THE ORAL HEALTH-RELATED LIFESTYLE OF VANCOUVER INNER CITY ELEMENTARY SCHOOL-AGED CHILDREN

by

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Abstract

Objectives: To describe the oral health-related lifestyle of Vancouver inner city elementary school-aged children and relate different aspects of their oral health-related lifestyle with demographic and socioeconomic factors. ***Methods:*** This cross-sectional study used a structured questionnaire with some open-ended items to survey 424 school-aged children in Vancouver inner city elementary schools (53.3% boys and 46.7% girls). There were two versions of the questionnaire: the shortened version was used for grades 1-3 and included only multiple choice questions while the comprehensive version for grade 4-7 comprised both structured and open-ended questions. In the questionnaire, different items were used such as ordinal, interval and qualitative to acquire information about different aspects of oral health-related knowledge, attitudes and behaviours. ***Results:*** Overall, there was a deficiency in oral-health related knowledge and corresponding behaviours in all age groups and both genders. Thus awareness about oral health in this cohort of children needs to be improved. The oral health-related lifestyle did not differ between boys and girls except for the interdental cleaning behaviour (P=0.033). Oral health-related lifestyle did not differ according to socio-demographic characteristics except for the difference in consumption of sugar-containing drinks among age groups (P<0.001). The diet-related knowledge differed between children born inside and outside Canada (P<0.050). ***Conclusion:*** Oral health-related knowledge, attitudes and behaviours among elementary school-aged children in inner-city Vancouver areas was deficient and professional guidance from oral health care workers concerning oral health self-care was lacking. There were no distinct socio-economic or demographic differences in lifestyle factors among the inner city Vancouver school-aged children.

Preface

The present cross-sectional survey was conducted in Vancouver inner-city elementary schools. To start the project, Behavioural Research Ethics Board approval (Certificate number: H11-00621) has been received from the University of British Columbia. To facilitate the communication and subsequent collaboration with principals of inner city Vancouver elementary schools, the Support Letter was obtained from Vancouver School Board (Appendix 3).

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Chapter 1. Introduction

About inner city

Inner city refers to the older and more populated and usually poorer central section of a city. As a general definition inner city is a general term for impoverished areas of large cities which is characterized by minimal educational opportunities, high unemployment rate, broken families and inadequate housing (The American Heritage New Dictionary of Cultural Literacy, 2005). Vancouver Inner City school allocation was established in 1988 to provide support and services to children who face difficulties to success at school for economic and related social reasons. The purpose of the Inner City Schools Program was to provide additional resources to designated schools in order to facilitate equitable educational outcomes for all students (Vancouver Board of Education, 2009). According to Vancouver School board, Vancouver School District 39 is a large, urban and multicultural school district that includes some of the most affluent and impoverished urban neighbourhoods in the country providing programs to 56,000 students in Kindergarten to Grade 12 (Vancouver School Board, assessed June 2012). This school district consists of a total of 75 Elementary schools, including 16 elementary annexes and 11 inner-city schools. The present study focused on children from seven inner-city elementary schools: Florence Nightingale, Britannia, John Henderson, Queen Alexandra, Tillicum, Mount Pleasant and Grandview elementary schools.

1.1 Literature Review

Oral health is a part of general health and affects quality of life. Oral health, similarly to the broad definition of health, can be defined as not only an absence of disease, but also includes functional aspects and social and psychological well-being (WHO, 1998). Oral health allows an individual to speak, socialize and eat without any discomfort (WHO, 2003). Oral diseases may result in general health problems, low self-esteem, dental anxiety and poor quality of life (WHO, 2003). It is important to emphasize that poor oral health affects the growth, development, and well-being of children and consequently has a significant impact on their later life (Guarnizo-Herreño, & Wehby, 2012) as well as it can have a detrimental effect on children's performance in school and their success in later life. Self-reported problems with teeth have been associated with poor school performance among children ((David et al., 2006; Guarnizo-Herreño, & Wehby, 2012). Children who suffered from oral diseases were 12 times more likely to have restricted-activity days, including missing school, than those who did not have oral problems (US GAO, 2000).

Biological, physical, environmental, behavioural and lifestyle-related factors have been considered as determinants of oral health (Eriksen et al., 2006; Selwitz et al., 2007).

Lifestyle in its broader definition is an integrated system of attitudes, values, opinions and interests as well as behaviours (Berkman & Gilson's, 1978). In the narrower definition, "*Lifestyle has been defined as a distinctive mode of living that is defined by a set of expressive, patterned behaviors of individuals occurring with some consistency over a period of time"* (Elliott, 1993). Health-related lifestyle refers to behaviours that have been shown by epidemiological and other health research to predict disease or health (Irvin, 1990). This definition of lifestyle has also been used in a report of 'The Health of Canadians' and implied that lifestyles are the result of choices made by individuals (Lalonde, 1974). The lifestyle of an individual is seen as the result of an

aggregate of decisions made by the person him- or herself, decisions over which the person has considerable control. In addition, it has been shown that environmental and social factors influence health behaviours, even in affluent societies, and there are factors over which the individual person has limited or no control (Eaton et al., 2004).

Oral health-related lifestyle (knowledge, beliefs, attitudes, behaviours, etc.) has been related to oral health. Oral health knowledge is considered to be an essential prerequisite for health-related behaviour (Carneiro et al., 2011). An association between knowledge and behaviour (Tolvanen et al., 2012) and between knowledge and oral health have been extensively reported (Hamilton & Coulby, 1991; Lateefat S et al., 2012).

In the study by Oliveira et al. (2000), third grade schoolchildren without knowledge were twice as likely to have caries experience as compared to children having oral health-related knowledge. Evidence has also shown that oral health knowledge and positive attitudes towards it related to good oral care practices (Oliveira et al., 2000). Thus, oral health education helps to improve oral health care practices (Cialdini et al., 2005; Sgan-Cohen, 2008), i.e. if the knowledge about how to maintain oral health is properly transmitted and adopted, oral diseases can be prevented (Rodrigues et al., 2009).

1.1.1 Social Determinants of Oral Health Behaviour

Understanding the factors influencing health is critical for health professionals to deliver effective treatments and prevention of diseases (Daly et al., 2002). Health behaviours have been related to social, economic, and environmental factors (Sheiham & Watt, 2000). Social determinants of health including lifestyle, social support, and socio-economic, family-related, cultural, and environmental factors determine general health (Dahlgren & Whitehead, 1992; Dahlgren, 1995) as well as oral health of individuals and populations (Petersen, 2005b; Newton

& Bower, 2005). Consequently, sustainable improvements in a population's health and reduction in health inequalities can be achieved by addressing the social determinants of disease (Watt, 2005).

Biological and behavioural factors as well as the social support offered by family, friends, and the community at large may determine an individual's oral health (Dahlgren & Whitehead, 1992). Social support may be created in a child's everyday environment e.g. their home and school (Moysés & Rodrigues, 2006). For children, parents have been identified as the most important source of social support (Wigen & Wang, 2012). Different child- and parent-related determinants of oral health and behaviour have been identified (Wickrama et al., 1999; Poutanen et al., 2007).

1.1.2 Child-related Determinants of Oral Health Behaviour

Oral health status and oral health related-lifestyle have been related, e.g. a positive association between frequency of tooth brushing and personal hygiene was observed among adolescents (Dorri et al., 2009). Similarly, tooth brushing less than twice a day and/or frequent sugary snacking were found as important predictors of caries in children (David et al., 2005; Levine et al., 2007; Vaganas et al., 2009; Hietasalo et al., 2012).

In Finnish children, oral disease-related behaviours at the age of three years were associated with having dental caries at the age of 10 years (Matilla et al. 2005b). In contrast, some other studies found no relationship between a child's oral health behaviour and his/her dental health (Okada et al., 2002; Bruno-Ambrosius et al., 2005). Oral health knowledge was related with twice-daily tooth brushing among 12- to 22- year-old students in Sudan (Darout et al., 2005); a similar association was observed in British adolescents (Freeman et al., 1993). It has been shown that

third grade schoolchildren with insufficient oral health knowledge were twice as likely to have caries as compared to children having oral health-related knowledge (Oliveira et al., 2000).

Other health-related behaviours have also been associated with children's oral health. In Swedish female teenagers dental caries has been related with missing breakfast and having irregular meals (Ambrosius et al. 2005).

Källestål et al. (2002) found that reasons for performing oral health behaviours change as children reach adolescence, e.g. emotional factors such as aesthetic values seem to increase in importance with age, whereas cognitive factors such as knowledge become less important. A combination of oral health-related behaviours has been suggested to form an oral health-related lifestyle (Aleksejuniene et al., 2002). It has been shown that frequent ingestion of sugar containing snacks was related to less frequent tooth brushing (Rajala et al., 1980). Twice-daily tooth brushing has been related to regular use of dental floss among adolescents (Macgregor et al., 1998; Honkala et al., 2007).

1.1.3 Social Determinants of Child's Oral Health Behaviours

1.1.3.1 Individual socio-economic status (SES)

Individual socioeconomic status is commonly conceptualized as a combination of three SES indicators: education, occupation and income (Kent & Croucher, 1998). Professionals with the highest level of education and income are usually considered as a high SES group and unskilled workers as a low SES group (Kent & Croucher, 1998). Sociologists have documented the social patterning of disease and have found a strong association between an individual's SES and his or her health (Bruce G. Link & Jo Phelan, 1995).

Socioeconomic disparities in health remain strong despite reductions in acute infectious diseases (Wilson, 2009). This means that individuals with higher SES have at their disposal a broad range of flexible and multi-purpose resources that can be used to the advantage of their health, including knowledge, money, power and social connections (Link & Phelan, 1995). These same resources aid in the successful treatment of diseases (Wilson, 2009). For example, higher SES individuals as compared to lower SES individuals tend to have greater access to medical care and resources and consequently these resources help them to make adequate treatment decisions (Lutfey & Freese, 2005).

Socioeconomic differences consistently have been associated with risk behaviours, especially insufficient tooth brushing and use of sweet snacks (Honakala, 1993; Kuusela et al, 1999). Children's poor oral health has been associated with the family's low socio-economic status (Källestål & Wall, 2002; Peterson, 2005) as well as parents' poor oral health-related behaviours (Matilla et al., 2005a; Okada et al., 2002).

Although the differences in oral health behaviours have lessened over time among Finnish children, boys from low socioeconomic groups with poor school performance still have the poorest oral hygiene practices in Finland (Östberg et al, 2002; Fizgerald et al., 2004). Similar gender differences have been observed in other European countries (Kuusela et al., 1997b).

1.1.3.2 Relationship between parents' lifestyle and their children's lifestyle

Ample evidence has shown that parental oral health-related knowledge, beliefs, and attitudes influence oral health and oral health behaviours of their children (Okada et al., 2001; Szatko et

al., 2004; Poutanen et al., 2007). Unfavourable oral health behaviour has been identified among children who had mothers with low-skill occupations (Poutanen et al., 2005) and low levels of education (Verrips et al., 1993; Rajab et al., 2002). In a cross sectional study of 4315 children aged three to 15 years caries was higher in children whose parents had low levels of education (Hjern et al., 2001). US report suggests that people from some ethnic minorities often have poor oral health status (US Department of Health and Human Services, 2000; Sabbah et al, 2009). It has been mentioned in a study done by Fisher-Owens, et al. (2012), that Hispanic and non-Hispanic-Black people showed poor oral health status compared to non-Hispanic White people.

1.1.3.3 Area-based socio-economic status

In addition to an individual SES–based health deprivation, area-based social inequalities have been identified. There is ample evidence demonstrating that people living in socially disadvantaged environments have poorer health than their better-off counterparts (US Department of Health and Human Services, 2000). Area-based socioeconomic status reflects the socioeconomic context in which people live beyond their individual SES background (Sanders et al., 2006). However, it is important to consider that area-based socio-economic measurements tend to underestimate the effects of individual socioeconomic variation, and assume that measured social characteristics are stable and homogeneous within a specific socio-economic area (Sanders et al., 2006).

Area-based SES is an important concept as people with lower SES tend to reside in certain neighbourhoods, e.g. inner city Vancouver, while their higher SES counterparts cluster in more wealthy areas, e.g. Vancouver West. This geographical distinction in residence may bring differences in area-based socio-economic inequalities, e.g. higher SES areas may have shops

with healthier food choices, safer and healthier environments, which are more conducive to health than what may be found in low SES geographic areas where the majority of poor and less educated families live.

A review was done on existing explanations for the relationship between socio-economic status and unhealthy behaviours (Fred et al., 2010). In focusing on the mechanisms that account for the relationships between SES and health behaviours, studies from sociology, economics, and public health were considered which provided insight into the sources of health inequalities (Fred et al., 2010). These studies reported that SES disparities in health behaviour involve more than freely chosen individual lifestyles, i.e. unhealthy behaviours result from vast differences in social circumstances (Fred et al., 2010).

Social environments may produce influence in health lifestyles that affect multiple behaviors e.g. oral hygiene, exercise, and diet (Cockerham, 2005). An example for that could be schools with health promotion program. Consequently, health or risk behaviours and the social environment surrounding them may increase health disparities (Wilson, 2009).

Well-educated people are more likely to self-report their oral health as very good, more likely to have visited a dentist regularly and less likely to visit a dentist only when a specific problem arises than are less educated people (Australian Research Centre for Population Oral Health 2006). Unsurprisingly, oral health knowledge, attitudes and behaviour as well as oral health status have been closely linked to differences in SES. For example, children from high SES groups tended to have more positive attitudes, behaviours and oral health knowledge than their socially disadvantaged counterparts (Beal, 1989). Concomitantly, children from low SES families living in high SES neighbourhoods may receive a positive health impact from their high

SES neighbourhoods e.g. they can acquire health knowledge and behaviours through peer communication (Beal, 1989).

1.1.3.4 Family affluence

In adults, SES is usually measured by income, education or occupation. Most often, the SES of a parent or head of a household has also been used to identify the SES of adolescents. However, data on family SES can be difficult to collect from young children because they do not know or are not willing to disclose such information resulting in a non-response on parental occupation varying from 20% to 45% as reported by various studies (Currie et al., 1997; Wardle, Robb, & Johnson, 2002; Molcho et al., 2007). When the family affluence scale (FAS) was introduced for the first time it was used in a national context only and contained three items: whether a family had a car and a telephone and whether each child had a separate bedroom (Currie et al. 1997). Later on, this scale was revised and used cross-nationally and it was comprised of the following items: whether a family had a car and a separate bedroom for each child as well as the number of vacations a family had taken and the number of computers at home (Due et al., 2005). The FAS has been utilized in different ways and it has been employed over the last 10 years to explain socioeconomic inequalities in a wide range of health indicators while studying health behaviours in school-aged children (the HBSC study) (Currie et al., 2008). By using data from children who were able to report on parental occupation, a consistent association between the FAS score and parental social class was found which validated the FAS scale (Wardle et al., 2002). It has been shown that children with lower FAS scores consumed more soft drinks and ate more high-sugar foods compared with children who presented with higher FAS scores (Inchley et al., 2001). The high FAS also has been shown to be a predictor of frequent tooth brushing (more than once a day) and visiting the dentist regularly (Maes et al., 2006).

1.1.4. Gender Differences in Oral Health-related Lifestyles

In general, girls have more favourable attitudes and behaviors towards oral health than boys (Östberg et al., 1999; Jimenez, R et al., 2011) and gender related differences in oral health knowledge have also been observed (Freeman et al., 1993; Östberg et al., 1999; Kuusela et al., 1997; Currie et al., 2000; Rajab et al., 2002; Farsi et al., 2004; Maes et al., 2006; Joshi et al., 2005; Källestål et al., 2006).

Differences between genders also exist regarding the consumption of sugar-containing foods; e.g. girls have reported using sugary snacks and soft drinks less frequently than boys (Honkala et al., 1982; Freeman et al., 1993; Ahmed et al., 2007). Nonetheless, in terms of sugar consumption a Norwegian study found that the gender disparities observed among adolescents levelled off as the adolescents reached adulthood (Åstrøm & Samdal, 2001). In Sweden and Finland a diet associated with high risk for caries was more common among boys than among girls (Källestål et al., 2000; Poutanen et al., 2005). In contrast, other studies reported more frequent consumption of sweets and soft drinks among girls than among boys (Lian et al., 2010; Okullo et al., 2003).

1.1.5. Family's Influence

The family is a key social organization having the primary responsibility for the proper development of a child (Åstrøm, 1998; Pine et al, 2000). Adoption of consistent behavioural habits in childhood is established at home with parents, especially the mother, being the primary model for a child's behaviour (Blinkhorn, 1981).

Socialization to oral health behaviours may be considered a modelling process in which children imitate the behaviour of their parents (Bandur, 1986). Through primary socialization, a growing child learns the norms, values, and behaviours usually from his/her parents, the group in which

he/she is raised (Tuckett, 1980). Similarly to health behaviours, risk behaviours in children may also be family-based. For example, parents' smoking habits, alcohol consumption, and fat intake have been associated with the corresponding behaviours of their children (Rossow & Rise, 1994). In terms of oral health habits, the associations between parents and their children have been clearly demonstrated (Vanagas et al., 2009). They demonstrated that parents with good own oral hygiene skills significantly more often understood the importance of brushing their children's teeth.

Several authors have emphasized the importance of acknowledging multi-directionality in family influences on establishment of health behaviors in children. Whereas parents provide initial opportunities for socialization for their children into oral health behaviors, it is widely recognized that parents might also be reciprocally be influenced by their children, especially their older ones (Snyder and Purdy, 1982). The similarity in oral health behaviors between parents and their offspring extending well into the adolescence has been observed (Honkala et al., 1983).

Parents' ability to effectively facilitate oral care in their children is one of the key elements that determine formation of positive oral behaviours in children (Syrjala et al., 1999).

The association between a child's oral health status and parental education (usually that of the mother) has been examined. These studies have shown that a child's caries experience is high if parents (particularly the mother) are less educated. In general, highly educated people have established positive dental health behaviours, such as lower sugar consumption, more frequent tooth brushing, and routine visits to the dentist as compared to their less educated counterparts (Broughton, 2000; National Advisory Committee on Health and Disability, 2003).

To a child's health detriment, some parents use sugar-containing items as rewards (Hwang, 2008). Sugar-containing products are of lower cost than healthy snacks. Due to their lower cost

and the parents' lack of health knowledge, unsurprisingly, lower income families tend to use sugar-containing products that are convenient for them both economically and emotionally (Hwang, 2008).

One of the factors leading to parents inadvertently contributing to oral health problems in their children is that accommodating oral health routines in the family's daily life may be difficult. This may be especially true for lower income, single parent households where the primary financial support comes from one parent working long hours, which limits the amount of time left for supervision of a child's behaviours (Hwang, 2008).

Many studies have demonstrated that parental modeling and parental attitudes have a significant impact on the establishment of oral health habits in children (Pine et al., 2000; Adair et al., 2004). In addition, parents' health-related attitudes, knowledge, and their own health status have been related to their children's oral health behaviours and consequently to their children's oral health. In an international study conducted in 17 countries, parental attitudes were associated with a child's tooth brushing behaviours (Adair et al., 2004).

In terms of intergenerational transmission (culture-based carrying-on influences) of health-risk behaviours, it has been shown that fathers' lifestyles related to boys' lifestyles, and mothers' lifestyles associated to girls' lifestyles (Wickrama et al., 1999).

A child's tooth brushing and inter-dental cleaning behaviours have been correlated with the corresponding behaviors of their parents, especially of their mothers (Okada et al., 2002).

It has been reported that a mother's oral health-related behaviours such as proper oral self-care, active supervision of their child's oral care, and positive attitudes towards oral health in general had a strong influence on the child's tooth-brushing behaviour and his/her oral health (Okada et

al, 2001; Mahejabeen et al, 2006). Scottish parents with health-focused beliefs/attitudes about their child's tooth-brushing behaviour had children who brushed their teeth twice a day (Pine et al., 2000).

To understand child's behaviours, it is essential to study the oral health-related behaviour of children as well as that of their parents. Adair et al. (2004) found that the most significant predictors of children's oral health-related behaviours were parents' attitudes towards monitoring their children's tooth brushing and sugar-snacking habits. They suggested that parental attitudes significantly influence the establishment of healthy habits in children. Fukuda et al., (2011) demonstrated significant similarities between parents and their children in terms of use of dental floss, tooth brushing and drinking non-sugary drinks. It is important to consider that parents who lack personal oral health care habits are poor role models for their children, i.e. oral health care is a learned behaviour and if a parent or caregiver does not practice oral self-care, children are not likely to practice oral self-care either (Broughton, 2000).

1.1.5.1 Culture

Culture is often defined as coherent, shared patterns of actions or beliefs specific to certain groups of people, defining behavioural norms and interpersonal relationships (Strauss, 1990). Culture organizes norms of family life and thus cultural beliefs and practices may act as facilitators or barriers to accessing health care services (Strauss, 1990).

Being part of a cultural minority group does not inevitably mean poor oral health (Riedy et al., 2001; Hilton et al., 2007). It does suggest, however, that there may be certain cultural beliefs and practices common to people in certain cultural groups that may influence their oral health status, e.g. the value placed on maintaining healthy primary teeth or expectations about preventive or

therapeutic activities. Consequently, cultural factors may have important implications for an individual's own health and those of others for whom they provide care, such as children (Riedy et al., 2001; Hilton et al., 2007).

It is important to note that among, and within, ethnic groups there are substantial differences in beliefs and behaviours, which can lead to varying health status. Worldwide, there are numerous distinct ethnic minority and cultural groups and these cultural groups tend to maintain their beliefs, including health beliefs, after their migration to Canada (Ember M & Ember CR, 2001). Ethnic groups might have their own set of beliefs and attitudes towards oral health care, therefore it is important to understand cultural beliefs, values and practices (Ember M & Ember CR, 2001).

A survey in ethnic minority subpopulations in England (Gould, 2001) found that children from some ethnic minority groups, especially Pakistani and Bangladeshi children, were less likely to have ever visited a dentist. Of these ethnic minorities, the individuals who visited a dentist were more likely to do so because of existing dental problems rather than from any motivation to seek professional help for preventive reasons (Gould, 2001). Epidemiological studies have suggested that Asians living in Britain, particularly children, have a poor oral health-related lifestyle (Bedi et al., 2000).

1.1.5.2 Diet habits

Poor diet has been frequently associated with the aetiology of dental caries at any age, especially, among school children (Hooley et al, 2012; Watt & Rouxel, 2012). For young children who are unable to make independent decisions, diet is determined by family values, traditions and lifestyle (Petersen, 2003).

In recent years, there has been a trend among school-aged children to have irregular meal times and to engage in unhealthier snacking (Vereecken et al., 2004). High consumption of sweets and soft drinks is common among school children in many European countries (Vereecken et al., 2004).

In the Middle East, consumption of sugar-containing foods and drinks is also high (Vigild et al, 1999; Sayegh et al., 2005) and is more frequently observed among boys than girls (Ahmed et al., 2007). Hupkens et al., (1998) demonstrated that a mother's high socio-economic status related to her children having a healthy diet enriched by a low intake of sweets, soft drinks, chips and white bread.

Chapter 2. The Study's Rationale, Aims and Hypotheses

2.1 Rationale

During the transition from childhood to adolescence, health behaviours are formed (Kuusela et al., 1997b; Kwan et al., 2012). Pre-adolescence and adolescence have been shown to be a period when health education is important as much biological and psychological development occurs during this time (Durward & Wright, 1989). Adolescence is also a period of intense psychological changes, where cognitive development is rapid and beliefs developed in this stage of life will influence an individual's future life (Declerck , 2009). During pre-adolescence and adolescence, young people acquire health-related attitudes and behaviours that carry over into adulthood. It has been shown that patterns of tooth brushing (Kuusela et al., 1997a), physical activity and diet behaviour are established during childhood and adolescence and such patterns remain relatively stable throughout later life (Kelder et al., 1994), e.g. individuals who brushed their teeth more than once a day at the age of 12 years tended to maintain this behaviour through adolescence. Similarly, dietary habits are also established during adolescence (Sweeting & Anderson, 1994).

A number of studies have examined the oral health knowledge and behaviours of children from low income areas (Lim et al, 2008; Koerber et al., 2006; Bedi et al., 2000; Hamilton & Coulby, 1991); however no studies had been done on the children residing in the low income areas of Vancouver. The inner city of Vancouver comprises areas where families with low income and from many ethnic groups reside (Vancouver School Board, assessed June 2012). Available evidence about inner city populations from other countries has demonstrated that inner city children are form a high-risk population (Laher, 1990; Canadian International Development Agency, 1998; Toronto District Health Council, 1999) and so a relatively high prevalence of oral disease might be expected. Therefore, the inner city of Vancouver might be an area where

children as well as their parents might have a poor oral-health lifestyle. Moreover, there have been no previous studies about oral health-related research about this age group in British Columbia. It is therefore unclear whether the family structure and SES status of Vancouver's inner city schoolchildren relate to these children's oral health-related knowledge, attitudes and behaviours.

2.2 The Study Aims

The aims of the present study were: 1) to describe the oral health-related lifestyle of elementary school-aged children attending Vancouver's inner-city schools 2) to relate different aspects of the oral health-related lifestyle with demographic and socioeconomic factors.

2.3 Study Hypotheses

1) Children from higher SES families have a better oral health-related lifestyle as compared to children from lower SES families.

2) Oral health-related knowledge, beliefs, attitudes and behaviors differ between boys and girls.

Chapter 3. Material and Methods

3.1 Study Design and Sampling Framework

The present study was approved by the University of British Columbia Research Ethics Board (H11-00621) and by the Vancouver School Board. The present cross-sectional survey was conducted in seven of Vancouver's eleven inner-city elementary schools. The pre-selected schools comprise culturally and ethnically diverse communities and have high rates of immigrant children (Vancouver School Board, assessed June 2012).

The following inner city Vancouver elementary schools participated in the present study: Florence Nightingale, Britannia, John Henderson, Queen Alexandra, Tillicum, Mount Pleasant and Grandview. We approached the parents or guardians of inner city Vancouver school children to obtain informed parental consent for the study. A total of 424 out of 820 children were recruited (the response rate 52%).

Then, all school children with parental consents were asked to complete a comprehensive questionnaire comprising 60 items and to take another questionnaire comprising 68 items home for their parents. The questionnaire for children (grades 1-3) was abbreviated to consider the developmental level of children at this age, thus this questionnaire included only simple multiple-choice questions.

After multiple reminders, only 68 parental questionnaires were returned, i.e. the return was rate 16 %.

3.2 Developing The Questionnaire

Most of the questionnaire items were pre-selected from previously validated questionnaires from a number of studies (World Health Organization, year, Kawamara & Takase, 2008; Ernesto, 2007; Poutanen & Lahti, 2005). In order to accommodate the present audience, some of the questionnaire items were revised.

The questionnaire was designed to be administered anonymously and included both structured and open-ended questions concerning different aspects of oral health or disease related lifestyle. The questionnaire included inquiries about the following themes: (a) demographic information, (b) socio-economic status, (c) oral hygiene practices, (d) dietary habits, (e) knowledge, attitudes and practices related to oral health and (f) self-assessment of oral health status. After the questionnaires were developed, they were tested in a pilot study and then revised accordingly.

A few duplicate questions were included in the questionnaire to test for reliability. Reliability was measured by employing Cohen's Kappa and values ranging from 0.72 to 0.77 for different questionnaire items. Given the targeted audience of young children, an internal reliability of 70% or more was considered satisfactory.

3.2.1 Questions about Family Structure

This section included inquiries about a child's family structure and the ethnicity of his/her parents/guardians. The measurements for this section were designed on nominal variables. The children were asked about their family structure, i.e. about the number of family members they lived with. The structured answers for this inquiry were: mother, father, stepmother, stepfather, siblings, grandparents or other family members living with them (Children were asked to specify). The ethnicity questions included seven structured answers: Aboriginal, Chinese, European, Filipino, Vietnamese, Indian and other.

3.2.2 Questions about Family's Wealth

The Affluence Scale (FAS) was chosen to measure a family's wealth. The questions for this section were taken from the HBSC (Health Behaviour in School-aged Children) WHO Collaborative Cross- National Study in Adolescent Health Study (Currie, 1998).

The present study measured each child's SES based on principles of the FAS with some small modifications. From the aforementioned study, we pre-selected relevant items which were non-sensitive, simple to answer and relevant to current Canadian economic circumstances. The measurements in this section were on nominal variables and the following questions were included: "number of cars in a family" and "child's having or not having own bedroom".

3.2.3 Questions about Family's Demographics

This part consisted of six questions and inquired about age, gender, parent's/guardian's ethnicity, job, family income and parents' education. The measurements in this section were either on nominal variables or had open-ended answers (qualitative measurements).

The grouping into low, medium or high socio-economic status groups was done qualitatively based on socio-economic status measures (separate bedroom for child, number of cars in family, whether parents working or not and what kind of job parents have) and consensus between two examiners, e.g. a child will be allocated into a high SES group if he/she has a separate bedroom, the family has two or more cars and at least one of the parents has a professional job.

3.2.4 Questions about Oral Health-related Knowledge

This section comprised both structured (ordinal and interval variables) and open-ended questions. The open-ended questions were chosen in order to avoid leading questions and subsequently to reduce the measurement bias.

Examples of open-ended questions (qualitative measurements):

- What do you think causes "rotten teeth"?
- How do you clean between your teeth?

Examples of ordinal variable measurements: "How often do you brush your teeth"? The structured answers were: never, not every day, once a day, twice a day, after every meal.

Other ordinal item measurements included inquiries regarding the frequency of consumption of different sugar-containing food items and drinks. These questions were taken from a similar study (Hamilton & Coulby, 1991; Heft et al., 2003).

An example of an interval response measurement: "A child should stop brushing if gums bleed"

The question was taken from a similar previous study (Zhu et al., 2003) with some modifications. The child is asked to place a mark on a line labelled with 'completely wrong' at one end and 'completely true' at the other end.

3.2.5 Questions about Oral Health-related Behavior

Questions included inquiries about brushing activity such as frequency of brushing and dietary habits such as frequency of consuming sugar-containing foods or drinks (Heft et al., 2003; Hietesalo et al., 2008). Ordinal items were chosen.

Example of an ordinal variable measurement: How often do you brush your teeth?" The structured answers were: never, not every day, once a day, twice a day or more, and after every meal.

The interval response measurements were designed employing the Visual Analog Scale (VAS). For example, the child read the statement "I take good care of my teeth" and answered by placing a mark on a 100 mm line where one end is labeled with 'never' and the other end is labeled 'always'. For more examples, please refer to the Appendix 1.

3.2.6 Question items about oral health-related attitudes and beliefs

This section included inquiries about attitudes and beliefs; the questions for this section were taken from a previous study by Poutanen & Lahti, (2005). Subsequently, some modifications to both questions and answers were made. In order to collect more accurate information and subsequently enable parametric statistics, the responses for these inquiries were designed on a VAS instead of the original ordinal variable measurements.

The questionnaire items (statements) assessed participants' attitudes, beliefs about oral hygiene practices and attitudes about dentists and regular dental visits.

VAS–based questions had answers ranging from 'completely wrong' to 'very true' and included the following statements:

"People, who take good care of their teeth, do not have toothaches."

"If I do not see a dentist often my teeth will rot."

"Brushing teeth helps to stop teeth from being yellow."

"When one tooth is rotten, other teeth will rot too."

3.3 Pre-testing the Questionnaires

In the pilot study, the questionnaires were first peer-reviewed for content validity and revised accordingly. Next, in May 2011, a pilot study with 25 children at one of the elementary schools (Grandview Elementary) was done in order to test for the questionnaires' readability and absence of ambiguity. In addition, as the questionnaires included some questions to be answered on a VAS, it was important to test the response and be sure that the children understood how to answer the questions using this method. The pilot study showed that, when the VAS was explained, the children did not have any problems answering the questions in this way.

After the pilot study was completed, the questionnaires were revised where required. In order to simplify the wording for children, some revisions were necessary. The final revised comprehensive questionnaires including mainly structured and some open-ended questions are presented in the Appendix 1. Subsequently, the study protocol was prepared and the data collection began.

3.4 Data Collection

Data was collected in two periods: May 2011 to the end of June 2011 and from September 2011 to the end of January 2012.

Data has been gathered by a trained research team (all dentists). The questionnaires were administered in ordinary classroom settings and our team supervised all school-aged children participating in the present study during completion of the questionnaire. Younger children, i.e. grades one to three, were assisted individually by one team member to fill out the questionnaire. In order to avoid report bias, teachers were not allowed to help children complete the

questionnaires. In order to reduce information bias due to missing answers, all questionnaires were checked for missing answers prior to releasing the child.

3.5 Data Analyses

All analyses were performed employing the SPSS 18.00 software. Univariate analyses (desriptive statistics) were used to report frequency distributions regarding different study variables. Bivariate analyses (inferential statistics) were employed to test whether oral health-related lifestyle is associated with socio-demographic characteristics (Chi-square or Fisher's Exact Test and independent sample t-test).

The study variables are presented in Tables 3.1 and 3.2

Table 3.1 Operationalization of the dependent variables

Dependent variables	Operationalization
Knowledge about oral hygiene	What is dental floss used for? Open ended question.
	Reasons for tooth decay. Open ended question
	Should stop brushing if gums bleed. A Visual Analog Scale (VAS) from never to always.
Knowledge about diet	Water is bad for the teeth. No (0) Yes (1)
	Juice is bad for the teeth. No (0) Yes (1)
	Milk is bad for the teeth. No (0) Yes (1)
Brushing behaviour	Tooth brushing frequency: Never (0), Not daily (1), Once a day (2), Twice a day (3), After every meal (4).
Diet behaviour	Diet behaviours. Frequency of taking any of the following: candy, chocolate, soft drinks, cakes or muffins. Never (0), Less than once a week (1), 1-2 times a week (2), 3-6 times a week (3) and every day (4).
Attitudes/Beliefs	Only a dentist can stop cavities in teeth. A VAS from completely wrong to very true.
	I take care of my teeth. A VAS from completely wrong to very true.
	I brush my teeth to make my parents happy. A VAS from completely wrong to very true.

Table 3.2 Operationalization of the study variables (independent variables)

Variable	Operationalization of a variable
Gender	Boy (1), Girl (2)
Years lived in Canada	Number of years lived in Canada
Family members a child lives with	Mother (1), Father (2), Stepmother (3), Stepfather (4), Brother (5), Sister (6), Other (7).
Ethnic groups	Aboriginal (1), Chinese (2), European (3), Filipino (4), Vietnamese (5), Indian (6), Other (7).
A child has his/her own bedroom	No (0), Yes (1).
Number of cars family has	The number of cars a family owns.
Family Socioeconomic Status	Father/Guardian work? No (0) Yes (1) Mother/Guardian work? No (0) Yes (1)

Chapter 4. Results

4.1 Univariate Descriptive Statistics

4.1.1 Distribution of Children According to Behavioural Variables

Table 4.1 shows the distribution of children according to oral health-related behaviour, such as the frequency of tooth brushing, history of the last dental visit, frequency of eating and drinking sugar-containing items and cleaning between teeth. Only a small proportion of children did not brush their teeth every day and the majority of children brushed their teeth at least once a day. Regarding the last dental visit, more than half of the children visited a dentist during the last year, but around one third of them did not know or did not remember when their last dental visit was.

Only 8.0 % of children reported that they never drank juice; almost one fourth of them drank juice every day and more than half of the children reported that they drank juice less than once a week or only 1-2 times a week. More than one third of children never drank Coca Cola, Pepsi or Slurpee, while one third of them drank these cariogenic drinks less than once a week. A few of them (4.7%) drank them every day. Regarding the consumption of candies, chocolate and sweets, only a few of the children never ate these items.

Table 4.1 Children distribution according to behavioural variables

Study Variables	Number	%
Total number of children	424	100
Frequency of brushing		
Not every day	11	6.3
Once a day	117	22.9
Twice a day	40	66.0
After every meal	7	4.0
Last dental visit		
Last year	256	57.8
More than one year ago	23	5.2
Does not know/does not remember	164	37.0
Frequency of drinking juice		
Never	8	4.6
Less than once a week	43	24.6
1-2 times a week	55	31.4
3-6 times a week	29	16.6
Every day	40	22.9
Frequency of eating candy/chocolate/sweets		
Never	31	7.4
Less than Once a week	118	28.1
1-2 times a week	155	36.9
3-6 times a week	63	14.9
Every day	53	12.6

(Continued) Table 4.1 Children distribution according to behavioural variables

Study Variables	Number	%
Frequency of eating cookies/cakes/muffins		
Never	44	10.4
Less than once a week	166	39.2
1-2 times a week	118	27.8
3-6 times a week	55	13.0
Every day	40	9.4
Frequency of drinking Coca cola/Pepsi/Slurpee		
Never	136	32.2
Less than once a week	141	33.4
1-2 times a week	97	23.0
3-6 times a week	28	6.6
Every day	20	4.7
Cleaning between teeth		
No	5	2.9
Yes, always	61	34.2
Yes, sometimes	109	62.3

4.1.2 Distribution of Children According to Diet-related Knowledge

Table 4.2 presents the distribution of children according to oral health-related knowledge. The structured answers related to consumption of different food items were as follows: “yes”, no” and “do not”.

Of all, 95% of children stated that water is good for teeth, but 5% believed that water is bad for teeth. Almost half of children reported that juice is not bad for their teeth. The majority of children reported that milk is not bad for teeth and 87% of them considered soft drinks to be bad for teeth.

Children from grades 4-7 also were also asked about other food items. The majority of them (91%) reported that candy bar is not good for teeth, and very few (6%) reported it to be good for teeth. Of all, 8% of children reported popcorn as good for teeth, while the majority (92%) reported it either as bad for teeth or did not know whether it is good or bad for their teeth.

When children were asked about “nuts” almost 27% of them reported that nuts are not good for teeth, 30% did not know whether nuts are good or bad for teeth and 43% stated that nuts are good for teeth.

More than half of the children reported that raisins are good for teeth, while 22% stated that they are not good for teeth and one fourth of them did not know if raisins are good or bad for teeth.

Half of the children reported cheese to be good for teeth, while almost 20% stated that cheese is not good for teeth and the rest of the children did not have any knowledge about whether cheese is good or bad for teeth.

Table 4.2 Children distribution according to diet-related knowledge

Study Variables	Number	%
Total number of children	424	100
Water is bad for teeth		
No	403	95.0
Yes	21	5.0
Juice is bad for teeth		
No	203	48.0
Yes	220	52.0
Soft drinks are bad for teeth		
No	55	13.0
Yes	368	87.0
Milk is bad for teeth		
No	360	85.1
Yes	63	14.9
Coffee w/o sugar is bad for teeth		
No	80	18.9
Yes	95	22.4
Tea w/o sugar is bad for teeth		
No	117	27.6
Yes	57	13.4
Candy bar is good for teeth		
No	159	90.9
Yes	10	5.7
Does not know	6	3.4
Popcorn is good for teeth		
No	126	72.0
Yes	14	8.0
Does not know	35	20.0

(Continued) Table 4.2 Children distribution according to diet-related knowledge

Study Variables	Number	%
Nuts are good for teeth		
No	47	26.9
Yes	75	42.9
Does not know	53	30.2
Raisins are good for teeth		
No	38	22.0
Yes	93	53.4
Does not know	43	24.6
Cheese is good for teeth		
No	33	18.9
Yes	94	53.7
Does not know	48	27.4
Muffin is good for teeth		
No	76	43.4
Yes	47	26.9
Does not know	52	29.7
Ice cream is good for teeth		
No	124	70.9
Yes	23	13.1
Does not know	28	16.0
Fruits are good for teeth		
No	20	11.4
Yes	138	78.9
Does not know	17	9.7

4.1.3 Distribution of Children According to Demographic Characteristics

Table 4.3 illustrates the sample distribution according to demographic characteristics. Of all the children (n=424), 53% were boys and 47% were girls. The children were divided into three age groups; 32% were six years old, 27% were 7-8 years old and 41% were between 9 to 13 years old. The majority of children were born in Canada. Of all, around 40% of the children came from families of four family members and one third of them were from households consisting of five or more people. The assessment of a child's socio-economic status was based on the joint assessment of the following aspects: parent's employment, the child having a separate bedroom and the number of cars in the family (Table 4.3).

Table 4.3 Sample distribution according to demographic characteristics

Study Variables	**Number**	**%**
Total number of children	424	100
Gender		
Boy	226	53.3
Girl	198	46.7
Age groups		
6 years	134	31.6
7-8 years	116	27.4
9-13 years old	174	41.0
Born in Canada		
No	91	24.6
Yes	278	75.4

(Continued) Table 4.3 Sample distribution according to demographic characteristics

Ethnicity		
Aboriginal	19	8.4
Chinese	22	9.7
European	24	10.6
Filipino	47	20.8
Vietnamese	29	12.8
Indian	36	15.9
Other	49	21.7
Study Variables	**Number**	**%**
Household size		
2-3 people	115	27.4
4 people	162	38.4
≥ 5 people	144	34.2
Socio-economic status		
Father employed		
No	71	16.9
Yes	350	83.1
Mother employed		
No	111	26.3
Yes	311	73.7
Child has a separate bedroom		
No	241	56.8
Yes	183	43.2
Number of cars in a family		
No Cars	98	23.4
One Car	208	49.8
Two or more Cars	112	26.8

4.1.4 Children's Knowledge, Attitudes, Beliefs and Behaviours

Table 4.4 describes the children's answers regarding their knowledge, attitudes, beliefs and behaviours. There was a wide range of answers to the majority of inquiries with a minimum of "0%", i.e. no agreement to a maximum of "100%" denoting a complete agreement with the oral health-related lifestyle-related statement. The majority of children considered themselves to be from families of middle wealth, measured on a scale from "0%" (poorest) to the "100%" (richest) as they marked around the 50% mark. There was a strong belief among the children that brushing teeth helps to avoid cavities (mean = 90%), people who take good care of teeth do not have toothaches (mean=77%) and that people who brush their teeth have good breath (mean=78%). There was no self-reported impediment to the oral health related quality of life as the majority of children did not consider their oral health to be a problem, i.e. children did not avoid talking (mean=19%) or smiling (mean=30%) because of any problems with their teeth. However, a common erroneous belief, was found in that only 5% of the children were completely certain that one should not stop brushing if one's gums bleed.

Table 4.4 Self-reported data regarding children's knowledge, attitudes, beliefs and behaviours

Questionnaire Items	Min-Max	Mean ± SD*
Child compares own family financial status with other families	0-100	51.5±16.5
People who take good care of teeth do not have toothaches	0-100	76.8 ±26.4
Child takes good care of his/her teeth	9-100	77.1±20.9
Child takes good care of teeth so his/her mouth feels clean	0-100	74.2±27.7
Child brushes teeth because he/she wants to smell good	0-100	59.3±33.8
If a child doesn't see a dentist often, his/her teeth will rot	0-100	61.9±33.1
Child should stop brushing if gums bleed	0-100	47.7±35.5
Child brushes teeth to make parents happy	0-100	52.8±37.0
Child brushes teeth to be liked by friends	0-100	37.8±36.9
Child avoids smiling because of teeth	0-100	30.2±31.6
Child avoids talking because of teeth	0-100	18.8±28.0
There are people with good or bad teeth no matter what they do	0-100	40.6±34.6
People who brush teeth have good breath	0-100	77.6±26.5
Brushing teeth helps to avoid cavities	37-100	90.1±15.2
Brushing helps teeth from being yellow	0-100	88.2±20.9
People who brush look better	0-100	66.0±32.8
Child can avoid rotten teeth	0-100	67.3±32.9
When one tooth is rotten, the other teeth will rot too	0-100	47.3±33.3
Only a dentist can stop cavities	0-100	50.8±39.1

*** 0% most negative answers ⟷ 100% most positive answer)**

4.2 Bivariate Inferential Statistics

4.2.1 Oral-health-related Knowledge According Socio-demographic Characteristics

Table 4.5 presents information about the children's knowledge of how diet relates to oral health in relation to their socio-demographic characteristics. Overall, there were only a few significant differences. There was a statistically significant difference between the knowledge of children born in Canada as compared to children born outside Canada; the latter did not have adequate knowledge about the detrimental effect to teeth of muffins and ice cream ($P < 0.05$).

Table 4.5 Diet knowledge according socio-demographic characteristics

Demographic characteristics	Are these good for your teeth?*																							
	Candy %			Popcorn %			Nuts %			Raisins %			Cheese %			Muffins %			Ice cream %			Fruits %		
	Yes	no	dnk	yes	No	dnk	yes	no	Dnk	yes	no	dnk	Yes	no	dnk	yes	No	dnk	yes	no	dnk	yes	no	dnk
Gender																								
Boys	5.4	90.2	4.3	7.6	70.7	21.7	56.6	25.3	18.1	56.0	18.7	25.3	56.5	19.6	23.9	25.0	46.7	28.3	15.2	64.1	20.7	78.3	14.1	7.6
Girls	6.1	91.5	2.4	8.5	73.2	18.3	50.0	24.4	25.6	50.0	25.6	24.4	50.0	18.3	31.7	28.0	40.2	31.7	11.0	78.0	11.0	79.3	8.5	12.2
Chi square#	P= 0.779			P= 0.843			P= 0.535			P=0.535			P= 0.513			P= 0.690			P= 0.116			P= 0.347		
Age group																								
7-8 years	16.7	66.7	16.7	8.3	66.7	25.0	33.3	33.3	33.3	50.0	3.33	16.7	33.3	33.3	33.3	25.0	58.3	16.7	16.7	66.7	16.7	75.0	16.7	8.3
9-13 years old	4.9	92.6	2.5	8.0	72.4	19.6	43.6	26.4	30.1	53.7	21.0	25.3	55.2	17.8	27.0	27.0	42.3	30.7	12.9	71.2	16.0	79.1	11.0	9.8
Chi square	P= 0.006			P= 0.899			P= 0.774			P= 0.564			P= 0.274			P= 0.493			P= 0.924			P= 0.836		
Born in Canada																								
No	7.3	85.4	7.3	7.3	73.2	19.5	39.0	36.6	24.4	37.5	32.5	30.0	58.5	19.5	22.0	14.6	61.0	24.4	22.0	53.7	24.4	80.5	7.3	12.2
Yes	4.7	92.9	2.4	7.9	71.7	20.5	44.9	23.6	31.5	59.1	18.9	22.0	52.8	18.1	29.1	30.7	38.6	30.7	11.0	75.6	13.4	78.7	12.6	8.7
Chi square#	P= 0.258			P= 0.982			P= 0.257			P=0.051			P= 0.668			P= 0.031			P= 0.028			P= 0.554		
Ethnicity																								
Aboriginal	6.7	86.7	6.7	73.3	0.0	26.7	33.3	26.7	40.0	73.3	13.3	13.3	66.7	6.7	26.7	26.7	40.0	33.3	6.7	73.3	20.0	73.3	6.7	20.0
Chinese	0.0	100.0	0.0	75.0	18.8	6.3	75.0	12.5	12.5	75.0	25.0	0.0	62.5	12.5	25.0	25.0	50.0	25.0	12.5	87.5	0.0	87.5	12.5	0.0
European	7.7	92.3	0.0	76.9	15.4	7.7	46.2	38.5	15.4	61.5	30.8	7.7	46.2	53.8	0.0	30.8	53.8	15.4	7.7	92.3	0.0	69.2	7.7	23.1

*dnk” do not know; # Chi square or Fisher’s Exact Test

(Continued) Table 4.5 Diet knowledge according socio-demographic characteristics

Demographic characteristics	Are these good for your teeth?*																							
	Candy %			Popcorn %			Nuts %			Raisins %			Cheese %			Muffins %			Ice cream %			Fruits %		
	Yes	no	dnk	yes	No	dnk	yes	no	Dnk	yes	no	dnk	Yes	no	dnk	yes	No	dnk	yes	no	dnk	yes	no	dnk
Ethnicity																								
Filipino	2.6	94.7	2.6	71.1	5.3	23.7	34.2	23.7	42.1	28.9	28.9	42.1	50.0	15.8	34.2	23.7	44.7	31.6	10.5	71.1	18.4	84.2	7.9	7.9
Vietnamese	12.5	83.3	4.2	66.7	4.2	29.2	45.8	20.8	33.3	58.3	8.7	21.7	58.3	16.7	25.0	25.0	41.7	33.3	16.7	62.5	20.8	83.3	12.5	4.2
Indian	3.4	96.6	0.0	69.0	13.8	17.2	44.8	27.6	27.6	51.7	17.2	31.0	51.7	17.2	31.0	31.0	34.5	34.5	10.3	72.4	17.2	86.2	3.4	10.3
Other	7.5	85.0	77.5	75.0	5.0	20.0	37.5	35.0	27.5	50.0	25.0	25.0	50.0	20.0	30.0	27.5	45.0	27.5	20.0	60.0	20.0	67.5	22.5	10.0
Chi square#	P= 0.685			P= 0.502			P= 0.324			P=0.021			P= 0.193			P= 0.995			P= 0.537			P= 0.257		
Household size																								
2-3 people	10.2	79.6	10.2	10.2	61.2	28.6	49.0	30.6	20.4	55.1	28.6	16.3	55.1	22.4	22.4	26.5	44.9	28.6	12.2	73.5	14.3	77.6	16.3	6.1
4 people	3.3	95.1	1.6	8.2	72.1	19.7	37.7	36.1	26.2	53.3	21.7	25.0	59.0	18.0	23.0	32.8	42.6	24.6	16.4	73.8	9.8	78.7	9.8	11.5
≥ 5 people	4.6	95.4	0.0	6.2	80.0	13.8	43.1	15.4	41.5	52.3	16.9	30.8	47.7	16.9	35.4	21.5	43.1	35.4	10.8	66.2	23.1	80.0	9.2	10.8
Chi square	P= 0.012			P= 0.289			P= 0.029			P= 0.387			P= 0.455			P= 0.595			P= 0.320			P= 0.666		
Father works																								
No	6.7	90.0	3.3	10.0	66.7	23.3	36.7	36.7	26.7	31.0	34.5	34.5	33.3	20.0	46.7	20.0	43.3	36.7	16.7	66.7	16.7	70.0	16.7	13.3
Yes	5.6	91.0	3.5	7.6	72.9	19.4	44.4	24.3	31.3	58.3	18.8	22.9	57.6	18.8	23.6	27.8	43.8	28.5	12.5	71.5	16.0	81.3	10.4	8.3
Chi square#	P= 0.972			P= 0.781			P= 0.376			P= 0.024			P= 0.023			P= 0.569			P= 0.812			P= 0.384		

*dnk" do not know; # Chi square or Fisher's Exact Test

(Continued) Table 4.5 Diet knowledge according socio-demographic characteristics

Demographic characteristics	Are these good for your teeth?*																							
	Candy %			Popcorn %			Nuts %			Raisins %			Cheese %			Muffins %			Ice cream %			Fruits %		
	Yes	no	dnk	yes	No	dnk	yes	no	Dnk	yes	no	dnk	Yes	no	dnk	yes	No	dnk	yes	no	dnk	yes	no	dnk
Mother works																								
No	10.0	87.5	2.5	7.5	75.0	17.5	45.0	25.0	30.0	59.0	23.1	17.9	62.5	15.0	22.5	27.5	40.0	32.5	17.5	67.5	15.0	75.0	10.0	15.0
Yes	4.4	91.9	3.7	8.1	71.1	20.7	42.2	27.4	30.4	51.9	21.5	26.7	51.1	20.0	28.9	26.7	44.4	28.9	11.9	71.9	16.3	80.0	11.9	8.1
Chi square#	P= 0.394			P= 0.886			P= 0.940			P= 0.534			P= 0.446			P= 0.868			P= 0.649			P= 0.431		
Own bedroom																								
No	4.0	92.9	3.0	8.1	69.7	22.2	43.4	21.2	35.4	57.1	16.3	26.5	54.5	12.1	33.3	22.2	43.4	34.3	13.1	68.7	18.2	80.8	9.1	10.1
Yes	7.9	88.2	3.9	7.9	75.0	17.1	42.1	34.2	23.7	48.7	28.9	24.7	52.6	27.6	19.7	32.9	43.4	23.7	13.2	73.7	13.2	76.3	14.5	9.2
Chi square	P= 0.514			P= 0.693			P= 0.098			P= 0.136			P= 0.015			P= 0.177			P= 0.660			P= 0.539		
Number of cars																								
No Cars	11.8	85.3	2.9	8.8	70.6	20.6	38.2	35.3	26.5	52.9	20.6	26.5	52.9	17.6	29.4	26.5	41.2	32.4	14.7	73.5	11.8	73.5	5.9	20.6
One Car	4.5	90.9	4.5	10.2	65.9	23.9	45.5	23.9	30.7	54.0	21.8	24.1	56.8	15.9	27.3	27.3	40.9	31.8	12.5	71.6	15.9	77.3	14.8	8.0
Two or more cars	3.8	94.2	1.9	3.8	82.7	13.5	40.4	26.9	32.7	51.9	23.1	25.0	50.0	23.1	26.9	26.9	48.1	25.0	13.5	67.3	19.2	84.6	9.6	5.8

*dnk" do not know; # Chi square or Fisher's Exact Test

(Continued) Table 4.5 Diet knowledge according socio-demographic characteristics

Demographic characteristics	Are these good for your teeth?*																							
	Candy %			Popcorn %			Nuts %			Raisins %			Cheese %			Muffins %			Ice cream %			Fruits %		
	Yes	no	dnk	yes	No	dnk	yes	no	Dnk	yes	no	dnk	Yes	no	dnk	yes	No	dnk	yes	no	dnk	yes	no	dnk
Chi square#	P= 0.470			P= 0.315			P= 0.767			P= 0.998			P= 0.867			P= 0.906			P= 0.918			P= 0.111		
SES groups																								
Lowest	9.0	87.6	3.4	6.7	75.3	18.0	42.7	28.1	29.2	51.1	25.0	23.9	48.3	21.3	30.0	28.1	41.6	30.3	16.9	67.4	15.7	73.0	14.6	12.4
Middle	2.8	93.3	4.2	8.5	66.2	25.4	40.8	25.4	33.8	57.7	15.5	26.8	59.2	16.9	23.9	22.5	47.9	29.6	7.0	77.5	15.5	83.1	8.5	8.5
Highest	0.0	100	0.0	13.3	80.0	6.7	53.3	26.7	20.0	46.7	33.3	20.0	60.0	13.3	26.7	40.0	33.3	26.7	20.0	60.0	20.0	93.3	6.7	0.0
Chi square#	P= 0.344			P= 0.426			P= 0.842			P= 0.499			P= 0.689			P= 0.678			P= 0.345			P= 0.309		

*dnk" do not know; # Chi square or Fisher's Exact Test

Table 4.6 shows the children's consumption of sugar-containing drinks in relation to their socio-demographic characteristics. Only a few statistically significant differences were found; namely there was a statistically significant difference among different age groups in terms of drinking cariogenic drinks such as Coke, Pepsi or Slurpee. Around half of the 6-year-olds, one third of the 7-8 year-olds and 15% of the 9-13 years old children never drank Coke/Pepsi/Slurpee (P<001).

Regarding the frequency of drinking juice, almost half of the 6-year-olds and one third of the 7-8 years olds reported that they drank juice every day, while among 9 -13 year-old children, one out of five, drank juice everyday (P<001).

Table 4.6 Consumption of sugar-containing drinks according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing drinks									
	Coke/Pepsi/Slurpee %					Juice %				
	never	Less than once a week	1-2 times/week	3-6 times/week	everyday	never	Less than once a week	1-2 times/week	3-6 times/week	everyday
Gender										
Boys	32.2	30.5	24.2	7.2	5.9	6.3	16.0	26.9	15.1	35.7
Girls	33.5	36.4	21.1	5.3	3.8	7.7	15.8	28.2	20.1	28.2
Chi square#	P= 0.505					P= 0.423				
Age group										
6 years	52.6	18.0	16.5	6.8	6.0	8.2	7.5	20.9	17.2	46.3
7-8 years	34.5	30.2	25.0	6.0	4.3	6.0	14.7	34.5	13.8	31.0
9-13 years old	15.0	47.4	26.6	6.9	4.0	6.3	24.1	30.5	19.0	20.1
Chi square	P<001					P<001				
Born in Canada										
No	33.3	31.2	21.5	10.8	3.2	6.3	14.7	25.3	22.1	31.0
Yes	31.6	34.2	23.0	5.6	5.6	5.9	17.4	29.3	16.1	31.3
Chi square#	P= 0.417					P= 0.694				

(Continued) Table 4.6 Consumption of sugar-containing drinks according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing drinks									
	Coke/Pepsi/Slurpee %					Juice %				
	never	Less than once a week	1-2 times/week	3-6 times/week	everyday	never	Less than once a week	1-2 times/week	3-6 times/week	everyday
Ethnicity										
Aboriginal	41.5	17.1	24.4	14.6	2.4	4.9	17.1	22.0	17.1	39.0
Chinese	30.6	36.7	20.4	4.1	8.2	12.2	14.3	32.7	12.2	28.6
European	40.8	32.4	12.7	7.0	7.0	8.3	18.1	19.4	19.4	34.7
Filipino	33.7	30.6	29.6	2.0	4.1	6.1	19.4	31.6	14.3	28.6
Vietnamese	21.7	41.7	20.0	11.7	5.0	10.0	11.7	25.0	15.0	38.3
Indian	32.7	26.9	25.0	7.7	7.7	3.8	5.8	28.8	21.2	40.4
Other	29.9	40.3	24.7	3.9	1.3	3.8	19.2	32.1	21.8	23.1
Chi square#	P= 0.090					P= 0.525				

Chi square or Fisher's Exact Test

(Continued) Table 4.6 Consumption of sugar-containing drinks according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing drinks									
	Coke/Pepsi/Slurpee %					Juice %				
	Never	< once a week	1-2 times/week	3-6 times/week	everyday	never	< once a week	1-2 times/week	3-6 times/week	everyday
Household size										
2-3 people	36.1	29.5	23.0	7.4	4.1	7.3	17.1	30.1	14.6	30.9
4 people	34.7	34.7	21.0	5.7	4.0	5.7	16.5	22.7	19.3	35.8
≥ 5 people	28.1	34.0	24.8	6.5	6.5	7.8	13.6	32.5	16.9	29.2
Chi square#	P= 0.819					P= 0.604				
Father works										
No	37.5	37.5	15.3	6.9	2.8	4.2	19.4	29.2	12.5	34.7
Yes	31.4	32.2	24.7	6.4	5.4	7.2	14.9	28.0	18.4	31.5
Chi square#	P= 0.360					P= 0.550				
Mother works										
No	33.9	36.4	16.5	6.6	6.6	5.0	17.4	21.5	20.7	35.5
Yes	32.1	32.1	25.1	6.4	4.3	7.3	15.2	30.4	16.1	31.0
Chi square#	P= 0.357					P= 0.276				

(Continued) Table 4.6 Consumption of sugar-containing drinks according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing drinks									
	Coke/Pepsi/Slurpee %					Juice %				
	Never	< once a week	1-2 times/week	3-6 times/week	everyday	never	< once a week	1-2 times/week	3-6 times/week	everyday
Own bedroom										
No	33.2	35.5	20.3	6.6	4.3	6.2	16.3	27.2	17.5	32.7
Yes	32.3	29.7	26.2	6.2	5.6	7.7	14.8	29.1	16.8	31.6
Chi square#	P= 0.515					P= 0.951				
Number of cars										
No Cars	35.5	31.8	21.8	9.1	1.8	9.1	14.5	26.4	17.3	32.7
1 Car	31.7	32.6	22.2	6.8	6.8	3.6	18.5	25.7	18.5	33.8
≥ 2 cars	32.8	34.5	25.0	3.4	4.3	10.3	11.1	35.0	15.4	28.2
Chi square#	P= 0.492					P= 0.117				
SES groups										
Lowest	34.4	33.6	20.6	6.5	5.0	6.8	15.6	26.6	18.3	32.7
Middle	32.5	30.5	27.2	5.3	4.6	7.9	14.5	31.6	15.1	30.9
Highest	23.7	39.5	21.1	10.5	5.3	2.6	21.1	23.7	18.4	34.2
Chi square#	P= 0.742					P= 0.864				

Table 4.7 shows the pattern of sugar-containing food consumption (candies, chocolate, sweets, cookies, cakes or muffins) according to socio-demographic characteristics. There were no statistically significant differences among different age or SES groups except for the consumption of sugar-containing foods, e.g. one out of five six year-old children ate candies, chocolate or sweets on an everyday basis, while this percentage decreased in 7-8 year olds and only a few 9-13 year-old children ate these sugar-containing items every day (P<001). A similar pattern was observed when children were asked about the frequency of eating cookies, cakes or muffins (P<001).

Table 4.7 Consumption of sugar-containing food items according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing food items									
	Candies/chocolates/sweets %					Cookies/cakes/muffins %				
	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday
Gender										
Boys	8.1	27.7	33.6	16.2	14.5	11.4	39.2	27.8	13.9	7.6
Girls	7.7	28.4	40.4	13.0	10.6	9.6	37.3	30.1	11.5	11.5
Chi square#	P= 0.478					P= 0.565				
Age group										
6 years	10.7	15.3	41.2	10.7	22.1	14.3	22.6	29.3	12.8	21.1
7-8 years	7.8	31.0	30.2	14.7	16.4	11.2	37.1	27.6	17.2	6.9
9-13 years old	4.6	35.8	38.2	18.5	2.9	6.9	53.4	27.0	10.3	2.3
Chi square	P<001					P<001				
Born in Canada										
No	5.3	26.6	33.0	20.2	14.9	7.4	34.0	31.9	19.1	7.4
Yes	8.6	30.6	37.2	12.3	11.3	11.2	41.8	27.3	10.9	8.9
Chi square#	P= 0.225					P= 0.158				

Chi square or Fisher's Exact Test

(Continued) Table 4.7 Consumption of sugar-containing food items according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing food items									
	Candies/chocolates/sweets %					Cookies/cakes/muffins %				
	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday
Ethnicity										
Aboriginal	4.9	19.5	48.8	7.3	19.5	7.3	26.8	48.8	7.3	9.8
Chinese	14.9	23.4	34.0	12.8	14.9	16.3	38.8	26.5	6.1	12.2
European	14.1	16.9	42.3	12.7	14.1	15.5	35.2	22.5	12.7	14.1
Filipino	5.1	36.7	29.6	15.3	13.3	9.2	33.7	33.7	14.3	9.2
Vietnamese	3.3	28.3	35.0	21.7	11.7	6.7	43.3	30.0	15.0	5.0
Indian	1.9	28.8	44.2	9.6	15.4	11.5	38.5	23.1	21.2	5.8
Other	10.4	32.5	32.5	18.2	6.5	9.0	47.4	21.8	11.5	10.3
Chi square#	P= 0.070					P= 0.238				
Household size										
2-3 people	7.4	27.0	28.7	20.5	16.4	11.4	31.7	30.9	14.6	11.4
4 people	5.7	26.4	42.0	12.1	13.8	9.7	38.1	30.7	10.8	10.8
≥ 5 people	10.5	29.4	37.3	13.7	9.2	11.1	43.1	24.8	14.4	6.5
Chi square#	P= 0.125					P= 0.521				

Chi square or Fisher's Exact Test

(Continued) Table 4.7 Consumption of sugar-containing food items according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing food items									
	Candies/chocolates/sweets (%)					Cookies/cakes/muffins (%)				
	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday
Father works										
No	9.7	33.3	26.4	16.7	13.9	12.5	45.8	26.4	8.3	6.9
Yes	7.3	26.4	39.4	14.3	12.7	10.2	36.9	28.9	13.9	10.2
Chi square#	P= 0.338					P= 0.435				
Mother works										
No	8.4	27.7	38.7	10.1	15.1	14.0	34.7	28.1	13.2	9.9
Yes	7.6	27.8	35.8	16.5	12.2	9.1	39.3	29.0	13.1	9.5
Chi square#	P= 0.515					P= 0.632				
Own bedroom										
No	9.5	28.9	35.6	15.0	11.1	11.3	39.1	28.1	12.5	9.0
Yes	5.6	26.0	38.3	14.8	15.3	9.7	36.7	29.6	13.8	10.2
Chi square#	P= 0.379					P= 0.934				

Chi square or Fisher's Exact Test

(Continued) Table 4.7 Consumption of sugar-containing food items according to socio-demographic characteristics

Demographic characteristics	Consumption of sugar-containing food items									
	Candies/chocolates/sweets (%)					Cookies/cakes/muffins (%)				
	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday	Never	< Once a week	1-2 times a week	3-6 times a week	Everyday
Number of cars										
No Cars	10.1	24.8	33.9	19.3	11.9	10.9	32.7	34.5	15.5	6.4
One Car	6.4	25.6	39.7	11.9	16.4	11.8	33.5	28.1	14.9	11.8
Two or more cars	8.5	34.2	34.2	16.2	6.8	6.8	51.3	25.6	7.7	8.5
Chi square#	P= 0.103					P= 0.030				
SES groups										
Lowest	9.3	29.3	31.3	13.9	16.2	12.2	34.7	29.0	13.7	10.3
Middle	6.6	25.7	46.7	12.5	8.6	9.9	40.1	28.3	12.5	9.2
Highest	2.6	23.7	34.2	31.6	7.9	2.6	52.6	28.9	10.5	5.3
Chi square#	P= 0.004					P= 0.506				

Chi square or Fisher's Exact Test

4.2.2 Oral-health Knowledge – Comparisons Between Boys and Girls

Table 4.8 illustrates the distribution of boys and girls according to their knowledge about different food items. As we can see in the table, there were no significant differences in terms of diet knowledge between the two genders.

Table 4.8 Diet knowledge –comparisons between boys and girls

Good for teeth	Boys (%)			Girls (%)			P values #
	yes	no	dnk*	Yes	no	dnk	
Candy bar	5	90	4	6	92	2	0.779
Raisins	56	19	25	50	26	24	0.535
Pop corn	8	70	22	8	74	18	0.843
Nuts	48	28	31	45	24	31	0.822
Cheese	56	20	24	50	18	32	0.513
Muffins	25	47	28	28	40	32	0.690
Ice cream	15	64	21	11	78	11	0.116
Fruits	78	14	8	79	8	13	0.347

Chi square or Fisher's Exact Test, *dnk: does not know

4.2.3 Oral Health-related Behaviour – Comparisons Between Boys and Girls

It is apparent from Tables 4.6 and 4.7 that there were no significant differences between the two genders in terms of the frequency of consumption of sweets, snacks and soft drinks. Table 4.9 presents a comparison of oral hygiene practices between boys and girls. There were no statistically significant differences in tooth brushing frequency between the two genders, but girls cleaned between their teeth more frequently than boys (P=0.033).

Table 4.9 Oral self-care – comparisons between boys and girls

Gender	**Oral self-care**						
	Frequency of tooth brushing				**Interdental cleaning**		
	not every day	**once a day**	**≥twice a day**	**after every meal**	**no**	**yes ,sometimes**	**yes, always**
Boys	5.4	25.0	68.5	1.1	4.3	67.4	28.3
Girls	7.3	20.7	64.6	7.3	0	42.7	57.3
#Chi square	P=0.182				P= 0.033		

Chi square or Fisher's Exact Test

Chapter 5. Discussion

5.1 Main Study Findings and Their Comparison with Other Studies

Oral health disparities in Canada are of great concern (Lawrence et al., 2009). Therefore it is important to consider the present findings in the context of social determinants of oral health. The systematic review by Reisine and Psoter (2001) concluded that that young children from low socio-economic families are at greater risk for dental caries. The role of behaviours and their contribution to oral health disparities should be considered. Individualistic approach, i.e. focusing on changing individual behaviours without considering the social environment/determinants may even increase health disparities (Marmot & Bell, 2011). Therefore we should tailor our preventive actions targeting social environments (families, peer groups, schools) where these behaviours occur (Marmot & Bell, 2011). Cultural beliefs and behaviours have been associated with oral health disparities (Butani et al., 2008). Given the multi-ethnic nature of the inner-city community it is also important to consider the potential differences among diverse cultural groups as their oral health-related behaviours may differ.

As it relates to establishment of healthy diet, it is important to take into account the possibilities of low-income families, i.e. these families have limited financial and material resources that may hinder them to make healthy diet choices. Demographic research in inner-city Vancouver found out that this vulnerable community has multiple areas of disadvantage (Lynam JM et al, 2011). On the other hand, the social school environment can be used to support healthy eating patterns by providing subsidies for healthy snacks and drinks in school areas (Hashim, et al. 2009).

The present cross-sectional study is the first study about oral health-related lifestyle in elementary school-aged children from inner city Vancouver. The total sample size comprised 424 children, among which 53% were boys and 47% were girls. All lifestyle-related information was collected by means of a self-administered structured questionnaire. The questions used for the present study have been validated in previous studies (Harikiran et al, 2008; Smyth 2007; Poutanen et al, 2007; Zhu L & Petersen P.E, 2003).

A school-based approach for collecting data about the children was chosen and we expected to acquire a high response rate. However, the 52% response rate achieved in the present study is relatively low despite the multiple attempts used to recruit participants. The relatively low response rate might at least partly be explained by the teacher's long-term job action, which coincided with the time the study was performed. As parental/guardian consents were necessary, the teachers' job action and their unwillingness to assist in any extracurricular activities possibly led to lower response rates.

The present study found that the majority of children did not consider their dental health to be a problem or to affect their quality of life in any way, i.e. most of the children responded that they did not avoid talking or smiling because of problems with their teeth. The present finding is not in accordance to similar studies performed in children, which reported having a lack of oral health influencing an oral health-related quality of life (Harikiran et al., 2008; Petersen et al. 2001; Varenne et al., 2006). However, these differences in oral health-related quality of life among children from different countries should be interpreted with caution mainly due to differences in the quality of life related measurements employed in these studies.

Although a number of oral health–related lifestyle aspects were assessed, none related to socio-demographic characteristics (gender, age, ethnicity, SES groups), i.e. there were no gender or socioeconomic differences in knowledge, attitudes or beliefs and only a few statistically significant associations were found. For example, older children as compared to younger ones tended to have better knowledge and more positive health behaviours. Given that only a few socio-demographic differences were found among inner city Vancouver elementary school-aged children, i.e. no distinct high risk groups based on socio-demographic characteristics could be identified, the whole cohort of inner city school-aged children should be considered as a high-risk subpopulation.

Two main approaches, namely a high-risk and a population-based strategy, have been suggested for health promotion in populations. The high-risk strategy focuses only on individuals who are considered to be at high risk for a specific disease. Consequently, the aim of a high-risk prevention strategy is to limit all prevention-based activities to the individuals who are considered to be at the highest risk without interfering with the rest of the population. This high-risk strategy is cost-effective for populations where the highest burden of a disease is found in only a small proportion of the population., When no distinct high-risk groups can be identified and the whole population or subpopulation carries a similar burden of a specific disease or the whole population/subpopulation presents with similar deficiencies in their health-related lifestyles, a population-based approach to health promotion is more relevant. The population-based prevention strategy focuses on the whole population, i.e. preventive activities are tailored to all, as opposed to addressing only the needs of high-risk groups in any given population (Rose G, 1992).

The present findings showed that there was a lack of adequate oral health-related knowledge, attitudes and beliefs in the whole cohort of inner city Vancouver elementary school-aged children. Thus the cohort of inner city Vancouver children should be considered as a subpopulation on which a population-based strategy for oral health promotion should be focused. The present findings identifying specific deficiencies in children's knowledge, attitudes, beliefs or behaviours could form the basis for future preventive activities in this population.

Overall, the children had insufficient or inadequate diet knowledge i.e. they did not know what is good and what is bad for their teeth. For example, almost half of the children either considered cheese and nuts to be bad or did not know that cheese and nuts are two healthy snacks despite that cheese and nuts are commonly recommended by dental professionals as healthy snacks (Tinanoff & Palmer, 2000). Similarly, popcorn has been categorized as a non-cariogenic food item (Tinanoff & Palmer, 2000), but only 8% of children reported popcorn to be good for their teeth, while the majority of them (92%) reported it as being either bad for their teeth or they did not know whether it is good or bad for their teeth.

Approximately half of the children did not know that drinking juice or eating raisins or muffins are detrimental to teeth. This finding is in contrast to the study by Al-Omiri et al, 2006, showed that the majority of children considered sweets and soft drinks bad for dental health. Our study results supported the findings of a previous study done by Lian et al.,(2010) which reported that carbonated drinks was most favorable among the respondents and the majority (77%) of the secondary school students in the study claimed they drink carbonated drinks and 26.3% have it at least once per day (Lian et al, 2010).

Obviously, a substantial proportion of Vancouver inner-city elementary school-aged children lack or have inadequate knowledge of what constitutes a good oral health lifestyle. It is important to consider that modifying the knowledge or behaviours of children who lack knowledge ("do not know") is easier than modifying the behaviours of children who already acquired inadequate knowledge ("wrong" answers).

Having inadequate knowledge leads to inappropriate behaviours, and subsequently this contributes to deterioration of dental health. For example, a commonly found belief among children is that they should stop brushing their teeth if their gums bleed. This inadequate belief is detrimental as the opposite is true, i.e. if gums show signs of bleeding; children should brush effectively as their bleeding gums indicate that tooth brushing is insufficient or inadequate. Perhaps, the children have acquired this erroneous belief from their parents, despite that bleeding gums, particularly in children, indicates deficient oral hygiene and these children should brush their teeth properly, to prevent their gums bleeding in the future.

The way in which children practice oral hygiene at home is important, as oral self-care should be established as a habit in order to retain healthy teeth. The present study showed that regular tooth brushing was already established as a habit in the majority of the children examined; as nine out of ten children reported that they brush their teeth at least once a day and only a small proportion of the children reported that they did not brush their teeth daily. However, interdental cleaning does not seem to be a common habit among inner city Vancouver elementary school-aged children. The present study showed a significant difference in cleaning between the teeth among two genders (P= 0.033); which supported the finding of a previous study (Ahmed et al., 2007). Regarding cleaning between teeth, 34% of children reported always cleaning between their teeth which is a substantially higher

percentage compared to the Harikiran et al., (2008) study that reported that only 5% of school children used dental floss for cleaning their teeth. This obvious disagreement in findings between the two studies may be explained by the difference in how children were asked about their interdental cleaning. The present study asked if children clean between their teeth or not, but there was no inquiry about how this interdental cleaning was actually performed. Possibly children from the present study considered cleaning between teeth as part of regular tooth brushing but not as an additional oral self-care activity involving dental floss. Future studies are needed in order to understand how and if the interdental cleaning is performed in the cohort of Vancouver inner city school-aged children.

The parents' support for establishing health-promoting habits in their children is of key importance for maintaining good health in the long term (Poutanen et al, 2006). However, only 37% of children in the present study reported that their parents or other family members monitored their brushing, i.e. 63% brushed their teeth on their own without any support or supervision from their parents. The same trend was seen in a study by Al-Omiri et al, 2006, which reported that only 26% of the children were watched by their parents while brushing. Although children of this age try to be independent and are willing to perform their daily care without a family member's interference, we should keep in mind that parents' failure to support their child's oral self-care could result in inadequate oral self-care, and consequently poor oral health.

Of all, 83% of the children stated that their parents had shown them how to brush. This percentage may be over-reported due to social desirability, i.e. the children may have wanted to present their parents in a more positive light. In a study done by Varenne et al., (2006) a substantial proportion of children (48%) reported their parents as their first source

of dental health information and only 4% of children mentioned their dentist as a source of information. A lack of guidance from dentists regarding oral health self-care was also found in the present study. Seemingly, family members represent the primary source of information for their children about oral health, thus one way to raise children's oral health awareness would be to educate parents/guardians about oral health and subsequently focus on the parental responsibility for children's oral health.

However, reaching parents of children may be a challenge as the present study showed a relatively low level of parental interest, e.g. only 15% of parental questionnaires were returned. Other medical studies have also identified a similar challenge and also reported a relatively low level of parental involvement (Bullen et al., 1988; Kerebel et al., 1985).

For maintaining healthy teeth in children, parental support is very important, as it is parents who are responsible for meals and snacks. In addition, the benefits of the available school infrastructure should be utilized, i.e. the school environment can offer a health - supportive environment where children can acquire and subsequently bring home health-related information. For example, the school staff with the help of health educators could develop and send home healthy meal menu plans to help improve diet at home. In addition, the school staff may work with nutrition experts to develop a healthy school lunch menu (including snacks available in school). This effort, together with a strong parental support, may facilitate the development of healthy-eating patterns among children that could be carried into their adult lives.

The importance of professional help should not be underestimated. There was a clear lack of professional help, at least in terms of assisting with the maintenance of healthy teeth; the majority of the children (67%) in the present study reported that their dentist did not explain how the children should to take care of their teeth. A lack of professional guidance has been

also reported in other studies e.g. high numbers of children reported that they have never received oral health care instructions from their dentists (Al-Omiri et al, 2006, Zhu et al, 2003). Thus an important recommendation for dentists is that they include professional guidance on oral self-care as part of a patient's routine dental appointment.

5.1 Advantages and Limitations of The Study

Limitations and advantages of the present study have to be considered. In order to decrease the potential inter-examiner disagreement, only one calibrated examiner was assisting children in completing the questionnaires and teachers were not allowed to help. Given that lifestyle was self-reported, some information may be under or overestimated. With regards to dental knowledge and oral hygiene habits, over-reporting may be expected, while the consumption of sugar-containing foods and drinks may be under-reported, both type of potential measurement bias mainly might occur due to social desirability. However, as questionnaires were completed anonymously, the social desirability should be minimal, as respondents had no reason to answer in a socially desirable way.

In order to adjust for the developmental stage of the children, questionnaires were pretested for readability and comprehension. Except for a few items, which were subsequently revised, the pilot study showed that the questionnaire items were written in a language that was understood by even the youngest subjects. Therefore, we did not expect bias to be caused by lack of comprehension.

Another limitation is the relatively low response rate (52%). However, even this response rate was achieved after multiple attempts to recruit subjects for the study. The parental

consent form included a paragraph where parents refusing to participate in the study could write a reason for their refusal. The most common reason for refusal to participate was that parents had their own dentist, thus they were not motivated to have their children enrolled in the present study. In order to increase the response rate, future studies should consider the recruitment of children assisted by local community members e.g. youth and or social workers. Community members will be helpful as they know their community values better than health professional workers.

Another limitation of the present study is the cross-sectional nature of its study design, which does not allow for inferences of causal associations. Given that the present study aimed to examine patterns of oral health-related lifestyle in an inner city children age cohort, but not to relate lifestyle variables with the children's dental health, the limitation to infer causally is not of substantial importance or relevance. For studies aiming to explore causal associations between lifestyle and dental health, longitudinal study designs should be recommended, as these will enable researchers to study causal relationships and long-term consequences of lifestyle factors to dental health.

5.2 Implications of The Present Study

Health promotion has been defined as "*the process of enabling people to increase control over and to improve their health*" (WHO, 1986). An important part of health promotion is education, including information, motivation, and training skills (WHO, 1999). Health education is a prerequisite for healthy choices and behaviour, and for enabling self-care (Glanz et al., 2010). The present study provides the necessary information for a needs-based

oral health promotion program in inner city Vancouver as the study mapped the oral health-related lifestyle of inner city school-aged children. Consequently, the present study provides the basis for education of future dental professionals regarding the needs of their future patients, as well as for community-based oral health education.

Understanding attitudinal and other lifestyle factors that underlie school-aged children's decisions about maintaining oral health is of key importance (Kida & Astrom, 1998). Motivating children to avoid frequent daily intake of sugar-containing foods or drinks and to engage them in quality oral self-care, as well as to increase their understanding of decision-making in the domain of food choices, should be used to guide the development of future educational programs tailoring school-aged children.

The present study also lays the basis for future comparisons where lifestyle factors can be monitored as time trends, i.e. the present study findings provide the baseline data for future studies. The baseline data is also necessary for development and subsequent monitoring of oral health promotion programs in this cohort of inner city school-aged children. The present data also offers important information for policy makers and or health educators aiming to prevent lifestyle related diseases. In order to maintain healthy teeth long-term, oral health education programs should be reinforced to promote oral health care as a lifelong practice. Certainly, the support from the parents and school for children in this process is crucial.

5.3 Conclusions

The cohort of inner city Vancouver children should be considered as a population of risk as any distinct socioeconomic or demographic differences among children in lifestyle factors were not found. Oral health-related knowledge, attitudes and behaviours among elementary school-aged children in inner city Vancouver areas is deficient, thus awareness about oral health in this cohort of children needs to be improved. The oral health care workers serving this population did not provide guidance to facilitate the establishment of good oral health behaviours.

References

Ahmed N, Åstrøm AN, and Skaug N. Dental caries prevalence and risk factors among 12-year old schoolchildren from Baghdad, Iraq. International dental Journal, 2007; 57:36-44.

Aleksejuniene J, Holst D, Grytten JI, Eriksen HM. Causal patterns of dental health in populations. Caries Res 2002; 36: 233-240.

Al-Omiri, Mahmoud K., Ahed M. Al-Wahadni, and Khaled N. Saeed. "Oral health attitudes, knowledge, and behavior among school children in North Jordan." Journal of Dental Education 70.2 (2006): 179-187.

Australian Research Centre for Population Oral Health, the University of Adelaide, South Australia. Oral health and access to dental care in Australia, comparisons by level of education. Aust Dent J 2006; 51: 342–345.

Bandura A. Social Foundations of Thought and Action: a Social Cognitive Theory. Englewood Cliffs, New Jersey: Prentice Hall, 1986.

Beal JF. Social factors and preventive dentistry. In: Murray J, editor. The prevention of dental disease. Oxford: Oxford Medical Publications; 1989: 373–405.

Bedi R, Lewsey J D, Gilthorpe M S. Changes in oral health over ten years among UK children aged 4-5 years living in a deprived multiethnic area. Br Dent J 2000; 189: 88-92.

Berkman HW & Gilson CC .Consumer Behavior: Concepts and Strategies, Encino, CA: Dickenson Publishing Co., 1978.

Blinkhorn AS.Dental preventive advice for pregnant and nursing mothers – sociological implications. International Dental Journal 1981; 31: 14–22.

Bruno-Ambrosius K, Swanholm G, Twetman S. Eating habits, smoking and tooth brushing in relation to dental caries: a 3-year study in Swedish female teenagers. Int J Paediatr Dent 2005; 15:190-196.

Bullen C, Rubenstein L, Saravia ME, Mourino AP. Improving children's oral hygiene through parental involvement. ASDC J Dent Child 1988; 55:125-128.

Butani Y, Weintraub JA, and BarkerJC. "Oral health-related cultural beliefs for four racial/ethnic groups: assessment of the literature." BMC Oral Health 2008; 8(1): 26.

Canadian International Development Agency. An urbanizing world — statement on sustainable cities. Ottawa: Public Works and Government Services Canada; 1998.

Carneiro L, Kabulwa M, Makyao M, Mrosso G, and Choum R, "Oral Health Knowledge and Practices of Secondary School Students, Tanga, Tanzania," International Journal of Dentistry. 2011; 2011:1-6.

Christensen P. The health-promoting family: a conceptual framework for future research. Soc Sci Med 2004; 59: 377- 87.

Cialdini R, Maner J, Gerend M. Persuasion. In: Kerr J, Weitkund R, Moretti M, eds. ABC of behaviour change. Oxford, UK: Elsevier, 2005; 247–258.

Cockerham WC. Health lifestyle theory and the convergence of agency and structure. J. Health Soc. Behav 2005; 46:51–67.

Currie C. Health Behaviour in School-Aged Children: a WHO cross-national survey (HBSC). Research protocol for the 1997/98 survey. Edinburgh: Research Unit in Health and Behavioural Change, University of Edinburgh; 1998.

Currie, C. E., Elton, R. A., Todd, J., & Platt, S. Indicators of socioeconomic status for adolescents: the WHO Health Behaviour in School-aged Children Survey. Health Education Research 1997; 12(3), 385-397.

Candace Currie , Michal Molcho , William Boyce , Bjørn Holstein , Torbjørn Torsheim , Matthias Richter.Researching health inequalities in adolescents: The development of the Health Behaviour in School-Aged Children (HBSC), Family Affluence Scale. Social Science & Medicine 2008; 66:1429-1436.

Cutler DM, Lleras-Muney A. Education and health: evaluating theories and evidence in making americans healthier. New York 2008; 29-60.

Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health. Copenhagen, WHO/Regional Office for Europe, 1992.

Dahlgren G. European Health Policy Conference: opportunities for the future. Copenhagen, WHO/Regional Office for Europe, 1995.

Daly B, Watt R, Batchelor P, Treasure E. Essential Dental Public Health. Oxford: Oxford University Press, 2002.

Darout IA, Åstrøm AN, Skaug N. Knowledge and behaviour related to oral health among secondary school students in Khartoum Province, Sudan. Int Dent J 2005; 55:224-230.

David J, Åstrøm AN, Wang NJ. Prevalence and correlates of self-reported state of teeth among school children in Kerala, India. BMC Oral Health, 2006; 6-10.

Declerck D .Oral health of adolescents, A challenge for the dentist; Dental School, Catholic University Leuven. Präv Gesundheitsf, 2009 ; 4:135–139.

Due, P., Holstein, BE, Lynch J., Diderichsen F., Gabhain, S. N., Scheidt, P., & Currie, C. Bullying and symptoms among school-aged children: international comparative cross sectional study in 28 countries. European Journal of Public Health, 2005; 15, 128–132.

Durward CS, Wright FAC: Dental knowledge, attitudes, and behaviors of Indo- Chinese and Australian-born adolescents. Community Dent Oral Epidemiol 1989; 17; 14-8.

Eaton, L., Flisher, A. J. & Aarø, L. E. Unsafe sexual behavior in South African youth. In Djamba, Y. K. (Ed.). Sexual behavior of adolescents in contemprary sub-Saharan Africa. Lewiston, New York, 2004. P: 65–109.

Elliott, D S. Health enhancing and health-compromising lifestyle, promoting the health of adolescents. New directions for the twenty-first century. New York: Oxford University Press; 1993,119–45.

Ember M, Ember CR: Countries and their cultures. Farmington Hills: Macmillan Library; 2001.

Eriksen HM, Dimitrov V, Rohlin M, Petersson K, Svensater G. The oral ecosystem: implications for education. Eur J Dent Educ 2006; 10:192-196

Fisher-Owens S A, Isong I A, Soobader M, Gansky S A, Weintraub J A, Platt L J. Newacheck P W. An examination of racial/ethnic disparities in children's oral health in the United States. Journal of Public Health Dentistry; 2012:1-9.

Freeman R, Maizels J, Wyllie M and Sheiham A. The relationship between health-related knowledge, attitudes and dental health behaviours in 14–16-year-old adolescents Community Dent Health. 1993, 10:397-404.

Fukuda, H., Shinsho, F., Shigemasa, A., & Saito, T. Relationships between dental health behaviour of japanese school children and their parents. Int Dent J 2011; 57(5), 319-323.

Glanz, K., & Saelens, B. E. Relevant health education and health promotion theory for childhood obesity prevention. Childhood Obesity Prevention: International Research, Controversies, and Interventions 2010; 203.

Gould M. Snapshot survey reveals huge task of improving ethnic health. 2001.HSJOnLine.

Guarnizo-Herreno C C , Wehby G L. Children's Dental Health, School Performance, and Psychosocial Well-Being. The Journal of Pediatrics 2012; In- Press.

Hamilton ME & Coulby WM. Oral Health Knowledge and Habits of Senior Elementary School Students.Journal of public Health Dentistry1991; 51(4):212-19.

Harikiran AG, Pallavi SK, Hariprakash S, Ashutosh, Nagesh KS. Oral health-related KAP among 11- to 12-year-old school children in a government-aided missionary school of Bangalore city. Indian J Dent Res 2008; 19: 236-42.

Hashim, Raghad, Sheila M. Williams, and Williams Murray Thomson. "Diet and caries experience among preschool children in Ajman, United Arab Emirates." European Journal of Oral Sciences 2009; 117 (6); 734-740.

Heft MW,Gilbert GH. Relationship of dental status, sociodemographic status, and oral symptoms to perceived need for dental care. Community Dent Oral Epidemiol 2003; 31: 351-60.

Hietasalo, P., Lahti, S., Tolvanen, M., Niinimaa, A., Seppä, L., & Hausen, H. Children's oral health-related knowledge, attitudes and beliefs as predictors of success in caries control during a 3.4-year randomized clinical trial. Acta Odontologica Scandinavica 2012, 70(4): 323-330.

Hietasalo P, Tolvanen M, Seppa¨ L, Lahti S, Poutanen R, Niinimaa A, Hausen H. Oral health-related behaviors predictive of failures in caries control among 11–12-yr-old Finnish schoolchildren. Eur J Oral Sci 2008; 116: 267–271.

Hilton IV, Stephen S, Barker JC, Weintraub JA: Cultural factors and children's oral health care: a qualitative study of carers of young children. Community Dent Oral Epidemiol 2007; 35(6):429-438.

Hjern A, Grindefjord M, Sundberg H, Rose´n M: Social inequality in oral health and use of dental care in Sweden. Community Dent Oral Epidemiol, 2001; 29: 167–74.

Honkala E. Oral health promotion with children and adolescents.In: Schou L, Blinkhorn A, editors. Oral health promotion.New York: Oxford University Press; 1993: 169–87.

Honkala S, Honkala E, Al-Sahli N. Do life- and school- satisfaction and self-esteem indicators explain the oral hygiene habits of schoolchildren? Community Dent Oral Epidemiol 2007; 35: 337-347.

Honkala E, Paronen O, Rimpelam A. Familial aggregation use of dental floss among adolescents in Finland. J Pedodont, 1983; 7:276–89.

Hooley, M., Skouteris, H., Boganin, C., Satur, J., & Kilpatrick, N. Parental Influence and the Development of Dental Caries in Children Aged 0-6 Years: A Systematic Review of the Literature. Journal of Dentistry 2012; 40: 873–885.

Houghton Mifflin .The American Heritage New Dictionary of Cultural Literacy, Third Edition. Company, 2005.

Hupkens CL, Knibbe RA, Otterloob AH and Drop MJ. Class differences in the food rules mothers impose on their children: a cross-national study .Socila science & Medicine 1998; 47: 1331-1339.

Hwang EI: Oral Health Disparities in Rural US Children. 2008; University of Pittsburgh.Thesis.

Inchley, J., Todd, J., Bryce, C., & Currie, C. Dietary trends among Scottish schoolchildren in the 1990s. Journal of Human Nutrition and Dietetics 2001; 14(3), 207-216.

Irvin, C. E.Jr. The theoretical concept of at-risk adolescents. Adolescent Medicine: State of the Art Reviews 1990; 1, 1–14.

Jimenez, R., Tapias- Ledesma, M. A., Gallardo- Pino, C., Carrasco, P., & Miguel, Á. G. Influence of sociodemographic variables on use of dental services, oral health and oral hygiene among Spanish children. International dental journal 2011; 54(4), 187-192.

Joshi N, Rajesh R and Sunitha M. Prevalence of dental caries among school children in Kulasekharam village: A correlated prevalence survey. 2005, J Indian Soc Pedod Prev Dent, 23(3): 138- 140.

Källestål C, Dahlgren L, Stenlund H. Oral health behavior and self-esteem in Swedish children. Soc Sci Med 2000; 51:1841–9.

Källestål C, Wall S. Socio-economic effect on caries. Incidence data among Swedish 12–14-year-olds. Community Dent Oral Epidemiol 2002; 30: 108–14.

Kelder SH, Perry CL, Klepp KI, Lytlle LL. Longitudinal tracking of adolescent smoking, physical activity and food choice behaviors. Am J Public Health 1994; 84:1121–6.

Kent G, Croucher R. Achieving oral health, the social context of dental care. London: Butterworth- Heinemann. 1998; 6–23.

Kerebel LM, Le Cabellec MT, Kerebel B, Daculsi G. Effect of motivation on the oral health of French schoolchildren. ASDC J Dent Child 1985; 52:287-292.

Kida, I & Åstrom N. Correlates of the Intention to Avoid Intake of Sugared Snacks Among Tanzanian Adolescents. Journal of Gender, Culture, and Health 1998; 3, (3).

Koerber, A., Graumlich, S., Punwani, I. C., Berbaum, M. L., Burns, J. L., Levy, S. R., Cowell, J. M. & Flay, B. R. Covariates of tooth-brushing frequency in low-income African Americans from grades 5 to 8. Pediatric Dentistry 2006; 28, 524–530.

Kuusela S, Honkala E, Rimpelä A, Karvonen S, Rimpelä M . Trends in tooth brushing frequency among Finnish adolescents between 1977 and 1995. Community Dent Health 1997a; 14:84-88.

Kuusela S, Honkala E, Kannas L, Tynjälä J, Wold B. Oral hygiene habits of 11-year-old schoolchildren in 22 European countries and Canada in 1993/1994. J Dent Res 1997b; 76:1602–9

Kuusela S, Kannas L, Tynjälä J, Honkala E, Tudor-Smith C. Frequent use of sugar products by schoolchildren in 20 European countries, Israel and Canada in 1993/1994. Int Dent J 1999; 49:105–14.

Kwan, M. Y., Cairney, J., Faulkner, G. E., & Pullenayegum, E. E. Physical activity and other health-risk behaviors during the transition into early adulthood: a longitudinal cohort study. American journal of preventive medicine 2012; 42(1), 14-20.

Laher MH. A comparison between dental caries, gingival health and dental service usage in Bangladeshi and white Caucasian children aged 7, 9, 11, 13 and 15 years residing in an inner city area of London, UK. Community Dent Health 1990; 7(2): 157-63.

Lalonde M. A new perspective on the health of Canadians. Ottawa, Canada: Ministry of Health and Welfare 1974.

Lateefat S, Musa OI, Kamaldeen A.S, and Muhammad Buhari A.S. Knowledge and practices on oral health among junior secondary school students in Ilorin West local government area of Nigeria. e-Journal of Dentistry 2012;2(2): 170-175.

Lawrence HP, Binguis D, Douglas J, McKeown L, Switzer B, Figueiredo R, et al. Oral health inequalities between young Aboriginal and non-Aboriginal children living in Ontario, Canada. Community Dent Oral Epidemiol 2009 Dec;37(6):495-508.

Lian, C., Phing, T., Chat, C., Shin, B., Baharuddin, L., & Jalil, Z. Oral health knowledge, attitude and practice among secondary school students in Kuching, Sarawak. Archives of Orofacial Sciences 2010; 5, 9-16.

Lim S, Sohn W, Burt BA et al. Cariogenicity of soft drinks, milk and fruit juice in low-income African-American children: a longitudinal study. J Am Dent Assoc 2008; 139: 959–967.

Link, B. G. and Phelan, J. 'Social Conditions as Fundamental Causes of Disease', Journal of Health and Social Behaviour 1995; 35, 80–94.

Locker D. measuring oral health: a conceptual framework. Community Dent Health 1988; 5:3-18.

Lutfey, K. and Freese, J. 'Toward Some Fundamentals of Fundamental Causality: Socioeconomic Status and Health in the Routine Clinic Visit for Diabetes', American Journal of Sociology2005; 110(5): 1326–72.

Lynam JM, Lorine S, Lock C and Wong TS. The richer Social paediatrics model fostering access and reducing inequalities in children's health. Healthcare Quarterly, 2011; (14): 41-46.

MacGregor IDM, Balding J, Regis D. Flossing behaviour in English adolescents. J Clin Periodontol, 1998; 25:291-296.

Maes L., Vereecken C., Vanobbergen J., & Honkala S. Tooth bushing and social characteristics of families in 32 countries. International Dental Journal 2006; 56 (3), 159-167.

Mahejabeen R, Sudha P, Kulkarni SS, Anegundi R. Dental caries prevalence among preschool children of Hubli: Dharwad city. J Indian Soc Pedod Prev Dent 2006; 24:19-22.

Marmot, M., and R. Bell. "Social determinants and dental health." Advances in dental research 2011: 23.2; 201-206.

Mattila L, Rautava P, Ojanlatva A, Paunio P, Hyssala L, Helenius H, et al. Will the role of family influence dental caries among seven-year-old children? Acta Odontol Scandn (2005a); 63: 73-84.

Mattila ML, Rautava P, Aromaa M, Ojanlatva A, Paunio P, Hyssala L, Helenius H, Sillanpaa M. Behavioural and demographic factors during early childhood and poor dental health at 10 years of age. Caries Res 2005b; 39:85-91.

Messer LB. A prediction model of nursing caries. Journal of Dental Research 1993: 72 (Abstract) 69.

Molcho, M., Nic Gabhainn, S., & Kelleher, C. Assessing the use of the Family Affluence Scale (FAS) among Irish schoolchildren. Irish Medical Journal 2007; 100(8), 37-39.

Morris R, Carmi S, Carrie S & Florence R. American Sociological Review 1995; 60 (1):141-156.

Moysés ST, Rodrigues CS. Healthy environments: strategies for promotion of children's oral health. In: Sheiham A, Bönecker M, eds. Promoting Children's Oral Health, Theory and practice. Quintessence Editora Ltda., Brazil, 2006. Pages: 1-12, 77-9.

National Advisory Committee on Health and Disability. Improving Child Oral Health and Reducing Child Oral Health Inequalities, 2003.

National Board of Health. Instructions about oral health promotion based. Public Health Act. Directive no. 7634. Helsinki: National Board of Health; 1972

Newton JT, Bower EJ. The social determinants of oral health: new approaches to conceptualising
and researching complex causal networks. Community Dentistry and Oral Epidemiology, 2005; 33:25-34.

Okada M, Kawamura M, Kaihara Y, Matsuzaki Y, Kuwahara S, Ishidori H, et al. Influence of parents' oral health behaviour on oral health status of their school children Int J Paediatr Dent 2002; 12: 101_8.

Okada M, Kawamura M, Miura K. Influence of oral health attitude of mothers on the gingival health of their school age children. J Dent Child 2001; 68:379-383.

Okullo I, Åstrøm AN, Haugejorden O, Rwenyonyi CM. Variation in caries experience and sugar intake among secondary school students in urban and rural Uganda. Acta Odontol Scand 2003; 61:197-202.

Oliveira ER, Narendran S, Williamson D. Oral health knowledge, attitudes and preventive practices of third grade school children. Pediatr Dent 2000; 22:395-400.

Pampel FC., Krueger MP, and Justin T. Denney. Socioeconomic Disparities in Health Behaviors. Annual Review of Sociolog 2010; 36: 349-370.

Petersen PE. The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century–the approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol 2003; 31(Suppl 1):3–23.

Petersen PE .Socio-behavioural risk factors in dental caries – international perspectives. Community Dent Oral Epidemiol 2005; 33:274-279.

Petersen PE, Hoerup N, Poomviset N, Prommajan J, Watanapa A. Oral health status and oral health behaviour of urban and rural schoolchildren in Southern Thailand. Int Dent J 2011;51:95-102.

Phelan, J. C., Link, B. G., Diez-Roux, A., Kawachi, I. and Levin, B. "Fundamental Causes" of Social Inequalities in Mortality. Journal of Health and Social Behavior 2004, 45(3): 265–85.

Pine CM, McGoldrick PM, Burnside G, Curnow NM, Chesters RK, Micholson J, Huntington E.
An intervention programme to establish regular toothbrushing: understanding parents' beliefs and motivating children. Int Dent J 2000; (Supp):312- 323.

Poutanen R, Lahti S, Tolvanen M, Hausen H. Parental influence on children's oral health-related behavior. Acta Odontol Scand, 2006; 5: 286-292.

Poutanen R, Lahti S, Seppä L, Tolvanen M, Hausen H. Oral health-related knowledge, attitudes, behavior, and family characteristics among Finnish school children with and without active initial caries lesions. Acta Odontol Scand, 2007; 65:87-96.

Primary Dental Care Services in England and Wales. Audit Commission 2002. National Health Report. Northampton: Belmont Press; 2002.
Rajab LD, Petersen PE, Bakaeen G, Hamdan MA.Oral health behaviour of school children and parents in Jordan. Int J Paediatr Dent .2002; 12:168-176.

Rajala M, Honkala E, Rimpelä M, Lammi S. Toothbrushing in relation to other health habits in Finland. Community Dent Oral Epidemiol, 1980; 8:391-395.

Reisine, Susan T., and Walter Psoter. "Socioeconomic status and selected behavioral determinants as risk factors for dental caries." Journal of Dental Education 2001;65 (1): 1009-1016.

Riedy CA, Weinstein P, Milgrom P, Bruss M: An ethnographic study for understanding children's oral health in a multicultural community. Int Dent J 2001, 51(4): 305-312.

Rodrigues, J. A., dos Santos, P. A., Baseggio, W., Milori Corona, S. A., Palma-Dibb, R. G., & Sasso Garcia, P. P. N. Oral hygiene indirect instruction and periodic reinforcements: effects on index plaque in schoolchildren. Journal of Clinical Pediatric Dentistry 2009; 34 (1): 31-34.

Rose G, The strategy of prevention medicine, 1992.

Rossow I, Rise J. Concordance of parental and adolescent health behaviors. Soc Sci Med 1994; 38: 1299-305.

Sabbah W, Tsakos G , Sheiham A, Watt R G. The effects of income and education on ethnic differences in oral health: a study in US adults. J Epidemiol Community Health 2009; 63:516-520.

Sanders AE, Spencer AJ, Slade GD. Evaluating the role of dental behaviour in oral health inequalities. Community Dent Oral Epidemiol 2006; 34: 71–9.

Selwitz RH, Ismail AI, Pitts NB. Dental caries. Lancet 2007; 369:51-59.

Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. Community Dent Oral Epidemiol 2000; 28:399-406.

Smyth E and Caamaño F. Oral health knowledge, attitudes and practice in 12-year-old schoolchildren. Med Oral Patol Oral Cir Bucal. 2007; 12(8): 614-20.

Snyder, EE & Purdy, DA. Socialization into sport: parent and child reverse and reciprocal effects. Res Q Exerc Sport 1982; 53: 263–8.

Strauss RP: Culture, health care, and birth defects in the United States: an introduction. Cleft Palate J 1990, 27(3):275-278.

Sweeting H, Anderson A. Socio-demographic correlates of dietary habits in mid to late adolescence. Eur J Clin Nutr 1994; 48:736–48.

Syrjälä AM, Kneckt MC, Knuuttila ML. Dental self-efficacy as a determinant to oral health behaviour, oral hygiene and HbA1c level among diabetic patients. J Clin Periodontol 1999; 26:616-621.

Szatko F, Wierzbicka M, Dybizbanska E, Struzycka I, Iwanicka-Frankowska E. Oral health of Polish three-year-olds and mothers' oral health-related knowledge. Community Dent Health 2004; 21:175-180.

Tinanoff N & Palmer CA. Dietary determinants of dental caries and dietary recommendations for preschool children. Journal of Public Health Dentistry 2000; 60(3). 197-206.

Tolvanen M, Lahti S, Miettune J and Hausen H. Relationship between oral health-related knowledge, attitudes and behavior among 15–16-year-old adolescents—A structural equation modeling approach. Acta Odontologica Scandinavica, 2012; 70: 169–176.

Toronto District Health Council. Discussion paper- toward the development of an urban health framework. The Council: Toronto; 1999.

Tuckett D. Sociology as a science. In: Tuckett D, editor. An introduction to medical sociology. London and New York: Tavistock Publications; 1976/1980. p 15.

US General Accounting Offices. Oral Health: Dental Disease Is a Chronic Problem Among Low-Income Populations. Report to Congressional Requesters. Washington, DC: US General Accounting Offices; 2000.

US Department of Health and Human Services: Oral Health in America: A Report of the Surgeon General – Executive Summary. Rockville, MD: US Department of Health and

Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000.

Vanagas G, Milašauskienė Ž, Grabauskas V, Mickevičienė A. Associations between parental skills and their attitudes toward importance to develop good oral hygiene skills in their children. Medicina Journal (Kaunas) 2009; 45(9), 718-723.

Vancouver Board of Education, Inner City Schools Project Review. Report and Recommendations, 2009.

Vancouver School Board; http://www.vsb.bc.ca/about-vsb; http://www.makeafuture.ca/bc-school-districts/regions/metro/39-vancouver/ Assessed June 20, 2012.

Varenne B, Petersen PE, Ouattarra S.Oral health behaviour of children and adults in urban and rural areas of Burkina Faso, Africa. International Dental Journal 2006; 56:61-70.

Vereecken CA, Keukelier E & Maes L. Influence of mother's educational level on food parenting practices and food habits of young children. J Appetite 2004; 43:93-100.

Verrips GH, Kalsbeek H, Eijkman MA. Ethnicity and maternal education as risk indicators for dental caries, and the role of dental behavior. Community Dent Oral Epidemiol. 1993; 21:209- 214.

Vigild M, Petersen PE, Hadi R. Oral health behaviour of 12-year-old children in Kuwait. Int J Paediatr Dent 1999; 9:23-29.

Wardle, J., Robb, K., & Johnson, F. (2002). Assessing socioeconomic status in adolescents: the validity of a home affluence scale. Journal of Epidemiology and Community Health, 56, 595-599.

Watt, R. G., & Rouxel, P. L. Dental caries, sugars and food policy. Archives of Disease in Childhood 2012; 97(9), 769-772.

Watt R, Sheiham A: Inequalities in oral health: a review of the evidence and recommendations for action. Br Dent J 1999; 187(1):6-12.

Watt RG. Strategies and approaches in oral disease prevention and health promotion.World Health Organ 2005; 83:711-718.

WHO. Ottawa Charter for Health Promotion. Ottawa: World Health Organization; 1986.

WHO. Geneva: World Health Organization; Health promotion planning: an educational and ecological approach, 3rd ed. Mountain View, CA: Mayfield Publishing; 1999: 1–49.

Wigen, T. I., & Wang, N. J. Parental influences on dental caries development in preschool children. An overview with emphasis on recent Norwegian research. Norsk epidemiologi 2012; 22(1).

World Health Organization. WHO information series on school health, Oral health promotion through schools, Geneva 2003 (DOC: 11).

Wickrama KA, Conger RD, Wallace LE, Elder GH Jr. The intergenerational transmission of health-risk behaviours: adolescent lifestyles and gender moderating effects. J Health Soc Behav 1999; 40:258-272.

Wilson AE. Fundamental Causes' of Health Disparities. A Comparative Analysis of Canada and the United States. International sociology 2009; 24(1): 93 - 113.

Zhu L, Petersen P.E and Wang HY. Oral health knowledge, attitudes and behaviour of children and adolescents in China. International Dental Journal, 2003; 53: 289–298.

Appendices

Appendix 1. Comprehensive oral-health related lifestyle questionnaire

Child's QUESTIONNAIRE (Grade 1-3)

Small children are assisted by an investigator

Question	Code
School: .... boy ☐ 1 Year of Birth: .... girl ☐ 2	gender
HOW MANY YEARS YOU LIVED IN CANADA?	Yrs.ca
Who are your family members? My mother ☐ My father ☐ Stepmother ☐ Stepfather ☐ Brother(s) how many………. ☐ Sister(s) how many……… ☐ Other family members are……………	Fam.n Moth Fath Step.m Step.f Sib.Broth Sib.sis
Does your Father/Guardian work? (1) Yes ☐ (0) No ☐ If yes, what is his job?.................................... Does your Mother/Guardian work? Yes ☐ No ☐ If yes, what is her job?	F.G.ses M.G.ses
Do you have your <u>own bedroom</u>**?** 1. No ☐ 2.Yes ☐	bedroom
Does your family have a car? 1. Yes 0. No If yes, how many? ……………	cars
WHEN DID YOU SEE A DENTIST LAST TIME?	Dentist1
WHY DID YOU SEE A DENTIST? .... …………………………………………………………………………	Dentist2
Which is BAD for YOUR TEETH? (1) (0) Water ☐ Yes ☐ No Juices ☐ Yes ☐ No Soft drinks (Coca Cola, Fuzzy drinks(Slurpees), energy drinks) ☐ Yes ☐ No Milk ☐ Yes ☐ No	 water juice soft.dr milk

WHO taught you HOW TO BRUSH YOUR TEETH?(Check one box next to each person on the list) (1) (0) Parents/Family ☐ Yes ☐ No Dentist ☐ Yes ☐ No Friend ☐ Yes ☐ No School ☐ Yes ☐ No	Fam.teach Dent.teach Fr.teach Sch.teach
Who CONTROLS how you Brush YOUR TEETH Nobody ☐0 I do it myself ☐ 1 Father ☐2 Mother ☐ 3 Other family member…..... ☐4	contr.brush
How often do you eat candies/chocolates/sweets? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	diet1
How often do you DRINK Coca Cola, Pepsi, slurpees, energy drinks? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐0	diet2
How often do you EAT COOKIES, CAKES, MUFFINS? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	diet11
How often do you DRINK JUICE? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	diet12

Thanks for your time filling this questionnaire!

Appendix 2. Shortened version of the questionnaire

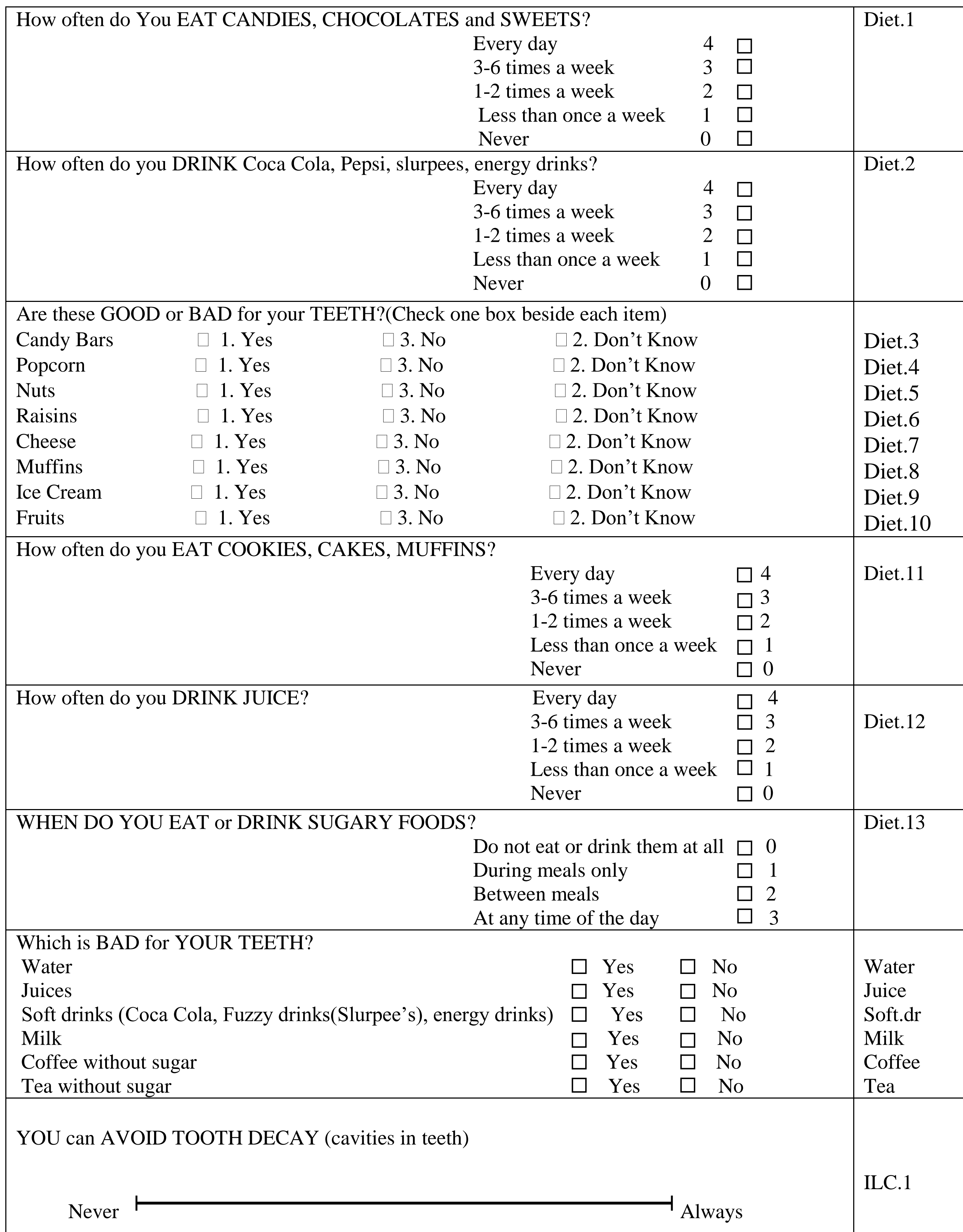
QUESTIONNAIRE for Schoolchildren (Grade 4-7)

Question	Code
Year of birth: .... boy ☐ 1 girl ☐ 2	Gender
Were you born in Canada? Yes ☐ No ☐ If No, how many years have you lived in Canada?............	yrs. ca
Now we would like to ask about YOUR FAMILY	
Who do you live with? Mother ☐ Father ☐ Brother(s) ☐ how many? .... Sister(s) ☐ how many? .... Guardian ☐ who? ……………..	Fam.n Moth Fath Step.m Step.f Sib.Broth Sib.Sist
Father(Guardian) is ☐ 1. Aboriginal ☐ 2. Chinese ☐ 3. European (specify…........) ☐ 4 .Filipino ☐ 5. Vietnamese ☐ 6. Indian ☐ 7. Other (specify...........) **Mother(Guardian) is** ☐ 1.Aboriginal ☐ 2.Chinese ☐ 3.European (specify….......) ☐ 4. Filipino ☐ 5. Vietnamese ☐ 6. Indian ☐ 7. Other (specify.............)	F/G.ethnic M/G.ethnic
Does your father work? Yes ☐ No ☐ If yes, what is his job?..................................... Does your mother work? Yes ☐ No ☐ If yes, what is her job? .... Does your guardian work? Yes ☐ No ☐ If yes, what is his/her job?	F.ses M.ses G.ses
Your families money needed for living comes from: ☐ Mothers job ☐ Fathers job ☐ Guardians job ☐ Other ……………………..	Moth.inc Father.inc G.inc Other.inc
Do you have your OWN BEDROOM**?** No (0) ☐ Yes (1) ☐	Bedroom
You think YOUR FAMILY when compared to OTHER FAMILIES is Poorest |————————————| Richest	Fam.ses
Does your family have a car? Yes ☐ No ☐ If yes, how many? ……………	Cars

Now we would like to know how you take care of your teeth Why do you Take CARE of your TEETH?	T.care6
How often do you BRUSH your TEETH? 1. Never ☐ 2. Not daily ☐ 3. Once a day ☐ 4. Twice a day or more ☐ 5. After every meal ☐	Toothbr
Now we would like to ask about DENTAL VISITS WHEN was YOUR LAST DENTAL VISIT?	Dent.1
People who take care of their teeth DO NOT have TOOTHACHE (pain) Completely Wrong ├──────────┤ Very True	T.care2
How often do YOU DRINK JUICE? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	Diet.12
People who TAKE CARE of their TEETH, <u>DO NOT NEED</u> to SEE the DENTIST Yes ☐ 1 No ☐ 2 I don't know ☐ 3	T.care3
I take CARE of my TEETH Never ├──────────┤ Always	T.care1
I take CARE of my TEETH, because MY MOUTH feels CLEAN Completely Wrong ├──────────┤ Very True	T.care4
Definition: Rotten teeth are also known as cavities or tooth decay. What do you think causes CAVITIES (rotten teeth)?	Know.1

I Brush TEETH, because I want my BREATH to SMELL GOOD Completely Wrong ├──────────┤ Very True	T.care5
If you DO NOT SEE the DENTIST OFTEN, your TEETH will ROT (cavities in teeth) Completely Wrong ├──────────┤ Very True	Dent. 3
QUESTIONS about Tooth Brushing WHO taught you HOW TO BRUSH YOUR TEETH?(Check one box next to each person on the list) Parents/Family ☐ 1. Yes ☐ 2. No Dentist ☐ 1. Yes ☐ 2. No Friend ☐ 1. Yes ☐ 2. No School ☐ 1. Yes ☐ 2. No Nobody (0) ☐	Fam.teach Dent.teach Fr.teach Sch.teach Nobody
What can you do to clean BETWEEN your TEETH?	between
I should STOP BRUSHING if my GUMS BLEED Never ├──────────┤ Always	Know.5
Which is BAD for YOUR TEETH? Water ☐ Yes ☐ No Juices ☐ Yes ☐ No Soft drinks (Coca Cola, Fuzzy drinks(Slurpees), energy drinks) ☐ Yes ☐ No Milk ☐ Yes ☐ No Coffee without sugar ☐ Yes ☐ No Tea without sugar ☐ Yes ☐ No	Water Juice Soft.dr Milk Coffee Tea
What is Dental Floss?	Know.4
To make my PARENTS HAPPY, I BRUSH my TEETH Completely Wrong ├──────────┤ Very True	Parent.acc
To be LIKED by my FRIENDS I BRUSH my TEETH Completely Wrong ├──────────┤ Very True	Friend.acc

Question	Code
I Avoid Smiling because of My Teeth Never ├──────┤ Always	Ql.smil
I Avoid Talking because of My Teeth Never ├──────┤ Always	Ql.talk
There are people with GOOD TEETH NO MATTER WHAT THEY DO, and others with BAD TEETH NO MATTER WHAT THEY DO Completely Wrong ├──────┤ Very True	Know.6
Do you clean BETWEEN your teeth? No (0) ☐ Yes (1) ☐ If YES, HOW do you clean BETWEEN your teeth?	Betw.th
People who BRUSH their TEETH have GOOD BREATH Completely Wrong ├──────┤ Very True	Breath
BRUSHING your TEETH helps STOP CAVITIES (rotten teeth) Completely Wrong ├──────┤ Very True	Th.decay
BRUSHING TEETH helps STOP TEETH from being YELLOW Completely Wrong ├──────┤ Very True	Discolor
People who BRUSH their TEETH look BETTER Completely Wrong ├──────┤ Very True	Appear
PEOPLE TAKE GOOD CARE OF TEETH BECAUSE they WANT…………………………………	Know.9
Who CONTROLS your tooth brushing at home? Nobody ☐ 0 I do it myself ☐ 1 Father ☐ 2 Mother ☐ 3 Other family member…..... ☐ 4	contr.brush



How often do You EAT CANDIES, CHOCOLATES and SWEETS? Every day 4 ☐ 3-6 times a week 3 ☐ 1-2 times a week 2 ☐ Less than once a week 1 ☐ Never 0 ☐	Diet.1
How often do you DRINK Coca Cola, Pepsi, slurpees, energy drinks? Every day 4 ☐ 3-6 times a week 3 ☐ 1-2 times a week 2 ☐ Less than once a week 1 ☐ Never 0 ☐	Diet.2
Are these GOOD or BAD for your TEETH?(Check one box beside each item) Candy Bars ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Popcorn ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Nuts ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Raisins ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Cheese ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Muffins ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Ice Cream ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know Fruits ☐ 1. Yes ☐ 3. No ☐ 2. Don't Know	Diet.3 Diet.4 Diet.5 Diet.6 Diet.7 Diet.8 Diet.9 Diet.10
How often do you EAT COOKIES, CAKES, MUFFINS? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	Diet.11
How often do you DRINK JUICE? Every day ☐ 4 3-6 times a week ☐ 3 1-2 times a week ☐ 2 Less than once a week ☐ 1 Never ☐ 0	Diet.12
WHEN DO YOU EAT or DRINK SUGARY FOODS? Do not eat or drink them at all ☐ 0 During meals only ☐ 1 Between meals ☐ 2 At any time of the day ☐ 3	Diet.13
Which is BAD for YOUR TEETH? Water ☐ Yes ☐ No Juices ☐ Yes ☐ No Soft drinks (Coca Cola, Fuzzy drinks(Slurpee's), energy drinks) ☐ Yes ☐ No Milk ☐ Yes ☐ No Coffee without sugar ☐ Yes ☐ No Tea without sugar ☐ Yes ☐ No	 Water Juice Soft.dr Milk Coffee Tea
YOU can AVOID TOOTH DECAY (cavities in teeth) Never ├────────┤ Always	ILC.1

When ONE TOOTH has A CAVITY(is rotten) OTHER TEETH will get cavities too Completely Wrong ⊢————————⊣ Very True	ELC.3
ONLY DENTISTS CAN STOP CAVITIES IN TEETH Completely Wrong ⊢————————⊣ Very True	ELC.2
I ENJOY being together with OTHER CHILDREN at SCHOOL Never ⊢————————⊣ Always	SE. 1
It is EASY for me TO MAKE NEW FRIENDS Never ⊢————————⊣ Always	SE.2
I like TO KNOW WHAT IS HAPPENING AROUND ME Never ⊢————————⊣ Always	SOC.1
I FEEL that I AM Others are NOT NICE TO ME Never ⊢————————⊣ Always	SOC.2
What is life like for you? Bad ⊢————————⊣ Great/Wonderful	Sat.life
Comparing to your friends, your teeth are … I think my teeth are BETTER than my friend's teeth ☐ 2 I think my teeth are THE SAME as my friend's teeth ☐ 1 I think my teeth are WORSE than my friend's teeth ☐ 0	S-OH

PLEASE CHECK IF YOU ANSWERED ALL QUESTIONS!

Thanks for your time filling this questionnaire!

Appendix 3. Vancouver School Board Support Letter

Vancouver School Board
School District No. 39 (Vancouver)
ASSOCIATE SUPERINTENDENT
1580 West Broadway
Vancouver, B.C. V6J 5K8
Tel: 604-713-4594 Fax: 604-713-5412

April 14, 2011

Dr. Jolanta Aleksejuniene
Department of Oral Health Science
University of British Columbia
2151 Wesbrook Mall
Vancouver, B.C. V6T 1Z3

Dear Dr. Aleksejuniene,

RE: Integrated Community-Based Oral Health Care in Inner-City Vancouver

Thank you for your research proposal "Integrated Community-Based Oral Health Care in Inner-City Vancouver". On behalf of the VSB Research Committee please accept this letter as approval for you to complete your research in Vancouver schools. You have permission to contact teachers, parents and students in the Vancouver district. We request that you contact the Principal at the school first and provide them with a copy of this letter.

The VSB Research Committee would be very interested in learning of your results and its implications for students. When your research is completed please send us an abstract of the results.

Thank you for focusing your work within the Vancouver School District. I wish you the best of luck as you proceed with your inquiry.

Sincerely,

Valerie Overgaard

Dr. Valerie Overgaard, Associate Superintendent
Learning Services