THE EFFECT OF OUTPATIENT CARDIAC EDUCATION ON KNOWLEDGE
AND HEALTH PROMOTION/PROTECTIVE BEHAVIOURS

by

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Date April 25, 1995
Abstract

This study was conducted to determine whether first time myocardial infarction (MI) patients who participated in both hospital-based and outpatient cardiac education programs were more knowledgeable about heart disease and engaged in health promotion/protective behaviours as a way of life to a greater extent than those who participated only in a hospital-based cardiac education program. A quasi-experimental pretest-posttest control group design was used for this study. The conceptual framework for this study was adapted from Hilton's (1986) Health Promotion/Protective Model.

One hundred and two first time MI patients between the ages of 32 and 80 were recruited from a major teaching hospital in western Canada. Seventy-two of these subjects completed the study by answering and returning the Health Promoting Lifestyle Profile (HPLP) and the Heart Health Knowledge Quiz (HHKQ) in the hospital while recovering from their MI, and again four to six months later. The 25 subjects in the experimental group participated in outpatient cardiac education. The remaining 47 subjects were placed in the control group.

The t-test for independent groups was performed on the posttest HHKQ scores to determine if first time MI patients who participated in outpatient cardiac education were more knowledgeable regarding heart disease and health behaviours four to six months after hospital discharge than those who did not. There was a significant increase
in HHKQ total mean scores and nutrition sub-test mean scores for the experimental group at the posttest stage. The t-test for independent groups was also performed on the posttest HPLP scores to determine if first time MI patients who participated in outpatient cardiac education engaged in health promotion/protective behaviours to a greater extent four to six months later than those who did not. No differences between the groups were found in the HPLP total scores and sub-scale scores. Other investigators found similar results in that the experimental groups did not engage in health promotion/protective behaviours as a way of life to a greater extent than the control group.

These results provide direction regarding the structure of outpatient cardiac education programs. The focus of class content could be less on formal teaching on selected topics such as physical activity, and more on participation in exercises and stress-reducing activities. More discussion regarding attitudes that motivate class participants to engage in health promotion/protective behaviours is indicated from the results of this study.
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CHAPTER ONE

Introduction

Background to the Problem

Coronary artery disease is the leading cause of death in Canada, accounting for 22% of all Canadian deaths in 1992 (Statistics Canada, 1994). Of these deaths, 12% were caused by an acute myocardial infarction (Statistics Canada, 1994), indicating that heart disease remains a major health problem in Canada.

Research reveals that there is a positive relationship between an individual's risk factor profile such as high blood cholesterol levels, high blood pressure, cigarette smoking, lack of exercise, stress, and the risk for developing coronary artery disease (Kannel, 1990). Modification of these risk factors by engaging in health promotion/protective behaviours contributes toward reducing the likelihood of coronary artery disease (Kannel, 1990).

One population group for whom modification of risk factors for heart disease is a major consideration are those individuals who have been hospitalized with documented coronary artery disease. To address their information needs regarding modification of risk factors and ways to engage in health promotion/protective behaviours, cardiac education programs have been developed in many health-care centres.

However, many patients who have experienced a myocardial infarction (MI) have difficulty concentrating on the educational facet of their recovery while in the hospital. They are still
responding to the life-threatening experience of a heart attack and
the loss of their previous state of health with emotions such as
denial, anxiety, depression, and feelings of uncertainty regarding
the future (Hentinen, 1986; Rahe, Scalzi & Shine, 1975; Webster &
Christman, 1988; Burke, 1981; Budan, 1983; Nicklin, 1986; Duryee,
1992). These factors, plus the experience of numerous interruptions
such as treatment appointments, visitors, noise, and physical
symptomatology (Gregor, 1984; Webster & Christman, 1988) may
interfere with regular participation or the ability to concentrate on
the information presented during hospital-based cardiac education
programs. Upon discharge home, patients often lack knowledge
regarding issues such as their prescribed physical activity, diet
instructions, and medication use (Liddy & Crowley, 1987; Nicklin,
1986; Rahe et al., 1975).

Because many patients experience difficulty retaining the
information they receive while in the hospital, several authors have
advocated educational follow-up of MI patients after discharge from
the hospital (Raleigh & Odtohan, 1987; Burke, 1981; Hentinen, 1986;
Nicklin, 1986). In addition, the hospital stay for MI patients is
becoming shorter while the amount of information that needs to be
taught is increasing. As a result, hospital-based programs often
provide information that is applicable to only the immediate post-
discharge period (Burke, 1981; Duryee, 1992). The first one to two
months following discharge from the hospital are a crucial time when
many MI patients are in the process of adjusting to the experience of
having had an MI. They seek answers to questions regarding their long-term recovery, and become more receptive to information regarding health promotion/protective behaviours (Scalzi, Burke, & Greenland, 1980; Liddy & Crowley, 1987; Nicklin, 1986; Owens, McCann & Hutelmyer, 1978; Steel & Ruzicki, 1987).

**Problem Statement**

Patient education programs are designed to inform individuals who have experienced an MI regarding health promotion/protective behaviours. Most cardiac education programs are provided during the patient’s hospitalization, which may not be the most favourable time for learning about health promotion/protective behaviours. Therefore, outpatient cardiac education programs have been designed to provide MI patients with this information. However, there is no conclusive evidence regarding the effect on cardiac knowledge and the engagement in health promoting/protective behaviours in MI patients who receive only hospital-based cardiac education versus those MI patients who receive both hospital-based and outpatient cardiac education.

**Purpose of the Study**

The purpose of this study was to determine whether first time MI patients who participate in both hospital-based and outpatient cardiac education programs are more knowledgeable about heart disease and engage in health promotion/protective behaviours to a greater extent than those who participate only in a hospital-based cardiac education program.
Conceptual Framework

Hilton's (1986) Health Promotion/Protective Model is the basis for the conceptual framework of this study (see Figure 1). It describes both the health promoting and health protecting variables that individuals with coronary artery disease engage in as they make healthy lifestyle behavioural changes. Both Pender's Health Promotion Model (Pender, 1987) and the Health Belief Model (Rosenstock, 1974) form the basis for Hilton's Model.

In Pender's Model, health promotion is viewed as a positive state that increases an individual's level of well-being. Health promotion behaviours occur when individuals act on the environment, and are motivated by a desire for growth, a desire to express human potential and a desire for quality of life. These behaviours become an integral part of an individual's way of life (Pender, 1987). Pender (1987) also views health promoting behaviours as an expression of self-actualization, in that an individual engages in self-initiated health promoting behaviours for the sake of improving health and well-being. The result is an improved sense of satisfaction and enjoyment in living. Pender (1987) categorizes the determinants of health promotion behaviour into modifying factors, cognitive-perceptual factors, and cues to action.

Although Pender (1987) acknowledges that individuals engage in health behaviours to protect them from illness, she does not incorporate this concept into her Health Promotion Model. Hilton (1986) states that this is a weakness in the Health Promotion Model.
Figure 1. Hilton’s Health Promotion/Protective model

<table>
<thead>
<tr>
<th>MODIFYING FACTORS</th>
<th>COGNITIVE-PERCEPTUAL FACTORS</th>
<th>LIKELIHOOD OF ACTION</th>
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<td>Situational factors</td>
<td>Perceived health status</td>
<td></td>
<td></td>
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<tr>
<td>Perceived threat of disease</td>
<td>Perceived benefits of health promotion and/or health protective action</td>
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- - - - DECISION-MAKING PHASE- - - - ACTION PHASE- -
In particular, the lack of a health protection component in the model fails to account for those individuals who cope with a chronic illness or a long-term disability. These people often engage in health behaviours that protect them from further disease, besides engaging in health behaviours that promote a higher quality of life. Consequently, Hilton incorporates the concepts of the Health Belief Model into the Health Promotion Model.

The Health Belief Model was developed in the 1950's to explain why some individuals took action to prevent illness and why others failed to do so (Rosenstock, 1974). The variables from the Health Belief Model which Hilton integrates into her model are perceived susceptibility to disease, perceived seriousness of disease, perceived benefits of action, knowledge about disease, previous contact with disease, perceived threat to disease and perceived barriers to action.

Due to its complexity of involving numerous variables that are beyond the scope of the investigations in this study, Hilton's Health Promotion/Protective Model has been adapted and simplified for the purposes of this study. The conceptual framework for this study portrays how a number of significant variables play a role in health promotion and health protection as individuals adjust to living with the chronic condition of coronary artery disease (see Figure 2). These health promotion/protection variables are continuing behaviours and perceptions that become part of an individual's way of life. The variables that relate to both health promotion and health protection
are:

1. the modifying factor of knowledge regarding health promotion/protective behaviours.
2. the modifying factor of interpersonal support.
3. the modifying factor of demographic characteristics.

The variables that relate to only health protection are:

1. the modifying factor of knowledge about the disease.
2. the cognitive-perceptual factor of perceived susceptibility to disease.

Figure 2. Adapted Health Promotion/Protective Model
The variable that relates to only health promotion is:

1. the cognitive-perceptual factor of self-actualization.

The variables of the action phase, and their descriptions in relation to this study, are the health promotion/protective behaviours of:

1. exercise, or engaging in physical activity that improves cardiovascular functioning.
2. nutrition, or modifying dietary habits to decrease total fat and cholesterol intake.
3. stress management, or minimizing the harmful physical and psychological effects of negative tension or distress (Pender, 1987).
4. health responsibility, or taking initiative in seeking information and professional assistance to ensure the promotion of health (Walker, Sechrist & Pender, 1987).

Research Hypotheses

1. First time MI patients who participate in outpatient cardiac education are more knowledgeable regarding heart disease and health promotion/protective behaviours, measured by the Heart Health Knowledge Quiz (HHKQ), four to six months after hospital discharge than first-time MI patients who do not participate in outpatient cardiac education.

2. First time MI patients who participate in outpatient cardiac education engage in health promotion/protective behaviours to a greater extent, measured by the Health Promoting Lifestyle Profile (HPLP), four to six months after hospital discharge, than do first time MI patients who do not participate in outpatient cardiac education.
Definition of Terms

1. Outpatient cardiac education program: Community-based classes designed for patients with heart disease, that provide information regarding health promotion/protective behaviours.

2. Lifestyle: The way in which individuals choose to live. In relation to health, lifestyle refers to the decisions individuals make that affect their health status (Walker, et al., 1987).

3. Health promoting behaviours: Actions that lead to a state of improved health, increased well-being and higher quality of life (Pender, 1987).

4. Health protecting behaviours: Actions engaged in by individuals to avoid or prevent further disease (Rosenstock, 1974).

5. Self-actualization: A demonstration of human growth and potential expressed by self-initiated activities that improve health and well-being, resulting in an improved sense of satisfaction and enjoyment in living (Pender, 1987).

6. Perceived susceptibility to disease: An individual's personal impressions regarding the possibility of acquiring a health problem (Rosenstock, 1974).

7. Interpersonal support: Feelings of belonging and encouragement due to the involvement of other people instrumental in facilitating health promotion, health maintenance and illness prevention (Pender, 1987).
Assumptions

In this study, it was assumed that individuals had the ability to identify their personal health promotion/protective behaviours. It was also assumed that individuals would respond honestly to the items on the questionnaires.

Limitations of the Study

1. Due to time constraints, the long-term effect (more than one year after an MI) of outpatient cardiac education on knowledge and health promoting/protective behaviours was not examined.
2. The quasi-experimental design of this study was a limiting factor in the generalization of results.
3. Six of the 25 participants in the experimental group attended a different outpatient cardiac education program than the other 19 participants. It is not known whether these 6 participants attended the program within the first one to two months following discharge from the hospital. Participants were not requested to supply this information.
4. The Health Promotion Lifestyle Profile (HPLP), one of the instruments used in this study, has not undergone psychometric evaluations with populations who are living with a chronic illness such as heart disease. Therefore, the results may not reflect the health promotion/protective behaviours of this population with complete accuracy.
5. The pretest Heart Health Knowledge Quiz (HHKQ) results may not accurately measure knowledge levels of first time MI patients prior
to their hospitalization because there were opportunities in the hospital to learn about heart disease and health promotion/protective behaviours before completing the pretest knowledge quiz.

6. Completing the written HHKQ may not always measure actual knowledge. Some individuals may be unable to accurately complete a written test, but may demonstrate knowledge based on verbal responses or observed behaviours.

Significance

This study was at the situation-producing level of theory development in that it involved the testing of an intervention (Woods & Catanzaro, 1988). It contributed to the validation of the proposition that participation of MI patients in an outpatient cardiac education program can improve their knowledge about heart disease and that it can encourage them to engage in health promoting/protective behaviours as a way of life.
CHAPTER TWO

Literature Review

In this chapter, the literature regarding knowledge about cardiac disease, the implementation of health promotion/protective behaviours, interpersonal support and self-actualization will be examined. The variable of perceived susceptibility of disease, which was identified as a concept in the conceptual framework (see Figure 2), will not be discussed in the literature review. This variable was not investigated due to the unavailability of a suitable tool for its measurement.

The literature that addressed the cognitive-perceptual factor of self-actualization, and the modifying factor of interpersonal support is discussed first. The largest section of this chapter is a review of how participants' involvement in both hospital-based and outpatient cardiac education programs influenced their knowledge regarding cardiac disease and health promotion/protective behaviours, and also how these programs played a role in whether these individuals actually engaged in health promotion/protective behaviours.

Self-actualization

In a qualitative study reported by Frenn, Borgeson, Lee & Simandl (1989), 6 men and 4 women with heart disease who were participating in a cardiac rehabilitation program were interviewed regarding their view of changes in diet, smoking cessation and exercise. Among the reasons subjects described for pursuing
lifestyle changes were that they enjoyed life, and that they wanted to live a long life. These descriptions were labelled as health promotion precipitants to change by the authors. Engaging in lifestyle changes for the sake of enjoying life is one element in the expression of self-actualization as described by Pender (1987). The results of this study provide some evidence that individuals with the chronic condition of heart disease engage in healthy behaviours for the sake of promoting health.

**Interpersonal Support**

In the qualitative study reported by Frenn et al. (1989), nine of the ten subjects described how the presence of family and friends was a positive support in helping them make lifestyle changes. Two subjects did report that, at a certain point, the support became overbearing.

Among the variables tested by Derenowski (1988 & 1991), was the relationship between social support systems, wellness motivation (the tendency to adhere to wellness behaviours for the promotion of health), and health value orientation (standards used for making choices regarding health behaviours). In the 1988 study, data were collected from a total of 106 post-MI male patients who participated in one of the three phases of cardiac rehabilitation. In the 1991 study, data were collected from 52 post-MI male patients who were actively involved in an outpatient cardiac rehabilitation program. The results of both studies revealed a positive relationship between the presence of supportive others and an increase in wellness.
motivation during all phases of cardiac rehabilitation. As the perceived help from supportive others increased, the value for engaging in health behaviours also increased. In addition, subjects indicated an increase in the value of significant relationships outside the family as they progressed through the rehabilitation programs. For example, they established friendships in group cardiac rehabilitation programs. The findings revealed the beneficial role for supportive others as active participants in the cardiac rehabilitation process, including their participation in establishing risk factor modification goals with the individual who had experienced the MI.

Several other studies emphasized the influence of the spouse, or another person in close relationship with the patient, as important in helping the MI patient comply with the therapeutic regimen (Holm, Fink, Christman, Reitz & Ashley, 1985; Miller, Wikoff, McMahon, Garrett & Ringel, 1985; Miller, Wikoff, McMahon, Garrett & Ringel, 1988; Miller, Wikoff, McMahon, Garrett, Ringel & Collura, 1989; Miller, Wikoff, Garrett, McMahon & Smith, 1990). In the studies by Miller et al. (1985, 1988, 1989, 1990), it was found that, during hospitalization, the patient's perceptions of significant others' beliefs regarding his/her intentions to adhere to the medical regimen were a strong indicator of the patient's intention to adhere to the medical regimen. Following discharge from the hospital, the patient's perceptions of significant others' beliefs regarding his/her intentions to adhere to the medical regimen were a strong
indicator of the patient actually adhering to the medical regimen. In contrast to these findings, Dracup, Meleis, Clark, Cyburn, Shields & Staley (1984) found that spousal participation in a group counselling program made no difference in the patient's compliance with the therapeutic regimen.

Ben-Sira & Eliezer (1990) studied the influence of social support from the broader perspective of physical and psychosocial readjustment after a heart attack, rather than compliance to the therapeutic regimen. The concept of readjustment was considered from three perspectives: emotional (affective), level of functioning (instrumental), and understanding and acceptance of the health condition (cognitive). There was a strong relationship between spousal support and the patient's physical and psychosocial readjustment after a heart attack. Open channels of communication between spouses were found to be of particular significance in promoting the three dimensions of readjustment following a heart attack.

With the exception of one study (Dracup et al., 1984), these studies provide evidence for the importance of interpersonal support in motivating those with heart disease to engage in health promotion/protective behaviours.

**Knowledge and Health Promotion/Protective Behaviours**

Knowledge and Behaviours of the General Public

Maccoby, Farquhar, Wood & Alexander (1977) studied the effects of a multimedia campaign and an intensive instruction program for
individuals in the general population at high risk for heart disease. Both the multimedia campaign and the intensive instruction program were identified as prevention programs designed to reduce risk for premature cardiovascular disease. These authors found that, as a result of both these methods of instruction, there was a significant increase in knowledge accompanied by substantial behavioural modifications that reflected a more healthy lifestyle. In addition, the more the participants in this study learned, the more they changed their behaviour.

Fleetwood and Packa (1991) had similar results in their study of 520 active duty military officers (86% male and 14% female, all with baccalaureate or masters degrees). Those participants with higher Coronary Artery Disease (CAD) Knowledge Scores engaged in more health promoting behaviours as measured with the Health Promoting Lifestyle Profile (HPLP). Although the subjects scored high in the knowledge test regarding some of the major risk factors for heart disease, there was a lack of knowledge regarding the significance of elevated blood cholesterol levels, diabetes and the use of contraceptives as risk factors for heart disease.

Hospital-Based Cardiac Education Programs

The effect of hospital-based cardiac education programs on knowledge and engaging in health promotion/protective behaviours following discharge from the hospital has been examined in a number of studies (see Table 1).
Table 1

Hospital-Based Cardiac Education Programs

Author (Year): Rahe, Scalzi & Shine (1975)

Program Goals: To improve the quality and consistency of a hospital-based cardiac education program, and to evaluate MI patients' knowledge about their illness and its management.

Program: A teaching booklet for cardiac patients was developed which provided information regarding the nature of heart disease, emergency planning, nutrition, smoking, resumption of physical activity, psychological issues and return to work following an MI. The teaching program involved individualized nurse-patient interaction.

Design: One group, convenience sample, pretest-posttest using a knowledge questionnaire before the teaching booklet was given to the participants and shortly before discharge.

Sample: 19 male and 5 female patients under age 65 with their first MI.

Results: There was a significant increase in total number of correct responses. However, when each section of the exam was analyzed separately, it was found that there was a significant increase in scores for issues pertaining to only the immediate post-discharge period, such as medication regimen, emergency procedures, physical activity and return to work. There was no significant increase in knowledge retention regarding long-term life-style modification issues such as exercise, low-fat diet, smoking cessation, and stress reduction.

Author (Year): Owens, McCann & Hutelmyer (1978)

Program Goals: To investigate the effectiveness of health teaching in a group setting for hospitalized patients with heart disease.

Program: A hospital-based cardiac teaching program developed for the purpose of the study. Teaching occurred in five 45-minute group discussion sessions.

Design: One group, convenience sample, time-series with data obtained using an interview questionnaire prior to the education
program, after the education program, and 6 weeks and 3 months following discharge from the hospital.

**Sample:** 25 male and 11 female medical and surgical cardiac patients, 18 years of age and older.

**Results:** Significant increases during hospitalization and throughout the 3 month period occurred for knowledge of risk factors, knowledge of complications of the disease and understanding the importance of continuing medical contact. The greatest increase in knowledge occurred 6 weeks after discharge from the hospital, when subjects also demonstrated a significant increase in the understanding of their illness, of appropriate lifestyle changes, of medical therapy, and knowledge of when to notify the physician.

---

**Author (Year):** Budan (1983)

**Program Goals:** Not specified. The study aim was to explore the relationships between how patients learn while in the hospital, and anxiety, stress, age, and education.

**Program:** An ongoing hospital-based cardiovascular education program conducted by staff nurses on a one-to-one basis.

**Design:** One group, non-random sample, pretest and posttest using a knowledge questionnaire during hospital stay.

**Sample:** 12 patients below age 70, diagnosed as having an MI.

**Results:** There was a significant increase in knowledge about heart disease during patients' hospital stay. Anxiety decreased after exposure to the education program. No statistically significant relationship was found between learning and personal stress. Patients with high school education or less were at a disadvantage. Advancing age did not limit the patients' ability to learn.

---

**Author (Year):** Mills, Barnes, Rodell & Terry (1985)

**Program Goals:** To determine if knowledge, demographics, general intelligence, problem-solving ability, and motivation influence heart patients' compliance to a medical regimen.

**Program:** A series of five 1-hour hospital-based patient education classes developed by the patient education team of the hospital in which the study was conducted.
Table 1 (cont.)

**Design:** Initial non-random selection, and then randomized to two groups to test for a practice effect with a pretest. Data was collected using a knowledge test prior to entering the program and prior to discharge, plus a behaviour assessment questionnaire four weeks after discharge.

**Sample:** 277 patients with an MI or angina, between 29 and 84 years of age.

**Results:** The effect of the program demonstrated a significant increase in knowledge prior to discharge from the hospital. Compliance to the medical regimen was demonstrated by a significant reduction in the number of cigarettes smoked four weeks after hospital discharge. No other lifestyle behaviours were examined at the 4-week period. The pretest group was more compliant than the non-pretest group, indicating that repeated testing may motivate patients to take advantage of information.

**Author (Year):** Hentinen (1986)

**Program Goals:** To increase knowledge and feelings of security, to achieve independence in care, to comply with care instructions and follow right lifestyles, and to achieve the best possible status of good health.

**Program:** An ongoing hospital-based cardiac education program that emphasized the importance of staff nurses' involvement in teaching.

**Design:** Method of sample selection not specified. Data was collected regarding knowledge and compliance using a questionnaire, interview method and patient documents at discharge, three months and one year after hospital discharge.

**Sample:** 170 MI patients under 65 years of age.

**Results:** There was a significant increase in knowledge prior to discharge regarding the nature of coronary heart disease, physical activity and recovery, diet, and sexuality. At the 3-month interval, there was an increase in the time spent for exercise and a reduction in the amount of fat in the diet. However, half of those who had stopped smoking had again resumed the habit at the 3-month interval.
Table 1 (cont.)

Author (Year): Fletcher (1987)

Program Goals: To help patients understand the pathophysiology of an MI, to identify risk factors, and to suggest possible modifications in lifestyle.

Program: Four 15-20 minute individualized cardiac education sessions by a nurse.

Design: Experimental, with random assignment to the study group or the control group. Data collection involved knowledge and modification of the risk factors for smoking, obesity, high fat diet and lack of exercise for both groups using a structured questionnaire, on the fourth day of hospitalization, and two and six months after discharge.

Sample: 18 male and 2 female MI patients ranging in age from 30 to 57. Ten patients in the study group, and ten patients in the control group.

Results: At six months, the experimental group demonstrated a greater reduction in fat consumption, a greater involvement in active exercise, and a greater reduction in daily cigarette consumption than the control group. There was no difference in weight loss.

Author (Year): Liddy & Crowley (1987)

Program Goals: Not specified. The study goals were to determine if MI patients and their spouses received enough information about the cardiac event and the recovery process while in the hospital.

Program: Ongoing hospital-based cardiac rehabilitation program in three hospitals, but no details provided regarding the specific nature of these programs.

Design: One group, convenience sample, data collected by means of intensive interviews two to three months post MI.

Sample: Eight men and three women between ages 34 and 81 following their first MI, and their spouses.

Results: Two to three months post MI, there was only a superficial understanding of the disease process, the recovery process and the identification of anginal pains for both patients and spouses. The information study participants received regarding physical activity was too general to apply to everyday living. They had only a
superficial understanding of their prescribed diets, including a lack of understanding for reducing their cholesterol level. The subjects found that the information received during their hospitalization lacked meaning until after discharge, when many questions surfaced.

Author (Year): Raleigh & Odtohan (1987)

Program Goals: To ensure the quantity and quality of information that the MI patient receives while in the hospital.

Program: A cardiac health education program that involved individualized instruction and which was developed by the staff of the hospital in which the study was conducted.

Design: Experimental, with random assignment to either an experimental or control group. Data collection occurred regarding knowledge and physical activity prior to the program for the experimental group, and prior to hospital discharge and two months after discharge for both the experimental and control groups.

Sample: Nine MI patients in each group

Results: The experimental group demonstrated a significantly higher knowledge level than the control group, both at the time of hospital discharge and two months after discharge. At the 2-month interval, the experimental group had resumed 70% of their prehospitalization activities, while the control group had resumed only 48% of their activities.

Author (Year): Murray (1989)

Program Goals: Not specified. The study aim was to investigate the type of information MI patients received, and whether it met their perceived information needs.

Program: An ongoing hospital-based cardiac education program that involved printed material and teaching in a group or on an individual basis by a staff nurse.

Design: One group, method of sample selection not specified. Data collection used face-to-face interviews between author and patients on the day of or the day before anticipated discharge.

Sample: 17 male and 8 female patients between 27 and 71 years of
Table 1 (cont.)

Age with confirmed first MI.

**Results:** These patients stated that they felt well-prepared for discharge from the hospital, but were only able to state a few specific items of advice or information when questioned just prior to discharge. In addition, they felt that the information was not relevant to their personal needs. Thirty-six percent of the patients said they were not given information regarding emergency action in the event of chest pain at home. Although most patients were told how long it would take to resume their normal levels of activity, many had unrealistic expectations of this taking 6 months or more.

**Author (Year):** Thompson (1991)

**Program Goals:** To provide support and education for cardiac patients and their spouses. The study aim was to determine the effect of this program on the knowledge of patients and their spouses.

**Program:** Individualized cardiac education and counselling conducted by a Cardiac Care nurse in four 30-minute sessions during the patients' hospital stay.

**Design:** Experimental, with patients and spouses assigned to either a treatment group which received the education and counselling program, plus routine care, and a control group which received only routine care. Data collection occurred before the intervention, and 5 days, 1 month, 3 months, and 6 months later.

**Sample:** 60 men under the age of 66 who had experienced their first MI, and their wives. 30 couples were placed in each group.

**Results:** Both patients and spouses in the experimental group had significantly higher knowledge scores than those in the control group on each occasion.

**Author (Year):** Pommier (1992)

**Program Goals:** To encourage making lifelong changes in lifestyle. The author also tried to determine if there was an increase of knowledge regarding CAD from attending CAD classes and what factors affected learning and knowledge retention.

**Program:** A 60-minute CAD rehabilitation class designed by the author which included an explanation of the disease process, risk factors,
symptoms, nutrition, physical activity, medications and self-help after discharge from the hospital.

Design: One group, pretest before class, and a posttest one month later.

Sample: 100 male patients between 37 and 77 years of age.

Results: Younger patients and those with more years of formal education had higher pretest scores (higher baseline knowledge). There was a significant increase in scores between pretest and posttest results indicating an increase in knowledge one month after the class. Married patients had significantly higher scores than unmarried patients.

The results of the majority of these studies indicate that patients do gain and retain knowledge after hospital discharge following participation in hospital-based cardiac education programs. However, in three of these studies (Rahe et al., 1975; Liddy, & Crowley, 1987; Murray, 1989) there is evidence that patients do not retain information regarding specific health promotion/protective behaviours.

Four of the studies review the effectiveness of hospital-based cardiac education programs for engaging in health promotion/protective behaviours after hospital discharge (Mills et al., 1985; Hentinen, 1986; Fletcher, 1987; Raleigh & Odtohan, 1987). Two of these authors examined the changes in only one behaviour, rather than investigating health promotion/protective behaviours as a way of life. Mills et al. (1985) reported a reduction in number of cigarettes smoked 4 weeks after hospital discharge, and Raleigh &
Odtohan (1987) reported an increased resumption of prehospitalization activities for the experimental group. On the other hand, Hentinen (1986) and Fletcher (1987) examined the effect of hospital-based cardiac education from a broader perspective by including behaviours such as diet, exercise, smoking, and weight loss in their investigations. Both reported a reduction in dietary fat consumption and an increase in exercising 3 to 6 months after hospital discharge. Fletcher (1987) also reported a reduction in cigarette smoking at 6 months.

In summary, hospital-based cardiac education programs are effective in helping patients learn about their heart disease and also in encouraging health promotion/protective behavioural changes.

Outpatient Cardiac Education Programs

A number of outpatient cardiac education programs have been reported and evaluated in the literature. A summary of the selected outpatient cardiac education programs chosen for review are presented in Table 2. They have been examined for their effect on knowledge and behavioural lifestyle changes following MI patients' involvement in outpatient cardiac education.
Table 2

**Outpatient Cardiac Education Programs**

**Author (year):** Scalzi, Burke & Greenland (1980)

**Program Goals:** To increase knowledge of coronary heart disease and methods of risk factor reduction.

**Program:** An organized educational program during hospitalization, and follow-up with clinic visits at 1, 3, 6, 12, 18 and 24 month intervals.

**Design:** Quasi-experimental, time-series. Patients in the first 6 months assigned to control group, and patients in the next 6 months assigned to experimental group.

**Sample:** Patients with first MI
- Experimental group--19 patients (17 men and 2 women)
- Control group--13 patients (11 men and 2 women)

**Results:** No significant changes in overall knowledge scores between the two groups over time. Follow-up instruction resulted in a significant difference in compliance in medications and weight loss for the experimental group. There were no differences between the groups regarding smoking compliance, dietary restriction compliance, and return to work.

**Comments:** Each subject received individualized instruction in the hospital and during clinic visits.

**Author (Year):** Sivarajan, Newton, Almes, Kempf, Mansfield & Bruce (1983)

**Program Goals:** To study the effect of exercise combined with a teaching-counselling program on smoking, diet and weight changes.

**Program:**
- Exercise program--30-minute weekly low-level exercise classes for 12 weeks.
- Teaching-counselling program--8 one-hour group classes. Content included heart disease and heart attack, nutrition, physical activity, stress and relaxation, and emotional reactions to a heart attack.

**Design:** Experimental design--patients randomized to control
Table 2 (cont.)

group, exercise group, and exercise and teaching-counselling group. Data collected during hospitalization, at 3 months, and at 6 months.

Sample: Men and women, 70 years old and under, with first MI. Entered experiment immediately post hospital discharge.
Initial randomization:
  Exercise group--88
  Exercise and teaching-counselling group--86
  Control--84

Results: The teaching-counselling program demonstrated limited effectiveness, with the only significant changes in reduced consumption of sodium-containing foods and in coffee intake at 3 months, but not at 6 months, for the teaching-counselling group. There were no significant changes between the groups regarding smoking reduction and weight loss.

Comments: All teaching sessions were group sessions.

Author (Year): Dracup, Meleis, Clark, Clyburn, Shields & Staley (1984)

Program Goals: To evaluate the effects of group counselling on compliance to not smoking, decreased BP, decreased body weight, and weekly exercise for MI and coronary bypass surgery patients and spouses.

Program: 10-week series of weekly 90 minutes sessions that focused on anxiety and stress reduction, relaxation techniques, and risk factor reduction. All groups involved in exercise training 3X/week.

Design: Quasi-experimental, three-group, time-series. Data collected at baseline, 10 week, and 6 month intervals.

Sample: 28 patients with an MI and 30 patients following bypass surgery who were enrolled in an outpatient cardiac rehabilitation program.

  Experimental group #1--17 patients and spouses in counselling program.
  Experimental group #2--22 patients and spouses, but only patients in counselling program.
  Control group--19 patients and spouses (spouses did not attend counselling program).

Results: After 6 months, both experimental groups experienced
significant weight loss and decreased systolic BP. There were no differences in weekly exercise level and smoking behaviour among all groups.

Comments: The experimental intervention consisted of group sessions. Method of group assignment not reported.

Author (Year): Niskala (1987)

Program Goals: To educate patients regarding coronary artery disease, risk factor reduction, and lifestyle modification.

Program: Home instruction for cardiac patients one week after discharge from hospital by a community health nurse, with subsequent visits arranged as needed.

Design: One group, non-random posttest design. Program evaluation regarding health knowledge, health behaviour, health functions (physical, emotional, social).

Sample: 55 male and 6 female patients, post MI.

Results: Those who were knowledgeable about their heart condition also engaged in health behaviour and had better physical functioning.

Comments: Individualized instruction. No time interval between intervention and evaluation reported. No report on reliability and validity testing of the questionnaire. No statistical report other than percentage results on questionnaire reported.

Author (Year): Billington (1988)

Program Goals: To change attitudes and health behaviour towards a more healthy lifestyle.

Program: 8 weekly sessions, 2 hours in length. Topics of instruction were exercise, diet, stress management and relaxation techniques. Participants entered program 1 month after hospital discharge.

Design: Patients were initially selected at random. The first 7 patients contacted were placed in the experimental group that attended the program.
Table 2 (cont.)

The remaining 7 patients received literature one month after discharge from the hospital. Data collection during hospitalization for both groups, and 3 1/2 months after program completion for the experimental group and 3 1/2 month after receiving literature for the control group.

**Sample:** Patients who had been hospitalized for an MI.
- Experimental group--7 patients
- Control group--7 patients

**Results:** Experimental group demonstrated greater changes in exercise levels, diet, and stress management than the control group.

**Comments:** Educational sessions occurred in group sessions. No validity and reliability information on the questionnaire reported. Very small sample size.

**Author (Year)**--Miller, Wikoff, McMahon, Garrett & Ringel (1988); Miller, Wikoff, McMahon, Garrett, Ringel, Collura, Siniscalchi, Sommer & Welsh (1989); Miller, Wikoff, Garrett, McMahon & Smith (1990)

**Program Goals:** To assist patients with formulating a health plan that addressed problems of attitudes toward medical regimen prescriptions, adherence to medical regimen, coping methods and societal adjustments.

**Program:** One home visit by a nurse 30 days post hospital discharge that focused on assessment, problem identification, and development of a health plan.

**Design:** Quasi-experimental time-series, subjects alternately assigned to groups. Experimental group received nursing intervention 30 days after discharge from hospital. Control group did not receive this intervention. Evaluation for both groups occurred prior to hospital discharge, at 30 days, 60 days, 1 year and 2 years after hospital discharge.

**Sample:** Patients with first diagnosis of MI
- Initial sample: Experimental group--58
  Control group--57
- 2 year sample: Experimental group--29
  Control group--22
Table 2 (cont.)

**Results:** There were no significant differences between groups in adherence to the medical regimen at 60 days and 1 year. However, at the 2 year period, there was a significant difference for compliance to diet for the experimental group, but no differences between the groups in compliance to activity, stress reduction, and medications. Control group was more compliant with smoking cessation. Favourable attitudes influenced compliance to diet, smoking cessation and stress reduction.

**Comments:** Individualized instruction.
Only one home visit with a focus on instruction.

**Author (Year):** Fridlund, Hogstedt, Lidell & Larsson (1991)

**Program goals:** To evaluate the influence of a caring intention in preventing secondary illness and in promoting an improved life situation, lifestyle modifications, and less health complaints.

**Program:** 6-month rehabilitation program that included 2-hour weekly sessions focusing on lifestyle, life stress and social support. Participants also were involved in an exercise and relaxation program.

**Design:** Following hospital discharge, participants were randomly divided into an experimental group that was involved in an exercise and educational rehabilitation program and a control group that was not involved in the rehabilitation program. Follow-up at hospital discharge, 6 and 12 months after MI.

**Sample:** MI Patients discharged from the hospital.
Experimental group--52 (45 men and 7 women)
Control group--58 (51 men and 7 women)

**Results:** Experimental group showed increased physical capacity at 6 months, less reinfarctions at 12 months, higher perceived life satisfaction at 12 months, better leisure situation at 6 months, and better partner situation at 12 months. There were no significant differences between the groups regarding diet alterations and smoking habits at 6 months and 12 months.

**Comments:** Instruction occurred in group sessions.
In all of these outpatient cardiac education programs, the investigators concentrated on changes in specific health promotion/protective behaviours, with an emphasis on adhering to, or complying with a prescribed treatment plan, rather than focusing on the broader perspective of engaging in these behaviours as a way of life. For five of these seven cardiac education programs, participants made significant changes in specific health promotion/protective behaviours. Scalzi et al., (1980); Dracup et al., (1984); Niskala (1987) and Billington (1988) reported significant changes in health behaviours such as taking medications, physical activity, weight loss, diet, reduction in blood pressure, and stress management. Fridlund et al., (1991) reported changes in specific psychosocial adjustments such as decreased anxiety, fatigue, and interpersonal friction, and increased independence, perceived life satisfaction, and sociability.

In two of these programs, participants did not make significant changes. Miller et al. (1988, 1989, 1991) did not find any differences between the groups regarding activity, stress reduction and medications. This education program consisted of only one teaching session. Sivarajan et al. (1983) reported limited effectiveness for reduction in cigarette smoking, reduction in fat consumption and weight loss, even though the education program involved 8 group sessions.

Two outpatient cardiac education studies report knowledge about heart disease, and the relationship of knowledge level to health
promotion/protective behaviours. Niskala (1987) reported that those who were knowledgeable regarding their cardiac condition also engaged in health promotion/protective behaviours. Scalzi et al. (1980) found no significant differences in knowledge between the control and experimental groups during hospitalization and during the follow-up period. However, the experimental group did demonstrate a significant difference in compliance for medications and weight loss compared to the control group during the follow-up period. For both of these programs, instruction occurred on an individualized basis. The other five outpatient cardiac education studies did not examine their effect on cardiac knowledge.

Five of these outpatient cardiac education programs involved a pretest while the participants were still hospitalized, enabling the investigators to determine the effect of outpatient cardiac education (Scalzi et al., 1980; Miller et al., 1988, 1989, 1990; Fridlund et al., 1991; Sivarajan et al., 1983; Billington, 1988). In the study by Miller et al. (1988, 1989, 1990), the experimental group received only one teaching session during a home visit by a nurse thirty days after hospital discharge. Scalzi et al. (1980) examined the effect of an educational program in which the experimental group received instruction at specific intervals for a two-year period after hospital discharge. In both of these programs, there was a lack of concentrated cardiac instruction during the first one to two months following hospital discharge.

One program extended for a period beyond the first one to two
months following hospital discharge. The rehabilitation program investigated by Fridlund et al. (1991) involved weekly sessions for six months after hospital discharge.

Two programs did provide concentrated cardiac education during the first one to two months following hospital discharge. In the Sivarajan et al. (1983) study, the experimental groups attended eight 1-hour classes each week, besides participating in a low-level exercise program for 12 weeks after hospital discharge. Statistical analysis revealed no significant changes between the experimental and control groups regarding the specific behaviours of smoking and weight loss. The experimental group that participated in the education classes did report making significant changes regarding consumption of specific food items at three months following hospital discharge, but not at the six month period.

The cardiac education program reported by Billington (1988) also involved eight weekly classes. The participants in the experimental group attended these two-hour classes six weeks following hospital discharge. Billington (1988) provided no information regarding data collection tools. Although the results indicated changes in exercise levels, nutrition and stress management in graph form and in a matrix of percentages, the results were based on a very small sample size of only seven subjects in each group.

Summary

It is evident that further study of the effect on knowledge and health promotion/protective behaviours for individuals who
participate in outpatient cardiac education is required. The programs that have been examined provide limited and inconsistent information regarding the effect of outpatient cardiac education during the first one to two months following hospital discharge. Weak study designs, lack of information regarding data collection tools, lack of statistical analysis, or lack of emphasis regarding health promotion/protective behaviours as a way of life contribute to this information gap.
CHAPTER THREE

Methodology

The details regarding the process of conducting this study are presented in this chapter. This includes an explanation of the design, procedure, sample selection, sample criteria, data collection instruments, recruitment, data collection, data analysis, and the protection of human rights.

Research Design

This study used a quasi-experimental pretest-posttest control group design as illustrated below:

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<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Posttest</th>
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<tbody>
<tr>
<td>Experimental group</td>
<td>01</td>
<td>X</td>
</tr>
<tr>
<td>Control group</td>
<td>01</td>
<td>02</td>
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(01--Observation 1; X--Intervention; 02--Observation 2)

The experimental group consisted of those patients who attended an outpatient cardiac education program at the hospital where this study was conducted, or a program in their local community, within the first 2 months of their hospital discharge. The control group consisted of those patients who were admitted to the same hospital, but who did not attend an outpatient cardiac education program.

Procedure

Observation 1 (01)--During subjects' admission to the hospital for their first MI, they were assessed with respect to their present knowledge level regarding heart disease and healthy behaviours, and the extent to which they engaged in health promotion/protective
behaviours before their admission to the hospital.

Intervention (X)--This refers to voluntary participation in an outpatient cardiac education program within the first 2 months following discharge from the hospital.

Observation 2 (O2)--Four to six months following discharge from the hospital, subjects were assessed again with respect to their knowledge level regarding heart disease and healthy behaviours, and the extent to which they engaged in health promotion/protective behaviours at that period in time.

Setting and Sample Selection

The sample for this study was selected from patients who were admitted to the Cardiac Care Unit (CCU) or the Cardiology Interventional Unit (CIU) of a major teaching hospital in western Canada.

Sample Criteria

Inclusion criteria were patients admitted to the CCU or CIU with their first MI, who read and spoke English, and who were between the ages of 30 and 75. This age range was chosen, based on the investigator's experience of caring for first time MI patients, as the time when these patients are most open to making health promotion/protective behavioural changes following their MI. Patients who had a coronary angioplasty following their first MI were also considered for inclusion in the study. Those patients with a major physical challenge such as rheumatoid arthritis or diabetic neuropathy, and with a major mental challenge such as schizophrenia
or Alzheimer's disease were excluded from the study.

**Instruments**

**Health Promoting Lifestyle Profile**

Health promotion/protective behaviours were measured with the Health Promoting Lifestyle Profile (HPLP) developed by Walker, Sechrist & Pender (1987) (see Appendix A). The subscales of this instrument measure the health promotion/protective behaviours and perceptions in the domains of interpersonal support, self-actualization, exercise, nutrition, stress management and health responsibility.

For a pilot test of the initial form of this instrument, Walker, Sechrist & Pender (1987) administered it to 173 graduate and senior undergraduate nursing students to evaluate it for item clarity, response variance, internal consistency, and stability. Cronbach's alpha for internal consistency was .919, indicating high internal consistency and the test-retest r was .854, indicating stability. The questionnaire was evaluated for content validity by four nursing faculty members who were knowledgeable regarding health promotion literature. With the inclusion of their recommended items, the result was a 107 item HPLP.

Reliability testing of the 107 item HPLP was performed on a convenience sample of 952 adults (436 female and 516 male) from various community settings. An attempt was made to include adults who participated in health-promoting behaviours. The investigators also included subjects who were inactive and those who participated
in exercise programs. Subjects ranged in age from 18 to 88, with a mean age of 39.2 years. Items with low alpha coefficients following item-total correlations were deleted. The remaining 70 items, most of which had item-total correlations of .25, were subjected to factor analysis, at which point 22 items did not load on any single factor and were eliminated.

Construct validity testing of the final 48-item Health Promoting Lifestyle Profile was accomplished by entering these items into another factor analysis. All these items loaded on the expected factors at a level of .35 or higher. The factors were labelled self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management. These six first-order factors were found to load significantly on one second-order factor which was named health promoting lifestyle.

Further reliability testing of this 48 item HPLP indicated a high internal consistency with an alpha coefficient of .922. Each of the 6 subscales representing each of the 6 first-order factors had alpha coefficients of .702 to .904, indicating that each of the subscales measures only the single concept of that subscale. Stability testing was performed by administering the HPLP to a sample of 63 adults at an interval of 2 weeks, which resulted in a Pearson r score of .926 for the entire scale and .808 to .905 for the subscales (Walker et al., 1987).

Permission to use the Health Promoting Lifestyle Profile was granted by Dr. Susan Walker (see Appendix B).
This instrument was developed from the perspective of promoting wellness, rather than the prevention of illness. It seeks to measure a healthy lifestyle for a broad population base. This is a limitation for this study in that a number of items in the HPLP may be misleading for individuals who are recovering from the illness event of an MI. In particular, item #13--"Exercise vigorously for 20-30 minutes at least 3 times per week"--may give the impression that vigorous exercise is an expectation during early recovery from an MI. Item #43--"Observe my body at least monthly for physical changes/danger signs"--is misleading for individuals recovering from an MI in that they need to constantly be aware of physical signs and symptoms of the onset of another MI. Since S. Walker requested that the content of the HPLP not be altered in any way (see Appendix B), participants in the second stage of this study (four to six months after hospital discharge) were informed in an explanatory letter (see Appendix D) that the questionnaire was not designed specifically for individuals who have had a heart attack, and that several items do not accurately describe behaviours that apply to individuals who are recovering from a heart attack.

Heart Health Knowledge Quiz

A 22-item Heart Health Knowledge Quiz (HHKQ) was developed by the investigator to measure the knowledge variable. This quiz measures knowledge regarding heart disease and knowledge regarding the health promotion/protective behaviours of nutrition, physical activity and stress management (see Appendix E).
The process for establishing content validity of the HHKQ included application of the investigator's knowledge of the subject matter, and adaptation of the quizzes used in the outpatient cardiac education program at the major teaching hospital where this study was conducted. Content validity of this quiz was also established by the examination and modification of concepts applied in the cardiac knowledge tests developed by other authors (Rahe et al., 1975; Budan, 1983; Smith, Hicks & Heyward, 1991). The investigator acknowledges the contribution of Budan (1983) in the development of quiz items one, two, four and seven, for the contribution of Rahe et al. (1975) in the development of quiz items two and three, and for the contribution of Smith et al. (1991) in the development of quiz items 13, 14, 19, 20, 21, and 22.

The process for establishing face validity of the Heart Health Knowledge Quiz involved obtaining the judgments of experts in cardiac patient education, including two clinical nurse specialists, the chairperson of a hospital patient education committee, and the coordinator of a cardiac rehabilitation and teaching program at another facility. In addition, the expert judgments of a nutritionist, a physiotherapist, and an occupational therapist were included in determining the face validity of this instrument.

The HHKQ was pilot-tested on patients with newly diagnosed coronary artery disease who were admitted to the major teaching hospital in western Canada where this study was conducted. It was also pilot-tested on participants of the outpatient cardiac education
program during February, March and April, 1993, at this same hospital. Further changes were made to those questions that were consistently answered incorrectly. Based on verbal feedback from patients, ambiguous answer choices for a selected number of questions were changed to increase clarity.

Demographic Information

Demographic information was obtained from study participants during the pretest phase of the study (see Appendix F). For the posttest, participants were asked whether they had attended any cardiac education or rehabilitation program following their discharge from the hospital (see Appendix G). This information was required to determine if study participants had attended other cardiac education programs, either in the city where this study was conducted, or in the local communities to which study participants returned after their transfer to and discharge from the city hospital of this study location.

Recruitment

Individuals who met the criteria for admission to the study were identified by the investigator. After their physical condition stabilized and they were in the recovery stage of their stay in the hospital, staff nurses in the CCU and CIU of the hospital in which patient recruitment for this study occurred made the initial contact with these patients. These nurses informed the patients regarding the nature of the study and asked if they were willing to participate in it. If the patients responded in the affirmative, the study
investigator approached the patient and provided more details regarding the study.

As a component of their hospital-based cardiac education program, study participants were informed about the existence of an ongoing outpatient cardiac education program at the hospital where this study was located. See Appendix H for a summary of this outpatient cardiac education program. Patients from other communities were also informed regarding the existence of local cardiac education programs.

**Data Collection**

After eligible patients indicated a willingness to participate in the study, the investigator gave them the HPLP, HHKQ, and demographic profile, together with a cover letter that included instructions regarding the completion of the questionnaires (see Appendix I). These questionnaires were distributed in an envelope to ensure participants' privacy following completion of the questionnaires. Participants were requested to complete the questionnaires during their hospital stay.

For the pretest, participants were requested to complete the HPLP with reference to the present state of their health promoting/protecting behaviours. Since some items on the HPLP refer to behaviours that cannot be applied to the hospital setting, participants were informed in the explanatory letter (see Appendix C) to reply to these items according to their way of life prior to hospital admission. They were also instructed to complete the HHKQ
according to their present knowledge level. The completed questionnaires were collected by the investigator. Participant recruitment and data collection for this first phase of the study occurred between September, 1993 and May, 1994.

For the second phase of this study, participants were mailed these same questionnaires with an appropriate cover letter (see Appendix J) four to six months following their discharge from the hospital. They were again requested to complete the questionnaires according to the present state of their knowledge regarding heart disease and their health promotion/protective behaviours. A stamped self-addressed return envelope was included with the mailed questionnaires. If participants did not respond after one month, a second copy of the questionnaires was mailed as a reminder. Data collection for this second phase of the study occurred between January, 1994 and September, 1994.

Data Analysis

Differences between the experimental and control groups in knowledge and health promotion/protective behaviours at the posttest stage were determined by using the t-test for independent groups. This test was applied to both the total scores for the HHKQ and the HPLP, and the subtests and subscales in each of these instruments. The use of the t-test for determining differences between the groups in the knowledge quiz subtests may provide inaccurate results due to the small number of items in each sub-test. This reduces the possibility of a normal distribution of the data. The investigator
recognizes that a non-parametric test for determining differences between two groups such as the Mann Whitney U test could be applied to the knowledge quiz sub-test scores. However, for the purpose of consistency, the t-test was applied to all the data, but a higher $\alpha$ level was applied to the sub-test scores to reduce the probability of error.

Procedures for Protection of Human Rights

Before implementing the study, the proposal was reviewed and approved by the University Behavioural Sciences Screening Committee for Research Involving Human Subjects. It was also reviewed and approved by the hospital-wide Research Committee and the Nursing Research Committee of the hospital in which the study was conducted.

An attached cover letter that briefly explained the study was included with each of the hand-delivered and mailed questionnaires (see Appendices I and J). In these cover letters, participants were assured of anonymity and confidentiality regarding the results of the questionnaires. They were also informed that their participation in the study was voluntary and that completion and return of the questionnaires was regarded as their consent to participate in the two phases of the study.
CHAPTER FOUR

Presentation and Discussion of Findings

The demographic information and other characteristics for both the experimental and control groups are described in this chapter. The findings in relation to both hypotheses are presented, followed by a discussion of the results.

The Sample

At the pretest stage, a total number of 102 subjects between the ages of 32 and 80 were recruited. Seven patients above the upper age limit (75 years) were recruited because of their interest in learning more about heart disease and their desire to make changes in health behaviours. Five of the seven patients over the upper age limit completed the study. Of the 102 subjects, 30 participated in an outpatient cardiac education program. These 30 participants comprised the experimental group, and the remaining 72 participants who did not participate in an outpatient cardiac education program were placed in the control group. One of the reasons for the large number of participants in the control group is that 50% (36) of these subjects were transferred from hospitals in communities where there are infrequent or no cardiac education programs.

Of the subjects in the experimental group, 12% (3) were from outlying areas and were able to attend a cardiac education program in their local community. Another 12% (3) resided within an hour's drive of the hospital where this study was conducted, and where an outpatient cardiac education program was provided, but they attended
programs in the area of their residence. Based on the descriptions of the programs attended by these 6 subjects, they were judged by the investigator as being similar to the outpatient cardiac education program described in Appendix H that was attended by the other participants in the experimental group.

The demographic information received from study participants is summarized on Table 3. Although the mean age of the experimental and control groups is very similar, it is interesting to note that the experimental group included the two 80 year-old subjects in spite of the fact that individuals in this upper age range often are not focused on making lifestyle changes after an MI. In addition, individuals in the younger age range may also focus less on making lifestyle changes after an MI, and this may be a reason why the experimental group did not include subjects below the age of 40. The experimental group had slightly fewer female participants (8% [2] in the experimental group compared to 21% [10] in the control group). Also, the experimental group had more widowed and widowered participants (20% [5] in the experimental group compared to 8.5% [4] in the control group). None of the four subjects with an education of less than grade 8 completed the study by returning the posttest questionnaires. A higher number of subjects in the experimental group than in the control group had post-high school education (52% [13] in the experimental group compared to 32% [15] in the control group).
### Table 3

#### Demographic Information

<table>
<thead>
<tr>
<th></th>
<th>Total Sample</th>
<th>Exp. Group</th>
<th>Control Group</th>
<th>Exp. Group</th>
<th>Control Group</th>
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<td>40-49 years</td>
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<td>10</td>
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<td>70-79 years</td>
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<td>23</td>
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<td>Female</td>
<td>19</td>
<td>2</td>
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<td>4</td>
<td>0</td>
<td>3</td>
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<td>Education</td>
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<tr>
<td>Grades 0-7</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Grades 8-11</td>
<td>27</td>
<td>4</td>
<td>15</td>
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<td>17</td>
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<td>C.C/T.S.**</td>
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<tr>
<td>University</td>
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<td>Working</td>
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<td>4</td>
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<td>20</td>
<td>1</td>
<td>11</td>
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<td>21</td>
<td>40</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Other as first language</td>
<td>17</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

*Subjects who did not complete the posttest

**Community College/Technical School
Presentation of Findings

Of the 72 subjects in the control group, 47 subjects completed the study by returning the posttest questionnaires, resulting in a 65% response rate for this group. Of the 30 subjects in the experimental group, 25 subjects returned the posttest questionnaire, for an 83% response rate in the experimental group. Statistical analysis was performed using only the 72 subjects who completed the study.

Comparison of Pretest and Posttest Results Within Groups

The pretest and posttest HHKQ scores and HPLP scores for both groups were analyzed to obtain a more complete description of the experimental and control groups regarding their knowledge and health promotion/protective behaviours regardless of participation in outpatient cardiac education. The t-test for paired observations between pretest and posttest was performed on the HHKQ scores and HPLP scores for both groups. A significant α level of 0.05 was used for the HHKQ total mean scores and HPLP total scores. A significant α level of 0.01 was used for the HHKQ sub-test mean scores, and the HPLP sub-scale scores. The higher significant α level of 0.01 was chosen for the HHKQ sub-test scores and HPLP sub-scale scores because repeated t-test measurements on sections of the same data increases the probability of a type-I error, i.e., the probability of incorrectly concluding that there were significant differences in sub-test and sub-scale mean scores, when in reality there were no significant differences.
Comparison within the experimental group.

The experimental group made significant improvements in the HHKQ total scores between the pretest and posttest periods, with significant increases in the sub-test scores for heart disease and nutrition. There were increases in the mean scores for physical activity and stress management from the pretest to the posttest periods, but these were not significant (see Table 4). This group also reported making lifestyle changes, as indicated by the significant difference between the HPLP total mean scores between the

Table 4

Comparing Heart Health Knowledge Quiz Pretest and Posttest Scores for the Experimental Group n = 25

<table>
<thead>
<tr>
<th>Quiz Scores (TPS)</th>
<th>Pretest</th>
<th>Posttest</th>
<th>t Value</th>
<th>d.f.</th>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td>Obtained</td>
</tr>
<tr>
<td>Total Scores (22)</td>
<td>12.36</td>
<td>3.09</td>
<td>16.44</td>
<td>3.38</td>
<td>6.06*</td>
</tr>
<tr>
<td>Sub-tests:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Disease (7)</td>
<td>4.92</td>
<td>1.60</td>
<td>6.04</td>
<td>1.27</td>
<td>3.86*</td>
</tr>
<tr>
<td>Nutrition (7)</td>
<td>3.60</td>
<td>1.80</td>
<td>5.40</td>
<td>1.47</td>
<td>4.87*</td>
</tr>
<tr>
<td>Physical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity (4)</td>
<td>1.68</td>
<td>0.95</td>
<td>2.24</td>
<td>0.97</td>
<td>2.50</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management (4)</td>
<td>2.20</td>
<td>1.00</td>
<td>2.76</td>
<td>0.72</td>
<td>2.50</td>
</tr>
</tbody>
</table>

TPS: Total Possible Score   †Two-tailed critical t at α 0.05
††Two-tailed critical t at α 0.01 *Indicates significant difference
pretest and posttest periods. Significant increases were reported in the sub-scale mean scores of health responsibility, exercise, and nutrition. There was an increase in the sub-scale mean score for stress management, but this was not significant (see Table 5).

Table 5
Comparing Health Promoting Lifestyle Profile Pretest and Postest Scores for the Experimental Group n = 25

<table>
<thead>
<tr>
<th>HPLP Scores</th>
<th>Pretest</th>
<th>Postest</th>
<th>t Value Obtained</th>
<th>d.f.</th>
<th>t Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>(TPS) Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Scores</td>
<td>116.28</td>
<td>18.52</td>
<td>133.76 22.91</td>
<td>3.63*</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>(192)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-scales:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-actualization (52)</td>
<td>38.32 5.65</td>
<td>39.08 7.18</td>
<td>0.57 24</td>
<td>2.79††</td>
<td></td>
</tr>
<tr>
<td>Health responsibility (40)</td>
<td>18.72 5.27</td>
<td>25.24 6.24</td>
<td>5.27* 24</td>
<td>2.79††</td>
<td></td>
</tr>
<tr>
<td>Exercise (20)</td>
<td>8.92 3.66</td>
<td>13.20 3.82</td>
<td>4.95* 24</td>
<td>2.79††</td>
<td></td>
</tr>
<tr>
<td>Nutrition (24)</td>
<td>15.16 4.09</td>
<td>19.04 4.08</td>
<td>4.13* 24</td>
<td>2.79††</td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>support (28)</td>
<td>18.92 4.18</td>
<td>19.28 3.81</td>
<td>0.35 24</td>
<td>2.79††</td>
<td></td>
</tr>
<tr>
<td>Stress management (28)</td>
<td>16.24 3.72</td>
<td>17.92 3.74</td>
<td>2.10 24</td>
<td>2.79††</td>
<td></td>
</tr>
</tbody>
</table>

TPS: Total Possible Score †Two-tailed critical t at α 0.05
††Two-tailed critical t at α 0.01 *Indicates significant difference
Comparison within the control group.

As with the experimental group, the control group also made significant improvements in the HHKQ total mean scores between the pretest and posttest periods. However, a significant increase occurred only in the sub-test scores for heart disease. There was an increase in the sub-test mean scores for nutrition and stress physical activity, but these were not significant (see Table 6). The control group also reported making lifestyle changes, as indicated by a significant difference between the HPLP total scores between the pretest and posttest periods. Significant changes were reported in

Table 6

Comparing Heart Health Knowledge Quiz Pretest and Posttest Scores for the Control Group n = 47

<table>
<thead>
<tr>
<th>Quiz Scores (TPS)</th>
<th>Pretest</th>
<th>Posttest</th>
<th>t Value Obtained</th>
<th>d.f.</th>
<th>Critical t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Scores (22)</td>
<td>13.36</td>
<td>2.70</td>
<td>14.83</td>
<td>2.86</td>
<td>3.93*</td>
</tr>
<tr>
<td>Sub-tests:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Disease (7)</td>
<td>5.38</td>
<td>1.19</td>
<td>6.00</td>
<td>1.27</td>
<td>3.19*</td>
</tr>
<tr>
<td>Nutrition (7)</td>
<td>3.89</td>
<td>1.45</td>
<td>4.40</td>
<td>1.56</td>
<td>2.51</td>
</tr>
<tr>
<td>Physical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity (4)</td>
<td>1.76</td>
<td>0.84</td>
<td>2.15</td>
<td>0.86</td>
<td>2.65</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management (4)</td>
<td>2.30</td>
<td>0.86</td>
<td>2.30</td>
<td>0.88</td>
<td>0.00</td>
</tr>
</tbody>
</table>

TPS: Total Possible Score †Two-tailed critical t at α 0.05
††Two-tailed critical t at α 0.01 *Indicates significant difference
the same sub-scales as reported by the experimental group, namely, health responsibility, exercise, and nutrition. There also were increases in the sub-scale mean scores for self-actualization and stress management, but these were not significant (see Table 7).

Table 7

Comparing Health Promoting Lifestyle Profile Pretest and Posttest Scores for the Control Group n = 47

<table>
<thead>
<tr>
<th>HPLP Scores</th>
<th>Pretest</th>
<th>Posttest</th>
<th>t Value t</th>
<th>Obtained</th>
<th>d.f.</th>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>(TPS) Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td>Obtained</td>
<td>d.f.</td>
<td>Critical</td>
</tr>
<tr>
<td>Total scores</td>
<td>122.70</td>
<td>22.75</td>
<td>134.13</td>
<td>20.80</td>
<td>5.34*</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>(192)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sub-scales:

Self-actualization (52) 39.21 6.82 40.04 7.21 1.19 46 2.68‡‡

Health responsibility (40) 19.98 6.00 24.79 5.49 5.85* 46 2.68‡‡

Exercise (20) 9.45 3.36 11.30 3.11 3.80* 46 2.68‡‡

Nutrition (24) 15.77 4.56 19.02 3.60 5.83* 46 2.68‡‡

Interpersonal support (28) 21.23 4.26 20.70 4.42 -1.32 46 2.68‡‡

Stress management (28) 17.06 4.33 18.28 3.76 2.58 46 2.68‡‡

TPS: Total Possible Score †Two-tailed critical t at α 0.05

‡‡Two-tailed critical t at α 0.01  *Indicates significant difference
Comparison of Knowledge of Heart Disease and Health Behaviours
Between Groups

The findings related to hypothesis #1 are presented in this section. This hypothesis was that first time MI patients who participate in outpatient cardiac education are more knowledgeable regarding heart disease and health promotion/protective behaviours, measured by the HHKQ, four to six months after hospital discharge than first-time MI patients who do not participate in outpatient cardiac education.

The equivalence of both the experimental and control groups with respect to knowledge regarding heart disease and its management at the pretest stage was determined using the t-test for independent groups on the pretest total quiz scores. Both the experimental and control groups were similar in knowledge level at the pretest stage (obtained t value = 1.42, two-tailed critical t value at α 0.05 = 1.99)

To determine if those first time MI patients who participated in outpatient cardiac education were more knowledgeable four to six months after hospital discharge than those who did not participate in outpatient cardiac education, the t-test for independent groups was used. A pooled variance was used because the smaller sample had the larger standard deviation. The results indicated that there was a significant increase in HHKQ total scores for the experimental group four to six months after hospital discharge (obtained t value = 2.15 > one-tailed critical t of 1.67 for α 0.05).
Since the HHKQ tested for knowledge of the nature of heart
disease, nutrition, physical activity, and stress management, the t-
test for independent groups with a pooled variance was used to
determine differences between the two groups in each of these sub-
test results. A significant difference was found in the nutrition
section indicating that on the posttest, subjects in the experimental
group scored significantly higher than the control group in this one
section (obtained \( t \) value = 2.70 > one-tailed critical \( t \) of 2.38 for
\( \alpha \) 0.01). There were no significant differences between the two
groups in the other three sub-tests scores. See Table 8 for a
display of HHKQ and sub-test mean scores, obtained \( t \) values and

<table>
<thead>
<tr>
<th>Quiz Mean Scores (TPS)</th>
<th>Experimental (n = 25)</th>
<th>Control (n = 47)</th>
<th>( t ) Value Obtained</th>
<th>d.f.</th>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total scores (22)</strong></td>
<td>16.44 3.38</td>
<td>14.83 2.86</td>
<td>2.15*</td>
<td>70</td>
<td>1.67†</td>
</tr>
<tr>
<td><strong>Sub-test scores:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease (7)</td>
<td>6.04 1.27</td>
<td>6.00 1.27</td>
<td>0.13</td>
<td>70</td>
<td>2.38‡‡</td>
</tr>
<tr>
<td>Nutrition (7)</td>
<td>5.40 1.47</td>
<td>4.40 1.56</td>
<td>2.70*</td>
<td>70</td>
<td>2.38‡‡</td>
</tr>
<tr>
<td>Physical Activity (4)</td>
<td>2.24 0.97</td>
<td>2.15 0.86</td>
<td>0.41</td>
<td>70</td>
<td>2.38‡‡</td>
</tr>
<tr>
<td>Stress Management (4)</td>
<td>2.76 0.72</td>
<td>2.30 0.88</td>
<td>2.20</td>
<td>70</td>
<td>2.38‡‡</td>
</tr>
</tbody>
</table>

TPS: Total Possible Score †One-tailed critical \( t \) at \( \alpha \) 0.05
‡‡One-tailed critical \( t \) at \( \alpha \) 0.01 *Indicates significant difference
critical t values.

Comparison of Health Promotion/Protective Behaviours Between Groups

The findings related to hypothesis #2 are presented in this section. This hypothesis was that first time MI patients who participate in outpatient cardiac education engage in health promotion/protective behaviours to a greater extent, measured by the HPLP, four to six months after hospital discharge, than do first time MI patients who do not participate in outpatient cardiac education.

Data analysis was conducted on the HPLP questionnaires that were completed by the 72 subjects at both the pretest and posttest stages. Initially, however, data analysis was performed on only those questionnaires without items missing, since 30% of the subjects in the control group and 32% of the subjects in the experimental group, failed to complete one or two of the 48 items on the HPLP questionnaire. These initial mean scores of each HPLP item obtained for both groups at the pretest stage were entered into the missing items of the pretest questionnaires for both groups. The same procedure was used for the missing items on the posttest questionnaires. These omitted items were distributed among the six sub-scales of the HPLP. The statements that subjects failed to complete are listed in Appendix K.

The equivalence of the experimental and control groups regarding health promotion/protective behaviours at the pretest stage was determined using the t-test for independent groups on the pretest HPLP total scores for both groups. The results indicated that both
the experimental and control groups were similar regarding health promotion/protective behaviours at the pretest stage (obtained t value = 1.21, critical t value of $\alpha$ at 0.05 = 1.99).

To determine if first time MI patients who participated in outpatient cardiac education engaged in health promotion/protection behaviours, measured by the HPLP, to a greater extent four to six months after hospital discharge, than first time MI patients who did not participate in outpatient cardiac education, the t-test for independent groups with a pooled variance was used. See Table 9 for the t-test results of the HPLP total score and subscale score differences at the posttest stage between the two groups. There were no significant differences in HPLP total scores between the two groups at the posttest stage (obtained t value = -0.07 < one-tailed critical t of 1.67 at $\alpha$ 0.05). Similarly, there were no significant differences in the HPLP sub-scale scores between the two groups at the posttest stage, although there was a trend in the direction of a significant difference for the exercise scores (obtained t value = 2.30 < one-tailed critical t of 2.38 at $\alpha$ 0.01).
Table 9

Health Promoting Lifestyle Profile Scores (Posttest)

<table>
<thead>
<tr>
<th>HPLP Scores (TPS)</th>
<th>Experimental (n = 25)</th>
<th>Control (n = 47)</th>
<th>t Value</th>
<th>t Obtained</th>
<th>d.f. Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>Total scores</td>
<td>133.76</td>
<td>22.91</td>
<td>134.13</td>
<td>20.80</td>
<td>-0.07</td>
</tr>
<tr>
<td>(192)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Scales:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-actualization (52)</td>
<td>39.08</td>
<td>7.18</td>
<td>40.04</td>
<td>7.21</td>
<td>-0.54</td>
</tr>
<tr>
<td>Health responsi-</td>
<td>25.24</td>
<td>6.24</td>
<td>24.79</td>
<td>5.50</td>
<td>0.31</td>
</tr>
<tr>
<td>bility (40)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise (20)</td>
<td>13.20</td>
<td>3.82</td>
<td>11.30</td>
<td>3.11</td>
<td>2.30</td>
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<td>Nutrition (24)</td>
<td>19.04</td>
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<td>3.81</td>
<td>20.70</td>
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<td>Stress manage-</td>
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<td>3.74</td>
<td>18.28</td>
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<td>ment (28)</td>
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TPS: Total Possible Score  †One-tailed critical t at α 0.05
††One-tailed critical t at α 0.01

Discussion

Comparison of Pretest and Posttest Results Within Groups

Although the experimental group had significantly higher total mean scores on the HHKQ than the control group at the posttest period, both groups demonstrated significant improvement in total mean scores on the HHKQ from the pretest to the posttest periods.
The control group, who did not receive outpatient cardiac education, made significant improvements in the heart disease section of the HHKQ between the time of hospitalization and four to six months later. The experimental group made significant improvements in the heart disease section as well, but also had a significant increase in mean scores for the nutrition section between the pretest and posttest periods. This is consistent with the findings in relation to hypothesis #1 in which the experimental group had significantly higher scores for the nutrition section of the HHKQ than did the control group.

These findings indicate that learning about their illness and its management has occurred for first time MI patients regardless of participation in outpatient cardiac education. They may have benefited from their participation in hospital-based cardiac education programs. This is consistent with the findings of other investigators. In a review of 14 hospital-based cardiac education programs, Duryee (1992) found that hospital-based cardiac education programs improved patients' knowledge, with information about physical activity as the topic that was most consistently learned by MI patients. Other investigators of hospital-based cardiac education programs have found significant increases in knowledge level before hospital discharge and up to 6 months after hospital discharge (Pommier, 1992; Thompson, 1991; Raleigh & Odtohan, 1987; Fletcher, 1987; Hentinen, 1986; Owens et al., 1978). In contrast to the results of these investigations and those of this study, Liddy &
Crowley (1987) found that MI patients had only a superficial understanding of their disease process 3 months after their illness. Scalzi et al. (1980) did not find a significant increase in knowledge for the control group, who did not receive outpatient cardiac education, between hospitalization and 3 months later.

The results of this investigation may indicate that MI patients do benefit from their involvement in hospital-based cardiac education programs. However, since a pretest and posttest during hospitalization was not conducted in this study, it is not known whether study participants gained knowledge during their hospitalization phase. However, between completion of the HHKQ during their hospitalization and four to six months later, study participants gained knowledge regarding heart disease. Factors such as self-motivated learning, heightened awareness to media presentations, and information gained from family and friends may have contributed to the significant increase in knowledge, especially for the control group.

Participants in both the control and experimental groups had a significant increase in HPLP total mean scores between the pretest and posttest periods. Both groups also reported making significant increases in the exercise, nutrition, and health responsibility sub-scale mean scores between the pretest and posttest periods. This indicates that the subjects in both groups engaged in health promotion/protective behaviours to a greater extent four to six months after their first MI than before their MI, regardless of
receiving outpatient cardiac education. These results are consistent with those reported by investigators who examined the effect of hospital-based cardiac education after hospital discharge. Hentinen (1986), Fletcher (1987) and Raleigh & Odtohan (1987) found that patients do make positive changes in specific health promotion/protective behaviours such as nutrition, exercise, cigarette smoking and resumption of prehospitalization activities during their recovery following an MI.

Since subjects in both the experimental and control groups engaged in health promotion/protective behaviours to a greater extent four to six months after their first MI regardless of receiving outpatient cardiac education, other variables mentioned earlier, such as self-motivated learning, media information and the influence of family and friends need to be considered to explain these behavioural changes, especially for the control group.

Comparison of Knowledge of Heart Disease and Health Behaviours Between Groups

Because there was a significant increase in the HHKQ total mean scores for the experimental group, hypothesis #1 was supported. First time MI patients who participate in outpatient cardiac education are more knowledgeable regarding heart disease and health promotion/protective behaviours, measured by the HHKQ, four to six months after hospital discharge, than first time MI patients who do not participate in outpatient cardiac education. These results are in contrast to the knowledge testing done by Scalzi et al. (1980).
who did not find significant posttest differences between the experimental and control groups three months after hospital discharge.

Although the findings in this study support hypothesis #1, these results must be viewed with caution because significant increases in the HHKQ scores for the experimental group occurred in only the nutrition section. However, learning about long-term changes such as nutritional habits following an MI is often a high priority for patients in the early period following discharge from the hospital. The experience of this investigator is that when hospitalized patients are approached regarding outpatient cardiac education classes, they often express keen interest in the nutrition class. This investigator's experience is also that MI patients frequently verbalize intent to improve their nutritional habits as a high priority after discharge from the hospital. Many patients are therefore ready to learn about nutrition during the first one to two months after hospital discharge in an outpatient cardiac education setting. The significant difference in scores for the nutrition section of the HHKQ supports this fact in that participants in the experimental group may have focused on gaining knowledge regarding nutrition while attending the outpatient cardiac education classes. During their hospitalization, patients may focus instead on increasing their knowledge regarding safe management of their condition at home, such as medication administration and physical activity limitations and abilities, rather than on long-term changes
such as nutritional habits (Duryee, 1992; Steel & Ruzicki, 1987; Rahe et al., 1975).

There were no significant differences in the other three sections of the HHKQ. This lack of significant difference between the groups at the posttest stage may be because patients had opportunities to learn the content, especially regarding the nature of heart disease, as part of the hospital-based cardiac education program before they completed the knowledge quiz at the pretest stage. Stress management is not routinely addressed in the hospital-based program, but patients in the experimental group participated in a stress management class as part of outpatient cardiac education. This may account for the experimental group's higher mean scores, although not significant, for the stress management section of the knowledge quiz. In addition, other factors mentioned above, such as self-motivated learning, exposure to media presentation, and information from family and friends may have contributed to the lack of differences in three of the four HHKQ sub-test scores between the two groups at the posttest stage.

Comparison of Health Promotion/Protective Behaviours Between Groups

In this study, it was found that first time MI patients who participate in outpatient cardiac education do not engage in health promotion/protective behaviours to a greater extent, measured by the HPLP, four to six months after hospital discharge, than do first time MI patients who do not participate in outpatient cardiac education. Therefore, hypothesis #2 was not supported. There was no difference
between the experimental and control groups in engaging in health promotion/protective behaviours as a way of life after experiencing their first MI. These results are similar to those of Sivarajan et al. (1983), who used a design and procedure comparable to this study. They did not find significant differences in smoking habits, diet and weight loss between the control and experimental groups. Miller et al. (1988, 1989, 1990) used only a single intervention at 30 days post-hospital discharge in comparison to the series of classes that subjects attended in this study. They had similar results in that there were no significant differences between the groups for physical activity, diet, stress reduction and taking medications at 60 days and 1 year, although there was a significant improvement in compliance to a healthy diet for the experimental group after 2 years.

The lack of a significant difference between the two groups for the HPLP total mean scores at the posttest stage indicates that the experimental group did not engage in the behaviours identified in the action phase of the conceptual framework for this study (i.e. exercise, nutrition, stress management and health responsibility) to a greater extent than the control group. For a more precise description of the involvement of the sample groups of this study in the specific health promotion/protective behaviours, the six sub-scales of the HPLP were also analyzed. These results, which describe the extent to which the sample groups engaged in the four specific behaviours of the action phase, plus two factors in the decision-
making phase of the conceptual framework (i.e. interpersonal support
and self-actualization), are discussed below.

**Health promotion/protective behaviours of the action phase**

The conceptual framework for this study includes two major
phases that describe the process of how individuals decide to engage
in health promotion/protective behaviours (see Figure 2). These are
the decision-making phase and the action phase. The six sub-scales
of the HPLP included the four health promotion/protective behaviours
of the action phase. The results of these four sub-scales are
discussed in this section.

Among these four subscales, there was a difference in mean
scores between the two groups only in the exercise section. The
experimental group scored higher than the control group in the
exercise sub-scale (13.20 vs. 11.20), but this difference was not
significant. This difference in mean scores may indicate that there
was a tendency for the experimental group to exercise more than the
control group 4-6 months after their first MI. The only other study
described in the literature that reported a difference in exercise
behaviour for an experimental group involved in outpatient cardiac
education, and whose intervention did not include an exercise
component was the study reported by Billington (1988). However, in
this study the sample size was only 7 in each group, and therefore
the results cannot be generalized. The other two studies that used
an experimental design (Dracup et al., 1984; Fridlund et al., 1991)
did report significantly higher levels of exercise for the
experimental group. However, in both of these studies, participation in physical activity was included as a component of the intervention. Therefore the results of these two studies cannot be compared to those of this study in which subjects attended a class that provided information about the benefits of exercise, but actual involvement in physical activity was not a part of the intervention.

There was no significant difference between the groups for the nutrition sub-scale scores at the posttest stage despite a significant difference in the nutrition sub-test of the HHKQ for the experimental group. Other investigators of outpatient cardiac education programs who used an experimental design, also did not find significant differences between the two groups with respect to adherence to a cardiac diet after 6 months (Miller et al., 1988, 1989, 1990; Scalzi et al., 1980; Sivarajan et al., 1983; Fridlund et al., 1991).

In this study, there was no significant difference between the experimental and control groups for the stress management sub-scale scores. Other investigators had different results. In the study by Fridlund et al. (1991), the experimental group reported a higher perceived life situation and a better leisure situation than the control group. Billington (1988) reported a reduction in stress levels for the experimental group, but as mentioned above, the sample size was very small and the results cannot be generalized.

As with the exercise, nutrition and stress management sub-scale results, there was no significant difference between the two groups
for the health responsibility sub-scale scores. There is no information in the literature regarding the effect of outpatient cardiac education on health responsibility. However, in this study it was found that both groups demonstrated improved health responsibility, since both groups made significant improvements in the health responsibility sub-scale scores at the posttest stage (see Tables 5 and 7).

It is difficult to compare the results for the behaviours of the action phase in this study with those of other studies due to differences in design and sample sizes, especially for exercise and stress management. However, the results for nutrition were consistent with those of other investigators.

Factors in the decision-making phase

In the decision-making phase of the conceptual framework, there is the modifying factor of interpersonal support and the cognitive-perceptual factor of self-actualization that were included in the HPLP. The results of these two sub-scales are discussed in this section.

The modifying factor of interpersonal support remained unaffected by the intervention of outpatient cardiac education. There was no significant difference between the two groups for the interpersonal support sub-scale scores at the posttest stage. In this study interpersonal support was not investigated in detail. It was not a major topic of discussion in the cardiac education program offered at the hospital where this study was conducted, and which was
attended by 19 of the 25 subjects in the experimental group. Spouses may have been in need of additional support themselves, and were not able to improve their level of support towards their partner. Data regarding the number of spouses who attended the outpatient cardiac education program with their partner were not collected.

The only investigator who examined interpersonal support from the perspective of how the program affects the quality of the interpersonal support experienced by subjects is Fridlund et al. (1991). He showed that attendance of both patient and spouse at cardiac education programs improves the level of interpersonal support for the patient (Fridlund et al., 1991). Most other investigators have studied interpersonal support from the perspective of how the presence of interpersonal support influences the subject's involvement in health promotion/protective behaviours. Derenowski (1988, 1991), Holm et al. (1985), Miller et al. (1985, 1988, 1989, 1990), and Ben-Sira & Eliezer (1990) all reported improvement in health promotion/protective behaviours as a result of the interpersonal support experienced by the subjects. The one exception is Dracup et al. (1984), who found no significant difference in smoking, blood pressure, body weight and weekly exercise between the patients who participated in the intervention together with their spouses and those who did not.

The scores on the HPLP subscale for the cognitive-perceptual factor of self-actualization remained unchanged for both groups at the two stages of this study (see Tables 5, 7, and 9), indicating
that self-actualizing traits, as measured by the HPLP subscale, were not affected by the intervention of outpatient cardiac education. One reason for this finding may be that self-actualization was not directly addressed in the cardiac education program attended by the majority of the subjects in the experimental group. Also, it is not known what types of interventions could affect this cognitive-perceptual factor since it has not been widely investigated. Only Frenn et al. (1989) referred to an element of self-actualization identified as "enjoyment of life" as a precipitant to making health promotion/protective behavioural changes. Consequently, little is known about this concept, and what its role is in motivating individuals to engage in health promotion/protective behaviours.

Relationship Between Knowledge and Health Promotion/Protective Behaviours

An overall review of the findings of this study, reveals that an increased knowledge level regarding health promotion/protective behaviours for the experimental group did not result in a higher performance level of health promotion/protective behaviours as a way of life when compared with the control group. Only two other studies examined both knowledge and health behaviours (Scalzi et al., 1980; Niskala, 1987). Neither of these studies are similar in design to this study. In both of these studies, the intervention consisted of individual visits in the homes of the subjects. However, Scalzi et al. (1980) used an experimental design, as in this study, but conducted follow-up for two years. They found no significant
difference between the two groups in knowledge scores three months after hospital discharge. They reported significant differences between the groups in the behaviours of medication compliance and weight reduction, two variables not examined in this study, six months after hospital discharge.

Because of the inconclusive results of this study, many questions remain regarding the variables that influence learning about heart disease and making health promotion/protective behavioural changes for individuals who have experienced their first MI. The intervention of outpatient cardiac education resulted in a significantly higher HHKQ total mean score for the experimental group, with the only significant difference occurring in the nutrition sub-test of the HHKQ. This increase in knowledge regarding nutrition did not result in a significant difference in behaviour regarding nutrition. Instead, there was a tendency toward a difference in exercise behaviour for the experimental group (although the mean score differences were not significant), even though there was no significant difference between the groups on the physical activity sub-test scores of the HHKQ. When pretest results were compared with posttest results within the groups, it was found that both groups had significant differences in knowledge and health promotion/protective behaviour scores from the time of their first MI and four to six months later. Clearly, there are other variables that have contributed to these results.

In the conceptual framework for this study, knowledge about
heart disease and health promotion/protective behaviours is but one of the variables in the decision-making phase that contribute to the action phase of engaging in health promotion/protective behaviours as a way of life. There may be other variables besides knowledge that influence health promotion/protective behavioural changes. One variable that was not examined in this study due to the lack of a suitable tool is the cognitive-perceptual factor of perceived susceptibility to disease. However, perceived susceptibility for further cardiac problems may be a factor that requires consideration when examining knowledge and health promotion/protective behaviours for first time MI patients. Frenn et al. (1989) and Holm et al. (1985) both reported that subjects made lifestyle changes to prevent further illness or death, and those who believed they were likely to experience recurrent cardiac events were more likely to adhere to therapeutic regimens. This may explain why the control group, who did not participate in an outpatient cardiac education program, reported making significant health promotion/protective behavioural changes in exercise, nutrition, and health responsibility. In addition, other cognitive-perceptual factors not incorporated into the conceptual framework for this study, but which are included in Hilton's (1986) health promotion/protective model, such as importance of health and perceived benefits of health promotion and/or health protective action, may need to be considered to explain the results of this study.

Several other factors that may have influenced study findings
must also be considered. Perhaps the education program attended by the majority of the experimental group did not accurately address the information needs of the participants.

Another factor that may have influenced study findings is related to the testing interval. The time period between receiving outpatient cardiac education and the posttest stage of four to six months later may be too short a period for participants to make significant health promotion/protective behaviours in several domains at one time, such as nutrition, exercise and stress management. The findings of Miller et al. (1990) support this statement. They found a significant difference in compliance to diet for the experimental group only after two years, but not after 60 days or 1 year.

A number of instrument features may have influenced study findings. For example, the items in the nutrition subscale of the HPLP included only general statements of behaviour regarding a nutritious diet (see Appendix A), rather than the more specific behaviours of following a low fat, low cholesterol diet. However, this more specific diet information was learned by subjects who received outpatient cardiac education, as reflected in the significant difference in scores for the nutrition section of the HHKQ for this group compared to the control group. Subjects in the experimental group may have applied this knowledge, but the HPLP items were not specific enough to accurately measure this behaviour.

Another example of how instrument features may have affected study findings is in relation to the items of the HPLP exercise sub-
scale and the HHKQ physical activity sub-test. There was an increase in the mean scores of the HPLP exercise sub-scale scores for the experimental group, which could be an indication for a tendency in the experimental group to exercise more than the control group at the four to six month period. However, the items in the physical activity section of the HHKQ may not be essential information to know in order to carry out an effective exercise program as measured by the exercise subscale of the HPLP. In addition, subjects may have been confused by the HPLP item "Exercise vigorously for 20-30 minutes at least 3 times per week," and the choice of either "40 minutes 3 times a week" or "20 minutes 3 times a week" as answer choices for question #18 of the HHKQ, "A recommended maintenance exercise schedule for someone who is recovering from a heart attack is...." Because of the information provided in the HPLP, subjects may have chosen "20 minutes 3 times a week" rather than the correct answer of "40 minutes 3 times a week."

Another example of instrument features influencing study findings may be related to the circumstances surrounding the completion of the pretests. Subjects frequently completed the pretest HHKQ during or after they had received information about heart disease while recovering from their MI in the hospital. This may explain the lack of significant differences in the heart disease section of the HHKQ. The content of the stress management section of the HHKQ may not accurately reflect the information received during a class on this subject. In addition, it is difficult to measure a
subjective domain such as stress management using an objective tool such as a multiple-choice quiz.

Summary

Both the control and experimental groups learned about heart disease and made significant improvements in health promotion/protective behaviours between the pretest and posttest periods. The intervention of outpatient cardiac education for first time MI patients resulted in a significant improvement in knowledge about heart disease and health promotion/protective behaviours for the experimental group at the posttest stage. The intervention of outpatient cardiac education did not result in a significant difference between the groups for engaging in health promotion/protective behaviours as a way of life.

The results of this study are similar to those of other investigators in that the experimental group did not engage in health promotion/protective behaviours as a way of life to a greater extent than the control group as a result of participation in outpatient cardiac education. Because of the inconclusive results of this study, other variables that may have influenced study results such as perceived susceptibility to disease, program content, testing interval and instrument items should be investigated further.
CHAPTER FIVE

Summary, Conclusions and Recommendations

This chapter includes a summary of the study process and results, conclusions based on these results, and recommendations in relation to nursing practice and research.

Summary

This study was conducted to determine whether first time MI patients who participated in both hospital-based and outpatient cardiac education programs were more knowledgeable about heart disease and engaged in health promotion/protective behaviours to a greater extent than those who participated only in a hospital-based cardiac education program. A quasi-experimental pretest-posttest control group design was used for this study. One hundred and two first time MI patients between the ages of 32 and 80 were recruited from the CCU and CIU of a major teaching hospital in western Canada. These subjects completed the HPLP and the HHKQ in the hospital while recovering from their MI. Seventy-two of these subjects completed the study by answering and returning these same questionnaires in the mail four to six months later. Of the subjects who completed the study, 25 participated in outpatient cardiac education during the first one to two months after hospital discharge and were placed in the experimental group, while the remaining 47 subjects, who did not participate in outpatient cardiac education, were placed in the control group.

For a comparison of pretest and posttest results within both
the experimental and control groups, a t-test for paired observations was done on the HHKQ scores and HPLP scores. Results revealed that both groups had a significant increase in the HHKQ total scores, and in HPLP total scores between the pretest and posttest periods.

Data analyses using the t-test for independent groups was performed on the posttest HHKQ total scores and sub-test scores for the experimental and control groups to determine if the experimental group who had participated in outpatient cardiac education knew more than the control group regarding heart disease and its management. The results indicated that there was a significant increase in HHKQ total scores for the experimental group four to six months after their hospitalization. The sub-test analyses revealed that there was a significant increase for the experimental group in only the nutrition section of the HHKQ.

Data analyses using the t-test for independent groups was also performed on the posttest total HPLP scores and sub-scale scores of the experimental and control groups to determine if the experimental group engaged in health promotion/protective behaviours to a greater extent than the control group. No differences were found in total HPLP scores between the experimental and control groups. Of the six sub-scales in the HPLP, there was an increase in the mean scores of the exercise sub-scale for the experimental group, but this increase was not significant.
Conclusions

The following conclusions are:

1. First time MI patients do gain knowledge regarding their disease, and they do engage in health promotion/protective behaviours as a way of life four to six months after their hospitalization, whether or not they participated in outpatient cardiac education.

2. First time MI patients who participate in outpatient cardiac education may be more knowledgeable about heart disease and health promotion/protective behaviours than first time MI patients who do not participate in outpatient cardiac education.

3. First time MI patients are responsive to learning about specific topics regarding heart disease and health promotion/protective behaviours during certain periods in their recovery. For example, they tend to learn more about nutrition than heart disease, physical activity, and stress management during the first two months after hospital discharge.

4. First time MI patients who participate in outpatient cardiac education may not engage in health promotion/protective behaviours as a way of life to a greater extent than first time MI patients who do not engage in outpatient cardiac education.

5. A gain in knowledge regarding heart disease and health promotion/protective behaviours for first time MI patients does not necessarily have a direct relationship with engaging in health promotion/protective behaviours. For example, subjects in the experimental group gained knowledge regarding nutrition, but did not
follow a healthy diet to a greater extent than the control group four to six months later. Although there was no difference between the groups for knowledge regarding physical activity, there may have been a tendency for subjects in the experimental group to exercise to a greater extent than those in the control group.

6. There may be other factors besides knowledge, such as perceived susceptibility to disease, that motivate first time MI patients to make health promotion/protective behavioural changes.

Recommendations

Nursing Practice

Nurses must continue to promote and be involved in outpatient cardiac education programs. This involvement includes the necessity to consider innovative perspectives for the delivery of outpatient cardiac education that will meet the unique needs of the participants. Perhaps there needs to be a greater emphasis on active participation and less on the delivery of information, as is suggested by the results in this study that did not find a direct relationship between knowledge gained and engaging in health promotion/protective behaviours. The content of outpatient cardiac education programs could be adjusted to include less formal instruction regarding physical activity, and more involvement of class participants in doing exercises appropriate for their stage of recovery. In stress management classes, providing information regarding the management of stress may continue to have merit since subjects in the experimental group tended to know more about stress
management than the control group, but there also needs to be an emphasis on doing stress-reducing activities during these classes. Participants in the experimental group seemed to show an interest in learning about nutrition during the early recovery phase from an MI as evidenced by their increase in knowledge regarding nutrition. Therefore, there is value in providing this information in outpatient cardiac education programs. However, the increase in knowledge regarding nutrition for the experimental group did not result in a behavioural change, as measured four to six months post MI. Other methods that promote behavioural changes in nutrition, such as discussions regarding motivational attitudes, need to be included in outpatient cardiac education programs. Both groups knew the same amount regarding heart disease at the posttest stage, and therefore information about the nature of heart disease could receive less emphasis in outpatient cardiac education programs.

There are many opportunities for nurses to initiate and/or participate in the implementation of outpatient cardiac education programs in communities that are distant from major urban centres. The evidence for this is seen in the distribution of numbers for this study. The control group of 47 subjects was almost twice as large as the experimental group of 25 subjects. One reason for this discrepancy, as explained in Chapter Four, was that 50% of the subjects in this group came from distant communities where no outpatient cardiac education was offered.

Nurses must continue to promote and improve hospital-based
cardiac education programs, since patients do learn about their disease and engage in health promotion/protective behaviours regardless of participation in outpatient cardiac education. However, nurses need to be aware that patients may also receive information from other sources such as the media, family and friends, community health promotion programs and individual health counselling programs. Some of these sources may provide misinformation and nurses need to incorporate this possibility in their teaching by directing patients to programs that provide reliable information. In addition, nurses have the knowledge and expertise to also make valuable contributions to these programs.

**Future Research**

Further research that investigates the effect of outpatient cardiac education on knowledge and health promotion/protective behaviours is required. The findings in this study raise questions regarding the relationship between knowledge gained as a result of participation in outpatient cardiac education, and the application of this knowledge by engaging in health promotion/protective behaviours as a way of life. What kind of information and which topics should be discussed in cardiac education programs? How should a program for MI patients be structured to most effectively meet both the need for information, and the motivation to engage in health promotion/protective behaviours? What factors besides knowledge motivate first time MI patients to make behavioural changes? For instance, what is the influence of the modifying factors of
interpersonal support and demographic characteristics such as age and education, and the cognitive-perceptual factors of self-actualization and perceived susceptibility to disease, in motivating MI patients to make behavioural changes? This information would be helpful to nurses in developing more effective cardiac education programs, both in the hospital and in the community, that would target groups of people with a variety of learning needs and learning styles.

The findings in this study also raise the question of whether lifestyle profiles are the best method for obtaining information regarding behavioural changes, or do other methods provide more accurate information. Further research could be conducted using different methods that measure involvement in health promotion/protective behaviours, since the lifestyle profile used in this study did not test for specific behaviours, especially for nutrition. Interviewing study participants, or requesting them to keep a record of daily nutritional intake, plus their exercise schedule, stress-reducing activities, and health responsibility behaviours may provide more accurate information regarding the extent to which study participants engage in health promotion/protective behaviours. Further research is also needed to develop a lifestyle profile for measuring healthy behaviours using statements that specifically describe the health promotion/protective behavioural changes of individuals who have heart disease.

There is a need to develop instruments that measure other variables such as perceived susceptibility to disease that may have
an influence on engaging in health promotion/protective behaviours. In addition, further research is required to develop an instrument that comprehensively measures knowledge of heart disease and health promotion/protective behaviours.

Further research is needed regarding the time frame required for patients to make behavioural changes, and whether participation in continuing education classes after the early post-hospitalization period would be effective in promoting long-term health promotion/protective behavioural changes.

There is merit in repeating the statistical analyses for this study using non-parametric methods since there may not be a normal distribution of the data, particularly for the HHKQ sub-tests which included only between four and seven items.

In summary, the effect of outpatient cardiac education requires continued investigation. The hypotheses proposed in this study could be examined again, but with the use of different and improved data collection instruments. There also needs to be further investigation regarding what other variables, and how these variables influence acquisition of knowledge and engaging in health promotion/protective behaviours for patients who have experienced an MI.
References


Appendix A

HEALTH-PROMOTING LIFESTYLE PROFILE

Scoring Instructions: Items are scored as Never (R) = 1
Sometimes (S) = 2
Often (O) = 3
Routinely (R) = 4

A score for overall health-promoting lifestyle is obtained by calculating a mean of the individual's responses to all 48 items; six subscale scores are obtained similarly by summing the responses to subscale items and dividing by the number of items on the subscale. The use of means rather than sums of scale items is recommended to retain the 1 to 4 metric of item responses and to allow meaningful comparisons of scores across subscales. The items included on each scale are as follows:

Health-Promoting Lifestyle
Self-actualization
Health Responsibility
Exercise
Nutrition
Interpersonal Support
Stress Management

References

Encl.: Health-Promoting Lifestyle Profile
List of publications reporting use of Lifestyle Profile
LIFESTYLE PROFILE

DIRECTIONS: This questionnaire contains statements regarding your present way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the regularity with which you engage in each behavior by circling:

N for never,  S for sometimes,  O for often, or R for routinely.

1. Eat breakfast.  N S O R
2. Report any unusual signs or symptoms to a physician.  N S O R
3. Like myself.  N S O R
4. Perform stretching exercises at least 3 times per week.  N S O R
5. Choose foods without preservatives or other additives.  N S O R
6. Take some time for relaxation each day.  N S O R
7. Have my cholesterol level checked and know the result.  N S O R
9. Feel I am growing and changing personally in positive directions.  N S O R
10. Discuss personal problems and concerns with persons close to me.  N S O R
12. Feel happy and content.  N S O R
13. Exercise vigorously for 20-30 minutes at least 3 times per week.  N S O R
14. Eat 3 regular meals a day.  N S O R
15. Read articles or books about promoting health.  N S O R
17. Work toward long-term goals in my life.  N S O R
18. Praise other people easily for their accomplishments.  N S O R
19. Read labels to identify the nutrients in packaged food.  N S O R
20. Question my physician or seek a second opinion when I do not agree with recommendations.  N S O R
22. Participate in supervised exercise programs or activities.  N S O R
23. Am aware of what is important to me in life.  N S O R

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<th>24. Enjoy touching and being touched by people close to me.</th>
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<td>25. Maintain meaningful and fulfilling interpersonal relationships.</td>
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<td>26. Include roughage/fiber (whole grains, raw fruits, raw vegetables) in my diet.</td>
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<td>27. Practice relaxation or meditation for 15-20 minutes daily.</td>
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<td>28. Discuss my health care concerns with qualified professionals.</td>
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<td>29. Respect my own accomplishments.</td>
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<td>30. Check my pulse rate when exercising.</td>
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<td></td>
<td>31. Spend time with close friends.</td>
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<td></td>
<td>32. Have my blood pressure checked and know what it is.</td>
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<td></td>
<td>33. Attend educational programs on improving the environment in which we live.</td>
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<td></td>
<td>34. Find each day interesting and challenging.</td>
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<td></td>
<td>35. Plan or select meals to include the &quot;basic four&quot; food groups each day.</td>
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<td></td>
<td>36. Consciously relax muscles before sleep.</td>
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<td></td>
<td>37. Find my living environment pleasant and satisfying.</td>
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<td></td>
<td>38. Engage in recreational physical activities (such as walking, swimming, soccer, bicycling).</td>
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<td>39. Find it easy to express concern, love and warmth to others.</td>
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<td></td>
<td>40. Concentrate on pleasant thoughts at bedtime.</td>
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<td></td>
<td>41. Find constructive ways to express my feelings.</td>
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<td></td>
<td>42. Seek information from health professionals about how to take good care of myself.</td>
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<td></td>
<td>43. Observe my body at least monthly for physical changes/danger signs.</td>
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<td></td>
<td>44. Am realistic about the goals that I set.</td>
<td></td>
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<tr>
<td></td>
<td>45. Use specific methods to control my stress.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>46. Attend educational programs on personal health care.</td>
<td></td>
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<tr>
<td></td>
<td>47. Touch and am touched by people I care about.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48. Believe that my life has purpose.</td>
<td></td>
</tr>
</tbody>
</table>

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Appendix C

Pretest

Instructions for Completing the Health Promoting Lifestyle Profile

The questionnaire on the following two pages contains statements about your way of life and personal habits. Please read the instructions at the top of the next page before responding to any of the statements.

In these instructions, you are asked to respond to the statements according to your present way of life. Since you are now in the hospital, your way of life is different from your usual experiences. Some of the statements on this questionnaire refer to activities that do not apply to the hospital setting. Please respond to these statements according to your way of life and personal habits before you came to the hospital.

Please read each statement carefully and circle only one of the four responses to the right of each statement. Do not skip any of the statements. It is not necessary to spend too much time on any one item.
Appendix D

Posttest

Instructions for Completing the Health Promoting Lifestyle Profile

The questionnaire on the following two pages contains statements about your present way of life and personal habits. Please read the instructions at the top of the next page before responding to any of the statements.

Please read each statement carefully and circle only one of the four responses to the right of each statement. Do not skip any of the statements. It is not necessary to spend too much time on any one item.

This questionnaire was not designed for individuals who have had a heart attack. You may find that several items do not accurately describe the way of life and personal habits that are most appropriate for those individuals who are recovering from a heart attack.
However, please circle the response for each item that most accurately describes your way of life or personal habits.
Appendix E

Heart Health Knowledge Quiz

Circle one correct answer for each question

Heart Disease

1. To be told that you have had a heart attack means that
   a. your heart stopped for a few seconds.
   b. you have an irregular heart rhythm.
   c. there is permanent damage to a part of the heart muscle.
   d. you have a weak heart.

2. A heart attack occurs when
   a. there is too much fat in the blood.
   b. the blood supply to a part of the heart muscle is cut off.
   c. there is not enough blood in the heart chambers.
   d. there is a weakened heart valve.

3. The pain of a heart attack is due to
   a. an irregular heart rhythm.
   b. too little blood in the heart chambers
   c. a lack of oxygen to the heart muscle
   d. dead heart muscle.

4. Angina or pain from the heart can be felt as
   a. a sore throat and a cough.
   b. numbness in the left arm and pain in the jaw.
   c. dizziness and a severe headache.
   d. a lower backache and a stomach ache.

5. Nitroglycerine, in tablet or spray form, is a good drug for reducing chest pain because it
   a. makes the blood flow more quickly through the heart chambers.
   b. widens the arteries of the heart.
   c. makes the heart beat slightly faster so that more blood reaches the heart muscle.
   d. acts as a blood thinner.

6. The most appropriate time to use Nitroglycerine tablets or spray is
   a. when angina or heart pain has become severe.
   b. only after an activity that has caused angina or heart pain.
   c. at the first sign of angina or heart pain.
   d. on a regular basis throughout the day.
7. For angina or heart pain,
   a. use one Nitroglycerine tablet or spray, and if you still have pain after 5 minutes, go to the hospital emergency department.
   b. use one Nitroglycerine tablet or spray, wait 5 minutes, and if you still have pain after doing this four times, go visit your family doctor.
   c. use one Nitroglycerine tablet or spray, wait 20 minutes, and if you still have pain after doing this two times, go to the hospital emergency department.
   d. use one Nitroglycerine tablet or spray, wait 5 minutes, and if you still have pain after doing this three times, go to the hospital emergency department.

Nutrition

8. Which of the following blood fats helps to lower the risk of heart disease?
   a. An increase in HDL.
   b. An increase in LDL.
   c. Cholesterol.
   d. Triglycerides.

9. The total blood cholesterol level to aim for is
   a. less than 2.0.
   b. less than 5.2.
   c. between 6.0 and 7.0.
   d. 8.5 or higher.

10. Cholesterol can be found in which of the following foods?
    a. Peanut butter and avocados.
    b. Shrimp and mozzarella cheese.
    c. Canola oil and margarine.
    d. Apples and oranges.

11. Which food is high in fat?
    a. Macaroni.
    b. Whole wheat bread.
    c. 1% milk.
    d. Nuts.

12. One serving of meat, fish or poultry is equal to
    a. 1 cup.
    b. 3 tablespoons.
    c. a deck of playing cards.
    d. 6 ounces.
13. Most of us could benefit from a diet that is
   a. higher in breads, rice and pasta and lower in fat.
   b. lower in breads, rice and pasta and higher in meat, fish
      and poultry.
   c. higher in vegetables and higher in fat.
   d. lower in breads, rice and pasta and lower in meat, fish
      and poultry.

14. The type of fat that is solid at room temperature is called
   a. monosaturated.
   b. polyunsaturated.
   c. saturated.
   d. unsaturated.

**Physical Activity**

15. For the first 2 months after a heart attack, a recommended
    exercise program is
    a. resting at home for one month after discharge from the
       hospital.
    b. jogging for a half hour every other day.
    c. walking daily at an increased pace and length.
    d. walking 5 blocks each day.

16. Which of the following is a direct benefit of exercise for
    someone who has had a heart attack?
    a. A stronger heart muscle.
    b. Larger coronary arteries.
    c. Enlarged lungs.
    d. An increased resting heart rate.

17. The term "target heart rate" in relation to exercising means
    a. deciding on any heart rate that is faster than your
       resting heart rate, and then making your heart beat at
       that rate while exercising.
    b. making your heart beat as fast as possible while
       exercising.
    c. increasing your heart rate to 35 beats above your resting
       heart rate while exercising.
    d. increasing your heart rate to about 75% of the highest
       level reached during your most recent exercise stress
       test.

18. A recommended maintenance exercise schedule for someone who is
    recovering from a heart attack is
    a. 60 minutes twice a week.
    b. 40 minutes 3 times a week.
    c. 15 minutes 7 times a week.
    d. 20 minutes 3 times a week.
Stress Management

19. The term "stress" can be described as
   a. a normal reaction to change.
   b. the usual response to any disturbance.
   c. the response to an event that strains a person's ability to cope.
   d. the response of the body to pleasant situations.

20. The experience of stress involves
   a. adapting to a difficult situation.
   b. being exposed to a challenging situation.
   c. identifying those situations that are difficult to handle.
   d. an inability to handle a difficult situation.

21. Which of the following is a common physical response to prolonged stress?
   a. A change in appetite.
   b. A slower heart rate.
   c. Decreased metabolism.
   d. Increased concentration.

22. What is a very effective way to relax?
   a. Breathing slowly and rhythmically.
   b. Controlling your emotions.
   c. Concentrating on muscle tension.
   d. Involvement in community activities.
Appendix F

Demographic Information

Please provide the following information about yourself:

1. Date__________
   dd/mm/yy

2. Age__________

3. Gender  a. male  b. female

4. Marital Status (circle one)
   a. Single
   b. Married
   c. Divorced
   d. Separated
   e. Widow(er)

5. Language(s) usually spoken at home (circle all that apply)
   a. English
   b. Chinese
   c. German
   d. Indo-Pakistan  specify:__________
   e. Italian
   f. Portuguese/Spanish
   g. French
   h. Japanese
   i. Greek
   j. Scandinavian  specify:__________
   k. Other, please specify

6. Highest level of education completed (circle one)
   a. Grade 0 - 7
   b. Grade 8 - 11
   c. Grade 12 or equivalent
   d. Community College/Technical School
   e. University

7. Employment Status (circle all that apply)
   a. Employed
   b. Unemployed
   c. Retired
   d. Unemployment Insurance
   e. Disability
   f. Social Assistance

8. Occupation__________________________

9. For the second part of this study, you will be mailed this same questionnaire. Please enter your name and address here:

   Name_____________________________________
   Street______________________________________
   Apt. #_____________________________________
   City or Town_________________ Province________ Postal Code_________
Appendix G

Health-Related Information

I.D. #____

1. Have you joined any cardiac education programs since you left the hospital?
   a. Yes  b. No

   If yes, please state where this program was located, how the program was organized (eg. classes, home visits by a nurse) and the topics of discussion.

   __________________________________________
   __________________________________________
   __________________________________________

2. Have you participated in an organized exercise program since you left the hospital?
   a. Yes  b. No

   If yes, please state where this program was located, when you began the program, and how often you attend the exercise program.

   __________________________________________
   __________________________________________
   __________________________________________
Appendix H

OUTPATIENT CARDIAC EDUCATION PROGRAM

Program Schedule
Hours: Wednesdays, 1000 - 1200 hours

Overview of Sessions

Session I
* How the heart works
* What is coronary artery disease?
* What is a heart attack?
* Signs and symptoms of a heart attack
* Emergency planning
* Identifying risk factors
* Medications

Resource Person
Registered Nurse

Session II
* What is cholesterol? Good cholesterol?
  Bad cholesterol?
* How to reduce dietary fat, cholesterol, and saturated fatty acids
* Understanding food labels
* Tips on eating out

Resource Person
Dietitian

Session III
* Effects of stress on the body
* Sources of Stress
* Techniques for managing stress
* Planning a balanced lifestyle
* Energy conservation

Resource Person
Occupational Therapist

Session IV
* The benefits of exercise
* Preparing for an exercise program
* Understanding the exercise prescription
* Sexual activity
* Identification of community resources
* Emotional reaction after a heart attack

Resource Person
Physiotherapist
Registered Nurse

Spouses are encouraged to attend
Appendix I

Cover Letter for Pretest

Lifestyle Adjustments After a Heart Attack

I am a Master of Science in Nursing student at the University of British Columbia. One of the requirements of this course of studies is to conduct a research project. This is a request for you to participate in this research project.

For this project, I am asking individuals who have had a heart attack to answer questions about their knowledge of heart disease, and their health habits. As someone who has been through the experience of a heart attack, you can provide valuable information that will help nurses to increase their understanding of what it is like to make lifestyle changes after a heart attack. This will help nurses to provide improved education programs that will encourage individuals who have had a heart attack to make effective lifestyle changes.

The enclosed questionnaires ask about your knowledge of heart disease, and your health habits. Please read the instructions at the beginning of each section carefully, and then proceed to complete the questionnaires without the help of other people. It will take you approximately 30 minutes to complete these questionnaires.

Your care will not be affected if you decide not to participate in this study or if you withdraw from the study.

Please complete these questionnaires at your leisure while you are here in the hospital. If you are interrupted, or become tired, it is better to take a rest and return to these questionnaires at a later time. When you have completed the questionnaires, please place them in the envelope provided and give them to myself or your nurse before you leave the hospital.

In 4 - 6 months you will be mailed these same questionnaires. The purpose of this is to determine if there have been changes in your knowledge about heart disease, in your way of life and in your personal health habits.

On one of the questionnaires is an identification number that is kept separate from the list of names, and is known only to myself as the researcher. You are assured of complete anonymity and confidentiality regarding your responses. Your name will not be associated with the information you have provided.

Completing and returning these questionnaires is considered as your consent to participate in the two phases of this study.
Appendix K

List of Omitted HPLP Items

6 omissions
  #3: Like myself.

4 omissions.
  #9: Feel I am growing and changing personally in positive directions.
  #25: Maintain meaningful and fulfilling interpersonal relationships.

3 omissions
  #21: Look forward to the future.
  #36: Consciously relax muscles before sleep.

2 omissions
  #2: Report any unusual signs or symptoms to a physician.
  #4: Perform stretching exercises at least 3 times per week.
  #16: Am aware of my personal strengths and weaknesses.
  #22: Participate in supervised exercise programs or activities.
  #31: Spend time with close friends.

1 omission
  #5: Choose foods without preservatives or other additives.
  #6: Take some time for relaxation each day.
  #8: Am enthusiastic and optimistic about life.
  #10: Discuss personal problems and concerns with persons close to me.
  #11: Am aware of the sources of stress in my life.
  #13: Exercise vigorously for 20-30 minutes at least 3 times per week.
  #17: Work toward long-term goals in my life.
  #20: Question my physician or seek a second opinion when I do not agree with recommendations.
  #26: Include roughage/fiber (whole grains, raw fruits, raw vegetables) in my diet.
  #29: Respect my own accomplishments.
  #32: Have my blood pressure checked and know what it is.
  #34: Find each day interesting and challenging.
  #35: Plan or select meals to include the "basic four" food groups each day.
  #41: Find constructive ways to express my feelings.
  #42: Seek information from health professionals about how to take good care of myself.
  #43: Observe my body at least monthly for physical changes/danger signs.
  #45: Use specific methods to control my stress.
  #46: Attend educational programs on personal health care.
  #47: Touch and am touched by people I care about.