women of Asiatic origin had an average weight gain ratio value of 0.76. Women of asiatic origin had gained, on the average, only 76 percent of their recommended weight gain. A significant correlation was found between weight gain ratio and birth weight ($r=0.33$, $df=125$, $p<0.001$). As well, a significant correlation was found between actual maternal weight gain and infant birth weight ($r=0.32$, $df=125$, $p<0.001$). Those women who had gained less than their recommended weight gain were found to have smaller infants. Asiatic women as a subgroup of this sample had been at a higher risk of having low birth weight infants than caucasian women.

In summary, women in this study had gained an average of thirty-four pounds during pregnancy. Seven percent of the sample had gained less than twenty pounds and 30 percent had gained more than forty pounds. In examining weight gain during pregnancy in relation to recommended weight gain, 32 percent of the sample had gained less than 75 percent of their recommended weight gain and 20 percent had gained more than 125 percent of their recommended weight gain. As such, 52 percent of the women in this study had been at a higher risk of either having a low birth weight infant or having greater complications during pregnancy, labor, and delivery. Weight gain ratio was not significantly associated with age, marital status, education level, or socioeconomic status. However, women of Asiatic origin had gained less weight than women of caucasian origin ($p\leq 0.01$). As such Asiatic women had been at a higher risk of having a low birth weight infant in this research study. Maternal weight gain was positively corrrelated with infant birth weight ($p \leq 0.001$). Over 90 percent of the sample had changed their eating habits and the most frequent changes cited included increasing milk, fruit, and vegetables, decreasing sweets, and having three meals a day instead of having less than three meals a day. The primary reason women had given for changing their eating habits was for the health of the baby. Secondary reasons included recommendations by health professionals and the physiologic reasons for not feeling well enough to eat.

Alcohol Consumption

Seventy-five percent of the sample had consumed alcoholic beverages during the month prior to their pregnancy. Comparable data for the pregnant population of primiparous women in British Columbia are not available. Some general statistics on alcohol consumption have been published. In 1978-79, The Canada Health Survey conducted by Health and Welfare Canada (Statistics Canada: Perspectives on Health, 1983) reported that 65 percent of Canadians consumed alcoholic beverages. British Columbia had the highest proportion of drinkers in Canada, with 73 percent of British Columbians consuming alcoholic beverages. The percentage of women in British Columbia consuming alcoholic beverages was slightly under 70 percent. In 1983, Canadian Gallup Poll Limited (Addiction Research Foundation, 1984) conducted in-home interviews with 1063 adults over eighteen years of age and reported that 73 percent had the occasion to use alcohol. More specifically, 83 percent of eighteen to twenty-nine year olds and 77 percent of thirty to forty-nine year olds consumed alcoholic beverages. The percentage of the women in the study consuming alcoholic beverages prior to their pregnancy was similar to female British Columbians and female Canadians.

The mean and median number number of alcoholic beverages consumed by drinkers ($N=95$) one month before pregnancy and during each trimester of pregnancy is outlined in Table 15. One drink was defined as one bottle of beer (335 ml), one bottle of cider (335 ml), five ounces of wine (150 ml), 1.5 ounces of liquor (45 ml), or 1.5 ounces of liqueur (45 ml). Overall there was a decrease in alcohol consumption during pregnancy with a slight increase from the second to the third trimester. It is encouraging to note that the average monthly number of drinks consumed during the second and third trimesters of pregnancy was only one and two drinks respectively. However, the range of drinks consumed during the first trimester of pregnancy was large (0-118), a time when the fetus is most susceptible to alcohol insult.

TABLE 15

Alcohol Consumption Patterns of Drinkers Before and During Pregnancy

Time Period	Mean Number of Drinks per Month	Median Number of Drinks per Month	Range: Number of Drinks per Month
Before Pregnancy	23	11.0	0.3-136.0
First Trimester	9	1.3	0.0-118.0
Second Trimester	1	0.0	0.0- 30.0
Third Trimester	2	0.3	0.0- 30.0

A comparison between the average number of alcoholic beverages consumed weekly by drinkers in this study and Canadian female drinkers participating in the 1978-79 Canada Health Survey (Statistics Canada: Perspectives on Health, 1983) is outlined in Table 16.

TABLE 16

Average Weekly Alcohol Consumption of Drinkers in the Sample Before Pregnancy and all Canadian Female Drinkers Participating in the Health Canada Survey

(No. Drinks per Week)	Canadian Females* (%)	Drinkers in Sample (%)
Less than 1	17	25
1 - 6	55	49
7 - 13	19	15
14 or more	9	11
Total	100 %	100 %

*SOURCE: Adapted from Statistics Canada: Perspectives on Health, Ottawa, 1983.

There was a higher percentage of drinkers in this sample who had consumed more than thirteen drinks per week and less than one drink per week in comparison to the drinking female population as reported in the Health Canada Survey.

An in-depth profile of the drinking habits of primiparous women in this study is contained in Table 17. Average weekly number of drinks consumed by the total sample for the periods before and during each trimester of pregnancy are provided.

TABLE 17

Average Weekly Number of Drinks Consumed by the Sample Before and During Pregnancy

Time Period	0 Drinks	< 1 Drink	1-6 Drinks	7-13 Drinks	> 14 Drinks
Before	25 % *	19 %	37 %	11 %	8 %
Tri 1	46 %**	32 %	14 %	6 %	2 %
Tri 2	74 %**	20 %	5 %	1 %	0 %
Tri 3	67 %**	26 %	6 %	1 %	0 %

* Percentage of non-drinkers in this study
** 25 percent whom are non-drinkers

The percentage of women abstaining from alcohol consumption had increased substantially, from 25 percent before pregnancy to 67 percent by the third trimester. However, 7 percent had re-started consuming alcoholic beverages during the third trimester of pregnancy. Eight percent of the women in this study had consumed greater than an average of seven drinks per week during their first trimester, a time when the fetus is most susceptible to alcohol insult.

The type of alcoholic beverages consumed before and during each trimester of pregnancy is outlined in Table 18. The sum of the percentages does not add up to 100 as women may have consumed more than one type of alcoholic beverage.

TABLE 18

Percentage of Drinkers Consuming Various Types of Alcoholic Beverages Before and During Pregnancy

Time Period	Beer	Cider	Wine	Liquor	Liqueur
Before	40	14	68	26	18
Tri 1	22	11	52	19	12
Tri 2	15	3	30	4	0
Tri 3	25	7	35	6	2

Wine and beer predominated as the alcoholic beverages of choice. Eighteen percent of drinkers had consumed liqueur before pregnancy and 2 percent had consumed liqueur during the third trimester, an 89 percent reduction rate (100-[2x100÷18]). Similarly, 26 percent had consumed liquor before pregnancy and 6 percent had consumed liquor during the third trimester, a 77 percent reduction rate. Fourteen percent had consumed cider before pregnancy and 7 percent had consumed cider during the third trimester, a 50 percent reduction rate. Sixty-eight percent had consumed wine before pregnancy and 35 percent had consumed wine during the third trimester, a 49 percent reduction rate. Forty percent had consumed beer before pregnancy and 25 percent had consumed beer during the third trimester, a 38 percent reduction rate. Wine and beer not only predominated as the beverages of choice but also were the alcoholic beverages which had had the lowest reduction rates.

The number of alcoholic drinks consumed on one occasion is outlined in Table 19. Five individuals had consumed more than four bottles of beer, two individuals had consumed more than four glasses of wine, and one individual had consumed more than four bottles of cider on one occasion either before or during the first trimester of pregnancy. Those women consuming more than four drinks of alcohol on a single occasion during their first trimester of pregnancy reported consuming alcohol when they had not known they were pregnant. Of the fifteen individuals consuming more than four drinks on one occasion before or during the first trimester of pregnancy, nine were either single or living common law. The mean age of these fifteen women was twenty-two years, and the range of their ages was from seventeen to twenty-seven. Two of these individuals stated that they had consumed alcohol to get drunk. Although data from human studies have not provided clear evidence of the effects of "binge" drinking on the fetus as has been reported in human studies examining the effects of regular heavy drinking by pregnant women either during the first eight weeks of pregnancy or the entire pregnancy, results of animal studies have indicated that there are detrimental effects of consuming large quantities of alcohol on a short term basis (Council on Science Affairs, 1983). What is encouraging to note is that after the first trimester, only three individuals had consumed three or four alcoholic drinks on any one single occasion.

Reduction in Alcohol Consumption

Reduction in alcohol consumption was calculated as a ratio of the average number of drinks consumed during pregnancy divided by the average monthly number of drinks consumed one month before pregnancy. As described in Chapter IV, the formula for the alcohol consumption ratio was defined as follows: ([average monthly number of alcoholic drinks consumed during the first trimester + average monthly number of alcoholic drinks consumed during the second trimester + average monthly number of alcoholic beverages consumed during the third trimester] ÷ 3) ÷ number of alcoholic drinks consumed one month before pregnancy.

TABLE 19

Number of Individuals Consuming Beer Cider, Wine, Liquor, and Liqueur Before and During Pregnancy and their Corresponding Number of Alcoholic Beverages Consumed on a Single Drinking Occasion

Number of Drinks	Before Pregnancy					Trimester 1					Trimester 2					Trimester 3				
	B*	C*	W*	L*	Li*	B*	C*	W*	L*	Li*	B*	C*	W*	L*	Li*	B*	C*	W*	L*	Li*
one	11	7	20	7	7	12	4	25	6	5	14	2	23	3	0	24	5	28	5	2
two	10	2	22	6	7	3	2	11	5	4			2					4		
three	10	1	15	3	3	8	1	5	1	2			2							
four	2	1	4	5			1	4	2			1								
five			2	1				2	1											
six	2	1		1		2	1													
seven	1			1		1			1											
eight	1					1			1											
nine																				
ten																				
eleven																				
twelve				1					1											

*B=Beer, C=Cider, W=Wine, L=Liquor, Li=Liqueur

Multiplying this ratio by 100 and subtracting from 100 provides for the percent reduction in alcohol consumption during pregnancy. The mean alcohol reduction ratio for drinkers was 0.18. Therefore, on the average, women had reduced their alcohol consumption by 82 percent. There was no significant association between the amount of alcohol consumed prior to pregnancy and the alcohol reduction ratio, indicating that both heavy and light drinkers had reduced their alcohol consumption during pregnancy.

Changes in alcohol consumption of drinkers were classified into four behavioral categories. These categories included: (1) those individuals who had quit drinking during their pregnancy once they knew they were pregnant (Quit), (2) those individuals who had reduced their alcohol consumption during pregnancy (Reduced), (3) those individuals who had reduced their alcohol consumption during the first and second trimesters and then subsequently had increased their alcohol consumption during the third trimester of pregnancy (Reduced-Increased), and (4) those individuals who had not changed or had increased their alcohol consumption during pregnancy (No Change or Increased). Table 20 contains a summary of the type of changes made in alcohol consumption and the average number of drinks consumed by the individuals in these four groups prior to their pregnancy.

TABLE 20

Alcohol Consumption Behavior Changes During Pregnancy and Mean Numbers of Drinks Consumed per Month Prior to Pregnancy

Behaviors	Incidence	Prepregnancy Mean No. of Drinks per Month
Quit	40 %	20
Reduced	17 %	38
Reduced-Increased	37 %	23
No Change or Increased	6 %	6
Total	100 %	

Fifty-seven percent of drinkers in this study had reduced or abstained from consuming alcoholic beverages during pregnancy. Another 37 percent had attempted to reduce their alcohol consumption, but were unable to maintain this reduction throughout the entire pregnancy and had increased their intake slightly towards the end of their pregnancy. Almost all pregnant drinkers in this study, 94 percent, had attempted to positively change their alcohol behaviors. Analysis of variance was conducted to determine whether the mean number of drinks consumed before pregnancy was associated with quitting, reducing, reducing-increasing, or not changing or increasing alcohol intake. No significant differences were found among the four groups. The within group variance of the mean alcohol consumption values was large in each of the four groups, therefore the difference among the means did not reach statistical significance. These results are encouraging since heavy drinkers, as well as light drinkers, can potentially reduce or abstain from consuming alcohol during pregnancy.

Reasons women had given for changing their alcohol consumption during pregnancy included: health of the baby (75 percent); not feeling well enough to drink (8 percent); alcohol had no appeal (6 percent); there were no safe limits established (4 percent); health of the baby and mother (2 percent); to reduce caloric intake (1 percent); and, to try and quit smoking (1 percent). The majority of women in this study had reported changing their alcohol consumption for the health of the baby and only 8 percent had reported changing their alcohol consumption because they had not felt well enough to drink.

Although no reasons were given by women who had increased their alcohol consumption during the third trimester of pregnancy, the time of year the interviews were conducted may have had some influence. The majority of interviews were conducted during August and September and several women had commented on consuming beer during the summer months. Referring back to Table 18 on p. 176, there was a 10 percent increase in beer consumption from the second to the third trimester. However there was also a 5 percent increase in wine consumption, a 4 percent increase in cider consumption, and a 2 percent increase in liquor and liqueur consumption. Increase in alcohol consumption from the second to the third trimester may also have been due to stress or anticipation of the forthcoming labor and delivery.

Alcohol Consumption and Demographic Characteristics

In comparing those individuals who had consumed alcoholic beverages one month prior to pregnancy (drinkers) and those individuals who had abstained from alcohol consumption one month prior to pregnancy (non-drinkers), there was no significant differences in age, marital status, education level, or socioeconomic status. There was, however, a significant difference in their ethnic origin ($\chi^2=38.03$, $df=1$, $p<0.001$). Women of Asiatic origin were less likely to consume alcoholic beverages. Mean birth weights of infants born to drinkers and non-drinkers were also significantly different ($t=-2.24$, $df=125$, $p=0.03$). Mean birth weight of infants born to drinkers was 3,483 grams and mean birth weight of infants born to non-drinkers was 3,241 grams. This difference was most likely due to the fact that non-drinkers were women of Asiatic origin who had had lower birth weight infants.

The amount of alcohol consumed prior to pregnancy was not associated with age, education level, socioeconomic status, or ethnic origin. The amount of alcohol consumed prior to pregnancy was, however, associated with marital status [$F_{(2,92)}=5.08$, $p=0.008$]. *Post hoc* analysis using Tukey's method showed that women living common law had consumed significantly more alcohol prior to pregnancy than married women. Women living common law had consumed an average of forty-one drinks per month, whereas married women had consumed an average of eighteen drinks per month. No significant differences were found in the amount of alcohol consumed prior to pregnancy between single women and women living common law, or between single women and married women. Common law women, as a group, drank more before pregnancy and as such had been at a higher risk of having lower birth weight infants, since the amount of alcohol consumed by drinkers before pregnancy was negatively correlated with birth weight ($r=-0.22$, $df=93$, $p=0.016$). The more alcohol an individual had consumed before pregnancy the lower the birth weight of the infant.

Reduction in alcohol consumption during pregnancy was not significantly associated with age, marital status, education level, socioeconomic status, ethnic origin, or birth weight. Furthermore, women who had quit, had reduced, had reduced-increased, or had not changed or had increased their alcohol consumption during pregnancy did not differ with respect to age, marital status, education level, socioeconomic status, ethnic origin, or birth weight.

In summary, 75 percent of women in this study had consumed alcoholic beverages during the month before their pregnancy, and close to 70 percent of female British Columbians had consumed alcoholic beverages in 1983 (Addiction Research Foundation, 1984). The amount of alcoholic beverages consumed by women in this study was similar to the amount consumed by Canadian female drinkers participating in the Health Canada Survey (Statistics Canada: Perspectives on Health, 1983). Seventy-four percent of drinkers in this study had consumed less than an average of seven drinks per week during the month before their pregnancy, and 72 percent of female Canadians had consumed less than an average of seven drinks per week. Alcohol consumption patterns of women in this study were similar to female British Columbians and other Canadians. Wine predominated as the alcoholic beverage of choice followed by beer. Once women knew that were pregnant, only three individuals had drunk three or four alcoholic drinks on any single drinking occasion, and only 1 percent of drinkers had consumed an average of seven or more drinks per week. However, during the first trimester of pregnancy, a time when women usually do not know they are pregnant and a time when the fetus is most susceptible to alcohol insult, fifteen women had consumed more than four drinks on one occasion and 8 percent of drinkers had consumed an average of seven or more drinks per week. The amount of alcohol consumed before pregnancy was negatively correlated with birth weight ($p \leq 0.01$). Common law women who drank had consumed significantly more alcohol prior to pregnancy than single or married women ($p \leq 0.01$), and as such had been at a higher risk of having lower birth weight infants. Forty percent of drinkers had abstained from alcohol during pregnancy, 37 percent had reduced their alcohol consumption, 17 percent had reduced their alcohol consumption during the first and second trimesters and then had increased their alcohol consumption during the third trimester of pregnancy, and 6 percent had not changed or had increased their alcohol consumption during pregnancy. On the average, women had reduced their alcohol consumption by 82 percent. Although the majority of women had positively changed their alcohol behaviors during pregnancy, these results should not provide health professionals with a false sense of security. As earlier noted, fifteen women had "binged" and 8 percent had consumed an average of seven or more drinks per week either before the pregnancy or during the first trimester of pregnancy, a time when the fetus is most susceptible to alcohol insult. The amount a woman had reduced her alcohol intake was not associated with age, marital status, education level, socioeconomic status, or ethnic origin. Drinkers, however, were more likely to be of caucasian origin ($p<0.001$). The majority of women had reported changing their alcohol consumption for the health of the baby. Women who had increased their alcohol consumption had not provided any reasons for this increase.

Tobacco Use

Thirty-nine percent of the sample had smoked cigarettes during the month prior to their pregnancy. Comparative data for the pregnant population of primiparous women in British Columbia are not available. The Canada Health Survey (Statistics Canada: Perspectives on Health, 1983) reported that 34 percent of the Canadian female population smoked in 1978-79. More specifically, 34 percent of fifteen to nineteen years olds, 45 percent of twenty to twenty-four year olds, 37 percent of twenty-five to forty-four year olds smoked. In the 1981 Smoking Behaviors of Canadians Survey (Statistics Canada: Perspectives on Health, 1983), 26 percent of female British Columbians, aged fifteen and over, smoked. In the 1985 Gallup Poll conducted by Health and Welfare Canada (Edwards, 1986), 34 percent of fifteen to seventeen year olds, 36 percent of eighteen to nineteen year olds, 52 percent of twenty to twenty-four year olds, and 47 percent of twenty-five to twenty-nine year old female Canadians smoked. Considering the range of ages of women in this study (sixteen to forty-six), the percentage of smokers in this sample is fairly comparable to the Canadian female population.

A comparison between the average daily number of cigarettes smoked by smokers in this sample and by Canadian female smokers participating in the Health Canada Survey (Statistics Canada: Perspectives on Health, 1983) is reported in Table 21. There was a lower incidence of heavy smokers (over twenty-two cigarettes per day) in this sample than was reported in the Health Canada Survey. Of the four individuals in this study who had smoked more than twenty-two cigarettes per day, three were living common law, and all four were of caucasian origin. Not only had common law women consumed large quantities of alcohol prior to pregnancy, but also they had smoked more than a pack of cigarettes per day. The mean age of these women was twenty-four and the range was from sixteen to twenty-nine years.

TABLE 21

Average Number of Cigarettes Smoked Daily by Smokers in the Sample Before Pregnancy and by all Canadian Female Smokers Participating in the Health Canada Survey

No. Cigs per Day	Canadian Females* (%)	Sample (%)
1 - 12	34	36
13 - 22	39	56
23 - 32	21	4
Over 32	6	4
Total	100 %	100 %

*SOURCE: Adapted from Statistics Canada: Perspectives on Health, Ottawa, 1983

The average number of cigarettes smoked daily by smokers (N=50) one month before pregnancy was sixteen. The mean number of cigarettes smoked, as well as the range of cigarettes smoked before and during each trimester of pregnancy is outlined in Table 22.

The average number of cigarettes smoked daily decreased from the period before pregnancy to the third trimester. However, the average daily intake was approximately seven to eight cigarettes even when women had been aware they were pregnant. A more in-depth

TABLE 22

Cigarette Smoking Patterns of Smokers Before and During Pregnancy

Time Period	Mean Number of Cigs per Day	Median Number of Cigs per Day	Range: Number of Cigs per Day
Before Pregnancy	16	20	1-40
First Trimester	10	10	0-40
Second Trimester	7	3	0-40
Third Trimester	8	5	0-40

profile of the quantity of cigarettes smoked before and during each trimester of pregnancy for the total sample is outlined in Table 23. Eleven percent of the total sample continued to smoke over twelve cigarettes per day during the third trimester of pregnancy. Smoking during pregnancy remains a challenge for health professionals working with pregnant smokers.

TABLE 23

Average Number of Cigarettes Smoked Daily by the Sample Before and During Pregnancy

Time Period	0 cigs	1-12 cigs	13-22 cigs	23-32 cigs	> 32 cigs
Before	61 %*	13 %	22 %	2 %	2 %
Tri 1	66 %**	19 %	13 %	1 %	1 %
Tri 2	75 %**	16 %	8 %	0 %	1 %
Tri 3	76 %**	13 %	10 %	0 %	1 %

*Percentage of non-smokers
** 39 percent whom are non-smokers

Reduction in Cigarette Smoking

Reduction in cigarette smoking was calculated as a ratio of the average number of cigarettes smoked during pregnancy divided by the average monthly number of cigarettes smoked one month before pregnancy. As described in Chapter IV, the formula for the cigarette reduction ratio was defined as follows: ([average monthly number of cigarettes smoked during the first trimester + average monthly number of cigarettes smoked during the second trimester + average monthly number of cigarettes smoked during the third trimester] ÷ 3) ÷ average number of cigarettes smoked one month before pregnancy. Multiplying this ratio by 100 and subtracting from 100 provides for a percent reduction in cigarette use during pregnancy. The mean cigarette reduction ratio for smokers in this study was 0.48. Therefore, on the average, women had reduced their cigarette smoking by 52 percent. Women had more difficulty reducing their cigarette smoking than reducing their alcohol consumption. There was no significant association between the number of cigarettes smoked before pregnancy and percent reduction in cigarette smoking, indicating that both heavy and light smokers had reduced their cigarette smoking during pregnancy.

Changes in smoking behaviors during pregnancy were also classified into four categories as was done for alcohol consumption. These categories included: (1) those individuals who had quit smoking during their pregnancy (Quit), (2) those individuals who had reduced their cigarette smoking during pregnancy (Reduced), (3) those individuals who had reduced their cigarette smoking during the first and second trimesters and then subsequently had increased their cigarette smoking during the third trimester of pregnancy (Reduced-Increased), and (4) those individuals who had not changed or had increased their cigarette smoking during pregnancy (No Change or Increased). Table 24 contains a summary of the type of changes made in smoking behavior and the average number of cigarettes smoked by the individuals in these four groups prior to their pregnancy.

Eighteen percent of pregnant smokers had not changed or had increased their cigarette smoking during pregnancy, that is, one-fifth of smokers had not made any attempt to positively change their smoking behaviors during pregnancy. A significant difference was found in the number of cigarettes smoked prior to pregnancy among those individuals who had quit, had

TABLE 24

Cigarette Smoking Behavior Changes During Pregnancy and Mean Numbers of Cigarettes Smoked per Day Prior to Pregnancy

Behaviors	Incidence	Prepregnancy Mean No. of Cigs Smoked per Day
Quit	38 %	12
Reduced	26 %	19
Reduced-Increased	18 %	21
No Change or Increased	18 %	23
Total	100 %	

reduced, had reduced-increased, or had not changed or had increased their cigarette smoking during pregnancy [$F_{(3,46)}=4.08$, $p=0.012$]. *Post hoc* analysis using Tukey's method showed there was a significant difference in the number of cigarettes smoked prior to pregnancy among individuals who had quit smoking and individuals who had reduced-increased their cigarette smoking. Individuals who had reduced and then increased their cigarette smoking in the third trimester of pregnancy had smoked an average of twenty-one cigarettes per day prior to pregnancy, and individuals who had quit had smoked an average of twelve cigarettes per day prior to pregnancy. However no other significant differences among the four groups were found. Perhaps it was the addiction to nicotine that had prevented heavy smokers from not being able to stop smoking or maintain a reduced level of cigarette use during pregnancy. Or perhaps heavy smokers had not received adequate support while attempting to change their smoking behaviors during pregnancy.

Eighty-two percent of smokers had made an attempt to reduce or quit smoking during pregnancy. Of the nineteen individuals who had quit smoking during their pregnancy, three had quit smoking before becoming pregnancy with the specific intention to quit smoking because they were planning to become pregnant, three had quit smoking when they had not known they were pregnant, ten had quit smoking upon knowing of their pregnancy, and three had quit smoking after knowing of their pregnancy during the second or third trimesters.

Reasons women had given for changing their cigarette smoking during pregnancy included: health of the baby (64 percent); health of the baby and mother (10 percent); health of the mother (7 percent); not feeling well enough to smoke (5 percent); peer pressure (5 percent); recommendations of physicians (5 percent); it was a good excuse to quit (2 percent); and, guilt (2 percent). The majority of women in this study had reported changing their cigarette smoking for the health of the baby and only 7 percent had reported changing because they had not felt well enough to smoke. Further, 17 percent of smokers had reported changing their smoking behaviors for their own health.

Reasons for increasing cigarette smoking during the third trimester of pregnancy were not provided by the women. It can be speculated that an increase in cigarette smoking occurred for the following reasons: (1) nicotine addiction, (2) no reinforcement from health professionals, family members, or friends to assist women in maintaining reduced cigarette intake, (3) actual stress of the pregnancy, or (4) anticipated stress prior to labor and delivery.

Tobacco Use and Demographic Characteristics

In comparing those individuals who had smoked one month prior to pregnancy (smokers) and those individuals who had not smoked one month prior to pregnancy (non-smokers), smokers were more likely to be younger ($t=3.65$, $df=125$, $p<0.001$), not married ($\chi^2=22.4$, $df=2$, $p<0.001$), of a lower education level ($\chi^2=17.57$, $df=3$, $p<0.001$), and of a lower socioeconomic status ($t=3.21$, $df=125$, $p=0.002$). The mean ages and socioeconomic indices of smokers and non-smokers are contained in Table 25. None of the Asiatic women in this study had smoked. There was no significant difference in the mean birth weights of infants born to smokers and non-smokers.

The number of cigarettes smoked prior to pregnancy was not associated with age, education level, or socioeconomic status. The number of cigarettes smoked prior to pregnancy

TABLE 25

Age and Socioeconomic Differences Among Smokers and Non-Smokers

Variable	Smokers (Mean Values)	Non-Smokers (Mean Values)	Level of Significance
Age (years)	24	28	$p < 0.001$
Ses (Blishen's Scale)	45	52	$p < 0.001$

was, however, associated with marital status [$F_{(2,47)} = 4.35$, $p = 0.018$]. *Post hoc* analysis using Tukey's method showed that women living common law had smoked significantly more cigarettes before pregnancy than single and married women. Women living common law had smoked an average of twenty-three cigarettes daily before pregnancy, married women had smoked an average of sixteen cigarettes daily before pregnancy, and single women had smoked an average of fourteen cigarettes daily before pregnancy. No significance difference was found in the number of cigarettes smoked before pregnancy between single and married women. The number of cigarettes smoked before pregnancy by smokers was correlated with birth weight ($r = -0.25$, $df = 48$, $p = 0.04$). The more an individual had smoked prior to pregnancy the lower the birth weight of the infant. As was found for alcohol consumption, common law women had been at a higher risk of having lower birth weight infants. Common law women may require special assistance in adopting healthy lifestyles during pregnancy.

Percent reduction in cigarette smoking was not significantly associated with age, marital status, education level, socioeconomic status, or birth weight. Furthermore, women who had quit, had reduced, had reduced-increased, or had not changed or increased their cigarette smoking during pregnancy did not differ with respect to age, marital status, education level, socioeconomic status, or birth weight.

In summary, 39 percent of the women in this study, aged sixteen to forty-six, had smoked during the month before becoming pregnant. In a 1985 Gallup Poll (Edwards, 1986) 34 percent of fifteen to seventeen year olds, 36 percent of eighteen to nineteen year olds, 52 percent of twenty to twenty-four year olds, and 47 percent of twenty-five to twenty-nine year old female Canadians smoked. Percentage of smokers in this study was fairly similar to the Canadian female population, considering the range of ages of participants in this study. Women had smoked an average of sixteen cigarettes per day before becoming pregnant. Women living common law had smoked more cigarettes before pregnancy than single or married women ($p \leq 0.05$). The number of cigarettes smoked before pregnancy was negatively correlated with birth weight ($p \leq 0.05$). Common law women who smoked had been at higher risk of having lower birth weight infants. Thirty-eight percent of smokers had stopped smoking during pregnancy, 26 percent had reduced their cigarette smoking, 18 percent had reduced their cigarette smoking during the first and second trimesters and then had increased their cigarette smoking by the third trimester of pregnancy, and 18 percent had not changed or had increased their cigarette smoking during pregnancy. On the average, women had reduced their cigarette smoking by 52 percent. Women, apparently had more difficulty changing their smoking behaviors than changing their alcohol behaviors. Smoking remains a major health concern among pregnant women in British Columbia. The amount a woman had reduced her cigarette smoking was not associated with age, marital status, education level, socioeconomic status, or birth weight. However, women who quit smoking during pregnancy had smoked significantly less prior to pregnancy than women who had reduced their cigarette smoking during the first and second trimesters of pregnancy and then subsequently had increased their cigarette smoking during the third trimester of pregnancy ($p \leq 0.05$). The majority of women had reported changing their smoking for the health of the baby. Women who had increased their cigarette smoking had not provided reasons for the increase. Smokers in this study were more likely to have been younger, married, of a lower education level, of a lower socioeconomic status, and of caucasian origin ($p \leq 0.01$).

Summary of Chapter V

Chapter V is a description of the data collection as well as the sample characteristics. An 87 percent response rate was obtained. The sample consisted of 127 volunteer participants experiencing their first pregnancy. Although judgment calls made by the nursing staff regarding selection of potential research participants may have biased the sample, the demographic characteristics of this sample were similar to the B.C. population of pregnant women. In this study, the average age of primiparous women was 26.5 years, the average birth weight of infants was 3,422 grams, the low birth incidence was 5.5 percent, and out-of-wedlock births accounted for 21 percent of the sample. In British Columbia, the average age of primiparous women was close to twenty-five years, the average birth weight of all infants was 3,444 grams, the low birth incidence for all infants was 5.1 percent, and out-of-wedlock births accounted for 23 percent of primiparous women. Seventy-five percent of the women in this study had consumed alcoholic beverages before becoming pregnant, and approximately 70 percent of female British Columbians consumed alcoholic beverages in 1983 (Addiction Research Foundation, 1984). Thirty-nine percent of the women in this study, aged sixteen to forty-six years, had smoked cigarettes before becoming pregnant, and 34 to 52 percent of seventeen to twenty-nine year old Canadians smoked in 1983 (Statistics Canada: Perspectives on Health, 1983). Because the key demographic characteristics of this sample are similar to the B.C. pregnant population, the results of this study should be generalizable to the B.C. population of primiparous women.

Women in this study had gained an average of thirty-four pounds during pregnancy, with 32 percent gaining less than 75 percent of their recommended weight gain and 20 percent gaining more than 125 percent of their recommended weight gain. Overall, 52 percent of the sample had weight gains during pregnancy that were less than optimal. A greater percentage of women had positively changed their alcohol behaviors than their smoking behaviors during pregnancy. Common law women were the subgroup of pregnant women in this study who had consumed large quantities of alcohol prior to pregnancy and had smoked heavily prior to pregnancy. Having described the research participants, it is appropriate to turn to Chapter VI, a report of the findings of this research study.

CHAPTER VI

LEARNING PATTERNS AND HEALTH BELIEFS OF PREGNANT WOMEN

The results of this study lay the foundation for a better understanding of learning during pregnancy and subsequently the direction for future research. Chapter VI consists of a presentation of the learning patterns and health beliefs of primiparous women. The framework for reporting learning patterns is based upon the research questions outlined in Chapter III. What women learned during pregnancy and how women learned about weight gain, alcohol consumption, and tobacco use are the central issues. Identification of learning patterns was based upon an adaptation of Tough's report "The Adult's Learning Projects" (1979) and Knowles's concept of self-directed learning. Health beliefs consisted of identifying women's : (1) concern, (2) perceived risk, (3) perceived usefulness of the information, and (4) perceived barriers regarding their weight gain, alcohol consumption, and tobacco use during pregnancy. Health beliefs were developed according to an adaptation of the Health Belief Model (Rosenstock, 1974b). Section one of this chapter begins with a report of women's learning patterns, and section two follows with a presentation of women's health beliefs. The final section contains a summary of Chapter VI.

Learning Patterns

Answers to the following questions provide for a composite picture of the learning patterns of pregnant women: (1) "What had been learned about weight gain, alcohol consumption, and tobacco use?" (2) "Which resources had been utilized?" (3) "What advice had been obtained from each resource?" (4) "What amount of time had been spent in learning?" (5) "Who had initiated the learning?" and (6) "What learning transaction types had emerged?" In reporting of results regarding advice given and resources utilized to answer the knowledge test questions, the categories of responses contained in this chapter are different from the categories of responses contained in the interview schedule. The categories of responses in the interview schedule were categories that had been developed by this researcher prior to data collection as a means of simplifying recording of responses. However some categories were not cited by the research participants and new categories were developed based upon participants' responses.

What Had Been Learned

The knowledge test questions in the interview schedule provided the framework for identifying what had been learned during pregnancy. Optimal responses to the knowledge test questions were based upon the review of the literature on the topics of weight gain, alcohol consumption, and tobacco use. Responses were scored on a ratio scale with the highest score reflecting the optimal response available, based upon the current research in the field.

Weight Gain Knowledge Results

Scoring of answers to the weight gain knowledge test questions are provided in the interview schedule following questions twenty-four to thirty-five and thirty-seven (see Appendix 9). Table 26 contains the percentage of women in this study who had provided the optimal response for each of the weight gain knowledge test items.

The majority of women in this study knew the average amount of weight women should gain during pregnancy, and the importance of weight gain as it relates to birth weight and development of the fetus. However, less than 25 percent of the women were able to specify the average weight gain recommendations for overweight and underweight women as identified by the B.C. Ministry of Health. In addition, 87 percent stated that gaining over five pounds during the first three months of pregnancy was suggested as the average weight gain during the first trimester. This latter result may be a contributing factor to the higher than recommended total weight gain being seen among 20 percent of the pregnant women in this study. Furthermore,

TABLE 26

Percentage of the Sample Providing Optimal Responses to the Weight Gain Knowledge Test Items

Item Description (Optimal Response)	% of Sample
1. Ideal weight gain for normal weight women (24-30 pounds)	56
2. Loss of weight during pregnancy (not advisable)	69
3. Amount of weight gain for overweight women (15-20 pounds)	18
4. Amount of weight gain for underweight women (30-35 pounds, or amount underweight)	24
5. Amount of weight gain during first trimester (1-5 pounds)	13
6. Weekly weight gain during second trimester (0.75-1 pound)	41
7. Weekly weight gain during third trimester (0.75-1 pound)	45
8. Minimum total weight gain during pregnancy (15-24 pounds)	49
9. Minimum weekly weight gain during second trimester (0.5 pound)	6
10. Minimum weekly weight gain during third trimester (0.5 pound)	9
11. Why weight gain is important (birth weight or development)	54
12. Effect of weight gain on birth weight (rating scale: moderate to high effect)	64
13. Identification of one health problem associated with low birth weight (mortality, morbidity, or postnatal development)	64

91 percent of the women did not know about a minimum recommended weight gain of one-half pound per week, and more than 50 percent did not know the average recommended weekly weight gain during the second and third trimesters. Knowing how much weight to gain throughout the pregnancy, that is the recommended pattern of gain, better equips women to manage their own weight gain.

The mean score on the weight gain knowledge test was 16.8 out of a possible score of thirty-one. The median score was 17.0, and the range of scores was from four to twenty-seven.

Women were asked to identify where they had obtained the information to answer the first weight gain knowledge test question: "Ideally, how much weight do you think a woman should gain while she is pregnant?" Resources cited are presented in Table 27. More than one resource may have been cited by research participants. The physician and reading materials had played significant roles as to where women had obtained information to answer the first knowledge test question about weight gain. Prenatal classes, friends, and personal opinion or previous knowledge were cited as secondary sources.

TABLE 27

Information Sources Used to Answer the First Weight Gain Knowledge Test Question

Resources	Percentage of Sample
Physician	31
Reading Materials	31
Prenatal Classes	13
Friends	7
Personal Opinion/Previous Knowledge	7
Observation of a Friend's Weight Gain	4
Family Members	2
Media	2
Dietitian	1
Nurse	1
Work Setting	1
Total	100 %

In summary, women knew the average amount of weight to gain during pregnancy and the importance of this gain. However, women had difficulty answering the following questions: weight gain of overweight women; weight gain of underweight women; weight gain during the first trimester; and, minimum weekly weight gain during the second and third trimesters of pregnancy. In trying to decrease low birth weight incidence, women should be aware of the risk factors associated with low birth weight: gaining less than the minimum weekly recommended weight gain during the second and third trimesters, and underweight women gaining inadequate weight for their height and weight. Knowing how much weight to gain in these circumstances would enable women to evaluate their own risk levels and subsequently modify their eating habits accordingly. Women had obtained the information to answer the first weight gain knowledge test question primarily from physicians and reading materials. The question that remains to be answered is whether knowledge scores are associated with ideal weight gain during pregnancy.

Alcohol Knowledge Results

Scoring of answers to the alcohol knowledge test questions are provided in the interview schedule following questions fifteen to eighteen (see Appendix 9). Table 28 contains the percentage of drinkers and non-drinkers who had provided the optimal response for each of the alcohol knowledge test items. Drinkers have been previously defined as those individuals who had consumed alcohol during the month prior to their pregnancy.

TABLE 28

Percentage of Drinkers and Non-Drinkers Providing Optimal Responses to the Alcohol Knowledge Test Items

Item Description (Optimal Response)	Drinkers (%)	Non-Drinkers (%)
1. Safe amount of alcohol consumption (no safe limits or no alcohol)	48	59
2. Effects of alcohol on baby (rating scale: high effect)	21	57
3. Possible effects of small amounts of alcohol (low birth weight or small infant)	15	19
4. Possible effects of large amount of alcohol (any aspect of fetal alcohol syndrome)	62	63

The majority of women in the study could name at least one possible effect of consuming large quantities of alcohol during pregnancy. However, less than 20 percent were aware that small amounts of alcohol consumption during pregnancy were associated with an increased risk of having a lower birth weight infant. Because women were not aware of this association, these women may have then assumed that they were engaging in optimal health practices and there were no risks related to drinking small quantities during pregnancy. The fact that only 20 percent of drinkers had been aware of the association between low birth and consumption of small amounts of alcohol during pregnancy could have been a function of two factors: (1) it has only been within the last ten years that researchers have examined the effects of small amounts of alcohol consumption during pregnancy, and (2) the possible reluctance of health professionals to address the issue of small amounts of alcohol intake during pregnancy. Increasing efforts to inform women of the potential effects of small amounts of alcohol intake seems warranted.

The responses of drinkers and non-drinkers was fairly similar with the exception of question number two, which had used a rating scale to identify the effects of alcohol during pregnancy. Drinkers primarily reported that alcohol had a moderate effect on the baby whereas non-drinkers reported that alcohol had a high effect.

The mean score on the alcohol knowledge test for the total sample was 12.2 out of a possible score of twenty-two. The median score was 13.0, and the range of scores from zero to twenty-one. There was no significant difference in the mean alcohol knowledge test scores of drinkers and non-drinkers.

Women were also asked to identify where they had obtained information to answer the first alcohol knowledge test question "What is a safe amount of alcohol to consume during pregnancy?" Resources cited by drinkers and non-drinkers are identified in Table 29. More than one resource may have been cited by research participants.

Personal opinions, reading materials, and the physician had played significant roles as to where drinkers had obtained information to answer the first alcohol knowledge test question. Reading materials, personal opinions, and prenatal classes had played significant roles for non-drinkers as resources for answering the first alcohol knowledge test question. Physicians were a key resource for drinkers but not for non-drinkers, whereas prenatal classes were a key

TABLE 29
Information Sources Used to Answer the First Alcohol Knowledge Test Question

Resources	Percentage of Drinkers	Percentage of Non-Drinkers
Personal Opinion/Previous Knowledge	26	21
Reading Materials	23	29
Physician	19	5
Friends	14	8
Family Members	7	8
Media	5	5
Prenatal Classes	4	21
Nurse	1	0
Work Setting	1	3
Total	100 %	100 %

resource for non-drinkers but not for drinkers. Although there was no significant difference in attendance at prenatal classes by drinkers and non-drinkers, drinkers had not cited prenatal classes as a key resource for obtaining information to the alcohol knowledge test question. This occurrence may have been due to the fact that drinkers had not personalized the information provided at prenatal classes to apply to their own circumstances; whereas, with the physician, the information may have been more meaningful since it had been related directly to their own circumstances. On the other hand, drinkers may have viewed the physician as a more knowledgeable source about alcohol consumption during pregnancy than prenatal class leaders, and as such, cited the physician as a resource to answer the first alcohol knowledge test question.

In summary, women were knowledgeable about the effects of consuming *large* amounts of alcohol during pregnancy, that is, more than two drinks per day and/or more than ten drinks per week. However, less than 20 percent knew about the possible effects of *small* amounts of alcohol intake on the fetus, that is, two drinks per day and/or ten drinks per week. Drinkers had obtained information to answer the first alcohol knowledge test question primarily from their previously acquired knowledge, reading materials, and physicians. Reading materials and personal opinion had played key roles for drinkers and non-drinkers as information sources for answers to the alcohol knowledge test question. The question that remains to be answered is whether alcohol knowledge test scores are associated with reduced alcohol consumption during pregnancy.

Tobacco Knowledge Results

Scoring of answers to the tobacco knowledge test questions are provided in the interview schedule following questions nineteen to twenty-three (see Appendix 9). Table 30 contains the percentage of smokers and non-smokers who had provided the optimal response for each of the tobacco knowledge test items. Smokers have been previously defined as individuals who had smoked during the month prior to their pregnancy.

TABLE 30

Percentage of Smokers and Non-Smokers Providing Optimal Responses to the Tobacco Knowledge Test Items

Item Description (Optimal Response)	Smokers (%)	Non-Smokers (%)
1. Safe amount of cigarettes to smoke (none)	68	82
2. Effects of smoking on baby (rating scale: high effect)	34	57
3. Smoking small amounts affects baby (yes)	66	79
4. Possible effects of smoking on the baby (low birth weight, prematurity, delivery complications i.e. placenta previa)	56	56
5. Stop smoking by the fourth month of pregnancy place smokers at same risk as non-smokers (yes)	30	10

The majority of women in this study had known about the effects of smoking during pregnancy, that is, low birth weight, prematurity, and delivery complications. When women were asked to rate the effects of smoking on the baby during pregnancy, 34 percent of smokers reported that smoking had a high effect on the baby whereas 57 percent of non-smokers reported that smoking had a high effect on the baby. In contrast, a higher percentage of smokers had the optimal response to the fifth tobacco knowledge test question. Thirty percent had stated that stopping smoking by the fourth month of pregnancy places the woman at the same risk level as the non-smoker. Although Butler, Goldstein, and Ross (1972) found that birth weight of non-smokers and smokers who had quit by the fourth month did not differ significantly, non-smokers had viewed smokers who quit at higher risk.

The mean score on the tobacco knowledge test for the total sample was 15.6 out of a possible score of twenty-two. The median score was 17.0 and the range of scores from one to twenty-two. There was no significant difference in the mean knowledge test scores for smokers and non-smokers.

Women were also asked to identify where they had obtained information to answer the first tobacco knowledge test question "What is a safe amount of cigarettes to smoke during pregnancy?" Resources cited by both smokers and non-smokers are identified in Table 31. More than one resource may have been cited by research participants.

TABLE 31

Information Sources Used to Answer the First Tobacco Knowledge Test Question

Resources	Percentage of Smokers	Percentage of Non-Smokers
Personal Opinion/Previous Knowledge	32	41
Reading Materials	24	33
Physician	24	4
Prenatal Classes	6	11
Friends	6	4
Media	5	3
Family Members	3	3
Nurse	0	1
Total	100 %	100 %

Personal opinion and previous knowledge, as well as reading materials dominated as resources cited by both smokers and non-smokers to obtain information to answer the first tobacco knowledge test question. However, in third place, the physician dominated for smokers, whereas prenatal classes dominated for non-smokers. Similar results were found for the alcohol knowledge test questions.

In summary, women were knowledgeable about the effects of smoking on the fetus. Smokers had obtained information to answer the first tobacco knowledge test question primarily from their own opinions and reading materials. As well, physicians had played a key role as information sources for answering the tobacco knowledge test question for smokers, however prenatal classes had played a more prominant role for non-smokers. As previously stated for weight gain and alcohol, the question that remains to be answered is whether tobacco knowledge test scores are associated with reduced cigarette smoking during pregnancy.

Utilization of Learning Resources

When a topic is discussed with a health professional, family member, or friend, a potential learning opportunity presents itself. The same can be said when an individual reads a book, article, or pamphlet, or views an audiovisual production. Resources utilized by primiparous women in this study are described in this section beginning with an overview of prenatal class attendance. Following, resources utilized specifically for the topics of weight gain, alcohol consumption, and tobacco use are presented.

Prenatal Class Attendance

Eighty-one percent of the sample had attended prenatal classes and 19 percent had chosen not to attend. Of those individuals attending classes, the mean number of classes attended was five and the median number six. The range of classes attended was from two to twelve. The location sites where women had attended prenatal classes are presented in Table 32.

TABLE 32

Location Sites of Prenatal Classes Attended

Location	Percentage of Prenatal Class Attenders
Vancouver City Health Department	18
Simon Fraser Health Unit	15
Boundary Health Unit	14
North Shore Health Unit	10
Grace Hospital	9
Central Fraser Valley Health Unit	7
Kwantlen College	6
Burnaby Health Unit	6
Vancouver Childbirth Association	3
Out of Province	3
Out of Lower Mainland, in B.C.	2
Private Midwives in North Vancouver	2
Surrey Hospital	2
Upper Fraser Valley Health Unit	1
St. Paul's Hospital	1
Richmond Hospital	1
Total	100 %

Sixty-one percent of the women had attended prenatal classes organized by either the B.C. Ministry of Health or the Municipal Health Units in the Lower Mainland of British Columbia. Seventy-six percent of individuals attending prenatal classes had gone to both the "early bird" and "regular" series. In most health units the topics of weight gain, alcohol consumption, and tobacco use are covered at "early bird" classes.

Twenty-five percent of attenders had begun classes during their first trimester of pregnancy, 52 percent had begun classes during their second trimester of pregnancy, 22 percent had begun classes during their third trimester of pregnancy, and 1 percent had attended classes prior to pregnancy. In the situation where classes had been attended prior to the pregnancy, this individual had attended classes with a pregnant friend during the previous year.

The women had given a variety of reasons for not attending prenatal classes. These reasons are reported in Appendix 13. Several themes for not attending prenatal classes can be drawn from the statements made by these women. The first theme included the cultural preference of not attending group sessions. The second theme included the "couple's" orientation to prenatal classes. The third theme included time commitments preventing women from attending prenatal classes, and the fourth theme included advice of friends not to attend classes.

Prenatal class attenders were more likely to be of a higher socioeconomic status (t=-3.65, df=125, p=0.001), of a higher education level (χ^2=10.9, df=3, p=0.01), and of caucasian origin (χ^2=11.4, df=1, p<0.001), findings which are consistent with the adult education literature on participation in organized learning activities. The mean socioeconomic index of prenatal class attenders was fifty-one, and forty-two for non-attenders. There were no significant differences in the age, marital status, drinking behaviors (drinker vs. non-drinkers), and smoking behaviors (smokers vs. non-smokers) of prenatal class attenders and non-attenders. Attendance at prenatal classes was also not found to be significantly associated with weight gain (weight gain ratio or adjusted weight gain ratio); reduced alcohol consumption (alcohol reduction ratio); or, reduced cigarette smoking (cigarette reduction ratio). However, a significant difference in birth weight was found between prenatal class attenders and non-attenders (t=-2.14, df=125, p=0.034). Those individuals who had attended prenatal classes had infants weighing 3,470 grams while individuals not attending prenatal classes had infants weighing 3,214 grams. However, when analysis of covariance was conducted controlling for age and socioeconomic status, no significant difference in birth weight was found.

In summary, 81 percent of the women in this study had attended prenatal classes, and the majority of women had attended classes sponsored by the B.C. Ministry of Health and Municipal Health departments. Of individuals attending prenatal classes, 66 percent had attended both the "early bird" and the "regular" series, and 25 percent had begun classes during the first trimester of pregnancy. Prenatal class attenders were more likely to be of a higher education level, of a higher socioeconomic status, and of caucasian origin ($p \leq 0.01$).

Weight Gain Resources

Prenatal classes, physicians, nurses, dietitians, family members, friends, reading materials, and audiovisual productions are all potential resources whereby women could have sought or been given information about issues related to pregnancy. The percentage of individuals who had requested or received information about weight gain from these various resources is presented in Table 33.

TABLE 33

Resources* Utilized for the Topic of Weight Gain

Resources	Percentage of the Sample
Physician	98
Reading Materials	93
Family Members	84
Friends	73
Prenatal Classes	72
Audiovisual Productions	35
Nurse	14
Dietitian	13

*Resources as identified in questions # 38,41,44,47,50,53,56,59,60,61,64,65,66 in the interview schedule.

Physicians, reading materials and family members had dominated as the resources which women had used to obtain or receive information about the topic of weight gain. Not only had physicians and reading materials been cited as reaching the majority of pregnant women but also they had been cited as resources where women had obtained information to answer the first weight gain knowledge test question. On the other hand, 84 percent of individuals in this study had discussed weight gain with a family member. Only two percent cited family members as the resource for obtaining information to answer the first weight gain knowledge test question.

This occurrence may have been a function of the nature of the discussion that had taken place regarding weight gain. Discussion about weight gain with family members may have revolved around concern about weight gain and may not have revolved around factual information.

As reported in Table 33, 98 percent of the sample had discussed weight gain with a physician. More specifically, 78 percent had discussed weight gain with a family doctor, 11 percent had discussed weight gain with an obstetrician, and 9 percent had discussed weight gain with both a family doctor and obstetrician. The majority of women had been under the care of their family doctor, and for most women the obstetrician had been seen only during the last month of the pregnancy.

Eighty-four percent of the sample had spoken to a family member about weight gain issues and of these women, 40 percent had spoken to one family member, 30 percent had spoken to two family members, 21 percent had spoken to three family members, and 15 percent had spoken to four family members. Of all the family members spoken to about weight gain, the husband had been the most frequently cited family member at 29 percent, followed by the mother at 28 percent, sister at 20 percent, sister-in-law at 8 percent, mother-in-law at 5 percent, father at 4 percent, parents at 2 percent, grandmother at 1 percent, cousin at 1 percent, aunt at 1 percent, and brother-in-law at 1 percent. Therefore the husband, mother, and sister had dominated as the family members spoken to about weight gain. Nineteen percent of these family members also happened to be health professionals (nurses, dietitians, or physicians).

Seventy-three percent of the sample had spoken to a friend about weight gain and of these women, 50 percent had spoken to three friends, 15 percent had spoken to one friend, and 8 percent had spoken to two friends. There was a limit imposed upon the recording of number of friends spoken to. If women spoke to more than three friends they were asked to report on the three most significant weight gain discussions. Twelve percent of friends spoken to happened to be health professionals.

Seventy-two percent of the sample reported that weight gain had been discussed at the prenatal classes they attended, however it must be remembered that 81 percent of the sample actually attended prenatal classes. The differences in percentages can be due, in part, to the fact that weight gain is a topic primarily discussed at "early bird" prenatal class sessions, and only 76 percent of those attending prenatal classes included the "early bird" series. Furthermore, women may not have attended every prenatal class offered in the series, and may have missed the prenatal class where weight gain was presented. Therefore knowing that women had attended prenatal classes is no assurance that all topics scheduled to be covered in the classes were actually heard by the individuals.

A detailed account of the types of nonhuman resources used by women in the study for the topic of weight gain is outlined in Table 34. The percentages do not add up to 100 as women may have read a book, an article, or pamphlet or any combination of these reading materials. Similarly, women may have viewed or listened to a television program, a video/film/slide production, a radio program, or any combination of these audiovisual productions.

TABLE 34

Types of Reading Materials and Audiovisual Productions Used for the Topic of Weight Gain

Nonhuman Resources	Percentage of the Sample
Reading Materials	93
-Books	84
-Articles	29
-Pamphlets	44
Audiovisual Productions	35
-Television Programs	13
-Video/Film/Slides	28
-Radio Programs	2

The majority of women had read about weight gain. Books were cited as the reading material most frequently used to obtain information about the topic of weight gain. Nine individuals had not read about any weight gain issues. Of these nine individuals: six were caucasian; six had not attended prenatal classes; and, two had had weight gain knowledge test scores of less than six, three had had scores between twelve and fourteen, and four had had scores over seventeen. As previously stated, the mean weight gain knowledge test score was 16.8 out of a possible score of thirty-one. The average birth weight of these nine individuals' infants was 3,102 grams, and these women's average weight gain during pregnancy was thirty-three pounds.

Audiovisual productions had played a minor role with regard to providing information to pregnant women. Availability of these resources as well as cost of audiovisual productions may have influenced this occurrence. As well, the dietitian and nurse were not frequently cited by women as a resource for weight gain information.

In summary, physicians and reading materials were cited as the resources women most frequently utilized to obtain or receive information about weight gain. Family members, friends, and prenatal classes played secondary roles. The majority of women had spoken to three friends and one family member. The husband, mother, and sister were cited as the family members most frequently spoken to about weight gain issues. Audiovisual productions, nurses, and dietitians played minor roles with regard to providing weight gain information to pregnant women.

Alcohol Resources

Resources women had used during pregnancy to obtain or receive information about the topic of alcohol consumption are identified in Table 35. Resources used by drinkers and non-drinkers are reported separately. As previously stated, drinkers had been defined as those individuals who had consumed alcohol during the month prior to their pregnancy even though they may have stopped drinking or reduced their alcohol consumption during their pregnancy.

TABLE 35

Resources* Utilized for the Topic of Alcohol Consumption

Resources	Percentage of Drinkers	Percentage of Non-Drinkers
Reading Materials	94	84
Prenatal Classes	77	66
Physician	73	53
Family Members	52	19
Friends	44	12
Audiovisuals	36	41
Dietitian	6	0
Nurse	5	0

*Resources as identified in questions # 38,42,45,48,51,54,57,59,60,61,64,65,66 in the interview schedule.

Reading materials, prenatal classes, and physicians had dominated as the resources which women had used to obtain or receive information about drinking during pregnancy. Although 77 percent of drinkers had received information at prenatal classes, only 4 percent had previously cited prenatal classes as the resource where they had obtained information to answer the first alcohol knowledge test question. On the other hand, reading materials and the physician not only had been cited as resources many pregnant women had used, but also had been cited as resources for obtaining information to answer the first alcohol knowledge test question. Women had used fewer resources to learn about the topic of alcohol than to learn about the topic of weight gain.

It is encouraging to note that a higher percentage of drinkers had been exposed to alcohol information than non-drinkers. Furthermore, there was still some discussion about alcohol consumption with non-drinkers, and this may act as a reinforcement for non-drinkers to refrain from consuming or beginning to consume alcoholic beverages during pregnancy. What is of concern, however, is the discovery that only 73 percent of drinkers reported having spoken to a physician about their alcohol consumption. It would seem important for more women to discuss alcohol with their primary care giver, the physician. The fact that 23 percent of drinkers did not discuss alcohol issues with their physician leads to two questions: (1) "Is it that women in this study had forgotten to report or had forgotten the discussion which had occurred with their physician about alcohol?", or (2) "Is it that physicians had placed alcohol consumption in a lower risk category in comparison to other prenatal risk factors?" It would seem important for physicians to discuss alcohol consumption with all their patients who drink so as to determine whether they were at medical risk.

As reported in Table 33, 73 percent of drinkers had discussed alcohol consumption with a physician. More specifically, 57 percent had spoken to a family doctor, 8 percent had spoken to an obstetrician, and 8 percent had spoken to both a family doctor and obstetrician. Once again the family doctor, rather than the obstetrician, acted as the primary care giver during pregnancy.

Fifty-two percent of drinkers had spoken to a family member about alcohol consumption, and of these women 62 percent had spoken to one family member, 16 percent had spoken to two family members, 16 percent had spoken to three family members, and 6 percent had spoken to four family members. Of all the family members spoken to, the husband had been the most frequently cited family member at 34 percent, followed by the mother at 25 percent, sister at 17 percent, mother-in-law at 9 percent, sister-in-law at 5 percent, father at 4 percent, brother-in-law at 4 percent, parents at 1 percent, and father-in-law at 1 percent. Therefore the husband, mother, and sister had dominated as the family members spoken to about alcohol issues. Three percent of these family members happened to be health professionals.

Forty-four percent of drinkers had spoken to a friend about alcohol issues, and of these women, 57 percent had spoken to three friends, 26 percent had spoken to one friend, and 17 percent had spoken to two friends. Eleven percent of friends spoken to happened to be health professionals.

A detailed account of the types of nonhuman resources used by drinkers for the topic of alcohol consumption is outlined in Table 36. The percentages do not add up to 100 as women may have read more than one reading material, or viewed more than one audiovisual production.

TABLE 36

Types of Reading Materials and Audiovisual Productions Used by Drinkers for the Topic of Alcohol Consumption

Nonhuman Resources	Percentage of Drinkers
Reading Materials	94
-Books	36
-Articles	35
-Pamphlets	47
Audiovisual Productions	36
-Television Programs	14
-Video/Film/Slides	28
-Radio Programs	1

The majority of women had read about alcohol issues during their pregnancy. Pamphlets were cited as the reading material most frequently used to obtain information about the topic of alcohol consumption. Six drinkers had not read about any alcohol issues. Of these six individuals: four were caucasian; four had not attended prenatal classes; and, two had had alcohol knowledge test scores of less than eight, two had had scores of eleven and fourteen, and two had had scores over sixteen. As previously stated, the mean alcohol knowledge test score was 12.2 out of a possible score of twenty-two. Four had abstained from drinking alcohol during pregnancy and two had reduced their alcohol intake.

As was found for weight gain, only a small percentage of women in this study had obtained information about alcohol consumption from audiovisual productions. As well, nurses and dietitians played minor roles.

In summary, reading materials and prenatal classes were cited as the resources most frequently utilized by drinkers to obtain or receive information about drinking during pregnancy. The physician, however, ranked third. Twenty-three percent of drinkers had not discussed alcohol with the physician, their primary care giver. Without discussing the topic, the physician would not be able to determine whether their clients who drank were at risk because of their alcohol consumption. As was found for weight gain, the majority of women had spoken to three friends and one family member. The husband, mother, and sister were the family members spoken to most frequently about drinking during pregnancy. As with weight gain, audiovisual productions, nurses, and dietitians played minor roles with respect to providing alcohol information to pregnant women.

Tobacco Resources

Resources women had used during pregnancy to obtain or receive information about the topic of tobacco use are presented in Table 37. Resources used by smokers and non-smokers are reported separately. As previously stated, smokers had been defined as individuals who had smoked during the month prior to their pregnancy even though they may have stopped smoking or reduced their cigarette smoking during pregnancy.

Reading materials and physicians were the main resources which smokers had used to obtain or receive information about smoking during pregnancy. Family members followed in third place. Not only had physicians and reading materials been cited as key resources for smokers but these also had been cited as resources where women had obtained information to answer the first tobacco knowledge test question. In contrast, smoking was discussed with 74 percent of smokers' family members, however only 3 percent had cited the family as a resource where women had obtained information to answer the first tobacco knowledge test question. Discussion with family members may have possibly influenced the formation of a personal

TABLE 37

Resources* Utilized for the Topic of Tobacco Use

Resources	Percentage of Smokers	Percentage of Non-Smokers
Reading Materials	94	86
Physician	90	52
Family Members	74	26
Prenatal Classes	58	78
Friends	44	20
Audiovisuals	40	36
Nurse	13	3
Dietitian	6	1

*Resources as identified in questions # 38,43,46,49,52,55,58,59,60,61,64,65,66 in the interview schedule.

opinion by the smoker, which had been cited as a resource to answering the first knowledge test question.

As reported in Table 37, 90 percent of smokers had reported speaking to a physician about tobacco use. More specifically 66 percent had spoken to their family doctor, 16 percent had spoken to both their family doctor and obstetrician, and 8 percent had spoken to their obstetrician.

Seventy-four percent of smokers had spoken to a family member about smoking during pregnancy, and of these women 54 percent had spoken to one family member, 27 percent had spoken to two family members, 14 percent had spoken to three family members, and 5 percent had spoken to four family members. Of all the family members spoken to, the mother was the most frequently cited family member at 35 percent, followed by the husband at 22 percent, sister at 17 percent, father at 9 percent, mother-in-law at 3 percent, sister-in-law at 3 percent, cousin at 3 percent, brother at 2 percent, grandmother at 2 percent, aunt at 2 percent, and parent-in-law at 2 percent. Therefore the mother, husband, and sister dominated as the family members spoken to about tobacco issues. Fourteen percent of these family members happened to be health professionals.

Forty-four percent of smokers had spoken to a friend about smoking during pregnancy, and of these women, 64 percent had spoken to three friends, 27 percent had spoken to one friend, and 9 percent had spoken to two friends. Four percent of friends spoken to happened to be health professionals.

A detailed account of the types of nonhuman resources used by smokers for the topic of tobacco use is outlined in Table 38. The percentages do not add up to 100 as the women may have read more than one reading material, or viewed more than one audiovisual production.

TABLE 38

Types of Reading Materials and Audiovisual Productions Used by Smokers for the Topic of Tobacco Use

Nonhuman Resources	Percentage of the Smokers
Reading Materials	94
-Books	92
-Articles	44
-Pamphlets	56
Audiovisual Productions	40
-Television Programs	15
-Video/Film/Slides	27
-Radio Programs	2

As was found for weight gain and alcohol, the majority of women had read about smoking during pregnancy. Books were cited as the reading material most frequently used to obtain information about the topic of tobacco use. Three smokers had not read about any smoking issues. All three were caucasian and all three had not attended prenatal classes. Scores on the tobacco knowledge test for these individuals were: fourteen, sixteen, and seventeen. As previously stated, the mean tobacco knowledge test score was 15.6 out of a possible score of twenty-two. One had quit smoking during pregnancy and the other two had reduced their cigarette smoking by approximately 50 percent.

Although a slightly higher percentage of women had viewed an audiovisual production containing information about smoking during pregnancy than had viewed a production dealing with weight gain or alcohol use, audiovisual productions about smoking nevertheless were viewed by only a small percentage of pregnant smokers. Nurses and dietitians played minor roles with respect to providing smoking information to women during pregnancy.

In summary, reading materials and physicians were cited as the resources most frequently utilized by smokers to obtain or receive information about smoking during pregnancy. Family members played a secondary role. As was found for weight gain and consumption of alcohol, the majority of women had spoken to three friends and one family member. However, the mother was the family member most frequently spoken to about smoking issues. Audiovisual productions, nurses, and dietitians played minor roles with regard to providing smoking information to pregnant women.

Advice and Recommendations from Resources

Resources utilized and the type of information obtained from these various resources, both combined, provide the reader with a sense of the depth of the interaction. In order to build upon and better interpret the percentages of women obtaining or receiving information from various resources, the advice and recommendations provided by these resources are presented for each topic addressed in this dissertation. It must be remembered that advice was reported by the pregnant women receiving the advice and not by the original resource providing the advice. Furthermore, it is not known at which time period during the pregnancy the advice had been obtained by the women. Advice given by various resources regarding the topic of weight gain, alcohol consumption, and tobacco use is now presented.

Advice about Weight Gain

Women had received a variety of recommendations, information, and comments about weight gain from health professionals, family members, friends, reading materials, and audiovisual productions. Advice has been clustered into four major categories. The first category consisted of statements that pertained to gaining specific amounts of weight during pregnancy, and included comments such as "gain twenty to twenty-five pounds", "gain a maximum of thirty pounds," and "don't gain less than twenty-five pounds." The second category included statements of a general nature, and included comments such as "weight gain is okay", "gaining too much," and "not gaining enough." The third category pertained to food and eating, and included comments such as "eat healthy foods from the four food groups", "don't eat too much", "don't diet," and "don't eat for two." The fourth category consisted of miscellaneous information, and included comments such as "weight gain should be gradual during pregnancy", "weight gain varies depending if you are underweight, normal weight, or overweight," and "discussion of personal weight gain experiences with family members and friends." A detailed account of weight gain advice is listed in Appendix 14. More than one type of advice may have been given by each resource. Table 39 contains a summary of weight gain advice, and outlines the three comments made most frequently by each resource and the dominant category of advice given.

Advice given by prenatal class leaders and the recommendations outlined in reading materials primarily focused on gaining specific amounts of weight during pregnancy, while at the same time included advice to follow Canada's Food Guide. Physicians seemed to tailor their advice to each patient's circumstances and as such focused on general comments pertinent to each case. What is not known is whether there was adequate or in-depth explanation as to what criterion the physician used to state that gain was okay. If physicians had provided a rationale behind their statements that weight gain was okay, this information would have provided women with their own means of self-assessment. Dietitians focused on naming foods to eat and

TABLE 39

Summary of Weight Gain Advice From Various Resources

Resources	Advice Most Frequently Given	Dominant Category of Advice
Prenatal Classes	1. Follow Food Guide 2. Gain 20-30 pounds 3. Gain 30-35 pounds	Specific Amounts of Weight
Family Doctor	1. Weight Gain is OK 2. Follow Food Guide 3. Gaining too much	General Comments
Obstetrician	1. Weight Gain is OK 2. Gain 30-35 pounds 3. Follow Food Guide	General Comments
Nurse	1. Foods to Eat-Avoid 2. Gain Depends Ht-Wt 3. Don't Diet	Food Comments
Dietitian	1. Eat Moderately 2. Foods to Eat-Avoid 3. Not Gaining Enough	Food Comments
Family Member	1. Not Gaining Enough 2. Follow Food Guide 3. Don't Worry	General Comments
Friends	1. Personal Weight Gain 2. Don't Worry 3. Not Gaining Enough	Miscellaneous Information
Reading Materials	1. Gain 20-30 pounds 2. Follow Food Guide 3. Gain 30-35 pounds	Specific Amounts of Weight
Audiovisuals	1. Eat Moderately 2. Gain 20-30 pounds 3. Discussed Case Situations	Miscellaneous Information

avoid, consistent with diet therapy. One hundred and nine individuals had compared their weight gain with a friend's weight gain. Discussion about personal weight gain experiences with friends is interesting from the point of view that knowing a friend's weight gain could be considered by women as a model for ideal weight gain during pregnancy. During the last thirty interviews conducted in this research, women had been asked whether their friend's weight gain influenced their own weight gain. In about one-half of these cases women said it had influenced their own weight gain, and the other half said it had no influence. An example of how a friend's weight gain could have influenced a pregnant woman's weight gain was the scenario where a friend had gained fifty pounds during her pregnancy and had difficulty returning to her prepregnant weight. This pregnant woman then wanted to avoid gaining an excessive amount of weight. On three occasions, family members had told pregnant women not to listen to their doctor. In one case, the physician had told one pregnant woman to reduce her sodium intake and one family member had suggested she not listen to this advice. When asked during the interview whether she had any medical problems warranting sodium reduction, none were reported. Sodium restriction is not recommended for healthy pregnant women. In the second case, the physician had told a woman of normal weight to gain fifteen pounds during her pregnancy. Two family members had advised her not to listen to the doctor. When pregnant women were told not to listen to the doctor's advice, this advice by the family members seemed appropriate.

What is of particular concern is the absence of advice about the consequences of inadequate weight gain in relation to low birth weight incidence. Furthermore, the issue of weight gain in relation to prepregnant height and weight status was addressed on only twenty-five occasions. As well, on only nine occasions women were advised that weight gain should approximate one pound per week. And finally, on only two occasions women were asked how much weight they had wanted to gain during pregnancy, thereby placing more responsibility for deciding weight gain on the individual.

In summary, advice given about weight gain generally focused on gaining twenty to thirty pounds and following Canada's Food Guide. No advice was given about the consequences of inadequate weight gain during pregnancy, and only 9 women were advised that weight gain should approximate one pound per week. Friends of pregnant women had discussed their own weight gain and this occurrence may have provided women with a standard for ideal weight gain.

Advice about Alcohol Consumption

Advice about alcohol consumption during pregnancy was as diverse as advice related to weight gain. Recommendations, information, and comments about drinking during pregnancy have been clustered into four major categories. The first category consisted of statements that pertained to specifying amounts of alcohol to consume during pregnancy, and included comments such as "do not drink during pregnancy", "it's okay to have one drink now and then", "refrain from drinking or just have one or two drinks per week", "it's okay to consume one drink every day," and "avoid getting drunk." The second category included statements of a more general nature, and included comments such as "consume small or moderate amounts of alcohol", "reduce your alcohol intake", "avoid hard liquor", "drinking helps you relax," and "it's okay to drink during pregnancy." The third category were statements that pertained to identifying the effects of alcohol on the fetus, and included comments such as "alcohol affects the baby", "alcohol crosses the placenta, when you drink your baby drinks", "alcohol consumption is associated with low birth weight," and "excessive amounts of alcohol consumption are associated with fetal alcohol syndrome." The fourth category consisted of miscellaneous information, and included comments such as "there are no safe levels of alcohol to consume during pregnancy", "discussion of other women's personal drinking experiences during pregnancy," and "discussion of how to cope with not drinking in social situations." An account of advice given to *drinkers* is outlined in Appendix 15. More than one type of advice may have been given by each resource. Table 40 contains a summary of advice given about alcohol during pregnancy, and outlines the three most frequent comments made by each resource and the dominant category of advice given.

Advice most frequently given to pregnant women by the majority of health professionals, family member and friends, and nonhuman resources was *not* to consume alcoholic beverages during pregnancy. Prenatal classes provided the most factual information on the effects of alcohol consumption on the fetus, specifically as it related to low birth weight. The second type of advice most frequent given by obstetricians and nurses, the third type of advice most

TABLE 40

Summary of Alcohol Advice Given to Drinkers By Various Resources

Resources	Advice Most Frequently Given	Dominant Category of Advice
Prenatal Classes	1. Do Not Drink 2. One Drink on Occasion 3. Low Birth Weight	Specifying Amounts to Consume
Family Doctor	1. Do Not Drink 2. One Drink on Occasion 3. Moderation	Specifying Amounts to Consume
Obstetrician	1. One Drink on Occasion 2. Moderation 3. No Safe Limits	Specifying Amounts to Consume
Nurse	1. One Drink on Occasion 2. Moderation 3. Crosses Placenta	No Dominant Category
Dietitian	1. Do Not Drink 2. Alcohol Affects Baby 3. Crosses Placenta	Specifying Amounts to Consume
Family Member	1. Do Not Drink 2. One Drink on Occasion 3. Alcohol Affects Baby	Specifying Amounts to Consume
Friends	1. One Drink on Occasion 2. Personal Experiences 3. Moderation	Specifying Amounts to Consume
Reading Materials	1. Do Not Drink 2. One Drink on Occasion 3. Moderation	Specifying Amounts to Consume
Audiovisuals	1. Do Not Drink 2. Crosses Placenta 3. Discussed Case Situations	Specifying Amounts to Consume

frequently given by family doctors, and the third type of advice most frequently contained in print material was to consume "moderate" amounts of alcohol during pregnancy. What is of some concern is the use of the term "moderate" in describing acceptable amounts of alcohol consumption. There are as many interpretations of the word moderate as there are women hearing that advice. Being specific and as quantitative as possible would have provided more direction to those receiving the message.

In summary, advice given to drinkers about alcohol consumption focused on not drinking during pregnancy or consuming one drink on occasion. Many individuals, however, received advice to consume "moderate" amounts of alcohol, a term which can be interpreted differently by pregnant drinkers. Prenatal classes provided the most factual information about the effects of alcohol consumption on the fetus.

Advice about Tobacco Use

Fewer comments had been provided by the various resources regarding advice about tobacco use during pregnancy. As with weight gain and alcohol, advice was clustered into four major categories. The first category consisted of statements that pertained to specifying the number of cigarettes to smoke during pregnancy, and included comments such as "quit" or "reduce cigarette smoking to one to five cigarettes per day." The second category included statements of a more general nature, and included comments such as "don't quit cold turkey, because stress of quitting is worse than smoking", "reduce if you can't quit," and "it's okay to smoke during pregnancy." The third category were statements that pertained to identifying the effects of smoking on the fetus, and included comments such as "smoking is harmful to the baby", "smoking decreases oxygen supply to the fetus","smoking lowers birth weight," and "smoking can be associated with prematurity and placenta problems at delivery." The fourth category consisted of miscellaneous information, and included "tips on quitting smoking" and "discussing personal smoking experiences with other women." An account of advice given to *smokers* about smoking during pregnancy from the various resources is contained in Appendix 16. More than one type of advice may have been given by each resource. Table 41 contains a summary of advice given about tobacco use during pregnancy, and outlines the three most frequent comments made by each resource and the dominant category of advice given.

The message was clear from health professionals, reading materials, and audiovisual productions: "quit smoking during pregnancy" or "reduce cigarette smoking." Furthermore prenatal class leaders, physicians, reading materials, and audiovisual productions had specified

TABLE 41

Summary of Smoking Advice Given to Smokers By Various Resources

Resources	Advice Most Frequently Given	Dominant Category of Advice
Prenatal Classes	1. Quit 2. Low Birth Weight 3. Reduce if Can't Quit	Specifying Amounts to Smoke
Family Doctor	1. Quit 2. Reduce if Can't Quit 3. Harmful to Baby	Specifying Amounts to Smoke
Obstetrician	1. Quit 2. Reduce if Can't Quit 3. Tips on Quitting	Specifying Amounts to Smoke
Nurse	1. Quit 2. Harmful to Baby 3. Reduce if Can't Quit	No Dominant Category
Dietitian	1. Reduce if Can't Quit 2. Reduce to 6-10 a day	General Advice
Family Member	1. Quit 2. Reduce if Can't Quit 3. OK to Smoke	Specifying Amounts to Smoke
Friends	1. OK to Smoke 2. Quit 3. Reduce if Can't Quit	General Advice
Reading Materials	1. Quit 2. Low Birth Weight 3. Harmful to Baby	Specifying Amounts to Smoke
Audiovisuals	1. Quit 2. Decreases Oxygen to Fetus 3. Low Birth Weight	Specifying Amounts to Smoke

the effects of smoking on the fetus, and addressed the low birth weight problem and possible delivery complications. What is, however, of major concern is that twenty-three friends of smokers (N=50) and seven family members had told pregnant smokers that "it's okay to smoke during pregnancy." Whether smokers had gravitated to friends who condoned smoking, or whether friends had influenced smokers to continue to smoke is unknown. It is surprising that with all the harmful effects of smoking being reported in the media, so many individuals did not seem concerned about the additional hazards of smoking during pregnancy.

In summary, advice given to smokers about tobacco use by health professionals was "not to smoke" or "reduce cigarette smoking." Women had also been informed by health professionals and in reading materials about the harmful effects of smoking on the fetus. In contrast, the most frequent advice given by friends and some family members was "it's okay to smoke." Whether friends' and family members' advice had influenced women's smoking habits or whether women had gravitated to friends who supported their own position on smoking during pregnancy is unknown.

Time Spent in Learning

The frequency of discussion about weight gain, alcohol consumption, and tobacco use, and the actual amount of time spent discussing these topics with health professionals, family members, or friends could potentially influence how the information obtained was integrated by the individual. Time spent in learning is presented for each of the three topics addressed in this dissertation. Time spent in learning about weight gain is reported for the entire sample; time spent in learning about alcohol consumption is reported for drinkers; and, time spent in learning about tobacco use is reported for smokers. As reported in Chapter IV, Methodology, time spent in learning was based upon self-report data. It represents the best estimate of time women could recall spending in learning about issues related to their pregnancy.

Time in Learning: Weight Gain

Women had been asked to categorize the frequency of their discussions about weight gain at prenatal classes, with health professionals, family members, and friends into one of four response groups: (1) on one occasion, (2) two to three times, (3) more than three times, and (4) at every visit to a doctor or at every prenatal class [if applicable]. Frequency of discussion had been estimated for the entire nine month period of the pregnancy. The relative number of weight gain discussions held by women who had discussed weight gain with health professionals, family members, and friends is outlined in Table 42.

TABLE 42

Percentage of Women Having Differing Number of Discussions about Weight Gain with Health Professionals, Family Members, and Friends

Resources	1 Time	2-3 Times	More 3 Times	Every Visit
With Dietitian	**47***	35	18	N/A
At Prenatal Class	25	**47**	12	16
With Family	11	20	**69**	N/A
With Friends	12	26	**62**	N/A
With Obstetrician	24	20	04	**52**
With Family Dr.	10	25	14	**51**
With Nurse	17	28	17	**38**

*Example: Percentage of women discussing weight gain with a dietitian on one occasion

In the majority of cases, weight gain had been discussed with obstetricians and family doctors at every doctor's visit. Many women had spoken to nurses at their doctors' offices, and as such these women had discussed weight gain whenever they had a doctor's appointment. This was most likely due to the fact that many nurses had weighed the women at every doctor's visit. Weight gain had also been discussed with the majority of family members and friends on more than three occasions during the pregnancy. At prenatal classes, however, weight gain had been primarily discussed on only two or three occasions. One woman reported that at the prenatal classes she had attended, the women had been weighed before every class. Most dietitians, health professionals trained to deal with weight gain, had discussed weight gain with their clients on only one occasion. Weight gain had been most frequently discussed with physicians, nurses, family members, and friends.

Approximations of the discussion time about weight gain issues at prenatal classes, with health professionals, family members, and friends, along with an estimation of the time spent reading and in viewing audiovisual productions are reported in Table 43. The mean and median amount of time spent in learning with each resource are reported. As well, the percentage of the total time spent in learning with each resource is reported. This percentage was calculated as follows: the sum of all women's time spent in learning with a particular resource divided by the sum of all women's total time spent in learning with all resources.

TABLE 43

Estimated Time in Learning about Weight Gain Issues by the Sample

Resources	Mean (minutes)	Median (minutes)	Percentage of Total Learning Time
With Family	946	120	27 %*
With Friends	379	90	20 %
Reading	359	84	33 %
With Dietitian	75	38	2 %
At Prenatal Class	47	30	7 %
With Nurse	35	15	1 %
With Family Doctor	32	20	8 %
With Obstetrician	19	14	1 %
Audiovisuals	18	10	1 %

* Example calculation: sum of the time spent in learning about weight gain with family members for all women divided by sum of the total time spent in learning with all resources for all women multiplied by 100.

Approximately sixteen hours had been spent, on the average, discussing weight gain with family members, with 50 percent of the sample having discussed weight gain for up to two hours. Although one cannot nor should not compare amount of time with quality or substance of discussion, the average amount of time that was spent discussing weight gain with family and friends was substantial. It must be remembered that discussion with family was recorded with up to four family members, and with up to three friends. As such, the mean discussion time with family and friends is elevated by the number of people involved in the discussions. Even taking this into consideration, a great deal of time had been spent on weight gain issues with family and friends. The dietitian was the health professional with whom the longest average discussion time had occurred. So although weight gain had usually been discussed on one occasion with the dietitian, the average discussion time was longer than average discussion time with other health professionals. A great deal of time had also been spent reading about weight gain issues. Some women had reported re-reading the material at different times throughout the pregnancy. Women had spent most of their time in learning by reading about weight gain issues and discussing the topic with family members and friends.

The mean amount of time spent in learning about weight gain with all resources was 24.6 hours, and the median amount of time was 7.5 hours during the nine month period of gestation. The range was from fourteen minutes to 104 hours. Several women had read extensively about weight gain, accounting for the differences between the mean and the median values reported. As well, one woman reported having discussed weight gain with her husband almost every day of her pregnancy. During the interview she stated "I was obsessed about the issue."

In summary, the majority of women had discussed weight gain with family members, friends, and physicians on more than three occasions. A large percentage of women had discussed weight gain at prenatal classes on two to three occasions, and with the dietitian on only one occasion. An extensive amount of time was spent learning about weight gain, an average of twenty-five hours with all resources during the entire pregnancy. Approximately one-half hour was spent discussing weight gain with health professionals, six hours with friends, and sixteen hours with family members. As well, approximately six hours was spent reading about the topic.

Time in Learning: Alcohol

The relative number of alcohol discussions held by *drinkers* who had discussed alcohol with health professionals, family members, and friends is outlined in Table 44. Number of discussions were classified into one of the four response groups: (1) once, (2) two to three times, (3) more than three times, and (4) at every visit to a doctor [if applicable].

TABLE 44

Percentage of Drinkers Having Differing Number of Discussions about Alcohol with Health Professionals, Family Members, and Friends

Resources	1 Time	2-3 Times	More 3 Times	Every Visit
With Dietitian	**100***			
With Obstetrician	**100**			
With Family Dr.	**84**	16		
With Nurse	**60**	40		
At Prenatal Classes	**44**	42	11	3
With Friends	30	**44**	26	N/A
With Family	30	27	**43**	N/A

*Example: Percentage of drinkers discussing alcohol with a dietitian on one occasion

In contrast to the frequent discussions which had occurred about the topic of weight gain, discussion about alcohol consumption with most health professionals had primarily taken place on only one occasion. However, alcohol had been primarily discussed with family members on more than three occasions and had been discussed with friends on two to three occasions. Is it that alcohol consumption is easier to discuss with family members and friends than with health professionals, or is it that health professionals do not view alcohol consumption as a serious problem. It is surprising that the majority of health professionals had only discussed alcohol consumption on one occasion with drinkers, since without discourse, health professionals would not be able to identify whether a health risk exists.

Approximations of the discussion time about alcohol issues with drinkers at prenatal classes, with health professionals, family members, and friends, along with an estimation of the time spent reading and in viewing audiovisual productions are reported in Table 45. The mean and median amount of time spent in learning with each resource are reported. As well, the percentage of the total time spent in learning with each resource is reported. This percentage was calculated as follows: the sum of all women's time spent in learning with a particular resource divided by the sum of all women's total time spent in learning with all resources.

TABLE 45

Estimated Time in Learning about Alcohol Issues by Drinkers

Resources	Mean (minutes)	Median (minutes)	Percentage of Total Time in Learning
With Friends	312	45	10 %*
Reading	252	72	52 %
With Family	246	30	14 %
At Prenatal Classes	30	20	15 %
Audiovisuals	12	10	2 %
With Nurse	6	2	1 %
With Family Doctor	5	3	4 %
With Dietitian	3	2	1 %
With Obstetrician	2	2	1 %

* Example calculation: sum of the time spent in learning about alcohol with friends for all drinkers divided by sum of the total time spent in learning with all resources for all drinkers multiplied by 100.

On the average, four to five hours had been spent discussing alcohol consumption with family members and friends. Approximately the same amount of time had been devoted to reading about alcohol issues in the literature. Although exposure to alcohol issues was less than exposure to weight gain issues, there still was a substantial amount of time spent discussing alcohol issues with family members and friends, and reading about the topic. Prenatal classes had devoted on the average thirty minutes to alcohol issues, whereas physicians, nurses, and dietitians had spent little time discussing alcohol consumption with their clients.

The mean amount of time drinkers spent in learning about alcohol consumption with all resources was 8.8 hours, and the median amount of time was 2.9 hours. The range was from zero minutes to seventy-eight hours. Time in learning was recorded for the entire pregnancy.

In summary, a large percentage of drinkers had discussed alcohol consumption with family members on more than three occasions, with friends on two to three occasions, and with health professionals on only one occasion. Alcohol was not discussed as extensively as weight gain. The average length of time spent learning about alcohol from all resources over the duration of the pregnancy was nine hours. Approximately four to six hours were spent discussing alcohol with family members and friends, and reading about the topic. However, only an average of five minutes was spent discussing alcohol with health professionals, excluding prenatal classes where thirty minutes was spent on the topic.

Time in Learning: Tobacco

The relative number of smoking discussions held by *smokers* who had discussed smoking with health professionals, family members, and friends is outlined in Table 46. Number of discussions were classified into one of the four response groups: (1) once, (2) two to three times, (3) more than three times, and (4) at every visit to a doctor [if applicable].

TABLE 46

Percentage of Smokers Having Differing Number of Discussions about Smoking with Health Professionals, Family Members, and Friends

Resources	1 Time	2-3 Times	More 3 Times	Every Visit
With Obstetrician	**89***	11		
With Nurse	**84**	16		
With Dietitian	**67**	33		
With Family Dr.	**50**	23	18	9
At Prenatal Classes	**45**	43	08	4
With Friends	14	**49**	37	N/A
With Family	33	26	**41**	N/A

* Example: Percentage of smokers discussing smoking with an obstetrician on one occasion

The frequency of discussions about tobacco use was fairly similar to the discussions about alcohol consumption. The majority of women had discussed smoking with health professionals on only one occasion. However it was particularly encouraging to note that in 27 percent of the cases, the family doctor had discussed smoking on more than three occasions with their pregnant clients who smoked. Smoking was discussed with friends on two to three occasions and with family members on more than three occasions during the entire pregnancy.

Approximations of the discussion time with smokers about smoking issues at prenatal classes, with health professionals, family members, and friends, along with an estimation of the time spent reading and in viewing audiovisual productions are reported in Table 47. The mean and median amount of time spent in learning with each resource are reported. As well, the percentage of the total time spent in learning with each resource is reported. This percentage was calculated as follows: the sum of all women's time spent in learning with a particular resource divided by the sum of all women's total time spent in learning with all resources.

TABLE 47

Estimated Time in Learning about Tobacco Issues by Smokers

Resources	Mean (minutes)	Median (minutes)	Percentage of Total Time in Learning
With Family	514	60	25 %*
Reading	402	135	45 %
With Friends	177	60	10 %
At Prenatal Classes	41	25	5 %
With Family Doctor	32	5	10 %
Audiovisuals	11	10	2 %
With Dietitian	11	2	1 %
With Nurse	6	6	1 %
With Obstetrician	3	2	1 %

* Example calculation: sum of the time spent in learning about smoking with family members for all smokers divided by sum of the total time spent in learning with all resources for all smokers multiplied by 100.

On the average, smokers had spent more time discussing tobacco issues than drinkers had spent time discussing alcohol issues. Smokers had spent a great deal of time discussing tobacco use with family members and in reading about the topic, approximately seven to eight hours. An average of three hours was spent discussing smoking with friends. As well, an average of approximately one-half hour was spent discussing smoking with the doctor and at prenatal classes.

The mean amount of time smokers spent in learning about tobacco use with all resources was 14.7 hours, and the median amount of time was 4.4 hours during the entire nine month period of gestation. The range was from two minutes to ninety-eight hours.

In summary, a large percentage of smokers had discussed tobacco use with family members on more than three occasions, with friends on two to three occasions, and with health professionals on only one occasion. The average length of time spent in learning about smoking from all resources over the duration of the entire pregnancy was fifteen hours. Approximately seven hours was spent discussing smoking with family members and reading about the subject, three hours spent discussing smoking with friends, and one-half hour with the physician and at prenatal classes. Physicians had spent more time discussing smoking with pregnant smokers than discussing alcohol with pregnant drinkers.

Reporting of time in learning has been presented separately for each of the three topics addressed in this dissertation. To conclude this section, average time spent in learning for all three topics and from all resources for the entire sample, including both drinkers and non-drinkers and smokers and non-smokers, is now presented. The purpose of this presentation is to provide the reader with an overall picture of time spent in learning during pregnancy. The mean time spent in learning about weight, alcohol consumption, and tobacco use from all possible resources was forty-one hours and the median was fifteen hours. Range was from thirty-eight minutes to 250 hours. Considering that weight gain, alcohol consumption, and tobacco use potentially constitute only a small part of all learning during pregnancy, much time is spent in learning during this period in the life cycle.

Initiators of the Learning

Further insights into the learning about weight gain, alcohol consumption, and tobacco use can be obtained by identifying who had initiated the learning episodes. Initiators of the discussion for the three topics addressed in this dissertation are first presented. Following, identification of who had initiated the decision to attend prenatal classes, to read about weight gain, alcohol consumption, and tobacco use, and to view audiovisual productions containing these three topics is reported. Initiators of weight gain learning episodes were identified for the total sample; initiators of alcohol learning episodes were identified for drinkers; and, initiators of smoking learning episodes were identified for smokers.

Initiators of Weight Gain Discussions

Of those individuals discussing weight gain with health professionals, family members, and friends, the percentages of these individuals engaging in self-initiated and other-initiated learning episodes are presented in Table 48. As previously stated in Chapter IV, if women themselves brought up the topic of weight gain it was classified as a self-initiated learning episode, whereas if the resource person brought up the topic it was classified as an other-initiated learning episode.

It is not surprising to find that the health professional, in the majority of cases, had initiated the discussion about weight gain issues since it is part of the training of professionals to ensure that their clients are informed about certain medical issues. As such, health professionals may not provide the opportunity to pregnant women to initiate the discourse or vocalize their concerns about weight gain. However what remains to be answered is whether self-initiated or other-initiated learning was associated with ideal weight gain. For family and friends, the women themselves had initiated the discussions about weight gain. This occurrence could have been a function of women reporting to their family and friends what their physician had said at the last doctor's visit, or it could have been a function of the concern women had had

TABLE 48

Profile of the Sample's Engagement in Self-Initiated and Other-Initiated Learning Episodes Regarding Weight Gain Issues

Resources	Self-Initiated Episodes (% of Sample)	Other-Initiated Episodes (% of Sample)
Family Members	**61**	39
Friends	**50**	**50**
Nurse	39	**61**
Family Doctor	38	**62**
Obstetrician	35	**65**
Dietitian	18	**82**

about their own weight gain. Women may have found it easier to initiate weight gain discussion with family members and friends since it may be a topic that is perceived to be related to body image rather than a medical concern.

Initiators of Alcohol Discussions

Initiators of the discussions about alcohol consumption with health professionals, family members and friends is presented in Table 49. The report is based upon women who had consumed alcohol one month before becoming pregnant. As previously stated, if women themselves brought up the topic of alcohol during the discussion, it was classified as a self-initiated learning episode.

In the majority of cases, discussion about alcohol consumption had been initiated by individuals other than the pregnant woman. This occurrence leads to the question of whether alcohol is a topic pregnant drinkers wish to avoid. There may have been some reluctance to discuss alcohol by those women who had consumed large amounts of alcohol when they had not known they were pregnant. On the other hand, alcohol may have become a non-issue for women who abstained or reduced their alcohol consumption during pregnancy.

TABLE 49

Profile of Drinkers' Engagement in Self-Initiated and Other-Initiated Learning Episodes Regarding Alcohol Issues

Resources	Self-Initiated Episodes (% of Drinkers)	Other-Initiated Episodes (% of Drinkers)
Family Members	36	**64**
Friends	34	**66**
Family Doctor	24	**76**
Obstetrician	18	**82**
Nurse	0	**100**
Dietitian	0	**100**

Initiators of Tobacco Discussions

Table 50 identifies who had initiated the discussions about smoking during pregnancy. This report is based upon women who had smoked one month before becoming pregnant. As previously stated, if women themselves brought up the topic about tobacco use, it was classified as a self-initiated learning episode.

The majority of smokers had not initiated the discussion about smoking during pregnancy. Avoidance of the issue seemed to prevail with the exception of interactions with friends. However, as had been previously reported, advice given by many friends of pregnant smokers was that "it was okay to smoke during pregnancy." This occurrence may well suggest that smokers had gravitated to friends they thought would support their position about smoking during pregnancy.

Initiators of Attendance at Prenatal Classes

When women were asked "Whose idea was it that you attend prenatal classes?", 67 percent reported that it was someone else's idea. Of these women, 64 percent reported that it had been their doctor's idea, 30 percent reported that it had been their husband's idea, and 6

TABLE 50

Profile of Smokers' Engagement in Self-Initiated and Other-Initiated Learning Episodes Regarding Tobacco Issues

Resources	Self-Initiated Episodes (% of Smokers)	Other-Initiated Episodes (% of Smokers)
Friends	47	**53**
Dietitian	33	**67**
Family Members	28	**72**
Nurse	17	**83**
Family Doctor	12	**88**
Obstetrician	9	**91**

percent reported that it had been a family member or a friend. In 33 percent of the cases women reported that it had been their own idea to attend prenatal classes. Physicians had played a key role in encouraging women to attend prenatal classes.

Initiators of Reading Episodes

In 62 percent of the cases women had read materials containing information about weight gain and alcohol consumption suggested by other individuals, and in 59 percent of the cases women had read materials containing information about tobacco use suggested by other individuals. The three most frequently cited sources that had recommended or provided *books* to pregnant women included: prenatal class leaders, friends, and family members. The three most frequently cited sources that had recommended or provided *articles* to pregnant women included: friends, prenatal class leaders, and family members. The three most frequently cited sources that had recommended or provided *pamphlets* to pregnant women included: prenatal class leaders, friends, and physicians. Other sources of reading materials had included: dietitians, nurses, church members, work setting, women's health centre, health units, yoga teacher, and a non-smokers rights group. See Appendix 17 for further information on sources of other-initiated readings. Prenatal class leaders and friends had played key roles in providing or suggesting reading materials to pregnant women.

Women who had read books on their own initiative had either purchased the books or obtained them from a library. Those who had read articles on their own initiative primarily had read these articles at a doctor's office, in the newspaper, or had purchased a magazine. Many of the pamphlets had been picked up or read at a doctor's office. Other sources where women had found reading materials included: health food store, magazine on an air plane, work setting, welcome wagon literature, and health fair. See Appendix 18 for further information on sources of self-initiated readings. Purchasing reading materials, obtaining reading materials in a library and a doctor's office, and reading the newspaper were the key resources where women had come across or sought information about weight gain, alcohol, and smoking.

Initiators of Viewing Audiovisual Productions

Viewing of television programs and listening to radio programs had primarily been initiated by the pregnant women themselves, however video/slide/film productions had been viewed at prenatal classes. As such 68 percent of the viewing of audiovisual productions about weight gain had been other-initiated, 67 percent of the viewing of audiovisual productions about alcohol consumption had been other-initiated, and 66 percent of the viewing of audiovisual productions about tobacco use had been other-initiated.

In summary, the majority of women had engaged in learning episodes about weight gain, alcohol, and smoking that were initiated by other individuals, with the exception of pregnant women initiating learning episodes about weight gain with family members and friends. It is not known whether women had chosen to avoid the topics of weight gain, alcohol consumption, and tobacco use or whether health professionals had not provided women with the opportunity to initiate these learning episodes. Most reading materials had been made available to pregnant women through prenatal classes and friends. Viewing of audiovisual productions had occurred primarily at prenatal classes.

Learning Transaction Types

Tough had identified the planner of a learning project as the individual or thing responsible for deciding what to learn, and how to learn (that is the activities and resources utilized). As previously stated, because of the specificity of the topics under investigation, planners in learning could not be identified using Tough's methodology, and therefore learning transaction types were developed and incorporated the concepts of time, settings, and responsibility for organizing the learning. The six learning transaction types that were developed and previously described in Chapter IV included: (1) self-initiated learning transactions in the group setting, (2) self-initiated learning transactions in the one to one setting, (3) self-initiated learning transactions in the nonhuman setting, (4) other-initiated learning transactions in the group setting, (5) other-initiated learning transactions in the one to one setting, and (6) other-initiated learning transactions in the nonhuman setting. Time spent in each of these learning transaction types was calculated and then divided by the total time in all transactions. On the basis of this information the dominant learning transaction type for every individual was identified. Dominant learning transaction types for the topics of weight gain, alcohol consumption, and tobacco use are now presented.

Weight Gain Learning Transaction Types

The six learning transaction types for weight gain are identified and presented in Table 51. Each cell contains the percentage of the sample which had that transaction type as its dominant transaction type.

Thirty-five percent of the sample had other-initiated learning transactions in the one to one setting as their dominant learning transaction type for the topic of weight gain. This means that most of the learning time for 35 percent of the sample had been other-initiated and had

TABLE 51

Dominant Weight Gain Learning Transaction Types for the Sample

Transaction Settings	Self-Initiated (% of Sample)	Other-Initiated (% of Sample)
Group	1	2
One to One	30	**35**
Nonhuman	10	22
Total	41 %	59 %

occurred with another individual. It is not surprising that, for 65 percent of the sample, learning about weight gain had occurred with other individuals, considering the number of potential contacts included in this setting (family doctor, obstetrician, nurse, dietitian, family members, and friends). What is of interest to note is that in 35 percent of the cases the learning had been other-initiated and 30 percent had been self-initiated with other individuals.

Because few individuals had the group setting as their dominant learning transaction type, anova analyses could not be performed to identify whether knowledge levels differed among women in each of the six learning transaction types. The reason few individuals had spent the majority of their learning time in the group setting may have been a function of the topics being investigated in this dissertation. Weight gain, alcohol consumption, and tobacco use are only a small part of the prenatal class curriculum. Because of this occurrence, learning transaction types were regrouped into the following categories: self-initiated and other-initiated learning transactions with health professionals (prenatal class leaders, physicians, nurses, and dietitians); with family members and friends; and, with nonhuman resources (reading materials and audiovisual productions). It was found that 2 percent had engaged in self-initiated learning transactions with health professionals; 10 percent had engaged in other-initiated learning transactions with health professionals; 28 percent had engaged in self-initiated learning transactions with family members and friends; 27 percent had engaged in other-initiated learning transactions with family members and friends; 11 percent had engaged in self-initiated learning transactions with nonhuman resources; and, 22 percent had engaged in other-initiated learning transactions with nonhuman resources. ANOVAS were performed and it was found that women in these six regrouped weight gain learning transaction types did not differ with respect to weight gain knowledge scores, ideal weight gain (adjusted weight gain ratio), age, marital status, education level, socioeconomic status, ethnic origin, or birth weight. The resources where women had obtained their information and the circumstances under which women had obtained information (self-initiated vs. other-initiated) were not associated with differences in their level of knowledge, ideal weight gain, or any demographic characteristics. However it must be remembered that this type of analysis reflects the time in learning in self-initiated and other-initiated learning episodes with health professionals, with family members and friends, and with nonhuman resources. Quality of the information and impact of the information received from each resource were not assessed.

In summary, 35 percent of the sample had engaged in other-initiated weight gain learning transactions in a one to one setting and 30 percent had engaged in self-initiated weight gain learning transactions in a one to one setting. Overall, other-initiated learning transaction types dominated, as 59 percent of the sample had engaged in other-initiated transactions with a group, other individuals, and nonhuman resources.

Alcohol Learning Transaction Types

The six learning transaction types for alcohol consumption are identified in Table 52. Learning transactions are presented for those individuals who had consumed alcohol within one month prior to their becoming pregnant. Each cell contains the percentage of drinkers who had that transaction type as its dominant transaction type.

Thirty-nine percent of drinkers had other-initiated learning transactions in the nonhuman setting as their dominant learning transaction type for the topic of alcohol

TABLE 52

Dominant Alcohol Learning Transaction Types for Drinkers

Transaction Settings	Self-Initiated (% of Sample)	Other-Initiated (% of Sample)
Group	5	9
One to One	9	19
Nonhuman	19	**39**
Total	33 %	67 %

consumption. This means that most of the learning time for 39 percent of drinkers had been spent reading or viewing audiovisual productions about alcohol consumption which had been suggested or given to them by another individual. Women may feel safer learning about alcohol by interaction with a nonhuman resource thereby eliminating any negative affective component of an interaction with another individual. Another possible explanation for this occurrence is the avoidance on the part of health professionals or the low priority given by health professionals to this risk factor.

ANOVAS were conducted to determine whether women who had engaged in the six alcohol learning transaction types differed with respect to their alcohol knowledge levels, reduced alcohol intake, or any demographic characteristics. No significant differences were found. As previously stated, this type of analysis only reflects the time in learning in self-initiated and other-initiated learning episodes with a group, with another individual, and with a nonhuman resource. Quality of the information and impact of the information received in each setting were not assessed. As was done for weight gain, learning transaction types were regrouped from learning settings to learning resources. For alcohol, it was found that 5 percent of drinkers had engaged in self-initiated learning transactions with health professionals; 12 percent of drinkers had engaged in other-initiated learning transactions with health professionals; 9 percent of drinkers had engaged in self-initiated learning transactions with family members and friends; 17

percent of drinkers had engaged in other-initiated learning transactions with family members and friends; 20 percent of drinkers had engaged in self-initiated learning transactions with nonhuman resources; and, 37 percent of drinkers had engaged in other-initiated learning transactions with nonhuman resources. No significant differences among the women in the six regrouped alcohol learning transaction types were found with respect to alcohol knowledge scores, reduced alcohol intake, or any demographic characteristics.

In summary, 39 percent of the sample had engaged in other-initiated alcohol learning transactions in the nonhuman setting, 19 percent had engaged in self-initiated alcohol learning transactions in the nonhuman setting, and 19 percent had engaged in other-initiated alcohol learning transactions in the one to one setting. The nonhuman setting had dominated as to where women had spent most of their time in learning about alcohol issues. Women who had engaged in the six alcohol learning transaction types did not differ with respect to knowledge about alcohol, reduced alcohol consumption, or any demographic characteristics.

Tobacco Learning Transaction Types

The six learning transaction types for tobacco use are identified in Table 53. Learning transactions are presented for those individuals who had smoked within one month prior to their becoming pregnant. Each cell contains the percentage of smokers who had that transaction type as its dominant transaction type.

Thirty-six percent of smokers had other-initiated learning transactions in the one to one setting as their dominant learning transaction type for the topic of tobacco use. Prenatal classes had not played a prominant role in learning about tobacco use during pregnancy. Because of the few individuals having the group setting as their dominant learning transaction type, anova analyses could not be performed to identify whether knowledge levels of smokers differed for those engaged in the six learning transaction types. As such learning transaction types were regrouped from learning settings to learning resources. For tobacco, it was found that no

TABLE 53

Dominant Tobacco Learning Transaction Types for Smokers

Transaction Settings	Self-Initiated (% of Sample)	Other-Initiated (% of Sample)
Group	0	2
One to One	10	**36**
Nonhuman	24	28
Total	34 %	66 %

smokers had engaged in self-initiated learning transactions with health professionals; 10 percent of smokers had engaged in other-initiated learning transactions with health professionals; 10 percent of smokers had engaged in self-initiated learning transactions with family members and friends; 26 percent of smokers had engaged in other-initiated learning transactions with family members and friends; 24 percent of smokers had engaged in self-initiated learning transactions with nonhuman resources; and, 30 percent of smokers had engaged in other-initiated learning transactions with nonhuman resources.

Since no individuals had self-initiated learning transaction types with health professionals as their dominant regrouped transaction type, ANOVAS were conducted with the remaining five regrouped learning transaction types. It was found that smokers who had engaged in these regrouped learning transaction types differed with respect to their knowledge levels about smoking [$F_{(4,49)}=4.21$, $p=0.006$], and socioeconomic status [$F_{(4,49)}=3,28$, $p=0.019$]. *Post hoc* analyses using Tukey's method found that women who had engaged in other-initiated learning transactions with family members and friends had lower tobacco knowledge test scores (mean score=10.8) than women who had engaged in either self-initiated learning transactions with a nonhuman resource (mean score=16.2) or other-initiated learning transactions with a nonhuman resource (mean score=17.5). This result is of particular significance since it was previously found that the majority of friends and some family members advised women that it was okay to smoke. Women who had spent most of their time in learning with family members and friends in other-initiated episodes knew less about the harmful effects of smoking during pregnancy than those who had spent most of their time reading and viewing audiovisuals about the topic. In addition women who had engaged in other-initiated learning transactions with health professionals had a lower socioeconomic index than the four other groups. Health professionals are initiating and spending more time with women of lower socioeconomic status, and discussing smoking issues with these individuals.

In summary, 36 percent of smokers who had engaged in other-initiated learning transactions had done so in the one to one setting and 28 percent had engaged in other-initiated learning transactions in the nonhuman setting. Because of the few individuals in the transaction of the group setting, the transaction types were regrouped and ANOVAS conducted to determine differences among women in these regrouped learning transaction types. It was found that women primarily engaging in other-initiated learning transactions with family members and friends had lower knowledge test scores about smoking than women engaging in other-initiated and self-initiated learning transactions with nonhuman resources. That is, women who had spent most of their time in learning with a family member or friend knew less about the effects of smoking on the fetus than women who had spent most of their time in learning reading about smoking issues. This finding is significant since it was previously reported that advice given by many friends and some family members to smokers was that "it's okay to smoke during pregnancy."

Health Beliefs

Measures of pregnant women's health beliefs for weight gain, alcohol consumption, and tobacco use were developed for the purposes of this study based upon an adaptation of the Health Belief Model (Rosenstock, 1974b). Four components of the Health Belief Model had been examined and these components consisted of: (1) concern, (2) perceived risk, (3) perceived usefulness of the information, and (4) perceived barriers. Women's responses were recorded on a seven point rating scale, with a zero value indicating no concern, risk, use, or barriers and a six value indicating high concern, use, risk, or barriers. A presentation of the health belief scores for each of the four components on the three topics addressed in this dissertation follows.

Weight Gain Health Beliefs

The four components of the health belief measure as they related to the topic of weight gain consisted of: (1) concern about weight change during pregnancy, (2) perceived risk of the woman's unborn child because of her weight gain, (3) perceived usefulness of the information in how it influenced the management of weight gain, and (4) perceived barriers or obstacles in managing weight gain during pregnancy. The mean scores for the entire sample are reported in Table 54. As previously described in Chapter V on p. 159, weight gain health belief data were not available for four individuals, and as such, scores reported in Table 54 are based upon N=123.

TABLE 54

Mean Scores of the Weight Gain Health Belief Components

Weight Gain Components	Mean Scores*
Concern	3.24
Perceived Risk	1.09
Perceived Usefulness	3.33
Perceived Barriers	1.83

* A rating scale from zero to six was used to assess health beliefs (0=no concern, risk, use, or barriers, 2=little, 4=moderate, and 6=high concern, risk, use, or barriers)

The average score values for the concern and usefulness components were near the midpoints on the scale of zero to six. However women had perceived that their infants were at little risk because of their weight gain (mean score=1.09). This may have been a function of two factors. The first factor may be that women had not known about the risks associated with inadequate weight gain and its relationship with increased low birth weight incidence. As previously mentioned only 6 percent of women in this study had known there was a minimun weekly recommended weight gain of one-half pound. The second factor as to why most women reported that they had perceived their unborn child to be at little risk may have been due to the fact that only 5 percent of women in the study had had a low birth weight infant and only 7 percent had gained less than twenty pounds during pregnancy. As such only a small portion of the sample were actually medically at high risk. It must also be remembered that nurses in participating hospitals prevented this investigator from seeing patients who had had low birth weight infants.

The women in this study had reported having encountered few barriers to managing their weight during pregnancy (mean score = 1.83). It is of interest to note that 53 percent of the women in this study stated that they had no barriers to managing their weight. Furthermore, fifteen individuals said they had no control over managing their weight - it was physiological and a natural process. This factor may potentially explain why women had perceived few barriers in managing their weight gain during pregnancy. Barriers that had been cited by women included: nausea (eight individuals); eating sweets and enjoying food (eight individuals); decrease in appetite and not being able to eat (eight individuals); gaining a lot of weight at the beginning of pregnancy (seven individuals); eating at regular meal times (three individuals); heartburn (two individuals); lack of will power (one individual); eating in restaurants (one individual); cravings (one individual); not getting enough exercise (one individual); toxemia (one individual); being told to diet for one month and finding it hard to do so (one individual); and, being given conflicting information on how much weight to gain (one individual). In addition it was found that the perceived weight gain barriers score was significantly correlated with age ($r=0.17$, $df=121$, $p=0.03$). Older individuals had reported encountering more barriers to managing their weight gain during pregnancy.

In summary, women had perceived their infants to be at little risk because of their weight gain during pregnancy. Less than 5 percent of the sample actually had a low birth weight infant and 7 percent of women had gained less than twenty pounds during pregnancy. Behavior may have precipitated reporting of health beliefs. In addition, women had reported few barriers to managing weight gain and many stated that weight gain was a physiologic process over which they had no control. Principal barriers cited were: nausea and a decrease in appetite, enjoying food, and gaining a lot of weight during the first trimester. Barriers were found to be significantly positively correlated with age. Women thought that the information they had received about weight gain was of moderate use in managing their weight gain.

Alcohol Health Beliefs

The four components of the health belief measure as they related to the topic of alcohol consumption consisted of: (1) concern about alcohol consumption during pregnancy, (2) perceived risk of the woman's unborn child because of her alcohol consumption, (3) perceived usefulness of the information in managing alcohol consumption, and (4) perceived barriers or obstacles in managing alcohol consumption during pregnancy. The mean scores of alcohol health beliefs for drinkers are reported in Table 55. As previously described in Chapter V on p. 159, alcohol health belief data were not available for seven drinkers, and as such, scores reported in Table 55 are based upon N=88.

The average score values for the concern and usefulness components were near the midpoints on the scale of zero to six. However women had perceived that their infants were at virtually no risk because of their alcohol consumption (mean score=0.90). The low perceived risk score was most likely due to the fact that 94 percent of the drinkers had reduced their alcohol consumption once they had known they were pregnant, and on the average they had reduced their intake by 82 percent. Furthermore, only two individuals had reported consuming more than two drinks on any single occasion during pregnancy once they knew they were

TABLE 55

Mean Scores of the Alcohol Health Belief Components for Drinkers

Alcohol Components	Mean Scores*
Concern	1.78
Perceived Risk	0.90
Perceived Usefulness	3.38
Perceived Barriers	0.28

* A rating scale from zero to six was used to assess health beliefs (0=no concern,risk,use,or barriers, 2=little,4=moderate,and 6=high concern,risk,use, or barriers)

pregnant. Women's alcohol behaviors may have influenced reporting of alcohol health beliefs. Whether reduction in alcohol intake had influenced reporting of risk or whether perception of risk had influenced women to reduce their alcohol intake is unknown.

The women in this study also had reported having virtually no barriers in managing their alcohol consumption during pregnancy (mean score=0.28). Eighty-eight percent of drinkers had reported no obstacles to changing their alcohol consumption. This observation is of interest since both light and heavy drinkers had reduced their alcohol intake. Barriers that had been cited by women included: social events (5 individuals); desire to drink (2 individuals); husband or friends continuing to drink (2 individuals); stress (1 individual); and, will power (1 individual). As was found for weight gain, the perceived alcohol consumption barriers score was significantly correlated with age ($r=0.18$, $df=86$, $p=0.047$). Those individuals who were older had reported a higher degree of barriers while managing their alcohol consumption during pregnancy.

In summary, women had perceived their infants to be at very little risk because of their alcohol consumption. This occurrence was most likely due to the retrospective nature of the study and reflected actual health behavior, since 94 percent of drinkers had attempted to reduce their alcohol consumption and the average reduction was 82 percent. Women had perceived fewer barriers in managing their alcohol consumption than in managing their weight gain. The most frequently cited barrier was attending social events where friends were drinking. As with weight gain, barriers were significantly positively correlated with age. Older women reported encountering significantly more barriers than did younger women. Women thought that the information they had received about alcohol consumption was of moderate use in managing their alcohol intake.

Tobacco Health Beliefs

The four components of the health belief measure as they related to the topic of tobacco use consisted of: (1) concern about cigarette smoking during pregnancy, (2) perceived risk of the woman's unborn child because of her cigarette smoking, (3) perceived usefulness of the information in how it influenced the management of cigarette smoking, and (4) perceived barriers or obstacles in managing cigarette smoking during pregnancy. The mean scores of smoking health beliefs for smokers are reported in Table 56. As previously described in Chapter V on p. 159, smoking health belief data were not available for seven individuals, and as such, scores reported in Table 56 are based upon N=43.

TABLE 56

Mean Scores of the Smoking Health Belief Components for Smokers

Smoking Components	Mean Scores*
Concern	3.51
Perceived Risk	2.69
Perceived Usefulness	3.16
Perceived Barriers	2.90

* A rating scale from zero to six was used to assess health beliefs (0=no concern, risk, use, or barriers, 2=little, 4=moderate, and 6=high concern, risk, use, or barriers)

The average score values for the concern and usefulness components are near the midpoints on the scale of zero to six. In contrast to weight gain and alcohol beliefs, women had perceived their infants to be at risk because of their cigarette smoking (mean score=2.69). Eighteen percent of smokers had not changed their cigarette smoking, and cigarette smoking had been reduced by an average of 52 percent. Smoking behaviors may have influenced reporting of health beliefs.

Smokers in this study reported having difficulty in managing their cigarette smoking during pregnancy (mean score=2.90). Barriers that had been cited by smokers included: difficult to quit (10 individuals); seeing other people smoke (6 individuals); lack of will power (5 individuals); stress of quitting (4 individuals); hassled by non-smokers (3 individuals); craving to smoke (2 individuals); and, personal stress (1 individual). As well, the perceived barriers score was significantly positively correlated with age ($r=0.39$, $df=41$, $p=0.005$). Those individuals who were older had reported a higher degree of barriers while managing their cigarette smoking during pregnancy.

In summary, women had perceived their infants to be at risk because of their cigarette smoking. Eighteen percent had not changed or had increased their cigarette smoking during pregnancy and the average reduction was 52 percent. Smoking behaviors may have influenced reporting of health beliefs. Women found it difficult to quit smoking and the barriers most frequently cited included: seeing other people smoke, lack of will power, and the stress of quitting. As was found for weight gain and alcohol consumption, perceived smoking barrier scores were significantly correlated with age. Women thought that the information they had received about tobacco was of moderate use in managing cigarette smoking.

Summary of Chapter VI

Chapter VI consisted of a presentation of the learning patterns and health beliefs of primiparous women. The process consisted of identifying what women knew about weight gain, alcohol consumption, and tobacco use and identifying how women learned about these three topics. Women knew the average amount of weight to gain during pregnancy and the importance of this gain. Women were also knowledgable about the effects of consuming large amounts of alcohol on the fetus and the effects of smoking on the fetus. However, women had difficulty answering questions pertaining to weight gain of overweight and underweight women, weight gain during the first trimester, and the effects of consuming small amounts of alcohol on the fetus.

Women had used a variety of resources to obtain or seek information about weight gain, alcohol consumption, and tobacco use. Physicians and reading materials were cited as the resources most frequently utilized for obtaining or receiving information for all three topics. Family members had ranked as the third most utilized resource for weight gain and tobacco use, whereas prenatal classes had ranked third for the topic of alcohol consumption. Of those individuals who had spoken to a family members, the majority had spoken to one member for all three topics. Husbands, mothers, and sisters of the pregnant women were the primary family members spoken to. Weight gain advice generally given by the various resources focused on gaining twenty to thirty pounds and following Canada's Food Guide. Little emphasis had been placed on identifying the risks associated with inadequate weight gain. Women had frequently compared their own weight gain with a friend's weight gain. Alcohol advice given to drinkers primarily focused on not drinking during pregnancy or consuming one drink on occasion. Advice given to smokers about tobacco use by health professionals was "not to smoke," however advice given by many friends and family members was that "it was okay to smoke."

On the average women had spent twenty-five hours learning about weight gain issues, drinkers had spent nine hours learning about alcohol issues, and smokers had spent fifteen hours learning tobacco issues. A great deal of time had been spent reading about the three topics, and weight gain had been extensively discussed with family members and friends. However, weight gain had primarily been discussed with the dietitian for an average of seventy-five minutes on only one occasion. As well, alcohol had been discussed with the physician for an average of five minutes on only one occasion.

The majority of women had engaged in discussions that were other-initiated, with the exception of women initiating the discussion about weight gain with their family members and friends. Most reading materials had been made available to women through prenatal classes and by friends. For the topics of weight gain and tobacco, other-initiated learning transactions in the one to one setting dominated; whereas, for the topic of alcohol consumption, other-initiated learning transactions in the nonhuman setting dominated. Learning transaction types provided a description of how women had organized their time in learning, and who had control over the interaction. Smokers who had engaged in other-initiated learning transactions about tobacco with family members and friends had significantly lower tobacco knowledge scores than smokers engaging in tobacco learning transactions with a nonhuman resource.

With regard to health beliefs, women had not perceived their unborn child to be at risk because of their weight gain or alcohol consumption, but had perceived their unborn child to be at risk because of their cigarette smoking. Perception of risk was most likely a function of women's actual health behaviors during pregnancy. As well, women had reported few barriers to managing weight gain and 20 percent stated that weight gain was a physiologic process for which they had no control. Perceived barriers in managing alcohol consumption were virtually non-existent, however women found it difficult to stop smoking. Women thought that the information they had received about weight gain, alcohol consumption, and tobacco use was of moderate use in managing health behaviors. How women learned during pregnancy has been described in Chapter VI. The results of testing the hypotheses are reported in Chapter VII.

CHAPTER VII

RESULTS OF HYPOTHESIS TESTING

The results of hypothesis testing are the pivotal dimensions of the findings in this research study. As previously stated, six sets of hypotheses were tested: (1) women whose pregnancies were planned will have spent more hours in learning and utilized more resources, (2) concerns about health behaviors will be associated with spending more hours in learning, (3) concerns about health behaviors will be associated with utilizing more resources, (4) self-initiated learning will be associated with higher knowledge test scores, (5) self-initiated learning will be associated with ideal health behaviors, and (6) health beliefs will be associated with ideal health behaviors. The primary purpose of hypothesis testing was to identify the relationships between learning and behavior as well as between health beliefs and behavior of pregnant women. Section one of this chapter consists of reporting outcomes of the six sets hypotheses tested, and section two consists of reporting other findings pertaining to goals in learning. The final section contains a summary of Chapter VII.

Outcome of Hypotheses Tested

The reporting of results of hypothesis tested is now presented, beginning with a re-statement of each hypothesis. In addition, the dependent and independent variables are related to demographic characteristics, knowledge scores, and/or health behaviors so as to enrich the discussion of the results found in hypotheses testing as well as to compare the results of this research with other studies.

Hypothesis 1 (a). "Women's whose pregnancies were planned will have spent significantly more hours in learning than women whose pregnancies were unplanned." Age and socioeconomic status were the variables that had been controlled for in an analysis of covariance.

No significant association was found between planning the pregnancy and total hours spent in learning about weight gain, alcohol consumption, and tobacco use. Once women knew they were pregnant, regardless of whether it had been planned or a surprise, the event of pregnancy itself was conducive to learning.

It may be that women experiencing a first pregnancy are eager to engage in learning, regardless of whether it was a planned or an unplanned event. The excitement of learning about physical and lifestyle changes for a first pregnancy may have overshadowed the planning aspect. However, the question is whether similar results would have been found for multigravidas, those women experiencing a second or subsequent pregnancy. Perhaps planning under those circumstances may have predominated. A second possible explanation for not obtaining significant results for hypothesis one is related to the concept of a planned pregnancy. Some women, once they decided to become pregnant, conceive immediately; whereas, other women may take up to six months or longer to conceive. A lengthy time period between planning and conception may have influenced the outcome of hypothesis one. A third possible explanation for not obtaining significant results is the option women today have to abort their pregnancy if it was unplanned and unwanted.

Hypothesis 1 (b). "Women whose pregnancies were planned will have utilized significantly more resources than women whose pregnancies were unplanned." Age and socioeconomic status were the variables that had been controlled for in an analysis of covariance. No significant association was found between planning the pregnancy and total number of resources utilized during pregnancy. Furthermore, planning the pregnancy was not significantly associated with ideal weight gain, reduced alcohol intake, or reduced cigarette smoking. As previously stated in Chapter V, planning the pregnancy was significantly associated with age, marital status, education level, and socioeconomic status. Those women who had planned their pregnancy were older, married, of a higher education level, and of a higher socioeconomic status.

Although hypothesis one (b) was not supported, planning the pregnancy may potentially influence the time the information is received by pregnant women, a relationship not tested in this study. From a medical perspective this is important since changes in eating habits, in alcohol and smoking behaviors should ideally occur prior to pregnancy. Women who plan their pregnancy may become aware that they are pregnant at an earlier time than women who do not plan their pregnancy. Women who plan their pregnancy may be in contact with resources sooner and subsequently in a position to modify their health behaviors earlier in the pregnancy. This occurrence is particularly important for alcohol behaviors since the fetus is most susceptible to alcohol insult during the first six weeks of gestation. It must also be remembered that hypothesis one (b) deals with total number of resources utilized throughout the pregnancy. Other factors besides the planning aspect may have influenced the number of resources utilized. It may have been that the type of resource first utilized influenced the total number used. For example, if women first sought information from a physician and they had perceived that information to be comprehensive and had perceived their health behavior to be adequate or ideal, then they may have had no need to seek other resources for that specific topic or issue.

Hypothesis 2 (a). "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with hours in learning about weight gain." A significant positive correlation was found between weight gain concern and total hours in learning about weight gain ($r=0.15$, $df=121$, $p=0.025$). Hours in learning should not be equated with quality of learning. However, it was found that time in learning about weight gain was positively correlated with weight gain knowledge test scores ($r=0.29$, $df=125$, $p=0.003$). And since concern was not associated with weight gain knowledge test scores, it may be that women who had been concerned about their weight gain had spent more time in learning and that time spent in learning had been productive.

The measure of concern in hypothesis two (a) was operationalized using a rating scale from zero to six, with a zero score indicating no concern and a six indicating high concern about weight gain. Since concern was not found to be associated with knowledge scores, the unanswered question is whether women's concerns parallel the medical profession's concerns about weight gain issues. Furthermore, it was not determined whether women were concerned about their weight gain because they were gaining too little weight, too much weight throughout the pregnancy, too much weight during the first trimester, too much weight because of the difficulty of losing weight following delivery, or for some other reason. Having discovered in hypothesis two (a) that the general concept of concern was associated with hours in learning, further clarification of the type of concern may provide even greater insights as to what motivates women to spend time in learning.

Hypothesis 2 (b). "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with hours in learning about alcohol consumption." A significant positive correlation was found between alcohol concern and total hours in learning about alcohol consumption (r=0.29, df=86, p=0.0015). Time in learning about alcohol was not found to be significantly associated with alcohol knowledge test scores, however concern about alcohol was significantly correlated with knowledge about alcohol. What is not known is whether knowledge led to a greater degree of alcohol concern which in turn led to more time in learning, or whether spending more hours in learning led to greater concern as well as higher knowledge scores.

As stated, concern about alcohol consumption was found to be associated with spending more time in learning about the subject. There may have been a general awareness that alcohol is a drug and hazardous to health, and this awareness led to concern about alcohol behaviors during pregnancy which in turn led to spending more time on the subject. It may also have been that knowing specifically about the effects of alcohol on the fetus led to a greater concern during pregnancy. Another possible scenario: spending time in learning about alcohol led to greater concern during pregnancy as well as a higher knowledge scores. What appears common to these scenarios is that knowledge and awareness about the effects of alcohol are central issues.

Providing women with factual information about the hazards of drinking during pregnancy may be an important part of the concept of alcohol concern, and subsequently learning about alcohol consumption during pregnancy.

Hypothesis 2 (c). "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with hours in learning about tobacco use." No significant association was found between smoking concern and total hours in learning about smoking issues. Concern was also not found to be associated with tobacco knowledge test scores. These results lead to the following questions: "What are the concerns of pregnant smokers?" and "What influences the development of the concept of concern for smoking behaviors?" Possibly, women may have been concerned that they were unable to quit smoking because of their nicotine addiction. Women may also have been concerned that their smoking affected the fetus and as such felt guilty because they had been unable to quit. On the other hand, there may have been individuals who were not all at concerned about their cigarette smoking and how it affected their unborn child. One smoker in this study stated "I had made a conscious decision to continue smoking during my pregnancy, and I did not wish to hear about what are the harmful effects on the baby." Identifying concern of smokers would seem to be a starting point in understanding why hypothesis two (c) was not supported and understanding the circumstances under which pregnant smokers will spend more time in learning.

Women react differently to their concern about tobacco use than to their concern about weight gain and alcohol consumption. This result may have been due to the fact that smoking is a health problem of the general population and women had previously heard about the hazards of smoking. During pregnancy they may not wish to spend any more time hearing about the harmful effects of smoking as it specifically relates to the fetus. Whereas with alcohol consumption and weight gain, these behaviors may not be viewed as serious health hazards, with the exception of engaging in excessive behaviors. Women may have been more curious to know about the effects of weight gain and alcohol consumption as they specifically related to the developing fetus, and therefore may have spent more time in learning.

Hypothesis 3 (a). "A measure of health concern regarding weight gain during pregnancy will be significantly positively correlated with number of resources utilized for the topic of weight gain." A significant positive correlation was found between weight concern and number of resources utilized ($r=0.32$, $df=121$, $p<0.001$). What is not known is whether women who were concerned about their weight gain had sought information from resources, or whether women had been exposed to resources which in turn had influenced their degree of concern. As previously noted, concern about weight gain was not associated with knowledge test scores. So although a positive correlation was found in hypotheses three (a) between concern about weight gain and number of resources utilized, health professionals cannot be assured that women who deviate from ideal weight gain will seek more resources on the subject.

The important issue would seem to be that health professionals attempt to identify what concerns women have about their weight gain during pregnancy. Knowing what women are concerned about may give the professional the opportunity to relate women's concerns to medical issues, and as such they may be more receptive to receiving this factual information. As well, knowing women's concerns may provide the professional with the opportunity to give comprehensive information regarding the issue and avoid having women seek information elsewhere that may be potentially misleading or needlessly worry the individual.

Hypothesis 3 (b). "A measure of health concern regarding alcohol consumption during pregnancy will be significantly positively correlated with number of resources utilized for the topic of alcohol consumption." A significant positive correlation was found between alcohol concern and number of resources utilized ($r=0.21$, $df=86$, $p=0.015$). Furthermore, concern about alcohol consumption was associated with alcohol knowledge test scores. What is not known from this analysis, however, is whether women who had been concerned about their alcohol consumption had utilized more resources, or whether women had been exposed to resources which had influenced their degree of concern. As well, it is not known whether women who were concerned about their alcohol consumption were those with greater knowledge about the subject or whether greater knowledge about the subject led to greater concern.

Although the path of the associations is not known, resources play a key role in learning about alcohol consumption during pregnancy. As previously noted in hypothesis two (b), the effects of alcohol on the fetus may be a central issue for the concept of concern. And since it was earlier reported in Chapter VI that women were not knowledgeable about the effects of small amounts of alcohol intake on the fetus, it would seem important for resources to provide this information to pregnant women.

Hypothesis 3 (c). "A measure of health concern regarding tobacco use during pregnancy will be significantly positively correlated with number of resources utilized for the topic of tobacco use." No significant association was found between smoking concern and number of resources utilized. The reasons as to why no association was found between concern and number of resources utilized may have included: (1) women who had been concerned about their smoking behavior avoided contact with resources, or (2) women who had decided to reduce their cigarette smoking at the beginning of pregnancy, regardless of whether they had a high or low degree of concern, had felt no need to seek resources on the subject. In either case, women who had been concerned about their cigarette smoking had not utilized more resources on the subject. Avoidance behavior in the smoker eliminates the potential assistance that might have been made available through these resources. Further research is required to understand the relationship between pregnant women's concerns about their smoking behaviors and number of resources utilized. Until further information is available, greater onus is placed on health professionals, family members, and friends who are concerned about individuals' cigarette smoking to encourage women to discuss cigarette use. Having noted that smokers in this study were more likely to be younger, not married, of lower education level, of lower socioeconomic level, and of caucasian origin, clients with this type of profile may be targeted for intensive counselling by either the physician or other support personnel.

Concern about smoking behaviors was not found to be associated with knowledge test scores. The situation was such that women with a low degree of concern about their cigarette smoking during pregnancy had both high and low knowledge test scores, and women with a high degree of concern about their cigarette smoking had both high and low knowledge test scores about tobacco use. For each of these situations, the health professionals may need to use a different type of strategy to encourage smokers to engage in learning and spend more time in learning. For example, persuading women to quit smoking who had had high degrees of concern regarding their smoking behaviors and high knowledge scores may require more emphasis on tips on quitting or may require assistance from their partners.

Hypotheses 4 (a). "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with scores on a knowledge test about weight gain." A significant relationship was found between the self-initiated learning weight gain measure and weight gain knowledge test scores ($r=0.16$, $df=124$, $p=0.02$). Therefore those individuals who had engaged in predominantly self-initiated learning episodes were more likely to have had a higher score on the weight gain knowledge test. However, weight gain knowledge test scores were not found to be associated with age, marital status, education level, socioeconomic status, or ethnic origin. Knowledge was not a function of any demographic characteristics but a function of the dynamics of the learning environment. Although only a small portion of the variance was accounted for, self-initiated learning was associated with learning outcome. Fostering an environment conducive for women to engage in self-initiated learning seems warranted for the topic of weight gain.

Knowledge about weight gain was also found to be associated with ideal weight gain (adjusted weight gain ratio). Women with a weight gain closer to their recommended weight gain were more knowledgeable about how much women should gain during pregnancy, the pattern of gain, as well as the importance of this weight gain. Knowing that knowledge was associated with both self-initiated learning and ideal weight gain, it would appear that learning about weight gain should not be limited to factual transmission of information. Making information relevant to women's personal circumstances and creating an environment encouraging women to take responsibility for their learning are important considerations.

Hypothesis 4 (b). "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with scores on a knowledge test about alcohol consumption." A significant negative correlation was found between the self-initiated learning alcohol measure and alcohol knowledge test scores (r=-0.22, df=122, p=0.008). Hypothesis four (b) was not supported. As described in Chapter IV, a high score on the self-initiated learning measure indicated engagement in predominantly self-initiated learning episodes, and a low score on the self-initiated learning measure indicated engagement in predominantly other-initiated learning episodes. Since a negative correlation was found, engagement in predominantly other-initiated learning episodes about alcohol issues was associated with a higher score on the alcohol knowledge test. This result is in sharp contrast to the weight gain findings, where engagement in predominantly self-initiated learning episodes was found to be associated with higher knowledge test scores. Although alcohol consumption is frequently under-reported and although women may not have initiated discussion about the subject, women were receptive to hearing information about alcohol consumption that had been initiated by other individuals. Encouraging health professionals, family members, and friends to initiate discourse about the effects of alcohol consumption during pregnancy seems warranted.

Alcohol knowledge test scores were not associated with age, marital status, socioeconomic status, or ethnic origin. Alcohol knowledge test scores were however associated with education level [$F_{(3,126)}=3.01$, $p=0.03$]. *Post hoc* analyses conducted using Tukey's method found that those women with post secondary education scored higher on the alcohol knowledge test than women with post secondary degree/s. No significant differences, however, were found for alcohol knowledge scores among: individuals with less than senior matriculation and those with senior matriculation; individuals with less than senior matriculation and those with post secondary education; individuals with less than senior matriculation and those with post secondary degrees; individuals with senior matriculation and those with post secondary degrees; and, individuals with senior matriculation and those with post secondary degrees. Although education was significantly associated with alcohol knowledge test scores, those individuals with a higher education level (post secondary education with a degree) had lower alcohol knowledge test scores than those individuals with a lower level of education (post secondary education without a degree).

Hypothesis 4 (c). "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with scores on a knowledge test about tobacco use." No significant association was found between the self-initiated learning tobacco measure and tobacco knowledge test scores. Furthermore, knowledge about tobacco use was not significantly associated with age, marital status, education level, socioeconomic status, or ethnic origin. Knowledge about tobacco use was also not associated with reduced cigarette smoking. Knowledge may have been a function of previous learning prior to pregnancy, and the circumstances and dynamics of this learning may have possibly influenced knowledge about tobacco use and smoking behaviors during pregnancy. Although a significant association between knowledge and initiators of learning was not found in this study, further research is warranted to differentiate between knowledge acquired before pregnancy and knowledge acquired during pregnancy. If knowledge was adequate prior to pregnancy, this occurrence may explain why women had not engaged in self-initiated learning episodes during pregnancy. Results of a research study using a pretest postest design may provide information as to why hypothesis four (c) was not supported.

Tobacco knowledge test scores were significantly correlated with smoking health beliefs, and beliefs associated with reduced cigarette smoking. Knowledge may then have been indirectly associated with smoking behaviors. Until further research is conducted regarding the relationship between knowledge, beliefs, and smoking behavior, knowledge should not be dismissed as a variable in understanding the factors that influence changes smoking behavior during pregnancy. Relating knowledge to individuals' health beliefs may be a crucial part of the learning process.

Hypothesis 5 (a). "A measure of self-initiated learning about weight gain during pregnancy will be significantly positively correlated with a measure of ideal weight gain during pregnancy." A significant positive correlation was found between ideal weight gain (adjusted weight gain ratio measure) and the self-initiated learning weight gain measure ($r=0.15$, $df=124$, $p=0.025$). This association remained significant even when weight gain knowledge test scores were held constant or "partialled out" (first-order correlational analysis). Even though only a small portion of the variance was accounted for in hypothesis five (a), this result is promising for further research in education since there are a multitude of factors influencing changes in weight during pregnancy.

Although the majority of health professionals in this study had initiated the learning episodes about weight gain, it was those individuals who had engaged in predominantly self-initiated learning episodes that had a weight gain closer to their recommended weight gain. The concept of self-initiated learning, as defined in this research study, was associated with what women knew about weight gain and with ideal health behavior. Managing weight during pregnancy implies control over eating habits and it may well be that management of learning about this behavior also warrants control over the learning environment. Engagement in predominantly self-initiated learning episodes was not significantly associated with age, marital status, education level, or socioeconomic status, but was found to be significantly associated with ethnic origin ($t=2.12$, $df=125$, $p=0.36$). Women of caucasian origin were more likely to engage in predominantly self-initiated learning episodes, whereas women of Asiatic origin were more likely to engage in predominantly other-initiated learning episodes. Culture may influence how pregnant women learn and the dynamics of who has control over the learning environment. The responsibility rests with health professionals to initiate learning about weight gain during pregnancy with Asiatic women.

Hypothesis 5 (b). "A measure of self-initiated learning about alcohol consumption during pregnancy will be significantly positively correlated with reduced alcohol consumption during pregnancy." A significant positive correlation was found between the alcohol reduction ratio and the self-initiated learning alcohol measure ($r=0.24$, $df=92$, $p=0.01$). Because a low score on the alcohol reduction ratio indicated reduced alcohol intake and a low score on the learning measure indicated other-initiated learning, engagement in predominantly other-initiated learning episodes about alcohol was associated with reduced alcohol consumption. This association remained significant even when alcohol knowledge test scores were held constant or "partialled out" (first-order correlational analysis). The fact that hypothesis five (b) was not supported, however yielded a new perspective on the interaction between initiators of learning and reduced alcohol intake. As previously stated engagement in predominantly self-initiated learning episodes was found to be associated with ideal weight gain, and in contrast, engagement in predominantly other-initiated learning episodes was found to be associated with reduced alcohol consumption. Perhaps the nature of the behaviors involved accounted for the different results obtained. For example, if a pregnant woman deviated from her ideal weight gain the effects or consequences are visible, whereas the effects of consuming excessive amounts of alcohol on the fetus are not immediately seen. Therefore with alcohol consumption, the role of others to initiate and inform pregnant women about the effects of alcohol on the fetus is needed.

The self-initiated learning measure about alcohol consumption during pregnancy was not significantly associated with age, marital status, education level, or ethnic origin. Engagement in predominantly self-initiated learning episodes about alcohol consumption was, however, associated with a higher socioeconomic status ($r=0.15$, $df=122$, $p=0.049$). These results lead to the question as to why women with a higher socioeconomic status had been more inclined to engage in predominantly self-initiated learning episodes about the topic of alcohol than women of a lower socioeconomic status. Do socio-cultural norms of women in a higher socioeconomic status encourage women to seek information about alcohol information during pregnancy?

Hypothesis 5 (c). "A measure of self-initiated learning about tobacco use during pregnancy will be significantly positively correlated with reduced cigarette smoking during pregnancy." No significant association was found between reduced cigarette smoking and the self-initiated learning smoking measure. The complexity of the role of learning as it is related to reduced cigarette smoking during pregnancy is evident. Perhaps it is the addiction component of the behavior that has supressed the role of learning, or perhaps women have been bombarded with smoking cessation messages prior to pregnancy. Or it may well be that the social, psychological, and educational factors related to smoking behavior are so interwoven that understanding the contribution of each of these aspects needs to be examined as a whole.

Self-initiated learning about tobacco use during pregnancy was also not found to be associated with age, education level, or socioeconomic status. Engagement in predominantly self-initiated learning episodes about tobacco use was, however, found to be significantly associated with marital status [$F_{(2,119)}=3.24$, $p=0.042$]. *Post hoc* analyses conducted using Tukey's method found that women living common law had engaged in more self-initiated learning episodes than single women. No significant differences were found in self-initiated learning episodes between: married women and single women, and married women and women living common law. The ways and reasons why common law women differ from single pregnant women in their learning orientation about tobacco use is perplexing.

Hypothesis 6 (a). "Scores on a 'Weight Gain Health Belief Measure' will be significantly positively correlated with a measure of ideal weight gain during pregnancy." A significant negative correlation was found, in contrast to the predicted positive correlation between the adjusted weight gain ratio measure and the weight gain health belief measure ($r=-0.15$, $df=121$, $p=0.05$). As stated in Chapter IV, the weight gain health belief measure consisted of three components: concern, perceived risk, and perceived usefulness of the information. Perceived barriers was examined separately because when this component was added to the health belief measure, the reliability coefficient was inadequate for this measure. Despite a low internal consistency reliability coefficient for the weight gain health belief measure a significant relationship was found. When the three components of this health belief measure (concern, risk, and use) were included as independent variables in multiple regression analysis, it was found that perceived risk accounted for 28 percent of the variance, [(R^2=8%, $F_{(3,119)}=3.48$, $p=0.018$]. A low degree of perceived risk was predictive of ideal weight gain and had accounted for a substantial portion of the variance. A correlation matrix of the four health belief components and ideal weight gain is outlined in Table 57.

TABLE 57

Intercorrelations Among the Four Components of Weight Gain Health Beliefs and Ideal Weight Gain

Variable	Concern	Risk	Use	Barriers
Concern				
Risk	37*			
Use	11	02		
Barriers	47*	31*	06	
Ideal Gain**	-09	-28*	05	-17*

*Significant at $p \leq 0.05$
**A one value on the adjusted weight gain ratio scale indicates ideal weight gain, and less than one value indicates inadequate weight gain (insufficient or excessive gain).

Ideal weight gain during pregnancy was significantly negatively associated with the "Weight Gain Health Belief Measure" (sum of concern + risk + use), and significantly negatively associated with perceived risk. These results are contrary to the predicted positive associations postulated by the health belief model: those individuals who perceived themselves to be at risk, those individuals who have a high degree of concern, and those individuals who have more use of the information would be more likely to have an ideal weight gain. A possible explanation for the negative correlations found may have been due to the fact that the behavior precipitated reporting of the health beliefs. For example, if a woman's weight gain was perceived as adequate throughout her pregnancy, she did not become concerned about her weight gain, nor did she ever perceive her infant to be at risk. In contrast, a negative association between barriers and ideal weight gain was found, indicating that those individuals who had no barriers were more likely to have an ideal weight gain. This finding supports the health belief model's prediction. As such, identifying women's perceived barriers to weight gain would seem to be an important part of assisting women to attain ideal weight gain during pregnancy.

Hypothesis 6 (b). "Scores on an 'Alcohol Health Belief Measure' will be significantly positively correlated with reduced alcohol consumption during pregnancy." No significant association was found between alcohol health beliefs and reduced alcohol consumption. Furthermore, when the three components of the health belief measure (concern, risk, and use) were included as independent variables in multiple regression analysis, no single component was predictive of reduced alcohol consumption. The result of this hypothesis did not support the health belief model predictions. Even though internal consistency reliability values of the alcohol health belief measure were adequate (Hoyt's estimate=0.62), significant results were not found. Perhaps the nature of the questions included in the "Alcohol Health Beliefs Measure" had played a role in producing non-significant results. The effects of alcohol consumption on the fetus are not visible and readily apparent to pregnant women, therefore more specific questions related to the risk component and barriers component might have changed the outcome of these findings. A correlation matrix of the four health belief components and reduced alcohol consumption is outlined in Table 58.

Not one component of the health belief model as operationalized in this study was found to be associated with reduced alcohol intake. There was, however, a significant association between concern and risk, concern and use, and risk and use. Although alcohol health beliefs were not directly associated with reduced alcohol consumption, beliefs may have played an indirect role. Alcohol knowledge test scores were found to be associated with the alcohol health belief measure, and knowledge in turn was associated with reduced alcohol consumption. This

TABLE 58

Intercorrelations Among the Four Components of Alcohol Health Beliefs and Reduced Alcohol Intake During Pregnancy

Variable	Concern	Risk	Use	Barriers
Concern				
Risk	44*			
Use	33*	38*		
Barriers	14	16	08	
Reduced Alcohol**	-08	06	-05	13

*Significant at $p \leq 0.05$.
**A value less than one on the alcohol reduction scale indicates reduced alcohol intake, a value of one indicates no change in alcohol intake during pregnancy, and a value greater than one indicates increased alcohol intake during pregnancy.

result leads one to question the role of health beliefs with respect to women's receptiveness to learn about alcohol consumption and modification of their alcohol intake.

Hypothesis 6 (c). "Scores on a 'Smoking Health Belief Measure' will be significantly positively correlated with reduced cigarette smoking during pregnancy." No association was found between the smoking health belief measure and reduced cigarette smoking. Hypothesis six (c) was not supported. As stated in Chapter IV, the smoking health belief measure consisted of three components consisting of four items: concern about smoking behavior, concern about second hand smoke, perceived risk, and perceived usefulness of the information. Perceived barriers was examined separately because when this component was added to the health belief measure, the reliability coefficient was inadequate. When the components of the health belief measure (concerns, risk, and use) were included as independent variables in multiple regression analysis, it was found that perceived risk about smoking accounted for 36 percent of the variance [($R^2 = 36\%$, $F(_{4,38}) = 5.35$, $p = 0.016$]. A low degree of perceived risk was found to be associated with reduced cigarette smoking. The results of this analysis did not support the assumptions of the health belief model as the relationship found was negative in contrast to the hypothesized positive relationship: a high degree of perceived risk would be associated with reduced cigarette smoking. A correlation matrix of the four health belief components and reduced cigarette smoking is outlined in Table 59.

TABLE 59

Intercorrelations Among the Four Components of Smoking Health Beliefs and Reduced Cigarette Smoking During Pregnancy

Variable	Concern	Risk	Use	Barriers
Concern				
Risk	70*			
Use	-08	-24		
Barriers	30	39*	-11	
Reduced Cigs**	28*	51*	-38*	13

*Significant at $p \leq 0.05$
**Less than a value of one on the cigarette reduction scale indicates reduction in cigarette smoking, a one value indicates no change in cigarette smoking during pregnancy, and a value of greater than one indicates increased cigarette smoking during pregnancy.

By examining Table 59, it can be seen that those individuals with a low degree of perceived concern and perceived risk had reduced their cigarette smoking during pregnancy. These results are contrary to the relationships predicted according to the health belief model assumptions, whereby individuals who had reduced their cigarette smoking would be those who perceived their unborn child to be at high risk or have a high degree of concern. A possible explanation of this occurrence may have been the retrospective nature of the study, where behaviors had influenced the reporting of risk and concern levels. In order to have overcome this problem, questions in the interview schedule should have included asking women about their concern and perceived risk at the beginning of the pregnancy and the end of the pregnancy. The results may then have supported the assumptions of the health belief model. In contrast, a higher degree of perceived usefulness of the information was found to be significantly associated with reduced cigarette smoking and this component of the smoking health belief measure, examined in isolation, supported the assumptions of the health belief model. This finding is surprising since not one of the learning variables examined in this study was directly associated with reduced cigarette smoking, however perception of the information received was directly associated with smoking behavior. This result provides support for further examination of the indirect role learning may play with regard to smoking behaviors, and specifically whether the type of information received is related to smoking behaviors.

In summary, planning the pregnancy was not found to be associated with hours spent in learning or number of resources utilized. Table 60 consists of a summary of the weight gain, alcohol, and tobacco hypotheses tested. Commentary regarding the outcomes of hypothesis tested is provided at the end of this chapter.

Other Findings

Houle (1984) has suggested that learning may be knowledge oriented, goal oriented, or activity oriented. In order to examine goal orientation of learning during pregnancy, women had been asked "Thinking back to the beginning of your pregnancy, how much weight were you aiming to gain?", "Thinking back to the beginning of your pregnancy, what changes in alcohol intake were you aiming to achieve?", and "Thinking back to the beginning of your pregnancy, what changes in cigarette smoking were you aiming to achieve?" The relationships found between goal, knowledge, and health behaviors for each of the topics investigated in this dissertation is now be presented.

Weight Gain Goal

Seventy-eight percent of the sample reported having had a weight gain goal at the beginning of their pregnancy. No significant association was found between women's reported weight gain goal and their calculated recommended weight gain. This occurrence may have been due to the fact that the majority of women reported having had a weight gain goal of twenty-five or thirty pounds, average recommendations for women of normal weight. However,

TABLE 60

Summary of Weight Gain, Alcohol, and Tobacco Hypotheses Tested

Independent & Dependent Variables	*r*	*p*
Weight Gain		
Concern & Time in Learning	0.15	≤0.05
Concern & Resources Utilized	0.32	≤0.01
Self-Initiated Learning & Knowledge	0.16	≤0.05
Self-Initiated Learning & Ideal Weight Gain	0.15	≤0.05
Health Belief Measure & Ideal Weight Gain	-0.15	≤0.05
Alcohol		
Concern & Time in Learning	0.29	≤0.01
Concern & Resources Utilized	0.21	≤0.05
Self-Initiated Learning & Knowledge	-0.22	n.s.*
Self-Initiated Learning & Reduced Alcohol**	0.24	n.s.*
Health Belief Measure & Reduced Alcohol**	-0.05	n.s.
Smoking		
Concern & Time in Learning	0.04	n.s.
Concern & Resources Utilized	0.00	n.s.
Self-Initiated Learning & Knowledge	0.01	n.s.
Self-Initiated Learning & Reduced Cigarettes**	0.08	n.s.
Health Belief Measure & Reduced Cigarettes**	0.02	n.s.

*Although self-initiated learning about alcohol during pregnancy was not found to be associated with alcohol knowledge test scores or reduced alcohol intake, *other-initiated* learning about alcohol during pregnancy was significantly associated with higher alcohol knowledge scores and reduced alcohol intake.

**A value less than one on the alcohol and smoking reduction scales indicated reduced alcohol intake and cigarette use, a value of one indicated no change, and a value greater than one indicated increased alcohol intake or cigarette use during pregnancy.

recommended weight gain in this study was calculated specifically for every individual based upon her prepregnant height and weight, a factor most likely not considered by these women. As well, no significant associations were found between having a weight gain goal and age, marital status, education level, socioeconomic status, or ideal weight gain (adjusted weight gain ratio). Having a weight gain goal was however associated with the weight gain ratio measure (t=-2.60, df=125, p=0.001), with knowledge test scores (t=-2.56, df=125, p=0.012), and with ethnic origin (χ^2=4.9, df=1, p=0.025). Asiatic women were less likely to have a weight gain goal. Women with a weight gain goal had gained, on the average, 98 percent of their recommended weight gain; whereas, women without a goal had gained, on the average, 79 percent of their recommended weight gain. The mean knowledge test score for those individuals with a weight gain goal was seventeen and the mean knowledge test score for those individuals without a weight gain goal was fourteen. Birth weight was also significantly associated with having a weight gain goal (t=-2,68, df=125, p=0.008). These results were found to remain significant even when analysis of covariance was conducted adjusting for age and socioeconomic status [$F_{(2,123)}$=6.26, p=0.014]. Those individuals with a weight gain goal had had infants weighing 3,488 grams (adjusted mean=3,484 grams), in contrast to those individuals without a weight gain goal whose infants had weighed 3,188 grams (adjusted mean=3,202 grams). These results are of particular interest since it was earlier noted in Chapter VI that a significant difference in birth weight was found between prenatal class attenders and non-attenders; however, these results did not remain significant when age and socioeconomic status had been controlled for. It may be important in future research studies to consider the total learning environment rather than focus only on one particular educational setting.

Alcohol Goal

Seventy-eight percent of the women who consumed alcohol one month before becoming pregnancy had a goal to change their alcohol consumption. More specifically, 55 percent had as their goal to abstain from consuming alcohol, and 23 percent had as their goal to reduce their alcohol consumption. No significant associations were found between having an alcohol goal and age, marital status, education level, socioeconomic status, ethnic origin, reduced alcohol intake, alcohol knowledge test scores, or birth weight. Since it was previously noted that engagement in predominantly other-initiated learning episodes was found to be associated with reduced alcohol intake, it may be that the information received during pregnancy played a greater role with respect to changing alcohol consumption than having a predetermined goal at the beginning of pregnancy.

Smoking Goal

Ninety-six percent of the women who smoked cigarettes one month before becoming pregnant had a goal to reduce their cigarette smoking. Of these women 78 percent had aimed to abstain from smoking, and 18 percent had aimed to reduce their cigarette smoking. No significant associations were found between having a smoking goal and age, marital status, education level, socioeconomic status, ethnic origin, reduced cigarette smoking, tobacco knowledge test scores, or birth weight. The desire to quit smoking is present, but, support systems may not be readily available to assist smokers reduce their cigarette smoking. As previously reported in Chapter VI, only four women had been given tips on how to quit smoking during pregnancy. Furthermore, a negative reinforcement that "it was okay to smoke" was given by friends of pregnant smokers.

In summary, having a weight gain goal was found to be associated with knowledge scores, and with birth weight even when age and socioeconomic status had been controlled for. Having an alcohol or smoking goal was, however, not associated with any demographic characteristics or health behaviors.

Summary of Chapter VII

Chapter VII consisted of a presentation of the results of the hypotheses tested. Planning the pregnancy was not found to be associated with hours in learning or number of resources utilized. The event of a first pregnancy, regardless of whether it was planned or unplanned, was conducive to learning. Concern about weight gain and alcohol consumption was significantly associated with hours in learning and number of resources utilized. The more concerned women were about their weight gain and alcohol consumption the more time they had spent in learning and the more resources they had utilized about these topics. However, smoking concern was not associated with either time or resources in learning. Identification of the type of concern women have about their health behaviors during pregnancy may provide insights regarding women's motivation to engage in learning. Engagement in predominantly self-initiated learning episodes about weight gain during pregnancy was found to be significantly associated with higher weight gain knowledge test scores and ideal weight gain, and as such, self-initiated learning was associated with learning outcome. Fostering a learning environment which stimulates self-initiated learning is warranted. In contrast, engagement in predominantly other-initiated learning episodes about alcohol consumption during pregnancy was found to be significantly associated with higher alcohol knowledge test scores and reduced alcohol intake. Women were receptive to the information provided to them about drinking during pregnancy. Health professionals, family members, and friends play important roles in assisting women to change alcohol behaviors during pregnancy. Contrary to the weight gain and alcohol results, no associations were found between self-initiated learning and tobacco knowledge test scores or reduced cigarette smoking. However, tobacco knowledge test scores were associated with health beliefs and health beliefs were associated with reduced cigarette smoking. Learning may have been indirectly associated with reduced cigarette smoking. The "Weight Gain Health Belief Measure" was negatively associated with ideal weight gain, contrary to the positive correlation predicted. For alcohol, health beliefs were found not to be associated with reduced alcohol intake. For smoking, perceived risk was negatively associated with reduced cigarette smoking, contrary to the positive correlation predicted. Actual behaviors may have precipitated reporting of health beliefs, thereby explaining the negative associations found.

The relationship between learning, health beliefs, and behavior are now summarized. For weight gain, both self-initiated learning and knowledge were associated with ideal weight gain. Weight gain health beliefs were also associated with ideal weight gain during pregnancy, although a negative association was found in contrast to the predicted positive association. Actual health behaviors may have precipitated reporting of health beliefs in a retrospective study, accounting for the negative associations found. Both learning and health beliefs were associated with weight gain during pregnancy, findings consistent with the conceptual framework of this study.

For alcohol, other-initiated learning and knowledge were both associated with reduced alcohol consumption during pregnancy. No association, however, was found between health beliefs and reduced alcohol intake. Learning was associated with alcohol behaviors, but not beliefs. Alcohol knowledge test scores were found to be associated with health beliefs, suggesting that beliefs may have played an indirect role. Further research is required to identify the path of the associations between beliefs, learning, and alcohol behaviors during pregnancy.

For smoking, self-initiated learning and knowledge were not associated with reduced cigarette smoking during pregnancy. Perceived risk was, however, associated with reduced cigarette smoking. Beliefs were associated with smoking behaviors, but not learning. Tobacco knowledge test scores were found to be associated with health beliefs, suggesting that learning may have played an indirect role. Further research is required to identify the path of the assocations between beliefs, learning, and smoking behaviors during pregnancy.

The roles that learning and beliefs play with respect to changing alcohol behaviors during pregnancy are contrary to those found for smoking behaviors. The addictive component of nicotine or the learning that occurs prior to pregnancy about the hazards of smoking may explain the differences found. This presentation concludes the reporting of results of this research study. The next and final chapter consists of a discussion of the results, the limitations of the study, and recommendations for theory, practice, and further research.

CHAPTER VIII

DISCUSSION AND CONCLUSIONS

The final chapter of this dissertation brings closure to the research study while at the same time it opens new horizons for future research. If educators understand the forces and dynamics which occur during learning, the better equipped they are to plan and evaluate public health programs to reach the pregnant population and the better they can assist women in achieving ideal health behaviors during their pregnancy.

The first section of Chapter VIII consists of a summary of this research. The purposes, principal hypotheses, design, and sample characteristics are reviewed. The second section outlines the significance of the study and the third section contains a discussion of the outcomes of hypotheses tested. The fourth section describes the limitations of the study, and the fifth section is an elaboration of the findings. Health behaviors of pregnant women are discussed as well as their learning patterns and health beliefs. The sixth section is a presentation of the conclusions and the seventh section includes recommendations for theory, practice, and further research. The final section of this chapter, the epilogue, challenges other researchers to continue the pursuit of understanding how pregnant women learn.

Summary of the Study

The purposes of this research study were to identify the learning patterns of pregnant women, and to identify the relationships between learning and behavior as well as between health beliefs and behavior of pregnant women. The three health behaviors examined in this dissertation were weight gain, alcohol consumption, and tobacco use, as these factors are amenable to an education intervention and are behavioral risk factors associated with low birth weight. Learning patterns were determined based upon an adaptation of the work of Tough

(1979), and Knowles's concept of self-directed learning (1975). Health beliefs were developed based upon an adaptation of the Health Belief Model (Rosenstock, 1974b). The process of investigating learning patterns consisted of identifying: (1) what had been learned about weight gain, alcohol consumption, and tobacco use, (2) which resources had been utilized, (3) what advice had been obtained from each resource, (4) what amount of time had been spent in learning, (5) who had initiated the learning, and (6) what learning transaction types had emerged. The process of identifying health beliefs consisted of questioning the interviewees regarding their: (1) concerns, (2) perceived risk, (3) perceived usefulness of the information, and (4) perceived barriers in managing weight gain, alcohol consumption, and tobacco use.

The hypotheses of this study were: (1) women whose pregnancies were planned will have spent more hours in learning and will have utilized more resources, (2) health concerns will be positively correlated with hours in learning, (3) health concerns will be positively correlated with number of resources utilized, (4) self-initiated learning will be positively correlated with knowledge scores, (5) self-initiated learning will be positively correlated with ideal health behaviors, and (6) health beliefs will be positively correlated with ideal health behaviors.

The research, an ex post facto design, involved a one hour structured interview with primiparous women following the delivery of their infants in hospital. The interview schedule was developed for this research study and consisted of questions designed to obtain information on: health behaviors of pregnant women, learning patterns of pregnant women, health beliefs of pregnant women, demographic characteristics, and newborn information.

The population of this study were women who had given birth to their first infant at hospitals in the Lower Mainland of British Columbia with average number of monthly births greater than 100. A proportional sample of 120 women was selected from the following hospitals: Grace, Royal Columbian, Surrey Memorial, Burnaby, Lion's Gate, Richmond, and St. Paul's. In addition, eight women were interviewed at Langley Memorial hospital as part of the pilot study. Since the pilot responses were similar to the responses provided by the main sample, with the exception of health belief data, the responses from these individuals were included in the analyses. One woman was excluded from the study because her husband had insisted on responding to the interview questions, making for N=127. A summary description of the demographic characteristics of the sample is outlined in Table 61.

Significance of the Study

One of Brookfield's (1984) major criticisms of the research on self-directed learning is the lack of attention that has been given to the quality of learning, that is, learning in terms of some external measure of its effectiveness. The focus on knowledge levels of pregnant women and the focus on learning in relation to health behaviors in this research study are intended to avoid the principal criticism cited by Brookfield. This study both examined learning as a process or activity and associated this learning with its outcomes.

Although planners of learning were not classified on the basis of Tough's methodology because of the specificity of the topics investigated, the methodology used in this research permitted an expansion of the design and methodology in the overall study of self-directed and self-planned learning. Once quality of learning is examined along with the process of learning, then a modified methodology is required to accommodate these investigations. Tough's methodology consisted of open-ended interviews in which individuals were directly asked to identify who had planned their learning. These individuals were provided with a sheet containing a description of four types of planners, and in discussion with the interviewer, a decision was made by the interviewer as to who was the primary planner. In contrast, in this research study, an indirect method was used to identify how learning had occurred. Episodes of learning were identified, from which a composite picture of learning was obtained. A somewhat more objective profile of how learning occurred was also obtained.

In an attempt to address the emerging challenges in health, the honourable Jack Epp, Minister of Health and Welfare, had announced a course of action proposed to attain equity of

TABLE 61

Summary of Demographic Characteristics of the Sample

I	Variable	Mean Values	Range
	Age (Years)	26.5	16-46
	SES (Blishen Index)	48.9	24.6-74.4
	Birth Weight (Grams)	3,422	1,720-4,680
	Low Birth Weight (Incidence)	5.5 %	N/A
	Gestational Age (Weeks)	39.6	32-42
II	**Variable**	**No. of Individuals**	**% of Sample**
	Marital Status		
	Married	97	77
	Single	14	11
	Common Law	13	10
	Separated	3	2
	Education		
	Less Senior Matriculation	15	12
	Senior Matriculation	53	42
	Post Secondary Education	41	32
	Post Secondary Degree/s	18	14
	Ethnic Origin		
	North American/European	105	83
	Chinese	8	6
	East Indian	5	4
	Fijian	4	3
	Philippine	2	1
	Japanese	1	1
	Vietnamese	1	1
	Native Indian	1	1

health care for Canadians. This course of action was presented in the document "Achieving Health For All: A Framework For Health Promotion" (Health and Welfare Canada, 1986). He identified the concept of self-care as one of the mechanisms intrinsic to health promotion. Epp refers to self-care as the decisions taken and practices adopted by individuals for the preservation of their health. Factors that were cited as playing an important role in self-care included beliefs, access to appropriate information, and manageable surroundings. Beliefs and information access have been the key variables in the hypothesis testing of this research study. The onus is on individuals to look after their own personal health, and the onus is on health educators to understand how that process occurs and to apply this understanding in planning appropriate strategies to facilitate self-care.

Previous research studies have focused on examining learning in one education setting and examining the effect of an education intervention strategy on birth weight outcome. In contrast this research study has examined learning in all settings, and has examined the relationship between this learning with health behaviors of pregnant women. Examining learning from a global perspective provides educators with a more comprehensive and somewhat more realistic picture of the learning that occurs during pregnancy.

Discussion of Hypotheses Tested and Other Findings

The outcomes of hypotheses tested in this research shed new light on the factors that are associated with women's engagement in learning, and the relationship between this learning and health behavior. For hypotheses one (a) and one (b) there were no significant differences found in total hours spent in learning or number of resources utilized between women who had planned their pregnancy and those who had not planned their pregnancy. The event of a first pregnancy may itself be a triggering mechanism to initiate the learning process. Planning the pregnancy was also not related to ideal health behaviors, results contrary to Weller et al.'s findings (1986), where married women who had planned their pregnancy were more likely to stop smoking during pregnancy. The different results obtained may have been due to the fact that women participating in the research study reported in this dissertation included only primigravidas. The excitement of learning about physical changes and health behaviors for a first pregnancy may have overshadowed the planning aspect. Although hypothesis one was not supported, planning the pregnancy is an important concept from a medical perspective. If women were to plan their pregnancy, individuals who are underweight prior to pregnancy would have the opportunity to reach ideal weight so as to begin the pregnancy in optimal nutritional status. In addition, since alcohol insult can occur during organogenesis, stopping alcohol consumption prior to pregnancy would eliminate any risk of malformations occurring due to high levels of alcohol intake during the first eight weeks of pregnancy, a time when women are usually unaware they are pregnant. Furthermore, since the effects of smoking are dose related, reducing or quitting smoking as early as possible would be the optimal environment for the developing fetus. Further research is required to determine whether planning the pregnancy influences the timing at which the information is received and when ideal behaviors are adopted.

In hypotheses two and three, the concept of concern about the three health behaviors addressed in this dissertation was examined in relation to time spent in learning and number of resources utilized. Women who were concerned about their weight gain and alcohol consumption spent more hours in learning and utilized more resources. These findings lead us to recommend that health professionals identify their clients' weight gain and alcohol concerns. The type of concern expressed by these women may then lead to strategies to cope with these issues or enable the professional to provide information related to their concerns. Furthermore, questioning the clients to determine whether they have discussed their concerns with other health professionals and individuals also seems warranted. The health professional would be able to identify what the women knew, what the women believed, who the women were speaking to, and what material they were reading so as to determine when these women were obtaining conflicting information or advice.

For weight gain, since concern was associated with time in learning and number of resources utilized, it would seem worthwhile to identify the path of the associations found. For example, is it the case that spending more time in learning results in greater concern, or is it the case that those who are more concerned will spend more time in learning. As stated, time in learning was associated with concern, but concern was not associated with knowledge levels. The question that still remains unanswered is whether concern has an indirect influence on knowledge. Is it the case that women who are concerned needlessly worry from a medical perspective or is it the case that women who are concerned about their weight gain need to discuss the issue more extensively with a health professional? Part of this issue may be resolved by identifying the type of concern expressed by women, as concern may be related to personal appearance resulting from gaining weight rather than concern about inappropriate weight gain.

For alcohol consumption, concern was associated with time in learning as well as number of resources utilized. Further clarification about these relationships could be obtained if the path of the associations were identified in subsequent research. Concern was also found to be associated with knowledge levels, but time in learning was not associated with knowledge levels. Is it the case that women who were concerned about their alcohol consumption spent more time in learning, or is it the case that women who knew more were concerned. Concern in relation to knowledge about the effects of alcohol on the fetus is a central issue. It is recommended that educators integrate information about the effects of alcohol consumption during pregnancy with women's personal circumstances so as to trigger further engagement in learning about this topic.

For smoking, concern was not associated with either time in learning or resources. It may be that there is avoidance behavior on the part of women to engage in learning about smoking issues. It may also be that the dynamics of the learning that had occurred about the hazards of smoking before pregnancy had influenced women's interest in spending time on the subject during their pregnancy. For example, if knowledge about smoking prior to pregnancy was adequate, this occurrence may explain why women had not spent a great deal of time in learning even though they may have been concerned about their smoking habits. As well, if women had perceived their knowledge about smoking to be adequate prior to pregnancy, then this occurrence may also have explained why hypotheses two (c) and three (c) were not supported. Or it may be that women deal with their concerns about smoking in a way that is not directly associated with learning. Further research is warranted on what type of concern smokers have and how they cope with that concern. As well, concern about smoking behavior, as identified at the end of the pregnancy in this study, was not found to be associated with knowledge about tobacco use during pregnancy. Until further research is available, it may be useful for educators to use different learning strategies for women in each of the following four categories: (1) those with a high degree of smoking concern and low knowledge levels, (2) those with a high degree of smoking concern and high knowledge levels, (3) those with a low degree of smoking concern and high knowledge levels, and (4) those with a low degree of smoking concern and low knowledge levels.

Hypotheses four and five addressed the relationships between self-initiated learning and knowledge as well as health behaviors. The concept of self-initiated learning, as defined in this research study, originated from Knowles's definition of self-directed learning. Knowles (1975) defined self-directed learning as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human resources and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. Knowles had suggested that self-directed learners will learn more and make better use of the information. In this research study initiators of the learning episodes were identified and a composite of these episodes obtained. Only one portion of Knowles's definition of self-directedness was studied. The results of hypothesis testing which examined the concept of self-initiated learning, as defined in this dissertation, showed that the more individuals had engaged in self-initiated learning episodes about the topic of weight gain the higher their weight gain knowledge test scores and the closer their actual weight gains were to their recommended weight gains. Although correlational analysis does not indicate the path of the association, these results suggest that self-directed learning may be associated with learning more and making better use of the information.

For the topic of weight gain, self-initiated learning was also found to be associated with ethnic origin, and caucasian women were more likely to engage in self-initiated episodes than Asiatic women. Self-directedness may then be culturally influenced. Health professionals may have a special role to play when counselling Asiatic women. The onus would be on health professionals, family members, and friends to initiate discourse with Asiatic women to provide them with information about weight gain during pregnancy and the problems associated with insufficient gain.

In contrast, engaging in other-initiated learning episodes was found to be associated with higher knowledge levels about alcohol consumption and reduced alcohol intake. Health professionals may have a role to play in providing information to the public about the hazards of drinking during pregnancy. It is recommended that health professionals, family members, and friends of pregnant women initiate the learning about alcohol consumption and monitor alcohol consumption during the entire pregnancy. These findings may not be in opposition to Knowles's assumption of self-directed learning, but rather, the benefits of self-directed learning may be topic specific. If this were the case, then the results of engaging in self-directed learning may not be superior to the results of engaging in other-directed learning for all occasions.

Self-initiated learning or other-initiated learning about smoking was not found to be associated with either knowledge or reduced cigarette smoking. The complexities of studying smoking behaviors and learning are evident. Whether it be the addictive component of smoking, whether it be the small sample size (N=50), or whether it be that smokers learn differently about tobacco use from the ways women learn about weight gain and alcohol consumption are unanswered questions. No direct associations between any learning variable and reduced cigarette use were found. However knowledge was found to be significantly associated with health beliefs, and health beliefs were found to be associated with reduced levels of cigarette smoking. Further research is required to determine whether knowledge is indirectly associated with smoking behaviors. If this research study had only examined learning in relation to smoking behaviors, one may have been tempted to erroneously draw the conclusion that learning is not associated with a reduction in cigarette smoking. Learning may possibly be associated with smoking behaviors through an indirect mechanism, via health beliefs. These results caution researchers to consider alternate or indirect mechanisms and approaches when studying the complex process of learning as it is related to smoking behaviors.

The reasons why women had engaged in predominantly self-initiated learning or other-initiated learning during pregnancy may have influenced the results of hypotheses testing in this study. Two potential influencing factors could have included women's actual knowledge prior to pregnancy and perceived knowledge adequacy prior to pregnancy. That is, if women had adequate knowledge or perceived themselves to have adequate knowledge prior to pregnancy they may have chosen not to engage in self-initiated learning episodes during pregnancy. A pretest posttest research design examining knowledge and engagement in learning would provide further clarification regarding the dynamics of engagement in self-initiated or other-initiated learning.

Knowledge about weight gain as well as knowledge about alcohol consumption were found to be associated with ideal weight gain and reduced alcohol intake. The debate in the literature continues as to whether knowledge is associated with behavior and this research study provides support for this association for the topics of weight gain and alcohol consumption. Knowledge was found to play an important role for the topics of weight gain and alcohol consumption, and this occurrence may be due to the complex nature of available scientific information about health behaviors. Attempts to increase knowledge levels of clients during a counselling session is therefore suggested.

Hypothesis six addressed the relationships between health beliefs and ideal health behaviors during pregnancy. As stated in Chapter IV, the health belief measure developed for the purposes of this research study had originally consisted of four components: concern, perceived risk, perceived use of the information, and perceived barriers in managing weight gain, alcohol consumption, and tobacco use during pregnancy. It was predicted that individuals with a high degree of concern, a high degree of risk, a high degree of perceived usefulness of the information, and few barriers would have ideal health behaviors. However when Hoyt's analyses of variance was conducted to determine internal consistency reliability coefficients for the weight gain, alcohol, and tobacco health belief measures, the perceived barriers scores were not correlated with the other dimensions of the measure. When the barriers scores were retained in the health belief measure, the reliability coefficients were inadequate. The barriers scores were examined and reported separately.

The "Alcohol Health Belief Measure" (concern+risk+use) and the perceived barrier scores were each found to be unrelated to reduced alcohol consumption. These results did not support the assumptions of the health belief model in predicting behavior change of alcohol intake. It may be that alcohol health beliefs are indirectly associated with behavior change. Health beliefs were found to be correlated with knowledge about alcohol, and knowledge was also correlated with reduced alcohol intake. Alcohol health beliefs may have indirectly influenced alcohol behaviors. Path analysis is suggested for future research. It may also be that a more in-depth operationalization of the components of alcohol health beliefs is warranted. Since the effects of alcohol consumption on the fetus are not readily visible and since perceptions may change from the beginning of a pregnancy to the latter part of that pregnancy, the following questions are suggested for future research: (1) Related to the concern component: "Were you concerned about your alcohol intake on the day you found out that you were pregnant?", "Were you concerned about your alcohol intake during the last month of your pregnancy?"; (2) Related to the perceived risk component: "Did you ever think your baby was at risk for being smaller in size because of your alcohol consumption during your pregnancy?", "Did you ever think your baby was at risk for development problems because of your alcohol consumption during your pregnancy?"; (3) Related to the perceived usefulness component: "Thinking about the information given to you by the doctor/(other individuals) about alcohol, how specific was the information?", "Thinking about the information given to you by the doctor/(other individuals) about alcohol, did the information include an explanation of why to change your alcohol intake?"; and, (4) Related to the perceived barrier component: "How difficult was it for you to refuse a drink at a social gathering during your pregnancy?", "How much pressure was exerted by your husband/family members/friends to consume alcohol during your pregnancy?", and "How much support did you receive from your husband/family members/friends/health professionals in reducing your alcohol consumption?"

The "Weight Gain Health Belief Measure" (concern+risk+use) was negatively associated with ideal weight gain. These results are contrary to the predicted positive association. In a retrospective study, weight gain behavior may have influenced reporting of health beliefs. For example, if a woman had had an ideal weight gain during pregnancy, she responded to the interview questions by stating that she had had no concern about her weight gain during the pregnancy. On the other hand, perhaps it is the nature of the behavior that does not lend itself to the prediction of weight gain, as defined by the health belief model. For example, if women perceived their gain as adequate, concern about weight gain or perceived risks are nonissues. If this were the case, then a different operationalization of these two risk components would seem warranted. Some questions to be asked at the beginning of the pregnancy to reflect this new perspective of viewing risk and concern include: "If you were to gain less than two pounds per month during your pregnancy, how concerned would you be about your weight gain?", "If you were to gain more than five pounds during the first three months of pregnancy, how concerned would you be about your weight gain?", "If you were to gain more than twenty-seven pounds during your pregnancy, would you consider yourself at risk because of your weight gain?" A more in-depth examination of weight gain health beliefs seems warranted.

The perceived barriers score for weight gain, however, was found to be associated with ideal weight gain during pregnancy, and this finding supports the health belief model assumptions. Therefore encouraging women to identify barriers during their counselling session so as to diminish their importance or degree is suggested.

In contrast to alcohol health beliefs, weight gain health beliefs were not found to be associated with knowledge about weight gain. It seems that weight gain health beliefs and knowledge are independent of the other, and each has a different role in influencing health behaviors. The differences in the nature of these behaviors most likely accounted for these results. Drinking may have a predominantly strong social component associated with this behavior; whereas, weight gain has both a social as well as a physiologic component, caloric intake.

The "Smoking Health Belief Measure"(concern+risk+use) and perceived barriers scores were both not found to be associated with reduced cigarette smoking. However when multiple regression analysis was conducted and the components included as independent variables, a low degree of perceived risk accounted for 36 percent of the variance for reduced cigarette smoking. A negative association was found between perceived risk and reduced cigarette smoking. As was found for weight gain, smoking behaviors may have influenced reporting of health beliefs. For example, women who had quit smoking during pregnancy responded to the interview questions by stating that they had had no concerns about their smoking during the pregnancy. Nevertheless, the risk component accounted for a fair portion of the variance, therefore, it would seem important to identify clients' perceived risk levels during the counselling of pregnant smokers.

Weight gain, alcohol, and smoking health beliefs were found to be unrelated to age and socioeconomic status. These findings are contrary to Rosenstock's statement (1974a) that the health belief model seems to have greatest applicability to middle class groups, since health beliefs imply orientation toward the future, toward deliberated planning, and toward deferment of immediate gratification in the interest of long range goals. Rosenstock suggests that individuals in a lower socioeconomic class accord greater priority to immediate rewards than to long range goals, a point debated in the literature.

An area that is promising for future research is the concept of weight gain goal. Having a weight gain goal was found to be associated with birth weight outcome. A significantly higher birth weight was found with women who reported having a weight gain goal at the beginning of their pregnancy than with those who reported having no goal, and this difference remained significant even when age and socioeconomic status had been controlled for. Further research is required to determine whether having a weight gain goal is associated with higher birth weight, when other variables such as medical conditions, smoking, and alcohol intake have been controlled for. If significant results are found, the concept of weight gain goal may become part of prenatal risk assessment tools for predicting birth weight outcome.

Limitations of the Study

The major limitation of this research study is its ex post facto design. The retrospective nature of the study brings with it the limitation of recall for identifying various resources, advice given by each resource, and account of the time spent in learning. However it must be recognized that pregnancy is a significant time in the life of women and therefore it was anticipated that this limitation may not be a major drawback. Of more serious consequence is the retrospective nature of the study related to reporting of health beliefs. It is not known whether health beliefs were reported as a function of behavior during pregnancy, or whether health beliefs were reported independently of behavior. In addition, pretest and postest knowledge scores for the topics of weight gain, alcohol consumption, and tobacco use were not available. It is not known to what extent knowledge levels reflect information acquired before pregnancy or during pregnancy. As well, it is not known to what degree knowledge level prior to pregnancy had influenced women's engagement in self-initiated or other-initiated learning episodes.

A second limitation of the study is related to self-report data of health behaviors. Women have a tendency to under-report their weight by approximately five pounds (Pirie et al., 1981). Weight gain during pregnancy was calculated as a ratio of actual weight gain (weight at delivery minus prepregnant weight) divided by recommended weight gain. Under-reporting would have decreased the weight gain ratio, but the amount of decrease would not be substantial. It is also known that women under-report their alcohol consumption (Williams, Aitken, and Malin, 1985). If under-reporting had occurred before and during pregnancy, the percent reduction ratio should theoretically not be affected. Furthermore self-report is the most feasible data collection procedure, as taking alcohol blood levels would have been costly and it would have been difficult to obtain an accurate assessment for the entire nine months of the pregnancy. In addition, the amount of alcohol consumed and the frequency of this consumption may vary from week to week. Similar problems of self-report data for smoking behaviors exist. An alternative method would be to conduct the research in a clinical setting where trained researchers would be able to measure health behaviors in a controlled environment permitting verification of self-report data. Windsor et al. (1985) did so in their smoking cessation program and found that 97 percent of the sample who provided oral reports of quitting smoking were confirmed as non-smokers by the salivary thiocyanate test, indicating that self-report data on smoking are reasonably accurate.

A third limitation of this research study is the fact that test-retest reliability values for the interview were not determined. Furthermore, low internal consistency values were obtained for the alcohol and smoking knowledge tests, as these tests consisted of only three and four items. The length of the test had most likely influenced these results. Low internal consistency values for the weight gain and smoking health belief measures were also obtained and this may also have been a function of the length of the test or the nature of the operationalization of the components of the health belief model. Becker et al. (1977) also found low consistency measures for the benefits and barriers component in their research which was concerned with predicting mothers' adherence to dietary compliance for their obese children. Low reliability coefficients limit the maximum correlation coefficients that can be obtained, and as such reduce the likelihood of obtaining significant results during hypotheses testing.

A fourth limitation of this research is the particular standard employed to determine ideal weight of pregnant women. Currently, there is widespread disagreement about the most appropriate standard weight to be employed in studies such as this. In this research, the 1959 Metropolitan Life Insurance Tables (1969) were used to determine standard weight, since the majority of studies examining the relationship between maternal gain and low birth weight have used these tables. However, Body Mass Index has been suggested by the Canadian Expert Group on Weight Standards, Nutrition in Pregnancy National Guidelines (Health and Welfare Canada, 1987), as the measurement tool to determine healthy weights for Canadians. Some university nutrition researchers believe that the use of National Center for Health Statistics data would be preferable to other measurements (Desai, 1988).

Discussion of the Findings

The discussion of the findings is presented in three sections: (1) discussion related to health behaviors, (2) discussion about learning patterns, and (3) discussion about health beliefs of primiparous women. The format of the discussion consists of a summary of the major findings as they relate to other research studies, suggestions for further research and practice, and/or theoretical considerations.

Health Behaviors

A discussion of the findings related to the three health behaviors addressed in this dissertation is now presented. The discussion in this section focuses primarily on relating the description of health behaviors to descriptions reported in other studies of pregnant women.

Weight Gain

The average weight gain of pregnant women in this study was thirty-four pounds with a standard deviation of 9.6 pounds. These results were similar to the mean gain of approximately 500 women giving birth in eighteen Nova Scotia Hospitals (Johnston, Hyson, and Blackmere, 1985), reported to be thirty-one pounds with a standard deviation of 10.6 pounds. Similarly, twenty-nine women participating in a weight gain attitude study had an average weight gain of thirty-one pounds (Palmer, Jennings, and Massey, 1985).

More specifically, the average weight gain for underweight women, defined as being less than 90 percent of their desirable weight based upon the 1959 Metropolitan Life Insurance Tables (1969), was thirty-three pounds. The average weight gain of normal weight women, defined as being between 90 and 120 percent of their desirable weight, was thirty-four pounds; and, the average weight gain of overweight women, defined as being over 120 percent of their desirable weight, was thirty-one pounds. These results are in contrast to Rosso's (1985) data derived from a low income, racially mixed population in New York City where the mean gain for underweight women was twenty-six pounds, the mean gain of normal weight women was twenty-three pounds, and the mean gain of overweight women was sixteen pounds. Underweight women in the Rosso study were defined as being less than 90 percent of their standard weight, normal weight women were defined as being between 90 and 110 percent of their standard weight, and overweight women were defined as being greater than 110 percent of their standard weight. The differences found in average weight gains were most likely due to the different sample characteristics of the two populations studied.

Seven percent of the women in this research study had gained less than twenty pounds during their pregnancy. In contrast, Johnston, Hyson, and Blackmere (1985) reported that 13 percent of approximately 500 Nova Scotia women had gained less than twenty pounds. There were fewer women in this study in comparison to other populations who had had an inadequate weight gain or a weight gain which had placed them in a higher risk category for having a low birth weight infant. This result was most likely due to the exclusion of non-english speaking women from this sample and exclusion by hospital nurses of certain potential research participants.

What however does emerge from the weight gain patterns of women participating in this study is the high percentage of women, 20 percent, who had gained more than 125 percent of their recommended weight gain and 30 percent of the sample who had gained over forty pounds during their pregnancy. This fact accounts for the concern that health professionals have expressed regarding the increased incidence of women gaining more weight than theoretically required to have a healthy pregnancy outcome (Verbal Communication Worthington-Roberts, 1986). The risks associated with excessive weight gain in *obese* women have been documented and include higher rate of perinatal mortality (Naeye, 1979), increased risk for hypertensive disorders, gestational diabetes, infection, and cesarean delivery (Worthington-Roberts, 1987). The risks associated with excessive weight gain in women of *normal* prepregnant stature have recently been documented by Shepard, Hellenbrand, and Bracken (1986) and include: increased risk of gestational hypertension, preeclampsia, cesarean section, and infants weighing over 4,000 grams at birth. Health professionals should encourage women not to gain excessive amounts of weight during their pregnancy.

The majority of women had changed their eating habits during pregnancy and the most frequent types of changes made included increasing milk, fruit, and vegetable intake, decreasing sweets and empty calorie foods intake, and eating three meals a day. Thirty-eight percent of the sample had reported increasing their milk intake and 29 percent had reported increasing their fruit intake. In contrast, 61 percent of the women participating in the Nutrition Canada Survey (Food Consumption Patterns Report, 1977) had increased their fruit intake and 59 percent had increased their milk intake. Similar results to the Nutrition Canada Survey were reported by Johnston, Hyson, and Blackmere (1985) where 70 percent of approximately 500 Nova Scotia women had increased their consumption of milk and milk products, and 62 percent had increased their fruit and vegetable products intake. Because an assessment of dietary intake at the time of conception was not done in this study, recommendations for dietary change cannot be made. It is not known whether women in this study had had adequate dietary intakes prior to pregnancy thereby not requiring substantial changes during pregnancy, or whether women in this study had had inadequate dietary intakes prior to pregnancy which would have led to the recommendation of increasing products from each of the food groups. However, Kiss (1983), in a descriptive study of health behaviors of 220 prenatal class participants in Vancouver, reported that 94 percent of respondents had increased their milk consumption, 89 percent had decreased their sweets intake, 84 percent had increased their fruit and vegetables intake, 49 percent had increased their meat intake, and 45 percent had increased their bread and cereal intake. Although Kiss found a high percentage of her sample who had reported changing their eating habits, 81 percent of these women had lower than minimum serving requirements from all the four food groups. In this light, it would be worthwhile for health professionals to periodically assess dietary intake to ensure adequacy of intake and not rely solely on reported increases in intake.

In this study 17 percent of the women had reported changing their eating habits by eating three meals a day. This change during pregnancy has not been reported in other research studies and it is not known whether women had previously not made this type of change, or whether women responded to a set of preselected list of dietary changes, which had not included meal pattern assessment.

Sixty-eight percent had reported changing their eating habits for the health of the baby and/or mother. Only 7 percent had reported changing eating habits on the recommendations of a doctor, dietitian, or prenatal class leader; 6 percent had reported changing eating habits because of previously poor eating habits; and, 6 percent had reported changing eating habits for physiological reasons of not feeling well enough to eat. Very few people in this study had reported changing their eating habits for physiological reasons. In contrast, 48 percent of women in the Kiss (1983) study reported that changes in appetite had influenced their dietary intake. Furthermore, 42 percent of women in the Kiss study had stated that physicians were most influencial in changing their dietary intake and 36 percent had stated that prenatal classes were most influencial in changing their dietary intake during pregnancy. In contrast, only 7 percent of changes made in this research study were made because of recommendations of a doctor, dietitian, or prenatal class leader. No explanation for this occurrence can be given except for the nature in which the questions were asked. In this study, women were asked "Why did you change your eating habits?" whereas in the Kiss (1983) study women were asked " What influenced you the most to make these changes in your food intake?" In addition, women in the Kiss study were asked to check off these influences from a preselected list of influences. What is not known in this research study is the degree to which physicians, family members, and other health professionals had influenced women's stating that they had changed their eating habits for the health of the baby because of the information received from these resources.

Alcohol Consumption

Seventy-five percent of the women in this study had consumed alcohol one month prior to becoming pregnant. In contrast, *91 percent* of the women in the Lillien, Huber, and Rajala (1982) study, *85 percent* of the women in the Little, Schultz, and Mandell (1976) study, and *81 percent* of the women in the Streissguth et al. (1983) study had consumed alcoholic beverages prior to their pregnancy. The Lillien, Huber, and Rajala (1982) sample consisted of 578 women delivering in an urban hospital in the Boston area; the Little, Schultz, and Mandell (1976) sample consisted of 156 obstetrical patients at a health maintenance organization in Seattle, Washington; and, the Streissguth et al. (1983) sample consisted of 1,529 women in Seattle, Washington during the period of 1974-75. Access to the Seattle women was obtained through the Obstetrical and Nursing Services of Group Health Cooperative of Puget Sound and the University of Washington hospital. On the other hand, four studies had reported a lower percentage of drinkers in their sample than the percentages found in this research study.

Sixty-five percent of women, during the period of 1980-81, in the Streissguth et al. (1983) study; *55 percent* of women in the National Natality Survey (Prager et al., 1984); *58 percent* of the women in the Kiss (1983) study; and, *49 percent* of the women in the Kruse, Le Fevre, and Zweig (1986) study had consumed alcoholic beverages prior to their pregnancy. The Streissguth et al. (1983) sample consisted of 1,413 women in Seattle, Washington during the 1980-81 period. It is the same research study as mentioned above which had examined drinking patterns over a six year interval. It must be remembered that Seattle has been subjected to extensive media coverage since it was in that city Fetal Alcohol Syndrome was first described. The Prager et al. (1984) sample consisted of 4,405 married mothers of live-born infants and these women were selected from those participating in the National Natality Survey in the United States. The Kiss (1983) sample consisted of 220 women attending prenatal classes organized by the Vancouver City Health Department. The Kruse, Le Fevre, and Zweig (1986) sample consisted of 255 married residents of Callaway County in Missouri. Alcohol consumption patterns prior to pregnancy seem to be geographically influenced as the incidence of drinking prior to pregnancy was closer to nonpregnant women in British Columbia, than any other research studies. Close to 70 percent of British Columbia females had consumed alcohol according to the 1980-81 Health of Canadian Survey (Addiction Research Foundation, 1984). Nevertheless the percentage of women consuming alcoholic beverages in this research was high in comparison to most other studies of pregnant women.

Not only was there a high percentage of the sample consuming alcohol prior to pregnancy, but also there was a high percentage of the sample consuming five or more drinks on any one occasion. In this research study fifteen individuals, or 16 percent of drinkers, had consumed five or more drinks on any one occasion either before becoming pregnant or during their first trimester when they had not known they were pregnant. This incidence is similar to the number of "binge drinkers" in the Streissguth et al. (1983) study, where "binge drinkers" were defined as individuals consuming five or more drinks on one occasion. Nineteen percent of drinkers binged before pregnancy in 1974-75 and 17 percent of drinkers binged in 1980-81

(Streissguth et al., 1983). However in this research study, once women knew they were pregnant, they had not consumed five or more drinks on any one occasion, whereas 12 percent of women in the Seattle study were classified as "binge drinkers" during pregnancy in 1974-75, and 8 percent were classified as "binge drinkers" during pregnancy in 1980-81.

As stated, there was a high percentage of the sample consuming alcohol prior to pregnancy and a high percentage of the sample who were "binge drinkers" prior to pregnancy, however, the amount of alcohol consumed *during* the pregnancy, once women knew they were pregnant, was substantially lower than had been reported in other research studies. *Prior to pregnancy* 25 percent of this sample had abstained from consuming alcohol, 19 percent had consumed an average of less than one drink per week, 37 percent had consumed an average of one to six drinks per week, 11 percent had consumed an average of seven to thirteen drinks per week, and 8 percent had consumed an average of more than thirteen drinks per week. *During the third trimester* of pregnancy 67 percent of the sample had abstained from consuming alcohol (25 percent non-drinkers, 42 percent of drinkers did not drink during the last trimester of pregnancy), 26 percent had consumed an average of less than one drink per week, 6 percent had consumed an average of one to six drinks per week, 1 percent had consumed an average of seven to thirteen drinks per week, and no one had consumed more than thirteen drinks per week. Table 62 contains a summary of the alcohol consumption levels of this research study (Strychar) and five other research studies. Consumption levels are reported for the time periods before and during pregnancy. In this research study the last trimester was selected as the time period to report alcohol consumption during pregnancy. In the Streissguth et al. (1983) study, data from the 1980-81 period were reported.

Women in this research study had reduced their average weekly alcohol intake during pregnancy. However as previously stated, 16 percent of drinkers had binged either before or during the first trimester of pregnancy, 8 percent had drunk more than an average of thirteen drinks per week prior to pregnancy, and 3 percent had drunk more than an average of thirteen

TABLE 62

Average Weekly Alcohol Consumption Levels Prior to and During Pregnancy of Women Participating in Six Research Studies

Time Period	Strychar		Kiss		Kruse		Prager		Streissguth		Lillien	
	Drinks	%	Drinks	%	Drinks	%	Drinks	%	Drinks	%	Drinks	%
Before Pregnancy	0-0	25	0-0	42	0-0	51	0-0	45	0-0	35	0-0	9
	<1	19	<1	11	1	31	<3	39	0-13	59	0-4.4*	61
	1-6	37	1-6	33	2-4	13	≥3	16	≥14	6	4.5-9*	14
	7-13	11	7-14	12	5-9	4					>9	16
	>13	8	>14	2	>10	1						
During Pregnancy	0-0	67	0-0	52	0-0	77	0-0	61	0-0	58	0-0	18
	<1	26	<1	18	1	19	<3	36	0-13	41	0-4.4*	76
	1-6	6	1-6	28	2-4	4	≥3	3	≥14	1	4.5-9*	3
	7-13	1	7-14	2	5-9	0					>9	3
	>13	0	>14	0	>10	0						

*Lillien, Huber, and Rajala (1982) reported alcohol consumption as monthly ounces of ethanol intake. The categories included: 0 ounces, 0.01-9.9 ounces, 10.0-19.9 ounces, 20.0 ounces or more. The authors state that one ounces of ethanol is equivalent to approximately 22 ounces beer, 8 ounces of wine, 2.5 ounces of 80 proof liquor (approximately 2 drinks). For comparison purposes, this categorization was converted to an average number of drinks per week. Ten ounces of ethanol per month is equal to 20 drinks per month = 4.5 drinks per week. Twenty ounces ethanol per month is equal to 40 drinks per month = 9 drinks per week. [4.4 weeks in a month]

drinks per week during the first trimester of pregnancy. It seems warranted to encourage women to reduce their intake prior to pregnancy, since the first eight weeks of pregnancy is a critical period of organ development, a time when women are usually unaware they are pregnant.

In comparison to the Kiss (1983), Prager et al. (1984), and the Streissguth et al. (1983) studies, there was a high percentage of this sample who had quit drinking during their pregnancy. In this research study 40 percent of the women who had consumed alcohol prior to their pregnancy had quit consuming alcohol during their pregnancy, 17 percent had reduced their intake, 37 percent had reduced their alcohol intake during the first trimester and then had increased their alcohol intake by the third trimester (reduced-increased), and 6 percent had increased or had not changed their alcohol intake during pregnancy (5 percent had increased, 1 percent had not changed). Of prenatal class participants at classes organized by the Vancouver City Health Department (Kiss, 1983), 16 percent had quit consuming alcohol at the time of the survey, 82 percent had reduced their alcohol consumption, and 2 percent had not changed their alcohol consumption levels. Thirty percent of married white women participating in the National Natality Survey (Prager et al., 1984) had stopped drinking during pregnancy, and 35 percent of women participating in the Seattle Study (Streissguth et al., 1983) in 1980-81 had stopped drinking during pregnancy. In contrast, 53 percent of married women who had consumed alcohol prior to becoming pregnant in the Callaway County, Missouri study (Kruse, Le Fevre, and Zweig, 1986) had abstained from consuming alcohol during pregnancy.

As stated in the previous paragraph, 37 percent of drinkers had reduced their alcohol intake either during the first or second trimester and then had increased their alcohol consumption during the third trimester of pregnancy. One of the few studies to report an increase in alcohol consumption during pregnancy was noted in the Little, Schultz, and Mandell study in Seattle (1976), where 66 percent of women drank less during the first four months of the pregnancy and only 40 percent of the women drank less during the last four months of the pregnancy. The increase in alcohol consumption in this study was not substantial, however, this pattern of increasing alcohol intake during pregnancy suggests that alcohol consumption needs to be monitored by health professionals during the entire pregnancy.

There were no significant differences in this research among the four groups of women who had quit, had reduced, had reduced-increased, or had not changed or increased their alcohol intake during pregnancy and age, marital status, education level, socioeconomic status, or ethnic origin. However Prager et al. (1984) and Lillien, Huber, and Rajala (1982) reported different results. Lillien, Huber, and Rajala (1982) found that: 27 percent of teenagers abstained from consuming alcohol during pregnancy in contrast to 17 percent of older women ($p<0.10$); 28 percent of unmarried women had abstained from consuming alcohol during pregnancy in contrast to 15 percent of married women ($p<0.005$); and, 26 percent of women with less than grade twelve education abstained from consuming alcohol during pregnancy in contrast to 16 percent of women with more than grade twelve education ($p<0.025$). Therefore women who had abstained from consuming alcohol during pregnancy were more likely to be teenagers, unmarried women, and women with less than grade twelve education. Prager et al. (1984) reported that younger women were more likely to stop drinking during pregnancy; however, no significant differences by education level were found in the proportion who had stopped drinking.

Women had reduced their alcohol intake, on the average, by 86 percent and this reduction rate (alcohol reduction ratio) was not significantly associated with age, marital status, education level, socioeconomic status, or ethnic origin. Similarly Kruse, Le Fevre, and Zweig (1986) found no significant associations between reduction in alcohol intake and education level or income. In contrast Streissguth et al. (1983) reported that the greatest decreases in alcohol consumption were observed in the most highly educated and older mothers, however this finding was reported for mothers consuming more than an average of fourteen drinks per week. As such, programs aimed at changing alcohol intake during pregnancy, regardless of whether women are light or heavy drinkers, should be targeted for the total pregnant population and not to only one subgroup.

Percent reduction was also not found to be associated with the amount of alcohol consumed prior to pregnancy, results which are contrary to Little, Schultz, and Mandell (1976) findings. A correlation of 0.71 ($p<0.001$) was found between prepregnant alcohol consumption levels and change during pregnancy (Little, Schultz, and Mandell, 1976). Since no significant correlation was found between prepregnant alcohol intake and percent reduction in the research study reported in this dissertation, the results of hypotheses testing are applicable to both heavy and light drinkers, as the hypotheses tested employed the measure of percent alcohol reduction as the dependent variable.

Amount of alcohol consumed prior to pregnancy was not found to be significantly associated with age, education level, socioeconomic status, or ethnic origin but was found to be significantly associated with marital status. Women living common law were found to have consumed significantly more alcohol prior to pregnancy than married women. In contrast Lillien Huber, and Rajala (1982) found that average monthly intakes of ethanol were associated with age and income. Women who were thirty years and older and women with incomes greater than $20,000 (1982 data) were more likely to consume more than seven ounces of ethanol per month. The differences found may be attributable to the different type of drinking population in the Boston area. Since the amount of alcohol consumed prior to pregnancy was found to be associated with birth weight in this research study and since common law women had drunk greater quantities of alcohol prior to pregnancy, it is suggested that information about the risks associated with consuming alcohol at conception should be targeted to this population. Unfortunately women who were living common law were less likely to plan their pregnancy, therefore efforts directed to reaching the all sexually active women of child bearing years seem warranted.

In comparing those individuals in the sample who had consumed alcohol one month before their pregnancy (drinkers) and those individuals who had not consumed alcohol one month before their pregnancy (non-drinkers), there were no significant differences in age, marital status, education level, socioeconomic status of these two groups. Kruse, Le Fevre, and Zweig (1986) also found that there was no significant differences between drinkers and non-drinkers and their ages, education levels, or income levels. On the other hand, Prager et al. (1984) found that the number of drinkers was higher among women who had more than sixteen years of education, and women who were over thirty years of age. Women of Asiatic origin, as reported in this dissertation, were less likely to consume alcohol prior to pregnancy. Similarly, Prager et al. (1984) found that the number of drinkers was higher among white women.

Differences in geographic location and ethnic origin of the samples cited may have accounted for the different results found between this research study and the others reviewed. Therefore a Canadian based population study on drinking habits during pregnancy seems warranted. The results of this study suggest that drinkers were more likely to be of caucasian origin, and women living common law were more likely to consume more alcohol prior to their pregnancy than married women. However reduction in alcohol consumption was not associated with any demographic characteristics. Therefore from an education perspective, in planning programs to change alcohol behaviors *during pregnancy*, all pregnant drinkers should be included as the target audience. From a medical perspective, since the amount of alcohol consumption before pregnancy was negatively correlated with birth weight and since common law women had consumed more alcohol prior to pregnancy, these women should become the target for *preconception* alcohol education intervention so as to prevent alcohol insult during the critical development period of the fetus.

The primary reason women had given for changing alcohol intake during pregnancy was for the health of the baby. In contrast, when women in the Little, Schultz, and Mandell (1976) study were asked "Why do you think this change had occurred?", over half said the changes were related to an adverse physiologic effect such as nausea, stomach irritation, headache and the diuretic effect of alcohol. The different type of responses given in this study and the 1976 report may have been a function of the increased awareness of the hazards of consuming alcohol over the past ten years, or it may have been a function of the different question asked in this study "Why did you change your alcohol intake?" versus "Why did you think this change had occurred?"

Seventy-seven percent of the women in this research study had changed their alcohol consumption for the health of the baby and/or mother, 8 percent had not felt well enough to drink, 6 percent had stated that alcohol had no appeal, 4 percent had stated that there were no safe limits, 1 percent had wanted to reduce caloric intake, and 1 percent had tried to quit smoking. Women in the Kiss (1983) study had been asked what factors had influenced a change in their alcohol intake during pregnancy and the following answers were provided: personal knowledge (90 percent), reading materials (43 percent), changes in cravings (36 percent), doctor (22 percent), family member (19 percent), prenatal class (17 percent), community health nurse (12 percent), TV/Radio (7 percent), and social pressure (6 percent). The contrasting results may have been a function of the different research instruments that were used in these two studies. Kiss (1983) provided her women with a list of factors and she had asked them to check off those factors which had influenced their alcohol intake. In this research, a free-response answer to the interview question was the means of data collection. In a similar study, Kruse, Le Fevre, and Zweig (1986) had reported that 96 percent of the women had cited fear for the infant's health as an important factor that had influenced their reduction in alcohol consumption during pregnancy. Also 67 percent of the women had cited advice from the doctor as important. However as with the Kiss study, women in the Kruse, Le Fevre, and Zweig study had been given a preselected list of factors and were asked to rate the influence each factor had had on their reduction in alcohol intake (fear for infants' health, advice from doctor, TV/Radio, advice from family, and alcohol made patient sick). Since a preselected list was provided, it may have been perceived by pregnant women that checking off fear for the infant's health was a socially acceptable response to document. Although, as previously stated, women in the research study reported in this dissertation had listed health of the baby as the key reason why they had changed their alcohol consumption, it is not known to what degree health professionals, family members, friends, and previous knowledge had influenced this type of response.

Tobacco Use

Thirty-nine percent of the women in this study had smoked one month prior to becoming pregnant. This percentage is similar to the 1983 population based hospital survey of 3,628 women residing in the regional municipality of Ottawa-Carleton. Stewart and Dunkley (1985) had reported that *37 percent* of the women in the Ottawa area had smoked one month prior to becoming pregnant. A higher incidence of smokers was reported by Cresswell-Jones (1983) where *49 percent* of 132 women in Simcoe, Ontario had smoked prior to their pregnancy. Robitaille and Kramer (1985) reported in their Montreal study of 1,747 primiparous women that *44 percent* of prenatal class participants and 56 percent of nonparticipants had smoked before becoming pregnant. It must be remembered that Quebec has the highest percentage of both male and female smokers across Canada (Health and Welfare: Canadian Health Facts, 1982). A lower incidence of smoking was reported: by Kiss (1983), whereby *31 percent* of prenatal class participants had smoked before their pregnancy; by Prager et al. (1984), whereby *31 percent* of 4,405 married women in the United States had smoked before their pregnancy; by Kruse, Le Fevre, and Zweig (1986), whereby *28 percent* of 255 married women in Callaway County, Missouri had smoked before their pregnancy; and, by Streissguth et al. (1983), whereby *25 percent* of 1,529 women in 1974-75 and *22 percent* of 1,413 women in 1980-81 in Seattle, Washington had smoked before their pregnancy. In as much as the detrimental effects of smoking on perinatal outcome have been established and the findings indicate that 39 percent of the sample in this research study had smoked before pregnancy, smoking is a health concern among the British Columbian population of primiparous women.

Prior to pregnancy, 61 percent of the sample had not smoked, 13 percent had smoked between one and twelve cigarettes per day; 22 percent had smoked between thirteen and twenty-two cigarettes per day; 2 percent had smoked between twenty-three and thirty-two cigarettes per day; and, 2 percent had smoked more than thirty-two cigarettes per day. *During the third trimester*, 76 percent of the sample had not smoked, 13 percent had smoked between one and twelve cigarettes per day; 10 percent had smoked between thirteen and twenty-two cigarettes per day; no one had smoked between twenty-three and thirty-two cigarettes per day; and, 1 percent had smoked more than thirty-two cigarettes per day. In order to provide for a more direct comparison between this study and that of the Kiss (1983), Kruse, Le Fevre, and Zweig (1986), Prager et al. (1984), Streissguth et al. (1983), and Stewart and Dunkley (1985) studies, the data from this research study were regrouped as follows: (1) those who had not smoked, (2) those who had smoked between one and ten cigarettes per day, (3) those who had smoked between eleven and nineteen cigarettes per day, and (4) those who had smoked twenty or more cigarettes per day. Table 63 summarizes the results of this study (Strychar) and five other research studies. Data reported in Table 63 included both smokers and non-smokers, with the exception of the Stewart and Dunkley study which had excluded non-smokers.

TABLE 63

Number of Cigarettes Smoked Daily Prior to and During Pregnancy of Women Participating in Six Research Studies

Time Period	Strychar		Kiss		Kruse		Prager		Streissguth		Stewart	
	no. cigs	%	no. cigs	%	no. cigs	%	no. cigs	%	no. cigs	%	no. cigs	%
Before Pregnancy	0-0	61	0-0	69	0-0	72	0-0	69	Not Available		1-5	13
	1-10	13	1-6	7	1-19	10	1-10	9			6-15	31
	11-19	5	7-24	16	≥20	18	>11	22			16-30	47
	≥20	21	≥25	8							>31	9
During Pregnancy	0-0	76	0-0	85	0-0	77	0-0	75	0-0	78	1-5	31
	1-10	13	1-6	5	1-19	13	1-10	12	1-15	16	6-15	24
	11-19	3	7-24	9	≥20	10	>11	13	>16	6	16-30	38
	≥20	8	≥25	1							>31	7

Nearly 10 percent of the sample in this research study continued to smoke twenty or more cigarettes daily during pregnancy, and this amount is comparable to the incidence of heavy smokers in the Kiss, Kruse, Prager, Streissguth, and Stewart studies. When non-smokers are excluded, 47 percent of smokers in this research study had smoked more than eleven cigarettes daily during the third trimester of pregnancy and 45 percent of smokers in the Stewart and Dunkley study had smoked more than fifteen cigarettes daily during pregnancy. As stated, there remains a fair number of individuals who continue to smoke during pregnancy, and therefore smoking during pregnancy is of major concern. It is therefore recommended that educators aim to reduce the percentage of pregnant smokers to a 10 percent level by the year

2000, an objective consistent with the Consultation, Planning and Implementation Committee of the National Program to Reduce Tobacco Use (1987).

As previously reported, 38 percent of the sample had quit smoking during pregnancy, 26 percent had reduced their cigarette smoking, 18 percent had reduced their cigarette smoking during the first and second trimesters of pregnancy and then had increased their cigarette smoking by the third trimester, and 18 percent had not changed or had increased their cigarette smoking during pregnancy (14 percent had not changed, 4 percent had increased). Stewart and Dunkley (1985) reported that 31 percent had quit, 28 percent had decreased, 39 percent had not changed, and 2 percent had increased their cigarette smoking. Prager et al. (1984) reported that 18 percent of smokers had quit smoking during pregnancy in the National Natality Survey. Kruse, Le Fevre, and Zweig (1986) reported that 33 percent had decreased, 17 percent had quit, and 50 percent had either not changed or had increased their cigarette smoking. Kiss (1983) reported that 91 percent had decreased, 6 percent had not changed, and 3 percent had increased their cigarette smoking. In comparison to most other studies conducted, there was a higher percentage of the present sample who had quit smoking during pregnancy, a comparable percentage who had increased their cigarette smoking during pregnancy, and a lower percentage who had not changed their cigarette smoking during pregnancy. The differences noted may have been a function of the sample size of smokers (N=50), or may reflect increased awareness by smokers in British Columbia.

Age, marital status, education level, and socioeconomic status did not differ among individuals who had quit, had reduced, had reduced-increased, or had increased or not changed their cigarette smoking during pregnancy. In contrast, Prager et al. (1984) reported that women with higher education had a higher percentage of individuals who stopped smoking during pregnancy. The same results were noted by Stewart and Dunkley (1985) where higher education was associated with smoking cessation in primiparous women. Kruse, Le Fevre, and Zweig (1986) found that women who had reduced their cigarette smoking were those of a higher education level. The education level of the women in all three studies were fairly comparable with this research study and therefore could not account for the differences found.

Women who had reduced their cigarette smoking during the first and second trimesters of pregnancy and then had increased their cigarette smoking by the third trimester had smoked significantly more prior to pregnancy than those who had quit during their pregnancy. This result suggests that heavy smokers require continued support during the entire pregnancy to be able to follow through on reducing cigarette smoking. Prager et al. (1984) found that a greater number of women who had smoked one to ten cigarettes per day prior to pregnancy had quit smoking during pregnancy than women who had smoked eleven or more cigarettes per day prior to pregnancy. Similarly, Stewart and Dunkley (1985) noted that smoking cessation during pregnancy was associated with fewer cigarettes smoked prior to pregnancy. Although comparable results were not obtained, it seems that number of cigarettes smoked prior to pregnancy may be related to the type of behavior change seen among pregnant smokers. Most previous research studies have grouped women into the following categories: those who quit smoking, those who reduced their cigarette smoking, those who increased their cigarette smoking, and those who did not change their level of cigarette use. However in future research studies it may be worthwhile considering another type of change pattern, those women who reduce and then increase their cigarette smoking.

On the average women had reduced their cigarette smoking by 52 percent. There was no significant association between the number of cigarettes smoked prior to pregnancy and the percent reduction ratio. Furthermore the percent reduction ratio was not associated with age, marital status, education level, or socioeconomic status. Education programs and activities specifically designed to assist women reduce cigarette smoking *during pregnancy* should be expanded since the overall reduction rate is low.

In comparing those individuals in the sample who had smoked one month before their pregnancy (smokers), and those individuals who had not smoked before their pregnancy (non-smokers), smokers were more likely to be younger, not married, of a lower education level, of a lower socioeconomic status, and of caucasian origin. Similar results were obtained by Stewart and Dunkley (1985), Prager et al. (1984), and Kruse, Le Fevre, and Zweig (1986). Stewart and Dunkley had reported that the number of smokers was highest among teenagers, unmarried women, and women of a lower socioeconomic status. Kruse, Le Fevre, and Zweig (1986) had reported that the number of smokers was higher among women under thirty years of age with less than high school education, and women of the middle income range. Prager et al. (1984) also reported that the number of smokers was higher among white women under twenty-five years of age having less than a high school education. In conclusion, pregnant smokers in this study were typical of pregnant smokers described in other research studies.

Eighty-one percent of the women in this research study reported that they had changed their cigarette smoking during pregnancy for the health of the baby and/or mother. Only 5 percent stated they had changed their cigarette smoking because they had not felt well enough to smoke. In contrast Cresswell-Jones (1983), in a study of 132 women living in Simcoe County, Ontario, reported that one of the major reasons for changing cigarette smoking during pregnancy included less desire to smoke. Kruse, Le Fevre, and Zweig (1986) had asked women to rate a preselected list of factors which had influenced reduction of their cigarette smoking. Ninety-six percent of the sample had rated fear for infant's health as important or very important, 67 percent had rated advice from the doctor as important or very important, and 50 percent had rated advice from the family as important or very important. Similarly, Kiss (1983) had asked Vancouver prenatal class participants to check off on a questionnaire the factors which had influenced a change in their smoking habits. Personal knowledge was checked by 87 percent of the women, reading materials were checked by 46 percent of the women, family members were checked by 30 percent of the women, cravings were checked by 24 percent of the women, and prenatal classes were checked by 22 percent of the women. The different reasons cited in this study for changing smoking habits and those reasons cited in the Cresswell-Jones, Kiss, and Kruse studies may have been due to the different wording of the questions asked and the method of data collection, free-response versus a preselected list of influencing factors. Furthermore it was not known in this study to what degree family members, friends, and health professionals had influenced women's reasons for reporting they had changed their cigarette smoking for health of the baby.

Learning Patterns

In the process of trying to obtain an overview of the learning patterns of pregnant women two key components were examined. The first component was "what women learn" and the second component was "how women learn." These components provide answers to one of the three research questions identified in Chapter III.

What Pregnant Women Learn

What women learned was identified by their responses to the knowledge test questions developed for the purposes of this study on the topics of weight gain, alcohol consumption, and tobacco use. Less than 25 percent of the women in this study were able to respond to the weight gain questions related to risk factors. The majority of women had not known about weight gain recommendations for overweight and underweight women, and for minimum weekly weight gain. If women had been at risk, they would not have known whether to initiate behavior change to reduce the risk and the type of change required. Furthermore, since self-initiated learning was found to be associated with ideal weight gain it would strengthen the argument that women should be equipped with some tools to assess their own circumstances, rather than leaving the total responsibility for monitoring and influencing weight gain solely in the hands of health professionals. This should not be interpreted as encouraging self-medical practice, but rather, health professionals should provide the tools for women to have a greater responsibility in managing their health care, a concept consistent with Epp's definition of self-care as reported in the document "Achieving Health for All: A Framework for Health Promotion (Health and Welfare Canada, 1986).

Knowing how much weight to gain throughout the pregnancy better equips women to manage their own weight gain. Over 50 percent of the women did not know the average weekly recommended weight gain during the second and third trimesters of pregnancy. As well, only 13 percent of the women had stated that the amount of weight to be gained during the first trimester of pregnancy was between one and five pounds. Not knowing how much weight to gain during the first trimester may have been a contributing factor to the higher than recommended weight gain found in over 20 percent of the sample. It is not known whether the higher than total recommended weight gains were due to higher weight gains in the first trimester, nevertheless, until further research is conducted on patterns of excessive weight gain it seems prudent to suggest that women be informed of the average recommended weight gain during the first trimester. Ideally, health educators should inform women prior to their pregnancy about expected weight gains during the first trimester, as well as encourage women to start a pregnancy at their desirable weight. All sexually active women of childbearing years would be the target population of such an education endeavor.

To the best knowledge of this researcher, very few studies have examined knowledge about weight gain during pregnancy. Palmer, Jennings, and Massey (1985) had asked women how much weight should be gained during pregnancy and 66 percent of the women were reported to have the correct answer, identified as being twenty to twenty-six pounds. In this research study the correct answer or "optimal response" was identified as being between twenty-four and thirty pounds, and 56 percent of the sample responded positively to that question. The percentages of correct responses in these two studies were fairly similar.

Related to the topic of alcohol consumption, less than 20 percent of the women in this study were aware of the effects of consuming small amounts of alcohol on the fetus. At a time when there is evidence in the literature to suggest that consumption of two alcoholic beverages a day or more than ten drinks per week is associated with low birth weight (Little, 1977; and Wright et al., 1983), health professionals should be ensuring that pregnant women obtain this information. The question that needs to be asked is whether health professionals are prepared to discuss the hazards of consuming small amounts of alcohol. It has been the personal experience of this researcher that some public health personnel are reticent about discussing small amounts of alcohol intake during pregnancy. It may be that pregnant women had consumed alcohol regularly during the first trimester of pregnancy when they had not known they were pregnant and health professionals wish to avoid making women feel guilty. Research on why some health professionals do not discuss the hazards of consuming small amounts of alcohol during pregnancy is warranted. Ensuring that women obtain information about alcohol consumption during pregnancy without instilling guilt continues to be a challenge for health professionals.

Women were knowledgeable about the effects of smoking on the fetus during pregnancy. More specifically they were able to name at least one of the medical problems associated with smoking, which included low birth weight, prematurity, or placenta problems at delivery. Not only were women knowledgeable about smoking, but in comparison to the topics of weight gain and alcohol, the mean knowledge test score was highest for the smoking test (smoking=16/22, 73%; weight=17/31, 55%; alcohol=12/22, 55%). One then questions whether the publicity of the hazards of smoking and second hand smoke coupled with information provided by health professionals regarding the dangers of tobacco use during pregnancy had influenced the test scores. This leads one to speculate whether an intensive media campaign on the risk factors associated with inadequate weight gain and the effects of small amounts of alcohol on the fetus may also be warranted.

How Pregnant Women Learn

In beginning the discussion about how pregnant women learn, a comparison between Tough's conceptualization of how adults learn and learning transaction types, developed for the purposes of this research study, is presented. This comparison sets the stage for describing how pregnant women learn. Following, the typical learner is described and highlights of this description include resources utilized, time in learning, and initiators of the learning episodes.

Tough (1979) focused on individuals' deliberate attempts to gain certain knowledge, to improve one's skill, to change one's attitude, or to change one's behavior. He examined what people learned, whether that was to prepare for an occupation, to learn for home and personal responsibilities, or to improve an area of competency. He also examined how people learn and identified this process as including the decision to begin (the preparatory steps) and choosing the planner. In this research study, the topics people learned about were preselected for the purposes of this study. Weight gain, alcohol consumption, and tobacco use were selected, since these behaviors can be associated with low birth weight. Because of the specificity of the topics investigated, the process of choosing the planner was not identified. A snapshot picture of how women had learned about these three topics was studied. This snapshot picture of learning was derived from Tough's conceptualization of planners. As has been previously stated, Tough defined the planner as the person or thing responsible for more than half of the detailed day to day planning and deciding in a learning project. Tough had identified four types of planners: the learner (self-planned), a group or its leader (group-planned), one person in a one to one situation (one to one-planned), and a nonhuman resource (nonhuman-planned). As previously stated in Chapter IV, Tough's self-planning could be further subdivided into learning projects that were self-planned but occurred in the nonhuman setting, in the group setting, or with one other individual in the one to one setting. Considering the specificity of the topics studied and considering that Tough's self-planned learning projects could be extended to specify the settings of learning, a typology of six learning transaction types was developed to identify how pregnant women learn about weight gain, alcohol consumption, and tobacco use. The learning transaction types developed for this study incorporated Tough's concept of time, settings, and responsibilities in planning. The six learning transaction types included: self-initiated learning transactions in a group setting, in a one to one setting, and in a nonhuman setting; and, other-initiated learning transactions in a group setting, in a one to one setting, and in a nonhuman setting. If one accepts the assumption that those individuals who take on the major responsibility for deciding which resources to utilize are those who initiate their learning episodes, then self-initiated learners in the group, one to one, and nonhuman settings are analogous to Tough's self-planned learners. It could then be said that 41 percent of the women in this study had spent most of their time in self-initiated learning transactions or had self-planned their learning about weight gain, 33 percent of the women in this study had spent most of their time in self-initiated learning transactions or had self-planned their learning about alcohol consumption, and 34 percent of the women in this study had spent most of their time in self-initiated transactions or had self-planned their learning about tobacco use. In contrast, Tough (1984) reported that 70 percent of learning projects are self-planned. This difference in percentage may be a function of: (1) the specificity of the topics examined, (2) the fact that learning experiences during pregnancy are unique because of medical intervention, or (3) the fact that health professionals assume the responsibility of initiating the interaction with pregnant women and as such do not permit women to initiate the learning transactions themselves. However, since this research study had used a different methodology from Tough and since this study had not identified how women had decided what resources to utilize but rather took a snapshot picture of what had been utilized, a comparison between Tough's concept of planners and the concept of learning transactions is tenuous.

Spear and Mocker (1984) have suggested an alternative conceptualization of planning. They suggest that preplanning does not occur, but rather, learners were more likely to use resources that were available within their environment. These circumstances seem applicable to learning during pregnancy, as there exists in the environment learning opportunities available to pregnant women as well as intervention by the medical profession.

To the best knowledge of this researcher, no studies have been conducted to relate how adults learn with specific measures of learning outcomes. In this study, learning transaction types were related to knowledge scores, health behaviors, and demographic characteristics. For alcohol transactions, no significant differences were found among the six learning transaction types and women's ages, marital status, education levels, socioeconomic status, alcohol knowledge scores, alcohol reduction ratios, or birth weights. Whether women had spent most of their learning time in self-initiated transactions with a group, self-initiated transactions with another individual, self-initiated transactions with a nonhuman resource, other-initiated transactions with a group, other-initiated transactions with another individual, or other-initiated transactions with a nonhuman resource, the learning transaction type was not associated with any demographic characteristics or learning outcomes. This finding suggests that demographic characteristics appear not to be associated with how pregnant women learn, instead the learners' circumstances and availability of resources appear to be related to how pregnant women learn. This concept would be consistent with Spear and Mocker's (1984) view on how adults learn.

For weight gain transactions, since there were insufficient numbers of women who had either self-initiated or other-initiated transactions with a group as their dominant transaction type, the women were regrouped into the following categories: self-initiated transactions with health professionals, self-initiated transactions with family members and friends, self-initiated transactions with nonhuman resources, other-initiated transactions with health professionals, other-initiated transactions with family members and friends, and other-initiated transactions with nonhuman resources. No significant differences were found among these six alternative learning transaction types and women's ages, marital status, education levels, socioeconomic status, weight gain knowledge scores, ideal weight gains, or birth weights. However when similar analyses were performed for smoking transactions, women who had spent most of their time in learning in other-initiated learning episodes with family members and friends had significantly lower knowledge scores than women who had spent most of their time in self-initiated or other-initiated episodes with nonhuman resources. This occurrence may be explained by the nature of advice given by each resource in the different transaction types, since the most frequent advice given by friends and family members was that "it's okay to smoke." It may be that learning in one transaction type is not superior to the other, if the information provided is the same. Further research is required to identify the impact of advice on the association between how women learn and learning outcomes. Tough's assumption that learning initiated by an instructor is not superior to other forms of learning did not apply to learning about tobacco use during pregnancy and this finding may be due to the medical intervention or the complexity of the science behind the information.

Learning had occurred in three settings: (1) The Group Setting: learning in an organized activity which included participating in prenatal classes, (2) The One to One Setting: learning with another individual which included discussing topics with health professionals, family members, and friends, and (3) The Nonhuman Setting: learning in an isolated environment which included reading publications or viewing audiovisual productions about the topics addressed in this dissertation. There did emerge key resources in each setting with whom the majority of the women had had contact. For *learning about weight gain*, the physician, reading materials, and family members were the key resources. For *learning about alcohol consumption*, reading materials, prenatal classes, and the physician were the key resources. For *learning about tobacco use*, reading materials, the physician, and family members were the key resources. Not only were physicians and reading materials cited as key weight gain resources women had used, but also these were cited as the resources from which women had obtained the answers to the first weight gain knowledge test question. In addition, for the topic of alcohol consumption and tobacco use, personal opinion was cited as a key resource from which women had obtained the answers to the first alcohol and tobacco knowledge test questions. What is not known is the degree to which health professionals, family members, friends, or reading materials had influenced women's formation of their personal opinion. Furthermore, it is of interest to note that prenatal classes were the primary source from which women had obtained their reading materials. So although prenatal classes did not appear among the top three resources utilized, except for alcohol consumption, prenatal classes may have played an indirect role by providing reading materials to class participants. Therefore since the physician, reading materials, family members, and prenatal classes are the key resources used by pregnant women, educators planning to disseminate information to the primiparous population or planning public health programs on the topics of weight gain, alcohol consumption, and tobacco use should consider these key resources as target resources to transmit information. These findings also suggest that since women are exposed to information from a multitude of individuals, the key resources such as physicians and public health personnel organizing prenatal classes should cooperate to develop strategies to reach the pregnant population and provide women with similar information.

Most of the research studies conducted about learning during pregnancy have focused on prenatal classes. Prenatal class participants in this study have been described as women of caucasian origin, of a higher socioeconomic status, and of a higher education level than nonparticipants. No significance difference in age was found between participants and nonparticipants. Darkenwald and Merriam (1982) concluded that participants in organized learning activities tend to be younger, white, better educated, and more affluent. With the exception of age, Darkenwald and Merriam's description of participants at organized learning activities were consistent with this research study. The differing results obtained regarding age was most likely due to the restricted age of women experiencing their first pregnancy, in comparison to examining the age of participants of organized learning activities during any other time period in the life cycle. Thordarson and Costanzo (1976) found that prenatal class participants were older, of a higher socioeconomic status and education level. Robitaille and Kramer (1985) found that the primiparous prenatal class participants in their study were more likely to be older, and of a higher socioeconomic status. Vinal (1981), on the other hand, reported that prenatal class participants were more likely to be younger, highly educated, and were experiencing their first pregnancy. Furthermore Robitaille and Kramer (1985) found that women participating in prenatal classes were more likely to be non-smokers, whereas in this research study smoking behaviors were not significantly associated with attendance at prenatal classes. The different results obtained may have been a function of the sample size of smokers in this study (N=50) in comparison to the sample size of the Robitaille and Kramer study (N=1,676). On the other hand we know that the Quebec region has the highest percentage of smokers in any region of Canada, and as such, the learning behavior of smokers in Quebec may in fact be different from that of smokers in British Columbia.

Kruse, Le Fevre, and Zweig (1986) had reported that 75 percent of the pregnant smokers and drinkers in their Callaway County study had discussed their smoking and drinking habits at some point during pregnancy with their physicians. Similar findings for alcohol were reported in this study, where 73 percent of drinkers had spoken to a physician about alcohol consumption, however, 90 percent of smokers had reported discussing their smoking habits with a physician. Black (1983) had interviewed twenty-five women about their drinking habits during pregnancy and only two of these individuals had reported discussing alcohol consumption with a health professional. Since the physician is the primary care giver and since alcohol problems can only be identified by obtaining information on drinking behavior of women, it is recommended that physicians monitor the alcohol behaviors of all their clients throughout pregnancy. Even though there was an overall reduction of alcohol intake by 82 percent and even though 96 percent of the sample had reduced their alcohol intake during pregnancy, these figures should not provide a false sense of security to health professionals. One of the primary purposes of prenatal care is to optimize pregnancy outcome. Therefore screening is required to identify high risk individuals, even though they may be only a small percentage of the population. As Larsson (1983) states, excessive drinkers cannot be identified by their appearance, therefore the aim of having physicians discuss and monitor alcohol consumption during pregnancy of all their clients seems warranted.

A summary of the major learning findings in this study is now presented in the form of describing the "typical prenatal learner." This description is based upon the key findings and the most prevalent results found and reported in Chapter VI. It includes aspects on resources, time in learning, initiators of learning episodes, learning transaction types, and advice given by key resources. The typical learner is presented for the topics of weight gain, alcohol consumption, and tobacco use.

The Typical Learner: Weight Gain

For the topic of weight gain, the typical learner can be described as an individual who discusses weight gain primarily with her family doctor, family members, and friends, and who reads about the topic in books. Usually she will speak to one family member, and that member will most likely be her husband/partner, whereas she will have the tendency to speak to three friends. This individual will discuss weight gain with her family doctor, family members and friends on more than three occasions during the pregnancy, and at prenatal classes on two or three occasions. She will spend an average of twenty-five hours during her pregnancy learning about weight gain, and more specifically she will spend an average of sixteen hours discussing weight gain with family members, an average of six hours discussing weight gain with a friend, an average of six hours reading about the topic, and an average of thirty minutes discussing weight gain with her family doctor. The doctor will be the person to initiate the discussion about weight gain, and other individuals, primarily prenatal class leaders, will provide or suggest books to read about this topic. However the learner herself will initiate weight gain discussions with her family members and friends. The majority of her learning time will be spent in other-initiated transactions with another individual. That is, most of her learning time will be spent discussing weight gain with other individuals, and those individuals will usually bring up the topic. When she attends prenatal classes and when she reads about the topic, she will most frequently be told to gain twenty to thirty pounds and to follow Canada's Food Guide. When she speaks with the doctor she will most likely be told that her weight gain is okay and to follow the food guide. When she speaks with family members she will be told she is not gaining enough and to follow the food guide. When she speaks with friends she will be comparing notes with her friends' prenatal weight gains. She will also be told by her friends not to worry.

It is not surprising that the physician was found to be the key resource used by primiparous women for information about prenatal weight gain. Similar findings were noted by Schwartz and Barr (1977) in a study conducted at the Vancouver General Hospital, and by

Johnston, Hyson, and Blackmere (1985) in a study conducted at eighteen Nova Scotia hospitals, where the physician was found to be the most useful and most frequently mentioned source of nutrition information by pregnant women. This occurrence was most likely due to the fact that physicians are the primary care givers and they permit entrance to the hospital for delivery. Furthermore physicians monitor weight gain of their clients by weighing them at every office visit. The American College of Obstericians and Gynecologists recommends monthly prenatal visits until the thirty-second week of gestation and weekly visits until delivery (Backman, 1983).

What is a discovery in this study, is the extent of reading about weight gain that occurs during pregnancy. Brockett (1985), in his research on self-directed learning, suggested that the self-directed learning readiness scale was not oriented toward learning through books. As stated, 93 percent of the pregnant women had read about weight gain in print material. It would therefore seem important that reading materials are readable and comprehendable by the group for whom they are intended to be used. Anderson, Olson, and Rhodes (1980) evaluated prenatal nutrition materials for programs of pregnant adolescents and concluded that professionals do not use objective criteria when they select reading materials they distribute. Therefore when educators are distributing reading materials, they should ensure that objective criteria be used in selecting reading materials and characteristics such as readability, format, and content be considered.

Another surprising finding in this study is the extent of discussion that occurred with family members and friends. An average of sixteen hours and a median time of two hours was spent discussing weight gain with family members, and an average of two hours and a median time of ninety minutes was spent discussing weight gain with friends. Women seem preoccupied about their weight gain and this occurrence may be due to social pressures of being slim. However total time in learning was not associated with ideal weight gain, nor was the time spent in the various learning transaction settings associated with ideal weight gain or knowledge levels.

The family member most frequently spoken to was the husband, yet it is not common practice in disseminating information to have this individual as a target audience. The husband/partner has, however, been encouraged to participate in prenatal classes and attend the birth. Increased recognition should be given to this important resource, and future research is suggested to identify the degree of impact husbands have on the health behaviors of pregnant women and their learning.

For the majority of women in this study, weight gain was discussed with the physician, family member, and friend on more than three occasions; however, weight gain was discussed at prenatal classes on only two or three occasions. One woman reported that at the prenatal classes she had attended, the women had been weighed before every class. If the goal of prenatal classes is to change behavior, then it would seem worthwhile for organizers to incorporate into their classes a regular weigh-in program, and not simply discuss weight gain on two or three occasions.

In the majority of cases, health professionals had initiated the discussion about weight gain issues with their clients. Yet it was found that women who had engaged in more self-initiated learning episodes had a weight gain that was closer to their recommended prenatal weight gain. As such, it would seem important for health professionals to provide the opportunity to their clients to initiate discourse, rather than dispensing information without taking note of their clients' concerns. Encouraging this process may include questions such as: "Are you concerned about your weight gain?", "Do you have any questions about your weight gain?", "Are you worried about returning to your prepregnant weight?", "What amount of weight does your husband/partner think you should gain?", "What do other family members think you should gain?", "What books are you reading about weight gain?", "What recommendations are you getting from these resources?", "Are you getting conflicting messages?", and "What amount of weight have you planned to gain during this pregnancy?". Although the use of these questions may be interpreted as initiating the discussion, over the duration of the pregnancy these questions may stimulate women to initiate their own learning on these issues.

Advice given by prenatal class leaders and information contained in reading materials focused on gaining approximately twenty to thirty pounds and suggested following Canada's Food Guide. The number of servings in this guide does not include sufficient number of servings for pregnant women to ensure optimal caloric intake (Health and Welfare Canada, 1987). It has only been in the last year that the B.C. Ministry of Health has produced a pregnancy food guide with adequate servings sizes for the average healthy pregnant woman. This guide was not referred to at any time during this study. It may be that women had not distinguished between which guide they were using, and in responding to the interview questions referred only to Canada's Food Guide. Advice given by physicians was tailored to each individual's circumstances and primarily focused on general comments such as "weight gain was okay." Further research is required to determine whether physicians had provided a rationale for their statements that weight gain was okay. Related to the issue of advice is another potential research question: "Does the format in which advice is given influence its adoption?". Identifying whether advice was given in the form of a recommendation or as a comment, and whether rationale was provided for the recommendation or the comment may provide further information on the dynamics of the interchange.

It is not known whether advice given by the various resources had changed over the nine months of the pregnancy, and if so, whether the women had reported on advice given at the beginning or at the end of the pregnancy. In-depth open ended interviews in this area would shed further light on how resources were acquired, the perceived degree of influence of advice received from each resource, and whether the time sequencing of this advice had any impact on its adoption.

What is of concern was the absence of advice pertaining to the risks associated with inadequate weight gain. If the goal is to reduce low birth weight incidence, then it is recommended that health professionals provide information related to these risk factors.

Audiovisual productions, nurses, and dietitians were the resources least utilized by pregnant women. Audiovisual productions viewed were mostly shown at prenatal classes. Media campaigns and television programs are costly productions, therefore their availability is limited. The potential exists for nurses in the doctor's offices to be key resources, however, this is most likely not the case because of their schedules and office roles. The dietitian is also in similar circumstances. Dietitians who work in hospitals receive referrals from physicians for high risk prenatal counselling. However close to 20 percent of hospitals in British Columbia (Schwartz, Bell, and Weber, 1987) do not have outpatient diet counselling services. Furthermore, in British Columbia approximately 66 percent of public health units engage the services of a nutritionist, a regulation required for accreditation of health units in Ontario. As well, many public health nutritionists do not offer nutrition counselling services to the public, the exception being Healthiest Babies Possible Program with the Vancouver City Health Department. Most public health nutritionists act as consultants to the public health nursing staff and therefore currently in British Columbia pregnant women do not have easy access to a dietitian-nutritionist. However, the B.C. Ministry of Health has recently made the decision to transfer the responsibility for teaching prenatal classes to the private sector. In the future, the Ministry staff will target the at-risk pregnant woman either directly or via community development strategies (McCarthy, 1988). This new policy may potentially increase the availability of offering one-to-one nutrition counselling services to the pregnant population.

Job descriptions and dietetic manpower play critical roles in determining whether dietitians-nutritionists will become a key resource for pregnant women in the future. As professionals who are knowledgeable and trained to deal with the topic of weight gain, it is recommended that dietitians-nutritionists: (1) expand services to include one-to-one counselling which is easily accessible to the pregnant population, (2) market existing services to target referral agents such as the physician, and/or (3) work through the physician, family members, and publishers to transmit the weight gain message. Alice E. Smith, Associate Director of Clinical Dietetics, Children's Memorial Hospital Chicago stated: "The role of the dietitian will ultimately be defined by the way the profession responds to the challenge presented by the enormous opportunities in the field of nutrition today. Or it will be defined by default - the role that is left over after others, who recognize the opportunities, had responded" (American Dietetic Association Reports President's Page: Challenges Facing the Dietetic Profession, 1984, p.1484). If difficult economic times do not permit role expansion of dietitians-nutritionists already employed in public health and hospital programs, the dietitian-nutritionist in private practice may well be challenged to take a leading role in offering nutrition and weight gain counselling services to the pregnant population. Having dietitians-nutritionists in private practice take a leading role in offering nutrition counselling services to the pregnant population will require financial support by health insurance companies to cover these services.

However, it must be noted that the role and availability of the dietitian-nutritionist were not the only factors that had influenced such sparse contact by pregnant women with this health profession. The pregnant women discussing weight gain with a dietitian-nutritionist reported that this discussion had occurred on only one occasion. It is questionable whether one session can produce behavior change, let alone address evaluation of the client's progress. Dietitians-nutritionists should be encouraged to follow their pregnant clients and monitor their weight gain during the entire pregnancy.

The Typical Learner: Alcohol Consumption

For the topic of alcohol consumption, the typical learner can be described as an individual who is exposed to alcohol consumption issues primarily through reading, with the prenatal class leader, and with the family doctor. Family members and friends play secondary roles. Usually she will speak to one family member and that member will most likely be her husband/partner, whereas she will have the tendency to speak to three friends. This individual will discuss alcohol consumption with her family doctor on only one occasion, with her friends on two or three occasions, and with her family on more than three occasions. She will spend an average of nine hours learning about alcohol consumption, and more specifically she will spend an average of five hours discussing alcohol with her friends, an average of four hours discussing alcohol with her family, an average of four hours reading about the topic, an average of thirty minutes discussing alcohol at prenatal classes, and an average of five minutes discussing alcohol with her family doctor. Health professionals, family members, and friends will be the ones to initiate the discussion about alcohol, and her friends and prenatal class leaders will most likely provide her with a pamphlet on the subject. The majority of her learning time will be spent in other-initiated learning transactions with a nonhuman resource. Most of her learning time will be spent reading about alcohol in pamphlets that have been given to her by either a friend or prenatal class leader. The key advice she will receive from all resources is not to drink or to have one drink on occasion. Prenatal class leaders will inform her about the relationship between consuming alcohol and having a low birth weight baby. The family doctor along with friends will stress "moderation," but few individuals actually will define what they mean.

As with weight gain, reading materials and the physician were the key resources for alcohol information. Prenatal classes were also cited as key resources. However, it must be remembered that 81 percent of the women in this sample had attended prenatal classes, and the mean number of classes attended was five. Therefore prenatal classes cannot be viewed as a continuous source of information or as an agent to monitor alcohol consumption during pregnancy. Since the physician is the primary care giver and since the physician sees the women throughout the pregnancy, the physician is able to monitor alcohol consumption during the entire pregnancy. Unfortunately this event had not occurred. As previously stated, 73 percent of physicians had discussed alcohol consumption with their patients and furthermore this discussion had taken place on only one occasion for an average of five minutes. In order to identify whether a drinking problem exists, identifying whether pregnant women drink, the amount consumed, and the frequency of consumption is vital. Research as to why some physicians do not monitor the alcohol consumption of all their patients seems warranted.

Health professionals had initiated the discussion about alcohol consumption with the majority of women. There may be a reluctance on the part of pregnant women to initiate discourse. These results seem consistent with the observation that alcohol consumption is frequently an under-reported behavior. Nevertheless, since the majority of women engaged in other-initiated learning episodes and since other-initiated learning was found to be associated with reduced alcohol intake, monitoring alcohol consumption during pregnancy seems warranted. However, the long range question which needs to be addressed is whether a more positive attitude toward reporting and discussing drinking habits would foster a more open dialogue and perhaps provide for even greater changes in alcohol consumption.

The overall message given to pregnant drinkers by all resources was "do not drink" or "only have one drink on occasion." It is interesting that the message contained the advice to consume small amounts of alcohol, but if we examine the knowledge test responses, we see that the majority of women did not know why they should be avoiding small amounts of alcohol during pregnancy. The word "moderation" was also frequently cited by respondents as coming from various resources. Professionals should attempt to quantify what they mean by the term moderation so as to provide clear guidance to their clients.

The Typical Learner: Tobacco Use

For the topic of tobacco use, the typical learner can be described as an individual who is exposed to tobacco use issues primarily through reading, with the family doctor, and with family members. Prenatal classes and friends play secondary roles. Usually she will speak to one family member who will most likely be her mother, whereas she will have the tendency to speak to three friends. This individual will discuss smoking with health professionals on only one occasion, but with family members on more than three occasions. She will spend an average of fifteen hours learning about smoking, and more specifically she will spend an average of eight hours discussing smoking with family members, an average of seven hours reading about the topic, and an average of forty minutes discussing smoking with her family doctor. Health professionals and friends will initiate the discussions about smoking and other individuals, primarily prenatal class leaders, will provide her with books containing smoking information. The majority of her time in learning will be spent in other-initiated transactions with one other individual. When she speaks to health professionals and reads about smoking, she will be told to: "quit smoking" or "reduce cigarette smoking." With print material and prenatal class leaders she will be informed about the harmful effects of smoking as it relates to low birth weight, prematurity, and delivery complications. Unfortunately, she will be told by the majority of her friends and some family members that "it's okay to smoke."

As was found in the identification of key information sources on weight gain, the physician was a key resource for pregnant women about smoking issues. An examination of the learning patterns of the smoker shows minor differences in the pattern in comparison to weight gain. What however is of major difference and of major concern is that smokers received the message from their friends and family that it was okay to smoke during pregnancy. It would seem important for health professionals to recognize this potential source of conflicting information and uncover this issue during the counselling session. The dangers of smoking during pregnancy should therefore be known to both the pregnant and nonpregnant population.

How women learn during pregnancy is topic specific. Nevertheless, several commonalities emerge among the three behaviors examined. Reading materials, physicians, and family members were cited as the three most frequently utilized resources. Although health professionals have been cognizant that the home setting is important, the extent of pregnant women's conversations with family members in this setting had not been previously documented and this finding points to further exploration of ways of increasing the likelihood that information provided by these sources will be based upon current medical recommendations.

Health Beliefs

The four components of the health belief measure in this study included concern, perceived susceptibility, perceived usefulness, and perceived barriers. Women were asked to identify their degree of concern, risk, use, and barriers on a rating scale of zero to six. A zero value indicated no concern, risk, use, or barriers; a two value indicated little concern, risk, use, or barriers; a four value indicated moderate concern, risk, use, or barriers; and, a six value indicated high concern, risk, use, or barriers.

Women had been most concerned about their smoking habits (mean=3.51), followed by concern for their weight gain (mean=3.24), and least concerned about their alcohol consumption (mean=1.78). These findings may have been a function of the fact that the actual behaviors had influenced women's reporting of their concern. Eighteen percent of the women had not changed or had increased their cigarette smoking during pregnancy, 7 percent of the women had gained less than twenty pounds during pregnancy, and 6 percent of the women had not changed or had increased their alcohol consumption during pregnancy. Even though this study was retrospective in nature, part of this problem may have been overcome by having asked two questions rather than one: (1) "Thinking back to the time you found out you were pregnant, were you concerned about your weight gain/alcohol consumption/tobacco use?", and (2) "Thinking back to the last month of your pregnancy, were you concerned about your weight gain/alcohol consumption/tobacco use?"

Dramatic differences in reporting of health beliefs were observed for the perceived risk component. Women did not perceive their unborn child to be at risk because of their alcohol consumption (mean=0.90) or their weight gain (mean=1.09), however they did perceive their unborn child to be at risk because of their smoking habits (mean=2.69). This finding is consistent with the medical literature where extensive documentation exists on the risks associated with tobacco use and inadequate weight gain, whereas fewer and more recent studies have addressed the problems associated with the effects of small amounts of alcohol intake on the fetus. It is surprising that the perceived risk values were not even higher for tobacco use, as the risks associated with smoking are clearly documented and known to pregnant smokers, as noted by their knowledge scores and the advice given to pregnant women by health professionals. The results for perceived risk, as with perceived concern, may also have been a function of the women's actual behavior.

Women had almost identical scores regarding perceived usefulness of the information in how it had influenced their health behaviors (mean rating of alcohol usefulness=3.38, mean rating of weight gain usefulness=3.33, and mean rating of smoking usefulness=3.16). Further information about this component would have been secured if the women had been asked about the nature of the information obtained. Was the information comprehensive? Was the information stated as "advice" or as a "comment?" If advice was given, was the reasoning behind the recommendation provided?

Smoking was perceived as being the most difficult behavior to change during pregnancy (perceived barrier mean score=2.90), in contrast, alcohol consumption was perceived as being the least difficult behavior to change during pregnancy (perceived barrier mean score=0.28). These differences may have been a function of the addictive component of smoking behaviors or it may have been a function of the fact that women were provided with little information on how to quit smoking. Only four individuals were provided with advice on how to quit. Women perceived few barriers in managing their weight gain (perceived barrier mean score=1.83) during pregnancy. However, it was most surprising to find that fifteen individuals actually perceived weight gain during pregnancy to be a natural physiologic process over which they had no control. This finding has implications for counselling of pregnant women as it may be necessary to inform women that estimated caloric requirements for a pregnancy range from 80,000 to 85,000 calories, resulting in a recommendation of increasing intake during the first trimester by 100 calories per day and by increasing intake during the second and third trimesters by 300 calories per day (Health and Welfare Canada: Recommended Nutrient Intake for Canadians, 1984). Barring any medical conditions or complications, weight gain is in the control of pregnant woman. Changing the misconception that weight gain is a natural physiologic process which women have no control over is warranted. Another implication for practice comes from finding a significant correlation between perceived barriers and age for all three health behaviors. Older pregnant women were more likely to report a higher degree of barriers encountered in managing their health behaviors. When health professionals are counselling older women, these individuals may require additional support for changing their health behaviors during pregnancy. Further research is also warranted on obtaining more information about the types of obstacles that could be experienced by pregnant women. The following questions can be added to the perceived barriers measure: "What influence did nausea have on preventing you from reaching ideal weight gain?", "What influence did decreased appetite have on preventing you from reaching ideal weight gain?", "What influence did stress have on preventing you from reaching ideal weight gain?", "What influence did lack of dietary control have on preventing you from reaching ideal weight gain?", and "What influence did conflicting information have on preventing you from reaching ideal weight gain?". For alcohol and smoking behaviors the following questions could be asked: "Did your partner continue to drink/smoke during your pregnancy?", "If yes, did seeing your husband/partner drink/smoke create an obstacle for you in managing your drinking/smoking habits?". "On a scale of zero to six, rate the amount of support you had received from your husband/partner in helping you to change your drinking/smoking habits." Not only can these questions be included in future research studies examining health beliefs of pregnant women, but also they can be included during the counselling of pregnant women.

Conclusions

Six principal conclusions have been drawn from the findings of this research study. They are as follows:

1. Learning during pregnancy was not limited to learning with one resource in one setting.

Reading materials, physicians, family members (particularly the husband/partner), and prenatal classes were the key resources utilized by pregnant women. Considering that weight gain, alcohol consumption, and tobacco use constitute three of many possible subjects women could learn about during pregnancy, pregnant women spent a substantial amount of time in learning about these three subjects.

2. Other-initiated learning transactions dominated pregnant women's learning about weight gain, alcohol consumption, and tobacco use. How pregnant women learn, that is learning transaction types for the topics of weight gain and alcohol consumption, was not associated with learning outcome or behavior. In contrast, how pregnant women learned about the topic of tobacco use was associated with their level of knowledge but not with behavior outcome, reduced cigarette smoking. It must be remembered that friends and family members had told pregnant smokers that it was okay to smoke, whereas health professionals had told pregnant smokers not to smoke. Since advice from each learning transaction type was not incorporated in the analyses and since advice from each resource in the learning transaction types differed for smoking and did not differ for weight gain and alcohol consumption, it may be that how pregnant women learn is associated with learning outcome if the advice or information obtained from the various resources is not consistent with the medical literature. Therefore Tough's assumptions that learning initiated by an instructor is not superior to other forms of learning may not be supported if conflicting or inaccurate information is provided from some of the resources. Furthermore, how women learn was not found to be associated with any demographic characteristics, therefore, the learner's circumstances and availability of resources may explain how pregnant women learn.

3. Self-initiated learning about weight gain was associated with higher knowledge scores and ideal weight gain; whereas, other-initiated learning about alcohol consumption was associated with higher knowledge scores and reduced alcohol intake. Self-initiated learning, therefore, was not found to be superior to other-initiated learning in terms of

learning outcomes and behavior outcomes. Alcohol consumption is frequently under-reported and this occurrence may have accounted for women's reluctance to initiate learning about this topic. These findings may not be in opposition to Knowles's assumption of self-directed learning, that self-directed learners will learn more and make better use of the information, but rather these findings suggest that the benefits of self-directed learning may be both topic specific and dependent upon the specific sources consulted.

4. Self-initiated learning and knowledge were not directly associated with behavior change of pregnant smokers. However, knowledge was associated with health beliefs and health beliefs in turn were associated with reduced cigarette smoking. Therefore, learning may be indirectly associated with reduced cigarette smoking via its association with health beliefs.

5. The health belief model, as operationalized in this research, was not supported. The alcohol health belief measure was not associated with reduced alcohol intake, and the smoking health belief measure was not associated with reduced cigarette smoking. It may be that a more in-depth operationalization of the components of these measures is warranted. However, the weight gain health belief measure, the perceived weight gain risk component, the perceived smoking risk component, and the perceived smoking concern component were significantly negatively correlated with ideal health behaviors, contrary to the positive associations predicted. The finding of significant results contrary to those predicted according to the assumptions of the health belief model may have been due to the retrospective nature of the study design or may be due to the fact that healthy pregnant women may not associate risk with their condition.

6. The weight gain results are consistent with the conceptual framework of this study. Learning as well as health beliefs were associated with ideal weight gain during pregnancy. The alcohol and smoking results, however, were not consistent with the conceptual framework of this study. For alcohol behaviors, beliefs may be indirectly

associated with reduced alcohol consumption via knowledge. For smoking behaviors, knowledge may be indirectly associated with reduced tobacco use via health beliefs. Results of alcohol and smoking hypotheses testing suggest a new conceptualization of learning during pregnancy, one that is influenced by the specific behavior studied.

Recommendations for Theory, Practice, and Future Research

This research study was a preliminary investigation of the complex process of learning during pregnancy and the relationship between learning, health beliefs, and health behavior. The results pave the way for recommendations for theory, practice, and future research.

Recommendations for Theory

The findings of this study challenge adult educators to re-examine the benefits of self-initiated learning. Numerous adult education programs are based upon the assumption that self-initiated learning is preferable to other-initiated learning. The results of this study suggest that the relationships among the topics studied, the circumstances of the learning environment, as well as the outcomes of learning in various settings may become crucial components in understanding self-initiated learning.

There is some evidence that the components of the conceptual framework developed for this research study describing the learning behaviors during pregnancy are associated with ideal health behaviors. It is recommended that a learning model be developed for predicting health behavior during pregnancy and that this model include the concepts of knowledge, initiators of learning, beliefs, time, and settings of the learning.

Recommendations for Practice

Three major recommendations for practice have been drawn from the findings of this research study. They are described as follows.

1. Adult educators, providing consultative services to physicians, nurses, and dietitians working with pregnant women, should encourage the incorporation of the following recommendations as part of the education process between health care workers and their pregnant clients. These recommendations are based upon the results of this research study, and the rationale behind each recommendation is first stated and described.

   a. Since advice given about weight gain was of a general nature and included comments such as "weight gain is okay" and since advice given about alcohol consumption was of a general nature and included comments such as "drink in moderation" and since advice given about smoking was of a general nature and included comments such as "reduce cigarette smoking" and since the the words "okay", "moderation," and "reduce" can be interpreted in various ways, it is recommended that advice given to pregnant women be as clear and as precise as possible. In addition the information must be based on current medical knowledge.

   b. Since knowledge was associated with ideal weight gain and reduced alcohol intake and since women were not knowledgeable about the risks associated with inadequate weight gain or the pattern of weight gain during pregnancy and since women were not knowledgeable about the risks associated with consuming small amounts of alcohol during pregnancy (two drinks per day or ten drinks per week), it is recommended that pregnant women be given information on these issues. This information can be made available through the three resources most frequently utilized by pregnant women: reading materials, physicians, family members, and prenatal classes.

   c. Since the majority of physicians, nurses, and dietitians had initiated the discussion about weight gain with their pregnant clients and since ideal weight gain was associated with self-initiated learning but not with other-initiated learning, it is recommended that physicians, nurses, and dietitians provide the opportunity to their clients to initiate discourse about weight gain.

d. Since having a weight gain goal was associated with birth weight of the infant, physicians, nurses, and dietitians should assist their clients in establishing a weight gain goal at the beginning of their pregnancy.

e. Since Asiatic women were less likely to be self-initiated learners about weight gain and since Asiatic women were less likely to attend prenatal classes, an organized group activity, it is recommended that physicians, nurses, and dietitians counsel their Asiatic clients on a one-to-one basis and initiate the learning process.

f. Since perceived risk was associated with reduced cigarette smoking, health workers counselling pregnant smokers should identify whether these women perceive their infants to be at risk because of their smoking behaviors. This information can serve as the basis for assisting women to change their smoking habits during pregnancy.

g. Since perceived barriers to managing health behavior was found to be associated with age, it is recommended that health workers identify whether their older clients require additional support in changing their health behaviors during pregnancy.

2. Since 75 percent of the sample had consumed alcohol prior to pregnancy and since 16 percent of drinkers had consumed five or more drinks on any one occasion prior to pregnancy and since amount of alcohol consumed prior to pregnancy was negatively correlated with birth weight and since excessive alcohol consumption during organ development can increase the risk for malformations, an education campaign to alert women about the risks of consuming alcohol at conception and during the first eight weeks of pregnancy is warranted. It was found that common law women had consumed more alcohol prior to pregnancy than single or married women and that common law women were also less likely to plan their pregnancy. It may be that this group require a special education approach. A campaign focusing only on those women who were planning to become pregnant would exclude this high risk group. Sexually active women of childbearing years should be considered the audience for this campaign.

3. Since women on the average had reduced their cigarette smoking by 52 percent and since

18 percent of smokers had not changed or had increased their cigarette smoking and since 11 percent of smokers had continued to smoke more than ten cigarettes per day during pregnancy and since only four individuals reported that they had been given tips on how to quit smoking and since smoking is habitual in nature, pregnant smokers should be encouraged to attend intensive smoking education cessation programs for pregnant women. As noted in Chapter II, Review of the Literature, intensive smoking education programs have been found to be effective in assisting pregnant women to stop smoking during pregnancy. Since smokers were more likely to be younger, not married, of a lower education and socioeconomic level, and of caucasian origin, these education efforts should target women of these characteristics.

Recommendations for Future Research

There is a distinct need for additional research related to examining learning during pregnancy. The following recommendations are made:

1. That research be conducted to develop a typology of learning transaction types that incorporate the notion of "advice" received as well as time in learning, initiators of learning, and settings of learning. This typology of transactions should be related to learning outcomes as well as behavior outcomes. Furthermore, research should be conducted to identify whether women act upon advice in the same way if it is: (1) provided as advice with supporting rationale, or (2) provided as advice without supporting rationale.
2. That research be conducted to identify the process of resource utilization, that is: time of resource acquisition, impact of differing resources, and nature of the information provided by resources. Does information received from a health professional have greater impact than information received from family members or friends? Does information received from one health professional have greater impact than information received from another health professional? Does the sequence of presentation of information by various resources influence the woman's adoption of the information?

3. That research be conducted to determine the dynamics of self-initiated learning and other-initiated learning:
    a. That research be conducted to determine whether individuals' beliefs about the adequacy of their own knowledge influence their engagement in either self-initiated or other-initiated learning.
    b. That research be conducted to determine the dynamics of other-initiated learning. For example, does the absence of the individual who had initiated the learning cause the learner to revert to original behavior.
4. That a prospective research study be conducted to identify knowledge levels and health beliefs at the time the pregnancy is diagnosed as well as knowledge levels and health beliefs at the end of the pregnancy. As well, a time-series design study could be conducted to identify the stability of health beliefs during pregnancy. Does a change in learning behavior occur simultaneously to changes in health beliefs? What is the path of the associations between knowledge and beliefs? Does knowledge influence beliefs, or do beliefs influence engagement in learning and subsequently a change in knowledge.
5. That research be conducted to determine whether self-initiated and other-initiated learning are associated with learning outcomes for non-health learning experiences. As well, that research be conducted with the nonpregnant population to determine whether self-initiated learning and health beliefs are associated with behavior change of other weight management therapies. These therapies could include either weight loss of obese individuals or weight gain for patients with cancer or AIDS.

Epilogue

A new approach to examining learning during pregnancy has provided new information with respect to the dynamics of how adults learn and the relationship between this learning and behavior outcome. Tough's assumption that learning guided by an instructor is not superior to other forms of learning may not apply to learning during pregnancy. This occurrence may be due to the medical intervention during pregnancy and/or the complexity of the science behind the information about weight gain, alcohol consumption, and tobacco use.

The findings of this study indicated that self-initiated learning was associated with higher knowledge about weight gain and ideal weight gain during pregnancy; and, other-initiated learning was associated with higher knowledge about the effects of alcohol on the fetus and reduced alcohol intake during pregnancy. Self-initiated learning may not be superior to other-initiated learning but may be topic specific. However, for the topic of weight gain there is evidence to support two of Knowles's assumptions that the self-directed learner will learn more and make better use of the information. Further research is warranted to incorporate Knowles's comprehensive definition of the self-directed learner, as this study had only examined one component of the definition, initiator of the learning.

Adult educators are challenged to continue the pursuit of studying the learning process during pregnancy as well as incorporate these findings in planning prenatal education programs. Ultimately the goal is to assist pregnant women learn the information they need in order to achieve a healthy pregnancy outcome.

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APPENDIX 1

DEFINITION OF MEDICAL TERMS

Abruptio Placentae: Premature detachment of the normally situated placenta.

Antenatal: Occurring before birth.

Embryo: Stage in prenatal development between the ovum and the fetus, that is, between the second and eighth week of pregnancy.

Fetus: The child in utero from the third month to birth.

Fetal Alcohol Syndrome: Birth defects in infants born to mothers who are heavy drinkers of alcohol during the gestation period.

Gestation: The length of time from conception to birth. The normal range is thirty-seven to forty-one weeks.

Gestational Age: Estimated age of a fetus expressed in weeks, and calculated from the first day of the last menstrual period.

Morbidity: The state of being diseased.

Mortality: Death.

Multiparous/Multigravida: Having borne more than one child.

Neonatal Period: (Total) The time interval from the time of birth through the first twenty-eight completed days of life; (Early) The time interval from the time of birth through the first seven completed days of life; (Late) The time interval beginning at or after the seventh completed day of life through the twenty-eighth completed day of life.

Nulliparous: A woman who has never given birth.

Perinatal: Concerning the period beginning after the twentieth week of pregnancy through the twenty-eighth day following birth.

Placenta: The oval or disc like spongy structure in the uterus through which the fetus derives its nourishment.

Placenta Previa: Placenta that is implanted in the lower uterine segment.

Postpartum: After childbirth.

Prenatal: Before childbirth.

Preterm: Born before the thirty-seventh week of gestation.

Primiparous/Primigravida: A woman experiencing her first pregnancy.

APPENDIX 2

RESEARCH INFORMATION PACKAGE

FOR: HOSPITAL ADMINISTRATORS

THE RELATIONSHIP BETWEEN LEARNING, HEALTH BELIEFS, WEIGHT GAIN, ALCOHOL CONSUMPTION, AND TOBACCO USE OF PREGNANT WOMEN

APPENDIX 5

INITIAL INTRODUCTION TO RESEARCH PARTICIPANTS

Hello, my name is Irene Strychar and I'm conducting research in Adult Education at The University of British Columbia.

I've received permission from the maternity ward's.........(head nurse or other staff)......... to ask you to participate in a research study on the subject of "Learning Patterns of Pregnant Women".

This letter of introduction that I have with me will provide you with some background information about the study. I'm hoping that you will take a few minutes to read it, and then I'll be happy to answer any questions you may have.

APPENDIX 7

RESEARCH CONSENT FORM

Research Study: Learning Patterns of Pregnant Women

I, the undersigned, agree to take part in this research study. I understand that this study is designed to examine the learning that occurs during pregnancy about weight gain, alcohol, and smoking. This study is also designed to examine the relationship between learning, health beliefs, weight gain, alcohol, and smoking habits of pregnant women.

I have been assured that the results of this study will deal with general conclusions and my identity will be protected. I have also been assured that my answers will be kept confidential.

I understand that my decision to participate or not participate in this study will *not* affect the care given to me by hospital personnel in any manner. I have been informed that the interview will take approximately one hour of my time.

I give hospital staff consent to release the following information from my medical records: (1) birth weight of my infant, and (2) number of weeks I was pregnant (medically called gestational age of my infant).

I understand I may withdraw from the study at any time. I have also been informed that, upon my request, I will be able to obtain a summary of the research report at the conclusion of the study. My questions concerning this activity have been answered to my satisfaction.

I,________________________________, have read the above information describing the research study, and agree to participate.

Signature of the Interviewer,________________________________, Irene Strychar, The University of British Columbia

Give Complete Mailing Address if a Summary Report
of the Research Study is Requested
Please Print

Name:____

Address:____

APPENDIX 8

RESEARCH STUDY SUMMARY STATEMENT

Introduction

Pregnancy is a time when numerous changes affect a woman's physical, psychological, and social make up. These changes coupled with a desire to have a healthy baby are powerful motivating forces for the pregnant woman to engage in learning. Educators are constantly seeking a better understanding of the learning process, and those educators dealing with pregnant women strive for optimal behaviors associated with healthy pregnancy outcome. Because of the association of low maternal weight gain, alcohol consumption, and tobacco use with increased incidence of low birth weight, the learning that occurs about weight gain, alcohol, and tobacco is of particular interest to educators. The research questions are: "What are the learning patterns of pregnant women?" and "What is the relationship between learning, health beliefs, weight gain, alcohol consumption, and tobacco use of pregnant women?"

Objectives

The objectives of this study are to identify pregnant women's (a) learning patterns, (b) health behaviors, and (c) health beliefs regarding their weight gain, alcohol consumption, and tobacco use.

Identification of the learning patterns will require determining: what was learned during the pregnancy; which resources were utilized; what advice was given from each resource; what amount of time was spent in learning; and, who initiated the learning. Determining how pregnant women learn will be based upon the work of Allen Tough's report "The Adult's Learning Project".

Identification of women's health beliefs regarding their weight gain, alcohol consumption, and tobacco use will be ascertained by determining women's concern, perceived susceptibility, perceived benefits, and perceived barriers, defined according to an adaptation of the Health Belief Model developed by Hochbaum, Rosenstock, Leventhal, and Kegeles.

Research Method

The research method of the study is an ex post facto design. Women will be interviewed following the delivery of their infants at hospitals in the Lower Mainland of British Columbia. The research instrument of the study is a structured interview schedule. The content of the interview schedule includes: health behaviors, learning patterns, health beliefs, demographic information, and information on the newborn.

Sample

The population of the study are women who have given birth to their first infant in Lower Mainland hospitals of British Columbia with average monthly births of greater than 100. A proportional sample of 120 women will then be selected from: Burnaby, Grace, Lion's Gate, Richmond, Royal Columbian, St. Paul's, and Surrey Memorial hospitals. The sample excludes: women identified by hospital staff as having emotional complications as a result of the pregnancy or birth; women unwilling to participate; women unable to provide oral information in English; women unable to read the written consent form in English; women experiencing their second or subsequent pregnancy; and, women having multiple births.

Procedures

Administrators of the seven selected hospitals in the Lower Mainland will be approached to request hospital endorsement of the study. A research information package will be made available to each hospital. The package includes: a Letter of Introduction to Hospitals, Initial Introduction to Research Participants, Letter of Introduction to Research Participants, Research Consent Form, Research Study Summary Statement, and Learning Patterns of Pregnant Women Interview Schedule.

Every attempt will be made during data collection to accommodate management styles of each hospital as long as the overall design of the research study is not jeopardized. The following data collection procedures are then proposed: The researcher will request from Admissions Department the names of nulliparous women who were admitted to the maternity ward on the preceding day. Participants will be randomly selected from this information using a table of random numbers. Following, the researcher will approach the charge nurse or other appointed hospital personnel to determine whether the women randomly selected meet eligibility criteria of the study. Should the women meet eligibility criteria, they will be advised by the attending physician *or* hospital personnel that a researcher from The University of British Columbia would be interested in meeting with them to request their participation in a study about learning during pregnancy. If the women grant permission for the researcher to approach them, a time convenient to both hospital personnel and each woman will be established so that the researcher can meet with the woman in her hospital room to describe the purpose of the research and request her participation in the study. At this time a letter of introduction will be given to the woman. It will be made explicit that participation is voluntary and she can withdraw from the study at any time. Before conducting the interview, the woman will be asked to sign a written consent form. The interview is approximately one hour in length. Following the interview, the researcher will approach the nursing staff or other appointed hospital personnel to be provided with the birth weight of the infant and gestational age of the infant (as documented by physician examination) from medical records. The woman and hospital staff will be thanked for their cooperation.

Significance

The study will contribute to the knowledge on learning during pregnancy. Research to date has been limited to and focused on: providing a descriptive profile of women attending prenatal classes; examining women's sources of information; and, examining the effect of education and counselling intervention strategies on women's health behaviors. This study may provide insights that may be useful to educators seeking to increase their understanding of learning behaviors during pregnancy. Further, the findings may suggest ways of improving the effectiveness of prenatal education.

APPENDIX 9

LEARNING PATTERNS OF PREGNANT WOMEN INTERVIEW SCHEDULE

DOCTORAL DISSERTATION RESEARCH INSTRUMENT

THE UNIVERSITY OF BRITISH COLUMBIA

Irene Strychar

Adult Education

July 19, 1986

LEARNING PATTERNS OF PREGNANT WOMEN INTERVIEW SCHEDULE

The wording in parentheses ( ) [ ], coding definitions, and point assignments are for the interviewer's coding purposes and recording.

1. [Mother's name:]______________________________
   First digit code: 1=Grace 5=Burnaby
   2=Royal Columbian 6=Lion's Gate
   3=Surrey Memorial 7=St. Paul's
   4=Richmond 8=Langley _ _ _
2. [Father present during the interview:]
   __________(no) code 1
   __________(yes) code 2 _
3. How are you feeling?
4. Did you have a boy or a girl?
   __________(boy) code=1
   __________(girl) code=2 _
5. On what day did you have your baby?
   ____
   (Date of the interview:)__________
   (Number of days postpartum:)__________ code= days postpartum _
6. How old are you?
   __________(age in years) code= years _ _
7. How tall are you?
   __________(feet/inches)
   __________(centimeters) code=in. _ _ _
8. What is your frame size? [Measurement of right wrist Circumference]
   __________(inches)
   code 1=small, code 2=medium, code 3=large _
9. What was your weight just before you became pregnant?
   __________(pounds)
   __________(kilos) code=pounds _ _ _
   code 1= less than 90% of ideal weight
   code 2= 90% to 120% of ideal weight
   code 3= greater than 120% of ideal weight code= 1,2,3 _

   [Recommended prenatal weight gain:] ________ code=pounds _ _
10. What did you weigh just before delivery?
    (If the mother is unable to answer this question, then ask: "What did you weigh at your last doctor's visit?"
    __________(pounds)
    __________(kilos) code=pounds _ _ _

11a. Did you smoke before you were pregnant?
____________(no) code 1
____________(yes) code 2 _

(if a smoker before pregnancy)

11b. On the average, how many cigarettes did you smoke per day one month before you became pregnant?
____ _ _

12a. **Did you smoke during this pregnancy**?
____
____
____
code 1=no, code 2=yes _

12b. On the average, how many cigarettes did you smoke per day during the first three months of pregnancy?
____ _ _

12c. On the average, how many cigarettes did you smoke per day during the fourth, fifth, and sixth months of pregnancy?
____ _ _

12d. On the average, how many cigarettes did you smoke per day during the seventh, eight, and ninth months of pregnancy?
____ _ _

(if abstained from smoking during pregnancy)

12e. When did you stop smoking?
____
code 1= tri 1, code 2= tri 2, code 3= tri 3 _

12f. When did you learn that you were pregnant?
____
code 1= stopped upon knowing of the pregnancy
code 2= stopped after knowing of the pregnancy _

12g. After you stopped smoking, did you ever smoke again before delivery?
____________(no) code 1
____________(restarted) code 2
____________(occasionally) code 3 _

13a. Did you drink alcoholic beverages one month before you became pregnant?
____________(no) code 1
____________(yes) code 2 _

(if drank before the pregnancy)

13b. What type of beverage did you usually drink? (type)	13c. How many drinks did you usually have at a time? (amount)	13d. How many times per week did you drink? (frequency)

beer:	1_____	bottles:_ _ ._	times:_ ._
cider:	2_____	bottles:_ _ ._	times:_ ._
wine:	3_____	5 ozs:_ _ ._	times:_ ._
liquor:	4_____	1.5ozs:_ _ ._	times:_ ._
liqueur:	5_____	1.5ozs:_ _ ._	times:_ ._

14a. Did you drink alcoholic beverages during this pregnancy?

____

____

____

code 1=no, code 2=yes _

During the first three months:

14b. What type of beverage did you usually drink?		14c. How many drinks did you usually have at a time?	14d. How many times per week did you drink?
(type)		(amount)	(frequency)
beer:	1_____	bottles:_ _ ._	times:_ ._
cider:	2_____	bottles:_ _ ._	times:_ ._
wine:	3_____	5 ozs:_ _ ._	times:_ ._
liquor:	4_____	1.5ozs:_ _ ._	times:_ ._
liqueur:	5_____	1.5ozs:_ _ ._	times:_ ._

During the fourth, fifth, and sixth months:

14e. What type of beverage did you usually drink?		14f. How many drinks did you usually have at a time?	14g. How many times per week did you drink?
(type)		(amount)	(frequency)
beer:	1_____	bottles:_ _ ._	times:_ ._
cider:	2_____	bottles:_ _ ._	times:_ ._
wine:	3_____	5 ozs:_ _ ._	times:_ ._
liquor:	4_____	1.5ozs:_ _ ._	times:_ ._
liqueur:	5_____	1.5ozs:_ _ ._	times:_ ._

During the seventh, eighth, and ninth months:

14h. What type of beverage did you usually drink?		14i. How many drinks did you usually have at a time?	14j. How many times per week did you drink?
(type)		(amount)	(frequency)
beer:	1_____	bottles:_ _ ._	times:_ ._
cider:	2_____	bottles:_ _ ._	times:_ ._
wine:	3_____	5 ozs:_ _ ._	times:_ ._
liquor:	4_____	1.5ozs:_ _ ._	times:_ ._
liqueur:	5_____	1.5ozs:_ _ ._	times:_ ._

(if abstained from drinking during pregnancy)

14j. When did you stop drinking?

____
code 1= tri 1, code 2= tri 2, code 3=tri 3 _

14k. When did you learn about your pregnancy?

____
code 1= stopped upon knowing of the pregnancy
code 2= stopped after knowing of the pregnancy _

14l. After you stopped drinking, did you ever drink again before delivery?
__________(occasionally) code 1
__________(restarted) code 2
__________(did not drink again) code 3 _

15a. What is a safe amount of alcohol to drink during pregnancy?

____
7 points = no safe limits established, or no alcohol
3 points = occasionally, small amounts, not daily, or less than 2 drinks on one occasion
0 points = don't know, large amounts, 1 drink or more daily, or more than 2 drinks on one occasion _

15b. Where did you get that information?

____
(code as many as applicable)
code 1=doctor, code 2=nurse, code 3=dietitian, code 4=prenatal classes, code 5=husband, code 6=mother, code 7=family, code 8=family, health professional, code 9=friend, code 10= friend, health professional
code 11= print material, code 12= audio/visual, code 13= health food store, code 14= myself, code 15= previous knowledge, code 16= other source
__/__/__/__/__/__

16. What effect does alcohol have on the baby during pregnancy?
(Show card)

0	1	2	3	4	5	6
no effect		little effect		moderate effect		high effect

4 points = 6 on the scale
3 points = 5 on the scale
2 points = 4 on the scale
1 point = 2 to 3.9 on the scale
0 points = less than 2 on the scale _

17a. When a woman drinks **small quantities** of alcohol during pregnancy, would there be any effect on the baby?
__________(no)
__________(yes)
__________(don't know)

17b. (if yes) What kind of possible effects?

4 points= yes, and low birth weight, or small baby
2 points= yes, and crosses placenta, mother drinks baby drinks
1 point = yes, and depressant
0 points= no effect, or don't know _

18a. When a woman drinks **large quantities** of alcohol during pregnancy, would there be any effect on the baby?
____________(no)
____________(yes)
____________(don't know)

18b. (if yes) What kind of possible effects?

7 points= yes, low birthweight, brain development, and fetal alcohol syndrome
5 points= yes, and 2 of the above
4 points= yes, and 1 of the above
3 points= yes, and crosses placenta, or developmental problems
1 point = yes, and depressant
0 points= no effect, or don't know _

19a. What is a safe amount of cigarettes to smoke during pregnancy?

6 points = none
3 points = less than or equal to 5 cigarettes per day
0 points = more than 5 cigarettes per day, or don't know _

19b. Where did you get that information?

(code as many as applicable)
code 1=doctor, code 2=nurse, code 3=dietitian, code 4=prenatal classes, code 5=husband, code 6=mother, code 7=family, code 8=family, health professional, code 9=friend, code 10= friend, health professional
code 11= print material, code 12= audio/visual, code 13= health food store, code 14= myself, code 15= previous knowledge, code 16= other source
__/__/__/__/__/__

20. What effect does smoking have on the baby during pregnancy?
(Show card)

0	1	2	3	4	5	6
no effect		little effect		moderate effect		high effect

4 points = 6 on the scale
3 points = 5 on the scale
2 points = 4 on the scale
1 point = 2 to 3.9 on the scale
0 points = less than 2 on the scale _

21a. When a woman smokes **small amounts** during pregnancy, would there be any effect on the baby?
____________(no)
____________(yes)

____________(don't know)
3 points = yes
0 points = no, or don't know
_

21b. (if yes) What kind of possible effects?

____

22a. When a woman smokes **large amounts** during pregnancy, would there be any effect on the baby?
____________(no)
____________(yes)
____________(don't know)

22b. (if yes) What kind of possible effects?

____
9 points= yes, low birth weight, prematurity, and placenta problems
7 points= yes, and 2 of the above
5 points= yes, and 1 of the above
3 points= yes, and decrease oxygen, or mother smokes baby smokes
2 points= yes, and respiratory problems
0 points= no effect, or don't know
_

23. If a woman stops smoking by the fourth month of pregnancy, is she at the same risk as a non smoker?
____________(no, greater risk than a non smoker)
____________(yes, same risk as a non smoker)
____________(don't know)
2 points= yes, at same risk as the non smoker
1 points= no, and explains why risk is different
0 points= no, or don't know
_

24a. Ideally, how much weight do you think a woman should gain while she is pregnant?

____
3 points = 24-30 lbs
2 points = 20-24 lbs, 20-30 lbs, or 30-35 lbs
1 point = no more than 20-25 lbs
0 points = less than 20 lbs, more than 35 lbs, or don't know
_

24b.(If the woman says she cannot answer the question since it depends on the woman's size, then ask her "How much weight should the normal weight woman gain while she is pregnant?")

____
4 points = 24-30 lbs
3 points = 20-24 lbs, 20-30 lbs, or 30-35 lbs
2 points = no more than 20-25 lbs
1 point = less than 20 lbs, more than 35 lbs [record answer as part of 24a]

24c. Where did you get that information?

____
(code as many as applicable)
code 1=doctor, code 2=nurse, code 3=dietitian, code 4=prenatal classes, code 5=husband, code 6=mother, code 7=family, code 8=family, health professional, code 9=friend, code 10= friend, health professional, code 11= print material, code 12= audio/visual, code 13= health food store, code 14= myself, code 15= previous knowledge, code 16= other source

__/__/__/__/__/__

25. Should a pregnant woman ever lose weight during pregnancy?
____________(no) 2 points
____________(yes) 0 points
____________(don't know) 0 points
_

26a. Do you think an overweight woman should gain the same amount of weight as a normal weight woman?
____________(yes)
____________(no)
____________(don't know)

26b. (if no) How much weight should an overweight woman gain?

____

2 points = no, and between 15 and 20 lbs
1 point = no, and 20-30 lbs, or less than normal weight women
1 point = no, and less than 15 lbs
0 points = don't know
_

27a. Do you think an underweight woman should gain the same amount of weight as a normal weight woman?
____________(yes)
____________(no)
____________(don't know)

27b. (if no) How much weight should an underweight woman gain?

____

2 points = no, and greater than 30 lbs, or add amount underweight
1 point = no, and 24-30 lbs, or more than normal weight woman
0 points = no, and less than 24 lbs.
0 points = don't know
_

28. Ideally, how many pounds should a normal weight woman gain during her first three months of pregnancy?

____

2 points = 1 to 4 lbs.
1 point = greater than 4 lbs.
0 points = no weight gain
0 points = don't know
_

29. Ideally, what do you think the **average weekly weight gain** should be during the fourth, fifth, and sixth months of pregnancy?

____

2 points = .75 to 1 lb weekly
1 point = 1-2 lbs, or less .75 lbs
0 points = don't know, or more than 2 lbs
_

30. Ideally, what do you think the **average weekly weight gain** should be during the seventh, eighth, and ninth months of pregnancy?

____

2 points = .75 to 1 lb weekly
1 point = 1-2 lbs, or less than .75 lbs
0 points = don't know, or more than 2 lbs
_

31a. Is there a minimum amount of **total weight** a woman should gain during pregnancy?

__________(no)
__________(yes)
__________(don't know)

31b. (if yes) How much should that be?

____

2 points = yes, 15-24 lbs
1 point = yes, greater than 24 lbs, or less than 15 lbs
0 points = no, or don't know __

32a. Is there a minimum amount of weight a woman should gain **weekly** during the fourth, fifth, and sixth months of pregnancy?

__________(no)
__________(yes)
__________(don't know)

32b. (if yes) How much should that be?

____

3 points = yes, and .5 lbs.
2 points = yes, and greater than .5 lbs.
1 point = yes, and less than .5 lbs.
0 points = no
0 points = don't know __

33a. Is there a minimum amount of weight a woman should gain **weekly** during the seventh, eighth, and ninth months of pregnancy?

__________(no)
__________(yes)
__________(don't know)

33b. (if yes) How much should that be?

____

3 points = yes, and .5 lbs.
2 points = yes, and greater than .5 lbs.
1 point = yes, and less than .5 lbs.
0 points = no
0 points = don't know __

34a. Is it important for a pregnant woman to gain weight?

__________(no)
__________(yes)
__________(don't know)

34b. (if yes) Why is it important?

____

2 points = yes, birth weight (growth), or development
1 points = yes, nourishment of the baby
0 points = no, or don't know __

35. What effect does the amount of weight gain have on the birthweight of the infant?
(Show card)

0	1	2	3	4	5	6
no effect		little effect		moderate effect		high effect

2 points = 4 to 6 on the scale
1 point = 2 to 3.9 on the scale
0 points = less than 2 on the scale _

36. When a doctor or nurse refers to a **very small baby**, how many pounds do you think that baby would weigh?
__________(pounds) _ _ . _
code 1 = less than 4.5 lbs
code 2 = 4.5 to 4.99 lbs
code 3 = 5.0 to 5.49 lbs
code 4 = 5.5 to 5.99 lbs
code 5 = greater than 6.0 lbs _

37. What potential health problems could a very small baby [premature] have?

3 points = mortality, morbidity, and postnatal development problems
2 points = any 2 of the above
1 point = 1 of the above, or health problems
0 points = no problems
0 points = don't know _

38a. Did you attend prenatal classes?
__________(no) code 1
__________(yes) code 2 _

38b. (if no) Why did you not attend?

code 1 = had enough knowledge
code 2 = no one had recommended it
code 3 = partner did not want to go
code 4 = did not know about it
code 5 = no time
code 6 = got information elsewhere
code 7 = did not think much about it
code 8 = no special reason
code 9 = too late in the pregnancy
code 10 = other reason _

38c. (if yes) Where did you attend the classes?

code 01 = Vancouver City Health Department
code 02 = Boundary Health Department
code 03 = Burnaby Health Department
code 04 = North Shore Health Department
code 05 = Richmond Health Department
code 06 = Central Fraser Valley Health Department
code 07 = Upper Fraser Valley Health Department
code 08 = Simon Fraser Health Department

code 09= Surrey Hospital
code 10= Grace Hospital
code 11= St. Paul's Hospital
code 12= Vancouver Childbirth Association
code 13= Other [if other, please specify]______________________ __/__

38d. How many weeks were you pregnant when you attended your first class?

code 1= tri 1, code 2= tri 2, code 3= tri 3 __

38e. How long were the classes?

__________(minutes per session) ___
__________(total number of sessions) __
code 1= early bird and regular series
code 2= early bird only
code 3= regular series only __

38f. How frequently was prenatal weight gain discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) __

38g. Approximately how much time was spent in class discussing prenatal weight gain?
__________(minutes) ___

38h. How frequently was prenatal alcohol discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) __

38i. Approximately how much time was spent in class discussing prenatal alcohol issues?
__________(minutes) ___

38j. How frequently was prenatal smoking discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) __

38k. Approximately how much time was spent in class discussing prenatal smoking issues?
__________(minutes) ___

38l. Whose idea was it that you attend prenatal classes?
__________(self) code 1
__________(other) code 2
__________(both) code 3 __

(code as many as applicable)
code 1=doctor, code 2=nurse, code 3=dietitian, code 4=prenatal classes,

code 5=husband, code 6=mother, code 7=family, code 8=family, health professional, code 9=friend, code 10= friend, health professional
code 11= print material, code 12= audio/visual, code 13= health food store, code 14= myself, code 15= previous knowledge, code 16= other source
__ __/ __ __/ __ __/ __ __/ __ __/ __ __

38m. Did you attend prenatal classes by yourself?
____________(no) code 1
____________(yes) code 2 __

38n. What advice was given to you at prenatal classes about weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= other advice
code 17= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

38o. What advice was given to you at prenatal classes about alcohol?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce intake
code 11= other advice
code 12= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

38p. What advice was given to you at prenatal classes about smoking?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes

code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= other advice
code 15= no advice __/__/__/__/__/__

39. When did you first see a doctor about your pregnancy?

____

code 1= tri 1, code 2= tri 2, code 3= tri 3 _

40. How many times did you visit a doctor during your pregnancy?

____

code = total number of visits __________ _ _

41a. Did you **discuss prenatal weight gain with your family doctor?**
__________(no) code 1
__________(yes) code 2 _

41b. (if yes) Who brought up the topic?
__________(self) code 1
__________(other) code 2
__________(both) code 3 _

41c. How frequently was prenatal weight gain discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) _

41d. Approximately how much time did you spend discussing weight gain?
__________(minutes) _ _ _

41e. What advice did the doctor give you about prenatal weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= other advice
code 17= no advice __/__/__/__/__/__

42a. Did you **discuss prenatal alcohol intake with your family doctor?**
____________(no) code 1
____________(yes) code 2 _

42b. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _

42c. How frequently was prenatal alcohol discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _

42d. Approximately how much time did you spend discussing alcohol intake?
____________(minutes) _ _ _

42e. What advice did the doctor give you about alcohol intake during pregnancy?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= other advice
code 12= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _

43a. Did you **discuss prenatal smoking issues with your family doctor?**
____________(no) code 1
____________(yes) code 2 _

43b. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _

43c. How frequently was prenatal smoking discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _

43d. Approximately how much time did you spend discussing smoking issues?
____________(minutes) _ _ _

43e. What advice did the doctor give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke

code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= other advice
code 15= no advice __/__/__/__/__/__

44a. Did you see an obstetrician or gynecologist during your pregnancy? [Before labour began]
____________(no) code 1
____________(yes) code 2 _

44b. Did you **discuss prenatal weight gain with an obstetrician/gynecologist**?
____________(no) code 1
____________(yes) code 2 _

44c. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _

44d. How frequently was prenatal weight gain discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _

44e. Approximately how much time did you spend discussing weight gain?
____________(minutes) _ _ _

44f. What advice did the obstetrician/gynecologist give you about prenatal weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember

code 15= don't lose weight
code 16= other advice
code 17= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

45a. Did you **discuss prenatal alcohol intake with an obstetrician/gynecologist**?
____________(no) code 1
____________(yes) code 2 __

45b. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 __

45c. How frequently was prenatal alcohol discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) __

45d. Approximately how much time did you spend discussing alcohol intake?
____________(minutes) __ __ __

45e. What advice did the obstetrician/gynecologist give you about alcohol intake during pregnancy?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= other advice
code 12= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

46a. Did you **discuss prenatal smoking issues with an obstetrician/gynecologist**?
____________(no) code 1
____________(yes) code 2 __

46b. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 __

46c. How frequently was prenatal smoking discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) __

46d. Approximately how much time did you spend discussing smoking issues?
____________(minutes) __ __ __

46e. What advice did the obstetrician/gynecologist give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= other advice
code 15= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

47a. Did you **discuss prenatal weight gain with a nurse**?
__________(no) code 1
__________(yes) code 2 __
(if yes):Was the nurse a friend or family member?
[if yes, proceed to section on friends or family]
:Was the discussion part of prenatal class?
[if yes, proceed to question 48]
[if no, then proceed with questions below]

47b. Who brought up the topic?
__________(self) code 1
__________(other) code 2
__________(both) code 3 __

47c. How frequently was prenatal weight gain discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) __

47d. Approximately how much time did you spend discussing weight gain?
__________(minutes) __ __ __

47e. What advice did the nurse give you about prenatal weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus

code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= other advice
code 17= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

48a. Did you **discuss prenatal alcohol intake with a nurse**?
____________(no) code 1
____________(yes) code 2 __
(if yes):Was the nurse a friend or family member?
[if yes, proceed to section on friends or family]
:Was the discussion part of prenatal class?
[if yes, proceed to question 48]
[if no, then proceed with questions below]

48b. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 __

48c. How frequently was prenatal alcohol discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) __

48d. Approximately how much time did you spend discussing alcohol intake?
____________(minutes) __ __ __

48e. What advice did the nurse give you about alcohol intake during pregnancy?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= other advice
code 12= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

49a. Did you **discuss prenatal smoking issues with a nurse**?
____________(no) code 1
____________(yes) code 2 __
(if yes):Was the nurse a friend or family member?
[if yes, proceed to section on friends or family]
:Was the discussion part of prenatal class?
[if yes, proceed to question 48]
[if no, then proceed with questions below]

49b. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _

49c. How frequently was prenatal smoking discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _

49d. Approximately how much time did you spend discussing smoking issues?
____________(minutes) _ _ _

49e. What advice did the nurse give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= other advice
code 15= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _

50a. Did you see a dietitian or nutritionist during your pregnancy?
____________(no) code 1
____________(yes) code 2 _

50b. Did you **discuss prenatal weight gain with a dietitian**?
____________(no) code 1
____________(yes) code 2 _

50c. (if yes) Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _

50d. How frequently was prenatal weight gain discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _

50e. Approximately how much time did you spend discussing weight gain?
____________(minutes) _ _ _

50f. What advice did the dietitian give you about prenatal weight gain?

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= diet plan
code 17= other advice
code 18= no advice __/__/__/__/__/__

51a. Did you **discuss prenatal alcohol intake with a dietitian?**
______(no) code 1
______(yes) code 2 _

51b. (if yes) Who brought up the topic?
______(self) code 1
______(other) code 2
______(both) code 3 _

51c. How frequently was prenatal alcohol discussed?
______code 1= (once)
______code 2= (2 to 3 times)
______code 3= (more than 3 times)
______code 4= (every time) _

51d. Approximately how much time did you spend discussing alcohol intake?
______(minutes) _ _ _

51e. What advice did the dietitian give you about alcohol intake during pregnancy?

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= other advice
code 12= no advice __/__/__/__/__/__

52a. Did you **discuss prenatal smoking issues with a dietitian?**

__________(no) code 1
__________(yes) code 2 _

52b. (if yes) Who brought up the topic?
__________(self) code 1
__________(other) code 2
__________(both) code 3 _

52c. How frequently was prenatal smoking discussed?
__________code 1= (once)
__________code 2= (2 to 3 times)
__________code 3= (more than 3 times)
__________code 4= (every time) _

52d. Approximately how much time did you spend discussing smoking issues?
__________(minutes) _ _ _

52e. What advice did the dietitian give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= other advice
code 15= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _

53a. Did you **discuss prenatal weight gain with a family member**?
__________(no) code 1
__________(yes) code 2 _

53b. (if yes) Who did you speak to?
__________(husband) code 1
__________(mother) code 2
__________(mother-in-law) code 3
__________(other family member) code 4 _/ _/ _/ _

53c. Was the family member a health professional?
__________(no) code 1
__________(yes) code 2 _/ _/ _/ _

53d. (if yes) What did she/he do?

____

code 1= dietitian
code 2= doctor
code 3= nurse
code 4= other _/ _/ _/ _

53e. Who brought up the topic of weight gain?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _/ _

53f. How frequently was prenatal weight gain discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _/ _

53g. Approximately how much time did you spend discussing weight gain?
____________(minutes) _ _ _/ _ _ _/ _ _ _/ _ _ _

53h. What advice did your (partner-husband/ mother/ other family member) give you about prenatal weight gain?
____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= discussed personal experiences
code 17= follow doctor's suggestions
code 18= don't worry if doctor says its ok
code 19= other advice
code 20= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

54a. Did you **discuss prenatal alcohol intake with a family member?**
____________(no) code 1
____________(yes) code 2 _

54b. (if yes) Who did you speak to?
____________(husband) code 1
____________(mother) code 2
____________(mother-in-law) code 3
____________(other family member) code 4 _/ _/ _/ _

54c. Was the family member a health professional?
____________(no) code 1
____________(yes) code 2 _/ _/ _/ _

54d. (if yes) What did she/he do?

____

code 1= dietitian
code 2= doctor
code 3= nurse
code 4= other _/ _/ _/ _

54e. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _/ _

54f. How frequently was prenatal alcohol discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _/ _

54g. Approximately how much time did you spend discussing alcohol intake?
____________(minutes) _ _ _/ _ _ _/ _ _ _/ _ _ _

54h. What advice did your (partner-husband/ mother/ family member) give you about alcohol intake during pregnancy?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= discussed personal experiences
code 12= follow doctor's suggestions
code 13= don't worry if doctor says its ok
code 14= other advice
code 15= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

55a. Did you **discuss prenatal smoking issues with a family member**?
____________(no) code 1
____________(yes) code 2 _

55b. (if yes) Who did you speak to?
____________(husband) code 1
____________(mother) code 2
____________(mother-in-law) code 3
____________(other family member) code 4 _/ _/ _/ _

55c. Was the family member a health professional?
____________(no) code 1

____________(yes) code 2 _/ _/ _/ _

55d. (if yes) What did she/he do?

____

code 1= dietitian
code 2= doctor
code 3= nurse
code 4= other _/ _/ _/ _

55e. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _/ _

55f. How frequently was prenatal smoking discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _/ _

55g. Approximately how much time did you spend discussing smoking issues?
____________(minutes) _ _ _/ _ _ _/ _ _ _/ _ _ _

55h. What advice did your (partner-husband/ mother/ other family member) give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= discussed personal experiences
code 15= follow doctor's suggestions
code 16= don't worry if doctor says its ok
code 17= other advice
code 18= no advice

_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

56a. How many friends did you talk to about prenatal issues?
____________(total number) _ _
[if greater than three, think of the three most meaningful discussions]

56b. Did you **discuss prenatal weight gain with a friend?**
____________(no) code 1
____________(yes) code 2 _

56c. (if yes) Was your friend a health professional?
____________(no) code 1
____________(yes) code 2 _/ _/ _

56d. (if yes) What did she/he do?
____

code 1= dietitian
code 2= doctor
code 3= nurse
code 4= other _/ _/ _

56e. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _

56f. How frequently was prenatal weight gain discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _

56g. Approximately how much time did you spend discussing weight gain?
____________(minutes) _ _ _/ _ _ _/ _ _ _

56h. What advice did your friend(s) give you about prenatal weight gain?
____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= discussed personal experiences
code 17= follow doctor's suggestions
code 18= don't worry if doctor says its ok
code 19= other advice
code 20= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

57a. Did you **discuss prenatal alcohol intake with a friend**?
____________(no) code 1
____________(yes) code 2 _

57b. (if yes) Was your friend a health professional?

____________(no) code 1
____________(yes) code 2 _/ _/ _

57c. (if yes) What did she/he do?

____

code 1= dietitian
code 2= doctor
code 3= nurse
code 4= other _/ _/ _

57d. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _

57e. How frequently was prenatal alcohol discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _

57f. Approximately how much time did you spend discussing alcohol intake?
____________(minutes) _ _ _/ _ _ _/ _ _ _

57g. What advice did your friend(s) give you about alcohol intake during pregnancy?

____

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol intake
code 11= discussed personal experiences
code 12= follow doctor's suggestions
code 13= don't worry if doctor says its ok
code 14= other advice
code 15= no advice

_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

58a. Did you **discuss prenatal smoking issues with a friend?**
____________(no) code 1
____________(yes) code 2 _

58b. (if yes) Was your friend a health professional?
____________(no) code 1
____________(yes) code 2 _/ _/ _

58c. (if yes) What did she/he do?

____

code 1= dietitian

code 2= doctor
code 3= nurse
code 4= other _/ _/ _

58d. Who brought up the topic?
____________(self) code 1
____________(other) code 2
____________(both) code 3 _/ _/ _

58e. How frequently was prenatal smoking discussed?
____________code 1= (once)
____________code 2= (2 to 3 times)
____________code 3= (more than 3 times)
____________code 4= (every time) _/ _/ _

58f. Approximately how much time did you spend discussing smoking issues?
____________(minutes) _ _ _/ _ _ _/ _ _ _

58g. What advice did your friend(s) give you about smoking during pregnancy?

____

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= discussed personal experiences
code 15= follow doctor's suggestions
code 16= don't worry if doctor says its ok
code 17= other advice
code 18= no advice _ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _
_ _/ _ _/ _ _/ _ _/ _ _/ _ _

59a. During your pregnancy, did you read any **books** that discussed prenatal weight gain, alcohol, or smoking?
____________(no) code 1
____________(yes) code 2 _
____________(total number) _ _
[if number is greater than 8:]
____________(total self initiated) _ _
____________(total other initiated) _ _
____________(total incidental cases) _ _

(if yes)
59b. Which books did you read?

59c. Whose idea was it that you read book #_

(if other) Who was it?

Book 1:	(self) code 11	__ __	
	(other) code 12	__ __	__ __
Book 2:	(self) code 21	__ __	
	(other) code 22	__ __	__ __
Book 3:	(self) code 31	__ __	
	(other) code 32	__ __	__ __
Book 4:	(self) code 41	__ __	
	(other) code 42	__ __	__ __
Book 5:	(self) code 51	__ __	
	(other) code 52	__ __	__ __
Book 6:	(self) code 61	__ __	
	(other) code 62	__ __	__ __
Book 7:	(self) code 71	__ __	
	(other) code 72	__ __	__ __
Book 8:	(self) code 81	__ __	
	(other) code 82	__ __	__ __
Other Books:		__ __	__ __

59d. Did book #__ discuss prenatal weight gain?	59e. Did book #__ discuss prenatal alcohol issues?	59f. Did book #__ discuss prenatal smoking issues?
Book #1:(no) code 11__ __	(no) code 11__ __	(no) code 11 __ __
(yes)code 12 __ __	(yes) code 12__ __	(yes) code 12__ __
Book #2:(no) code 21__ __	(no) code 21__ __	(no) code 21 __ __
(yes)code 22 __ __	(yes) code 22__ __	(yes) code 22__ __
Book #3:(no) code 31__ __	(no) code 31__ __	(no) code 31 __ __
(yes)code 32 __ __	(yes) code 32__ __	(yes) code 32__ __
Book #4:(no) code 41__ __	(no) code 41__ __	(no) code 41 __ __
(yes)code 42 __ __	(yes) code 42__ __	(yes) code 42__ __
Book #5:(no) code 51__ __	(no) code 51__ __	(no) code 51 __ __
(yes)code 52 __ __	(yes) code 52__ __	(yes) code 52__ __
Book #6:(no) code 61__ __	(no) code 61__ __	(no) code 61 __ __
(yes)code 62 __ __	(yes) code 62__ __	(yes) code 62__ __
Book #7:(no) code 71__ __	(no) code 71__ __	(no) code 71 __ __
(yes)code 72 __ __	(yes) code 72__ __	(yes) code 72__ __
Book #8:(no) code 81__ __	(no) code 81__ __	(no) code 81 __ __
(yes)code 82 __ __	(yes) code 82__ __	(yes) code 82__ __
Total Books: __ __	__ __	__ __

60a. During your pregnancy, did you read any **magazine or newspaper articles** that discussed prenatal weight gain, alcohol, or smoking?

____________(no) code 1

____________(yes) code 2 __

____________(total number) __ __

[if number is greater than 8:]

____________(total self initiated) __ __

____________(total other initiated) __ __

____________(total incidental cases) __ __

(if yes)

60b. Which articles did you read?

60c. Whose idea was it that you read article #__

(if other) Who was it?

Article 1:	(self) code 11	__	
	(other) code 12	__	__
Article 2:	(self) code 21	__	
	(other) code 22	__	__
Article 3:	(self) code 31	__	
	(other) code 32	__	__
Article 4:	(self) code 41	__	
	(other) code 42	__	__
Article 5:	(self) code 51	__	
	(other) code 52	__	__
Article 6:	(self) code 61	__	
	(other) code 62	__	__
Article 7:	(self) code 71	__	
	(other) code 72	__	__
Article 8:	(self) code 81	__	
	(other) code 82	__	__
Other Articles:		__	__

60d. Did article #_ discuss prenatal weight gain?	60e. Did article #_ discuss prenatal alcohol issues?	60f. Did article #_ discuss prenatal smoking issues?
Article #1:(no) code 11__	(no) code 11__	(no) code 11__
(yes)code 12__	(yes)code 12__	(yes)code 12__
Article #2:(no) code 21__	(no) code 21__	(no) code 21__
(yes)code 22__	(yes)code 22__	(yes)code 22__
Article #3:(no) code 31__	(no) code 31__	(no) code 31__
(yes)code 32__	(yes)code 32__	(yes)code 32__
Article #4:(no) code 41__	(no) code 41__	(no) code 41__
(yes)code 42__	(yes)code 42__	(yes)code 42__
Article #5:(no) code 51__	(no) code 51__	(no) code 51__
(yes)code 52__	(yes)code 52__	(yes)code 52__
Article #6:(no) code 61__	(no) code 61__	(no) code 61__
(yes)code 62__	(yes)code 62__	(yes)code 62__
Article #7:(no) code 71__	(no) code 71__	(no) code 71__
(yes)code 72__	(yes)code 72__	(yes)code 72__
Article #8:(no) code 81__	(no) code 81__	(no) code 81__
(yes)code 82__	(yes)code 82__	(yes)code 82__
Total Articles: __	__	__

61a. During your pregnancy, did you read any **pamphlets** that discussed prenatal weight gain, alcohol, or smoking?

_____________(no) code 1

_____________(yes) code 2 _

_____________(total number) __

[if number is greater than 8:]

_____________(total self initiated) __

_____________(total other initiated) __

_____________(total incidental cases) __

(if yes)

61b. Which pamphlets did you read?

61c. Whose idea was it that you read pamphlet #_

(if other) Who was it?

Pamphlet 1:	(self) code 11	__	
	(other) code 12	__	__
Pamphlet 2:	(self) code 21	__	
	(other) code 22	__	__
Pamphlet 3:	(self) code 31	__	
	(other) code 32	__	__
Pamphlet 4:	(self) code 41	__	
	(other) code 42	__	__
Pamphlet 5:	(self) code 51	__	
	(other) code 52	__	__
Pamphlet 6:	(self) code 61	__	
	(other) code 62	__	__
Pamphlet 7:	(self) code 71	__	
	(other) code 72	__	__
Pamphlet 8:	(self) code 81	__	
	(other) code 82	__	__
Other Pamphlets:			

61d. Did pamphlet #__ discuss prenatal weight gain?		61e. Did pamphlet #__ discuss prenatal alcohol issues?	61f. Did pamphlet #__ discuss prenatal smoking issues?
Pamphlet #1:	(no) code 11__ __	(no) code 11__ __	(no) code 11__ __
	(yes)code 12__ __	(yes)code 12__ __	(yes)code 12__ __
Pamphlet #2:	(no) code 21__ __	(no) code 21__ __	(no) code 21__ __
	(yes)code 22__ __	(yes)code 22__ __	(yes)code 22__ __
Pamphlet #3:	(no) code 31__ __	(no) code 31__ __	(no) code 31__ __
	(yes)code 32__ __	(yes)code 32__ __	(yes)code 32__ __
Pamphlet #4:	(no) code 41__ __	(no) code 41__ __	(no) code 41__ __
	(yes)code 42__ __	(yes)code 42__ __	(yes)code 42__ __
Pamphlet #5:	(no) code 51__ __	(no) code 51__ __	(no) code 51__ __
	(yes)code 52__ __	(yes)code 52__ __	(yes)code 52__ __
Pamphlet #6:	(no) code 61__ __	(no) code 61__ __	(no) code 61__ __
	(yes)code 62__ __	(yes)code 62__ __	(yes)code 62__ __
Pamphlet #7:	(no) code 71__ __	(no) code 71__ __	(no) code 71__ __
	(yes)code 72__ __	(yes)code 72__ __	(yes)code 72__ __
Pamphlet #8:	(no) code 81__ __	(no) code 81__ __	(no) code 81__ __
	(yes)code 82__ __	(yes)code 82__ __	(yes)code 82__ __
Total Pamphlets:	__ __	__ __	__ __

62a. From all these books, magazine and newspaper articles, and pamphlets that you read, what recommendations did you obtain about prenatal weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus

code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= discussed personal experiences
code 17= follow doctor's suggestions
code 18= don't worry if doctor says its ok
code 19= other advice
code 20= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

62b. From all these books, magazine and newspaper articles, and pamphlets that you read, what recommendations did you obtain about alcohol intake during pregnancy?

(code as many as applicable)
code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol
code 11= discussed personal experiences
code 12= follow doctor's suggestions
code 13= don't worry if doctor says its ok
code 14= other advice
code 15= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

62c. From all these books, magazine and newspaper articles, and pamphlets that you read, what recommendations did you obtain about smoking during pregnancy?

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= discussed personal experiences
code 15= follow doctor's suggestions
code 16= don't worry if doctor says its ok
code 17= other advice
code 18= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

63a. Typically, how many **days** each month did you spend reading about prenatal

issues?
_____________(days per month) __ __

63b. In how many months of your pregnancy did you spent reading about prenatal issues?
_____________(months) __ __
_____________(total reading days during the pregnancy) __ __

63c. Typically on one of these days, how many minutes or hours would you spend reading about prenatal issues?
_____________(minutes per day) __ __ __

63d. Approximately what percentage of your reading time did you spend on:
prenatal weight gain:_______________ __ __
prenatal alcohol issues:_______________ __ __
prenatal smoking issues:_______________ __ __

63e. What other prenatal issues did you read about?
____
____
code 1 = infant nutrition
code 2 = care of the infant
code 3 = abortion
code 4 = exercise
code 5 = delivery
code 6 = genetic factors
code 7 = other __

64a. During your pregnancy, did you watch any **television programs** that discussed prenatal weight gain, alcohol, or smoking?
_____________(no) code 1
_____________(yes) code 2 __
_____________(total number) __ __
[if number is greater than 6:]
_____________(total self initiated) __ __
_____________(total other initiated) __ __
_____________(total incidental cases) __ __

(if yes)

64b. Which programs did you watch?	64c. Whose idea was it that you watch program #__		(if other) Who was it?
Program 1:	(self) code 11	__ __	
	(other) code 12	__ __	__ __
Program 2:	(self) code 21	__ __	
	(other) code 22	__ __	__ __
Program 3:	(self) code 31	__ __	
	(other) code 32	__ __	__ __
Program 4:	(self) code 41	__ __	
	(other) code 42	__ __	__ __
Program 5:	(self) code 51	__ __	
	(other) code 52	__ __	__ __
Program 6:	(self) code 61	__ __	
	(other) code 62	__ __	__ __

Other Programs:

64d. While you were watching television program #_, how many minutes were dedicated to discussing prenatal weight gain?

____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___

64e. While you were watching television program #_ how many minutes were dedicated to discussing prenatal alcohol issues?

____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___

64f. While you were watching television program #_, how many minutes were dedicated to discussing prenatal smoking issues?

____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___
____________(minutes) ___

65a. During your pregnancy, did you watch any **video programs / films / slides** that discussed prenatal weight gain, alcohol, or smoking?

____________(no) code 1
____________(yes) code 2 _
____________(total number) __
[if number is greater than 6:]
____________(total self initiated) __
____________(total other initiated) __
____________(total incidental cases) __

(if yes)

65b. Which video programs did you watch?	65c. Whose idea was it that you watch program #_		(if other) Who was it?
Program 1:	(self) code 11 (other) code 12	__	__
Program 2:	(self) code 21 (other) code 22	__	__
Program 3:	(self) code 31 (other) code 32	__	__
Program 4:	(self) code 41 (other) code 42	__	__
Program 5:	(self) code 51 (other) code 52	__	__
Program 6:	(self) code 61 (other) code 62	__	__
Other Programs:		__	__

65d. While you were watching video program #_, how many minutes were dedicated to discussing prenatal weight gain?
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _

65e. While you were watching video program #_, how many minutes were dedicated to discussing prenatal alcohol issues?
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _

65f. While you were watching video program #_ how many minutes were dedicated to discussing prenatal smoking issues?
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _
__________(minutes) _ _ _

66a. During your pregnancy, did you listen to any **radio programs** that discussed prenatal weight gain, alcohol, or smoking?
__________(no) code 1
__________(yes) code 2 _
__________(total number) _ _
[if number is greater than 6:]
__________(total self initiated) _ _
__________(total other initiated) _ _
__________(total incidental cases) _ _

(if yes)

66b. Which radio programs did you listen to?	66c. Whose idea was it that you listen to program #_		(if other) Who was it?
Program 1:	(self) code 11	_ _	
	(other) code 12	_ _	_ _
Program 2:	(self) code 21	_ _	
	(other) code 22	_ _	_ _
Program 3:	(self) code 31	_ _	
	(other) code 32	_ _	_ _
Program 4:	(self) code 41	_ _	
	(other) code 42	_ _	_ _
Program 5:	(self) code 51	_ _	
	(other) code 52	_ _	_ _
Program 6:	(self) code 61	_ _	
	(other) code 62	_ _	_ _
Other Programs:			

66d. While you were listening to radio program #__, how many minutes were dedicated to discussing prenatal weight gain?
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __

66e. While you were listening to radio program #__, how many minutes were dedicated to discussing prenatal alcohol issues?
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __

66f. While you were listening to radio program #__, how many minutes were dedicated to discussing prenatal smoking issues?
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __
__________(minutes) __ __ __

67a. From these television, video, and radio programs that you watched or listened to, what recommendations did you obtain about prenatal weight gain?

____

(code as many as applicable)
code 01= gain 20 to 35 lbs.
code 02= gain less than 20 lbs.
code 03= gain greater than 35 lbs.
code 04= limit weight gain
code 05= don't gain too much
code 06= adjustments made for prepregnant weight and height
code 07= weight gain is ok
code 08= don't worry
code 09= eat healthy foods, or follow food guide
code 10= how weight gain affects the fetus
code 11= specific foods to avoid
code 12= specific foods to eat
code 13= weight gain pattern
code 14= can't remember
code 15= don't lose weight
code 16= discussed personal experiences
code 17= follow doctor's suggestions
code 18= don't worry if doctor says its ok
code 19= other advice
code 20= no advice __ __/ __ __/ __ __/ __ __/ __ __/ __ __

67b. From these television, video, or radio programs that you watched or listened to, what recommendations did you obtain about alcohol during pregnancy?

____

(code as many as applicable)

code 01= do not drink alcoholic beverages
code 02= drink on a full stomach
code 03= no safe limits established
code 04= ok to drink 4 or less drinks per week
code 05= ok to drink 2 drinks at a time
code 06= ok to drink 1 drink at a time
code 07= drinking helps you to relax
code 08= how alcohol affects the fetus
code 09= can't remember
code 10= minimize or reduce alcohol
code 11= discussed personal experiences
code 12= follow doctor's suggestions
code 13= don't worry if doctor says its ok
code 14= other advice
code 15= no advice __/__/__/__/__/__

67c. From these television, video, or radio programs that you watched or listened to, what recommendations did you obtain about smoking during pregnancy?

___

(code as many as applicable)
code 01= do not smoke
code 02= do not quit cold turkey because of stress
code 03= reduce number of cigarettes if you can't quit
code 04= reduce number of cigarettes
code 05= change brands of cigarettes
code 06= ok to smoke 1 to 5 cigarettes
code 07= ok to smoke 5 to 10 cigarettes
code 08= ok to smoke
code 09= don't be concerned
code 10= how smoking affects the fetus
code 11= dose related
code 12= can't remember
code 13= quit
code 14= discussed personal experiences
code 15= follow doctor's suggestions
code 16= don't worry if doctor says its ok
code 17= other advice
code 18= no advice __/__/__/__/__/__

68. Other resources:

___

code 1=no, code 2=health fairs, code 3=other _

Now we'll **conclude the interview** by discussing some of your perceptions about your pregnancy.

69a. Did you plan to become pregnant?
______(yes) code 1
______(no) code 2 _

69b. (if no) What was your reaction when you learned you were pregnant?

___

___

code 1 = planned

code 2 = unplanned

70. Overall, did you have a difficult time with your pregnancy?
(Show card)

0	1	2	3	4	5	6
no difficulty		little difficulty		moderate difficulty		great difficulty

71. Did you have concerns about your weight change while you were pregnant?
(Show card)

0	1	2	3	4	5	6
no concerns		little concerns		moderate concerns		great concerns

(if a drinker of alcoholic beverages)
72. Did you have concerns about your alcohol intake while you were pregnant?
(Show card)

0	1	2	3	4	5	6
no concerns		little concerns		moderate concerns		great concerns

(if a smoker)
73. Did you have concerns about your smoking habits while you were pregnant?

(Show card)

0	1	2	3	4	5	6
no concerns		little concerns		moderate concerns		great concerns

74. Did you have concerns about second hand smoke?
(Show card)

0	1	2	3	4	5	6
no concerns		little concerns		moderate concerns		great concerns

75. Did you ever think that your baby was at risk because of your weight gain?
(Show card)

0	1	2	3	4	5	6
no risk		little risk		moderate risk		high risk

(if a drinker of alcoholic beverages)

76. Did you ever think that your baby was at risk because of your alcohol intake? (Show card)

0	1	2	3	4	5	6
no risk		little risk		moderate risk		high risk

(if a smoker)

77. Did you ever think that your baby was at risk because of your smoking habits? (Show card)

0	1	2	3	4	5	6
no risk		little risk		moderate risk		high risk

78. Thinking about all the information you obtained about weight gain, how useful was the information in influencing the way you managed your weight? (Show card)

0	1	2	3	4	5	6
no use		little use		moderate use		high use

79a. What obstacles did you experience in managing your weight during your pregnancy?

______ code 1 (didn't feel well enough to eat)
______ code 2 (appetite decreased)
______ code 3 (nausea)
______ code 4 (will power)
______ code 5 (other)
______ code 6 (no obstacles) _/ _/ _/ _/ _/ _

79b. Looking at the first obstacle, how difficult was it for you? (Show card)

0	1	2	3	4	5	6
not difficult		slightly difficult		moderately difficult		very difficult

_/ _/ _/ _/ _/ _

80a. Did you change your eating habits during this pregnancy?

______ (no) code 1
______ (yes) code 2

80b. (if yes) What changes did you make?

(code as many as applicable)

code 01= increase fruits, code 02= decrease fruits
code 03= increase vegetables, code 04= decrease vegetables
code 05= increase milk products, code 06= decrease milk products
code 07= increase meat and alternates, code 08= decrease meat and alternates
code 09= increase breads and cereals, code 10= decrease breads and cereals
code 11= increase fiber, code 12= decrease fiber
code 13= increase quantity of food, code 14= decrease quantity of food
code 15= increase snacks, code 16= decrease snacks
code 17= increase calories, code 18= decrease calories
code 19= decrease herbal teas, code 20= increase herbal teas
code 21= decrease caffeine, code 21= increase caffeine
code 22= decrease sugars, code 23= increase sugars
code 24= decrease fat, code 25= increase fat
code 26= decrease fast foods, code 27= increase fast foods
code 28= use of vitamins, code 29= smaller meals
code 30= other __ __/__ __/__ __/__ __/__ __/__ __/__ __/__ __/__ __/__ __

80c. (if yes) Why did you change your eating habits?

____

code 1 = more hungry
code 2 = did not feel well enough to eat
code 3 = mother's health
code 4 = baby's health
code 5 = recommendation/s given to me
code 6 = from readings
code 7 = other __

81. Thinking back to the beginning of your pregnancy, how much weight were you **aiming** to gain during your pregnancy?
__________(no goal) code 1 __
__________(pounds) code= pounds __ __

(If a drinker of alcoholic beverages)

82. Thinking about all the information you obtained about alcohol, how useful was the information in influencing your alcohol consumption?
(Show card)

0	1	2	3	4	5	6
no use		little use		moderate use		high use

__

83a. What obstacles did you experience in managing your alcohol consumption during your pregnancy?

____

__________code 1 (social events)
__________code 2 (stress)
__________code 3 (will power)
__________code 4 (other)
__________code 5 (no obstacles) __/__/__/__/__

83b. Looking at the first obstacle, how difficult was it for you?
(Show card)

0	1	2	3	4	5	6
not difficult		slightly difficult		moderately difficult		very difficult

_/ _/ _/ _/ _/ _

84a. Did you change your alcohol intake during this pregnancy?
___________(no) code 1
___________(yes) code 2 _

84b. (if yes) What changes did you make?

code 1 = decrease quantity of intake
code 2 = increase quantity of intake
code 3 = decrease frequency of intake
code 4 = increase frequency of intake
code 5 = change beverages to a lower alcohol content
code 6 = change beverages to a higher alcohol content
code 7 = tried to quit
code 8 = tried to cut down
code 9 = other _/ _/ _/ _/ _

84c. (if yes) Why did you change your alcohol intake?

code 1 = did not feel well enough to drink
code 2 = mother's health
code 3 = baby's health
code 4 = recommendation/s given to me
code 5 = from readings
code 6 = other _

85. Thinking back to the beginning of your pregnancy, what changes in your alcohol intake were you **aiming** to achieve?

___________(no goal) code 1
___________(abstain) code 2
___________(reduce) code 3 _

(if a smoker)

86. Thinking about all the information you obtained about smoking, how useful was the information in influencing your smoking habits?
(Show card)

0	1	2	3	4	5	6
no use		little use		moderate use		high use

_

87a. What obstacles did you experience in managing your smoking habits during your pregnancy?

___________code 1 (social events)
___________code 2 (after meals)
___________code 3 (stress)

_____________code 4 (will power)
_____________code 5 (other)
_____________code 6 (no obstacles) _/ _/ _/ _/ _/ _

87b. Looking at the first obstacle, how difficult was it for you? (Show card)

0	1	2	3	4	5	6
not difficult		slightly difficult		moderately difficult		very difficult

_/ _/ _/ _/ _/ _

88a. Did you change your smoking habits during this pregnancy?
_____________(no) code 1
_____________(yes) code 2 _

88b. (if yes) What changes did you make?

code 1 = decrease quantity of intake
code 2 = increase quantity of intake
code 3 = decrease frequency of intake
code 4 = increase frequency of intake
code 5 = change to a milder brand
code 6 = change to a stronger brand
code 7 = tried to quit
code 8 = tried to cut down
code 9 = other _/ _/ _/ _/ _

88c. (if yes) Why did you change your smoking habits?

code 1 = did not feel well enough to smoke
code 2 = mother's health
code 3 = baby's health
code 4 = recommendation/s given to me
code 5 = from readings
code 6 = other _

89. Thinking back to the beginning of your pregnancy, what changes in your smoking habits were you **aiming** to achieve?

_____________(no goal) code 1
_____________(abstain) code 2
_____________(reduce) code 3 _

90. What is the highest level of education you completed?
_____________(up to grade thirteen) code 1
_____________(technical/vocational) code 2
_____________(college/university) code 3
_____________(bachelor degree) code 4
_____________(master's degree) code 5
_____________(doctorate degree) code 6 _

91. Are you single, married, separated, divorced, widow, or living common law?
_____________(single) code 1
_____________(married) code 2

__________(separated) code 3
__________(divorced) code 4
__________(widow) code 5
__________(common law) code 6 _

92. Did you work before you were pregnant? What was your occupation?
__________(yes) code 1
__________(no) code 2 _
______________________________________ _ _ _

93. Does your partner/husband work? What is his occupation?
__________(yes) code 1
__________(no) code 2 _
______________________________________ _ _ _

94. [Ethnic origin of the mother:]
____
__________(caucasian) code 1
__________(black) code 2
__________(asiatic) code 3
__________(other) code 4 _

THANK YOU VERY MUCH

Data from medical records:

95. Birth weight of the infant:
__________(grams) _ _ _ _

96. Gestational age of the fetus:
__________(weeks) _ _

Other:

97. [Request for summary report of the study:]
__________(no) code 1
__________(yes) code 2 _

98. [Cesarean section:]
__________(no) code 1
__________(yes) code 2 _

APPENDIX 10

HYPOTHESES AND CORRESPONDING INTERVIEW QUESTIONS

HYPOTHESIS 1 (a)

DEPENDENT VARIABLE	A. Hours in Learning About Weight Gain	Prenatal classes: 38g Family Doctor : 41d Obstetrician : 44e Nurse : 47d Dietitian : 50e Family : 53g Friends : 56g Print Material : 63 Audiovisual : 64d,65d,66d
	B. Hours in Learning About Alcohol Consumption	Prenatal classes: 38i Family Doctor : 42d Obstetrician : 45d Nurse : 48d Dietitian : 51d Family : 54g Friends : 57f Print Material : 63 Audiovisual : 64e,65e,66e
	C. Hours in Learning About Tobacco Use	Prenatal classes: 38k Family Doctor : 43d Obstetrician : 46d Nurse : 49d Dietitian : 52d Family : 55g Friends : 58f Print Material : 63 Audiovisual : 64f,65f,66f
	Total Hours in Learning	Sum of the above (A+B+C)
INDEPENDENT VARIABLE	Planned/unplanned Pregnancy	Question 69a

HYPOTHESIS 1 (b)

DEPENDENT VARIABLE	A.Resources: Weight Gain	Prenatal classes: 38a Family Doctor : 41a Obstetrician : 44b Nurse : 47a Dietitian : 50b Family : 53a Friends : 56b Print Material:59d,60d,61d Audiovisual : 64d,65d,66e
	B.Resources: Alcohol Consumption	Prenatal classes: 38a Family Doctor : 42a Obstetrician : 45a Nurse : 48a Dietitian : 51a Family : 54a Friends : 57a Print Material:59e,60e,61e Audiovisual : 64e,65e,66a
	C.Resources: Tobacco Use	Prenatal classes: 38a Family Doctor : 43a Obstetrician : 46a Nurse : 49a Dietitian : 52a Family : 55a Friends : 58a Print Material:59f,60f,61f Audiovisual : 64f,65f,66f
	Total Resources	Sum of the Above (A+B+C)
INDEPENDENT VARIABLE	Planned/unplanned Pregnancy	Question 69a

HYPOTHESIS 2 (a)

DEPENDENT VARIABLE	Health Concern About Weight Gain	Question 71
INDEPENDENT VARIABLE	Hours in Learning About Weight Gain	Same as hypothesis 1 (a) Dependent Variable (A)

HYPOTHESIS 2 (b)

DEPENDENT VARIABLE	Health Concern About Alcohol Consumption	Question 72
INDEPENDENT VARIABLE	Hours in Learning About Alcohol Consumption	Same as hypothesis 1 (a) Dependent Variable (B)

HYPOTHESIS 2 (c)

DEPENDENT VARIABLE	Health Concern About Tobacco Use	Question 73 and 74
INDEPENDENT VARIABLE	Hours in Learning About Tobacco Use	Same as hypothesis 1 (a) Dependent Variable (C)

HYPOTHESIS 3 (a)

DEPENDENT VARIABLE	Resources: Weight Gain	Same as hypothesis 1 (b) Dependent variable (A)
INDEPENDENT VARIABLE	Health Concern About Weight Gain	Same as hypothesis 2 (a) Dependent variable

HYPOTHESIS 3 (b)

DEPENDENT VARIABLE	Resources: Alcohol Consumption	Same as hypothesis 1 (b) Dependent variable (B)
INDEPENDENT VARIABLE	Health Concern About Alcohol Consumption	Same as hypothesis 2 (b) Dependent variable

HYPOTHESIS 3 (c)

DEPENDENT VARIABLE	Resources: Tobacco Use	Same as hypothesis 1 (b) Dependent variable (C)
INDEPENDENT VARIABLE	Health Concern About Tobacco Use	Same as hypothesis 2 (c) Dependent variable

HYPOTHESIS 4 (a)

DEPENDENT VARIABLE	Knowledge Level About Weight Gain	Questions 24a,24b,25 to 35,37
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Weight Gain	Prenatal classes: 38l Family Doctor : 41b Obstetrician : 44c Nurse : 47b Dietitian : 50c Family : 53e Friends : 56e Print Material: 59c,60c,61c Audiovisual : 64c,65c,65c

HYPOTHESIS 4 (b)

DEPENDENT VARIABLE	Knowledge Level About Alcohol Consumption	Questions 15a,16,17,18
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Alcohol Consumption	Prenatal classes: 38l Family Doctor : 42b Obstetrician : 45b Nurse : 48b Dietitian : 51b Family : 54e Friends : 57d Print Material: 59c,60c,61c Audiovisual : 64c,65c,66c

HYPOTHESIS 4 (c)

DEPENDENT VARIABLE	Knowledge Level About Tobacco Use	Questions 19a,20,21,22,23
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Tobacco Use	Prenatal classes: 38l Family Doctor : 43b Obstetrician : 46b Nurse : 49b Dietitian : 52b Family : 55e Friends : 58d Print Material: 59c,60c,61c Audiovisual : 64c,65c,66c

HYPOTHESIS 5 (a)

DEPENDENT VARIABLE	Weight Gain Ratio	Question (10 minus 9) Question 8,9
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Weight Gain	Same as hypothesis 4 (a) Independent Variable

HYPOTHESIS 5 (b)

DEPENDENT VARIABLE	Alcohol Reduction Ratio	Prepregnancy: 13b,c,d 1st trimester: 14b,c,d 2nd trimester: 14e,f,g 3rd trimester: 14h,i,j
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Alcohol Consumption	Same as hypothesis 4 (b) Independent Variable

HYPOTHESIS 5 (c)

DEPENDENT VARIABLE	Cigarette Reduction Ratio	Prepregnancy: 11b 1st trimester: 12b 2nd trimester: 12c 3rd trimester: 12d
INDEPENDENT VARIABLE	Self-Initiated Learning Ratio About Tobacco Use	Same as hypothesis 4 (c) Independent Variable

HYPOTHESIS 6 (a)

DEPENDENT VARIABLE	Weight Gain Health Belief Measure	Concern :71 Susceptibility:75 Benefits :78 Barriers :79
INDEPENDENT VARIABLE	Weight Gain Ratio	Same as hypothesis 5 (a) Dependent variable

HYPOTHESIS 6 (b)

DEPENDENT VARIABLE	Alcohol Health Belief Measure	Concern :72 Susceptibility:77 Benefits :86 Barriers:87
INDEPENDENT VARIABLE	Alcohol Reduction Ratio	Same as hypothesis 5 (b) Dependent variable

HYPOTHESIS 6 (c)

DEPENDENT VARIABLE	Smoking Health Belief Measure	Concern :73,74 Susceptibility:76 Benefits :82 Barriers :83
INDEPENDENT VARIABLE	Cigarette Reduction Ratio	Same as hypothesis 5 (c) Dependent variable

APPENDIX 11

DESCRIPTIVE DATA AND CORRESPONDING INTERVIEW QUESTIONS

Descriptive Data	Question Numbers
-Hospital identification	# 1
-Presence of father during the interview	# 2
-Gender of the infant	# 4
-Postpartum date of the interview	# 5
-Age of mother	# 6
-Maternal weight gain	# 9,10
-Smoking before pregnancy	# 11a
-Smoking during pregnancy	# 12a
-Number of cigarettes smoked	# 11b,12b,12c,12d
-Time when smokers abstained from smoking	# 12f
-Type of alcoholic beverages consumed	# 13b,14b,14e,14h
-Amount of alcoholic beverages consumed	# 13c,14c,14f,14i
-Frequency of drinking alcoholic beverages	# 13d,14d,14g,14j
-Time when drinkers abstained from drinking	# 13j,13k
-Resources: weight gain information	# 24c
-Resources: alcohol information	# 15b
-Resources: smoking information	# 19b
-Attendance at prenatal classes	# 38a
-Attendance at prenatal classes with partner	#
-Reasons for not attending prenatal classes	# 38b
-Location of prenatal classes attended	# 38c
-Time of first prenatal class	# 38d
-Frequency of discussion about weight gain	# 38f,41c,44d,47c,50d,53f,56f
-Frequency of discussion about alcohol	# 38h,42c,45c,48c,51c,54f,57e
-Frequency of discussion about smoking	# 38j,43c,46c,49c,52c,54f,58e
-Advice received about weight gain	# 38n,41e,44f,47e,50f,53h,56h,62a,67a
-Advice received about alcohol	# 38n,42e,45e,48e,51e,54h,57g,62b,67b
-Advice received about smoking	# 38p,43e,46e,49e,52e,55h,58g,62c,67c
-Description of books read	# 59b
-Description of articles read	# 60b
-Description of pamphlets read	# 61b
-Description of T.V. programs watched	# 64b
-Description of video programs watched	# 65b
-Description of radio programs listened to	# 66b
-Source: who suggested attending prenatal classes,	# 38l
reading books,	# 59c
reading articles,	# 60c
reading pamphlets,	# 61c
-Time of first visit to doctor	# 39
-Number of doctor visits	# 40
-Perceived difficulty of the pregnancy	# 70

-Changes in eating habits	# 80
-Changes in alcohol habits	# 84
-Changes in smoking habits	# 88
-Aims regarding weight gain	# 81
-Aims regarding alcohol habits	# 85
-Aims regarding smoking habits	# 89
-Educational background of the mother	# 90
-Marital status	# 91
-Mother's occupation	# 92
-Partner's or husband's occupation	# 93
-Ethnic origin of the mother	# 94
-Birth weight of the infant	# 95
-Gestational age of the fetus	# 96
-Request for summary report	# 97
-Cesarean section	# 98

APPENDIX 12

THANK YOU LETTER TO HOSPITALS

October 1986

To Hospital Administrators:

I would like to thank you and your staff for permitting me to conduct research on the "Learning Patterns of Pregnant Women" at .... Hospital. Your cooperation is much appreciated in light of the busy schedule of the maternity staff.

I would also like to extend my sincere thanks to the Director of Nursing for making the administrative arrangements necessary for me to conduct my study. I also extend a very special thank you to the Head Nurse of maternity for without her assistance this study would not have been possible.

A copy of the findings will be mailed to you upon completion of the study. I have conducted the 120 interviews required for the study, and I am currently analysing the data collected. Barring unforseen circumstances, a copy of the results should be available for circulation by the summer of 1987.

Thank you again for your cooperation and that of the .... Hospital staff.

Sincerely

Irene Strychar
Doctoral Candidate
Adult Education

cc: Director of Nursing
cc: Head Nurse, Maternity

APPENDIX 13

REASONS GIVEN FOR NOT ATTENDING PRENATAL CLASSES

Individual	Reasons Given
#1:	"Asked the Doctor questions - where I come from you don't go to classes"
#2:	"I am a single parent from India, no one to help"
#3:	"The Doctor didn't say to go to the classes"
#4:	"The Doctor said to go to the classes but we didn't have medical coverage"
#5:	"I thought I'd be more scared by going to the classes - husbands have to go to the classes and he was busy"
#6:	"I thought I'd be more scared and nervous - Doctor said to go but I didn't"
#7:	"My friends said it didn't help them to go to the classes - my friends said constipation was discussed at the classes and that is not good for the men to hear - the time to go to the classes was bad for my husband - I absorb more by reading"
#8:	"Emphasis is on marriage and couples - I'm a single mom, I went to one class and then stopped going"
#9:	"My husband was working out-of-province and I didn't want to go on my own"
#10:	"I had no time, I was working - my friends said not to bother going since you forget the breathing once you get into hospital"
#11:	"I don't like the large group process - I had no time - the cost was high"
#12:	"I was working - no time to go"
#13:	"My job required alot of travelling and I had no time to go"
#14:	"I was too busy with work, I was enrolled in the classes but cancelled"
#15:	"I called and cancelled"
#16:	"I forgot about them - I was enrolled but the timing was bad"
#17:	"I didn't bother going"
#18:	"Never really thought much about it"
#19:	"Didn't think much about it - I knew things from people"
#20:	"I thought I knew everything, but in retrospect I really regretted not going"
#21:	"I wanted to do it the old fashioned way"
#22:	"I decided to attend a two day workshop put on by Midwives, I also saw a midwife for private consultation"
#23-24:	No reasons were given.

APPENDIX 14

NUMBER OF INDIVIDUALS OBTAINING WEIGHT GAIN ADVICE FROM VARIOUS RESOURCES

WEIGHT ADVICE	PR*	DR*	OB*	NU*	DI*	FA*	FR*	RE*	AV*
Specific Amounts									
Gain 15 lbs		1	1			2	4		
Gain 20-25 lbs	7	1				1		3	
Gain 20-30 lbs	33	16	2	1	2	3	12	52	8
Gain 30-35 lbs	15	10	5		1	1	6	14	3
Gain 40 lbs	1	1							
Not less 25 lbs	2	4				1	3	1	1
Maximum 25 lbs	3	1				1		2	
Maximum 30 lbs	1	1							1
Maximum 40 lbs	3	2	2			1		2	
General Comments									
Weight Gain OK	1	31	10			8	9		
Don't Worry	4	12	3	2		31	33	2	
Gaining Too Much	8	19	3	2	1	24	20	3	3
Not Gaining Enough		10	1	1	10	51	23	1	
Gain Weight For Baby		1				11	7	3	
Not Too Much or Little	7					1	3	8	
Any Amount OK	2	1				1	2		
Hard To Lose After		1			1	2	2	5	
Food Comments									
Follow Food Guide	45	23	4	1	2	42	14	35	
Foods to Avoid/Eat	4	13	1	8	10	1		1	
Eat Moderately	4	5			17		3	5	10
Eat More		7		2			5	6	
Eat Anything You Want						1	2		
Don't Diet		6	2	3	1			3	1
Don't Eat For Two		3				3			
Decrease Salt			3			1	3		
24 Hour Dietary Recall			2	1	4	6	2		
Miscellaneous Information									
Under-Over-Normal	3	5	1	4	1		2	7	2
Composition Weight	7							8	2
Gradual Gain	9	5			2			13	2
Gain 1 lb/wk	1	5			1	1		1	
Advice Changes Years						3	1	2	1
Personal Experiences				1			109		6
Follow Dr. Advice	4	1				9	1		1
Don't Listen to Dr.						3			
Asked Woman's Goal		1		1					
Can't Remember	4	1						6	3

*PR=Prenatal Class, DR=Doctor, OB=Obstetrician, NU=Nurse, DI=Dietitian, FA=Family, FR=Friends, RE=Reading Materials, AV=Audiovisuals

APPENDIX 15

NUMBER OF INDIVIDUALS OBTAINING ALCOHOL ADVICE FROM VARIOUS RESOURCES

ALCOHOL ADVICE	PR*	DR*	OB*	NU*	DI*	FA*	FR*	RE*	AV*
Specific Amounts									
Do Not Drink	40	16			2	46	7	51	15
OK 1 Drink on Occasion	14	12	2	1		22	40	15	1
None or 1-2 Drinks/Week	7	4	1			1		5	
OK 2-4 Drinks/Week	2	1					1		
OK 1 Drink/Day						2	3	1	
Max 2-3 at a Time							4	4	
Avoid Getting Drunk	2	1				1	5	4	
General Comments									
Drink Small Amounts	1	1	1			1	3	3	3
Moderation	7	8		1		6	8	7	
Reduce	1	2					1	2	2
Avoid Hard Liquor	1							1	
Drinking is Relaxing	2	1				3	1		
Your Personal Choice	2	1				2		1	
OK to Drink							4	3	
Effects on the Fetus									
Alcohol Affects Baby	3	1			1	7	2	2	2
Crosses Placenta	4		1	1				1	4
Low Birth Weight	8				1			2	
Fetal Alcohol Syndrome	2					1		5	1
Miscellaneous Information									
No Safe Limits	7		1				1	6	1
Personal Experiences	1					1	11		4
Follow Dr. Advice						1			1
Asked Women's View	1								
Discussed Social Situations							3		
Asked if Drank		20	10	2	4				
Can't Remember	3	1	1			1		2	1

*PR=Prenatal Class, DR=Doctor, OB=Obstetrician, NU=Nurse, DI=Dietitian, FA=Family, FR=Friends, RE=Reading Materials, AV=Audiovisuals

APPENDIX 16

NUMBER OF INDIVIDUALS OBTAINING SMOKING ADVICE FROM VARIOUS RESOURCES

SMOKING ADVICE	PR*	DR*	OB*	NU*	DI*	FA*	FR*	RE*	AV*
Specific Amounts									
Quit	18	15	13	2		35	20	27	11
Reduce to 1-5 Cigs	1	1							
Reduce to 6-10 Cigs		3	1		1			1	
General Advice									
Don't Quit Cold Turkey	1	4	1			1		1	
Reduce	5	7	4	1	3	9	10	6	1
OK to Smoke				1		7	23		
Effects on the Fetus									
Harmful to Baby		5		2		4		6	1
Smoking Affects Baby	2							2	2
Decreases Oxygen	4							3	4
Low Birth Weight	8	3				3		7	3
Prematurity etc.	3	3						4	
Other Comments									
Tips on Quitting		1	1			1		1	
Personal Experiences				1		5	5		1
Follow Dr. Advice						2			
Asked if Smoked		12	4	2	2				
Can't Remember	3							2	2

*PR=Prenatal Class, DR=Doctor, OB=Obstetrician, NU=Nurse, DI=Dietitian, FA=Family, FR=Friends, RE=Reading Materials, AV=Audiovisuals

APPENDIX 17

SOURCES OF OTHER-INITIATED READINGS IN BOOKS, ARTICLES, and PAMPHLETS

Books	Articles	Pamphlets
(Source: No. of Individuals)	(Source: No. of Individuals)	(Source: No. of Individuals)
Prenatal Classes : 59	Friends : 9	Prenatal Classes : 48
Friend : 30	Prenatal Classes : 8	Friend : 6
Family : 18	Family : 5	Doctor : 4
Doctor : 8	Mother : 4	Family : 4
Mother : 5	Doctor's Nurse : 2	Dietitian : 3
Nurse : 2	Doctor : 1	Anti-Smokers Group : 1
Dietitian : 1	Dietitian : 1	Mother : 1
Yoga Teacher : 1	Work Setting : 1	Health Unit : 1
Church Member : 1	Church Member : 1	Husband : 1
Women' Health Centre : 1		

APPENDIX 18

SOURCES OF SELF-INITIATED READINGS IN BOOKS, ARTICLES, AND PAMPHLETS

Books	Articles	Pamphlets
(Source: No. of Individuals)	(Source: No. of Individuals)	(Source: No.of individuals)
Purchased : 24	Doctor's Office : 21	Doctor's Office : 20
Library : 20	Newspaper : 18	Health Fair : 1
At Home : 4	Purchased Magazine : 17	Welcome Wagon : 1
Health Food Store : 1	Work Setting : 2	Health Unit : 2
	Maternity Store : 2	
	Airplane : 1	
	Library : 1	