Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Parents

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Abstract

Despite an improvement in oral health status in recent decades, dental decay is still the most common preventable chronic childhood disease worldwide. Decay-causing bacteria can be transferred from parent to child within the first two years of a child's life. Left untreated, decay can result in pain, speech disorders and tooth loss, problems with chewing and damage to the adult teeth. Early intervention may be improved by understanding the effects of oral health education on the knowledge, motivation and behaviours of pre/postnatal parents.

The purpose of this study was 1) to investigate whether providing an oral health educational intervention results in improvements in oral health knowledge among pre/postnatal parents and caregivers, and 2) to explore the motivations and attitudes of parents towards oral health.

This research used a mixed methods design that included a pre-post intervention component and a semi-structured interview. The study was conducted in two phases. In Phase I, participants attended an oral health education session where oral health knowledge and attitudes were assessed prior to and immediately following the education session. In Phase II, participants were offered a free dental cleaning and invited to participate in a brief semi-structured interview regarding their oral health motivations and behaviours. Phase II participants also completed a second postquestionnaire assessment of oral health knowledge and attitudes.

Thirty-three participants attended the oral health educations sessions and completed Phase I; of these 33 participants, five chose to complete Phase II. The education session was effective at improving participants' total knowledge scores. Scores

on the 13 questions increased significantly, from 7.70±2.64 (mean±SD) (median 7) before the education session, to 11.24 ±2.27 (mean±SD) (median 12), immediately after the session (Wilcoxon test; $p<0.001$). The knowledge was retained into Phase II. The overall themes that emerged from interviews are 1) participants are knowledgeable about the importance of oral health, 2) they believe that their teeth and their children's teeth are important, however 3) factors such as income, education, and social support influence the adoption of positive oral health behaviours.

In summary, oral health education is successful at increasing parents' knowledge but provides minimal increases to motivation and changing attitudes. More research needs to be conducted on ways to increase parent and patient motivation towards improved oral health behaviours. Collaboration between medical and dental health practices may be one way of increasing parent's awareness of their options and duties in providing oral health care to their children.

Dedication

I dedicate this to my parents, Dale and Bonnie MacCallum who have provided me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Your love and ceaseless patience listening to all my tales of woe as I completed this journey strengthened and buoyed me on. All my life you have both believed in me and because of that I have always believed I could do anything.

I believe I have the *best* parents in the world and it is because of you both that I am who I am and for that *I thank you*. I love the peace that can always be found in our family home and am so glad that I grew up with parents who love God and one another. Thank you for the values you helped instill in me and for teaching me that *nothing matters but salvation*.

I love you both to the moon and back! XOXOXO

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Chapter 1. Introduction

Dental caries affects populations of all ages and nationalities throughout the globe (Zafar, Harnekar, & Siddiqi, 2009). Dental caries or tooth decay, is a multifactorial disease process (Milgrom, Riedy, Weinstein, Tanner, Manibusan & Bruss, 2000) that includes the transmission of specific decay-causing bacteria from parent to child within the first two years of the child's life (Canadian Institute for Health Information, 2013; Kagihara, Niederhauser, & Stark, 2009). Dental caries in baby teeth is a preventable infectious disease. When left untreated it can result in pain, speech disorders and loss of teeth, which can lead to problems with chewing and damage to the in-coming adult teeth (Friedman, Harrison, Hulland & Schroth, 2010; Kagihara et al., 2009).

The focus of this investigation is on early childhood caries (ECC), which is the presence of tooth decay in the primary teeth (baby teeth) of a child under the age of 71 months (Kagihara et al., 2009). ECC is a significant public health problem that is difficult to control (Zafar et al., 2009). Rates of ECC in North American may be rising as trends suggest there has been an increase in caries rates in preschool children over the past 20 years (Friedman et al., 2010). ECC has a huge impact at an individual and community level and can result in pain, loss of function, and even failure to thrive (Pahel, Rozier, & Slade, 2007; Zafar et al., 2009).

The author worked for two and a half years as a dental hygienist in Yellowknife, Northwest Territories, and witnessed many patients who presented with severe ECC. These young patients could not be seen in a general dental clinic because they required general anesthesia for each dental procedure; therefore, they were referred to a dentist with hospital dental privileges. The referral process could take anywhere from 6 months

to a year before the patient was seen and received dental treatment. The author's interest in ECC and its increasing prevalence are the foundation for this research.

This destructive childhood disease is preventable through multiple strategies: informing parents about the ECC disease process, explaining how each family member can play a role in the prevention of this contagious disease, and encouraging parents to take steps towards good oral health for themselves and their families (Berkowitz, 2003; Poureslami & Van Amerongen, 2009). Prevention of ECC is the goal of this study.

Oral health care providers have started to acknowledge the major role parents play in keeping their children's mouths healthy. Helping parents improve their own oral health with regular dental hygiene visits and good oral homecare may reduce the bacteria levels in their own mouths thus reducing the oral bacteria transferred to their child and postponing the development of ECC (Ramos-Gomez, Crystal, Ng, Crall, & Featherstone, 2010).

When developing oral health education interventions for parents, dental professionals must assess the parent's perception of oral health, the value that they place on the health of their teeth and on their child's teeth, and parent's comprehension of the benefits of home oral health practices. If parents believe that they or their child is susceptible to dental decay, then an education process is received more readily (Barker, 1999). When attempting to motivate patients, the health professional needs to listen to the patient, offer praise when the patient make changes, suggest reasonable and realistic advice, involve the patient in all decisions and make small changes over time so as not to overwhelm the patient (Barker, 1999).

The North End Community Health Center (NECHC) on Gottingen Street (Appendix A) in Halifax, Nova Scotia is a facility that promotes collaborative health care for their clients from the surrounding communities, many of whom are at high risk for oral disease. The author has worked in this community as a Dental Hygienist for the past five years. In this study the author provided oral health information to parents at three locations within the NECHC catchment area.

The information provided was intended to motivate participants to maintain their own and their child's/children's oral health. The study investigated whether providing this oral health educational intervention resulted in improvements in oral health knowledge among pre/postnatal parents and caregivers, and also explored the motivations and attitudes of parents and caregivers towards oral health.

Chapter 2. Literature Review

To identify current literature on whether providing oral education sessions can lead to increased oral health knowledge in parents, a literature search (limited from 1998 to 2015) was conducted through the PUBMED, NOVANET, and Google Scholar databases using the following key words and their combinations: early childhood caries (ECC), dental decay, oral health education, low-income mothers, adult education, motivation, attitude, social determinants of health, and missed dental appointments. Peer reviewed articles, chapters from books, reports, and reputable government websites were used for this review. Review and analysis of the dental literature revealed a common theme regarding ECC; it is a worldwide problem and education is a key factor in the prevention of this destructive disease.

Dental Caries Prevalence

Despite a noticeable improvement in population oral health over the past several years, early childhood caries (ECC) is still the most common preventable chronic childhood disease worldwide (CIHI, 2013; Gussy, Waters, Walsh, & Kilpatrick, 2006; Hobdell, Oliveira, Bautista, Myburghm, Lalloo, Narendran, & Johnson, 2003; Pultzer & Spencer, 2008; Poureslami & Van Amerongen, 2009; Ramos-Gomez, Crystal, Ng, Crall, & Featherstone, 2010; Rowen-Legg, 2013). ECC is the development of dental caries (cavities or decay) in a child's primary teeth while they are under the age of six years (Akpabio, Klausner, & Inglehart, 2008). Research from the United States Centers for Disease Control and Prevention indicates that ECC is five times more prevalent than asthma and seven times more prevalent than hay fever (Ramos-Gomez et al., 2010; Rowan-Legg, 2013). The Canadian Institute for Health Information (CIHI) found that

even though ECC is largely a preventable disease, every year 19,000 hospital surgical procedures are completed to treat carious lesions in Canadian children under the age of six (CIHI, 2013).

Caries Process

Dental caries is an infectious disease that can be affected by a person's diet. The bacteria in dental plaque metabolize ingested sugars and form acid, which in turn lowers the pH in the mouth. A prolonged decrease in one's oral pH can cause a weakening of the tooth surface creating an ideal environment for caries (Feldens, Vitolo & Drachler, 2007; Gussy et al., 2006). Dental caries can be prevented through individual measures, such as a diet low in sugar, adequate home care including fluorides, and disruption of bacteria by brushing and flossing. Professional treatments such as fluoride applications, dental sealants, as well as in-office prophylaxis (Rowan-Legg, 2013) can also reduce the likelihood of caries formation. Despite improvements in oral health over the past 30 years, largely a benefit of adequate fluoride, dental treatment services have never effectively tackled the primary cause of dental decay (Hobdell et al., 2003). Since most parents are the primary care providers for their child's oral health habits, delivering information to parents about the caries process could help motivate them to change their own oral health habits and those of their children to break the caries process chain (Saied-Moallemi, Virtanen, Ghofranipour & Murtomaa, 2008).

Transmission of Bacteria

It is a little-known fact that the majority of oral bacteria are transferred from parents to children during their early childhood years (Poureslami & Van Amerongen,

2009). ECC is an infectious disease in which *streptococci mutans* and *lactobacilli* are contributing bacteria. Examples of vertical bacteria transmission are when parents kiss their child, blow on their food, or lick a spoon when testing the temperature of foods (Rowan-Legg, 2013). Horizontal transmission of bacteria occurs when a person outside of the familial group, such as a nanny, passes their bacteria onto a child (Akpabio et al., 2008; Gussy et al., 2006; Kowash, Pinfield, Smith & Curzon, 2000; Poureslami & VanAmerongen, 2009; Seow, 2012).

Effects of ECC on Children

Oral health is an important contributor to overall health: "Oral health implies much more than healthy teeth. The mouth is both a cause and a reflection of individual and population health and well being" (Patrick, Lee, Nucci, Grembowski, Jolles & Milgron, 2006, p. 1).

Dental caries does not just affect the mouth. In children, discomfort, oral pain, abscesses and infection can result in sleep loss, behavioral problems, learning challenges, nutritional deficiencies, overall limited growth and development, and communication difficulties. A loss of space for the permanent teeth to erupt can lead to future malocclusion and chewing difficulties. These factors in conjunction with a displeasing smile can cause a child to experience low self-esteem and other psychological challenges (Feldens et al., 2007; Plutzer & Spencer, 2008; Poureslami & Van Amerongen, 2009; Ramos-Gomez & Ng, 2009; Rowan-Legg, 2013; Takushige, Cruz, Asgor & Hoshino, 2004). Among children the lingering memories of dental pain and its subsequent treatment can cause fear and adverse reactions to necessary future dental treatment. Compounding the problem, children who present with ECC run an increased risk of

developing dental caries in the future (Akpabio et al., 2008; Plutzer & Spencer, 2008).

Effects of ECC on the Health Care System

Since ECC is a global public health problem the treatment can be costly and time consuming. In some cases, treatment can be extremely difficult due to the level of cooperative behavior of young children (CIHI, 2013; Congiu, Campus & Luhlie, 2014; Friedman et al., 2010); in these cases, general anesthesia is usually necessary for most dental procedures (CIHI, 2013). In Canada, pediatric dental surgery using general anesthesia is the number one day surgery in most Canadian pediatric hospitals placing a preventable financial burden on Canada's already stressed health care system (Friedman et al., 2010).

Populations at Higher Risk for ECC

A greater prevalence of dental disease is found in marginalized individuals such as immigrant populations and low-income families, often because they are less likely to seek disease prevention health care services (Graves, Berkowitz, Proskin, Chase, Weinstein & Billings, 2004; Rowan-Legg, 2013; Rudd, 2004; Schecter & Lynch, 2011). Many children affected by ECC come from low-income families with parents who have fewer perceived needs for oral health care. Lack of education contributes substantially to the problem of ECC (Akpabio et al., 2008). Research suggests that parents who lack oral health knowledge do not recognize ECC, or understand how to prevent ECC, nor do they see dental caries as a disease. A parental participant in one study declared that, "baby teeth fall out anyway and don't have nerve endings, so why care for them?" (Mofidi, Zeldin, & Rozier, 2009, p. 247). This quote illustrates the inadequate knowledge some parents have about the importance of child's primary teeth. Parents' own oral health

habits can affect how they care for their child's oral health needs (Kowash, Pinfield, Smith & Curzon, 2000; Saied-Moallemi et al., 2008; Stevens, Iida & Ingersoll, 2007). There is a clear need for multiple efforts to prevent ECC. An essential element of prevention is educating parents about ECC, emphasizing it is a preventable disease and how parents play a major role in the prevention process (Seow, 2012).

Effects of Low Health Literacy

According to Statistics Canada, the determinants of health that affect a person's well-being include (among other things) income, education, employment, and personal health practices (Sistani, Yazdani, Virtanen, Pakdaman & Murtomma, 2013; Statistics Canada, 2011). Our health systems require a capacity to access, understand, and use challenging health information. With mounting emphasis on patient involvement in care and decision-making, "building health literacy skills among adult learners has the potential to contribute to efforts to eliminate health disparities and improve health outcomes" (Diehl, 2011, p. 30). Parents who lack oral health knowledge are more likely to have unmet oral healthcare needs (Feldens et al., 2007). If a parent neglects their own oral health then one can speculate that the oral health of their child may also be neglected (Akpaboi et al., 2008; Buerlein, Horowitz & Child, 2011; Plutzer & Spencer, 2008; Rowan-Legg, 2013; Saied-Moallemi et al., 2008). In a Canadian study, Amin & Harrison (2009) reported that for many parents' cavities seem like a normal everyday occurrence and tooth decay is an unavoidable part of life. It is that type of mindset that health professionals must address to help their patients understand that decay of any kind is not normal, nor acceptable.

Pregnancy and Oral Health

The use of dental care during pregnancy is low and dental caries is prevalent in women during their childbearing years (Buerlein et al., 2011). Many women believe that they are unable to receive routine dental treatment while they are pregnant but this is a myth (Buerlein et al., 2011; Kerpen, 2009; Lydon-Rochelle et al., 2004). It is recommended that during pregnancy a woman should continue to attend regular preventive dental hygiene, which involve scaling, polishing and fluoride applications, and dental examinations appointments, because there are many significant bodily changes arising during a woman's pregnancy from which the mouth is not exempt. There are no indications that dental treatment can cause harm to the mother or developing fetus during any trimester of pregnancy. However, most research indicates the second trimester as most ideal for dental procedures (California Dental Association Foundation, 2010). The hormonal changes a woman experiences during pregnancy can cause an increased predisposition to gingivitis (swelling, redness and bleeding of the gums) and periodontitis (destruction of bone that support your teeth) (Fitzsimons et al, 1998). When contemplating utilization of dental services pregnant women are influenced by: cost and dental insurance; understanding their dental insurance coverage; their perceived need for care; the value they place on oral health; the accessibility of dental care; the dental team's familiarity in providing care for expectant mothers' and fathers' (Chung, Gregorich, Armitage, Gonzalez-Vargas & Adams, 2014).

Self-care at home may also suffer during pregnancy due to morning sickness; many pregnant patients can find it difficult to brush their teeth during pregnancy, and flossing is not possible for them due to nausea, gagging and vomiting (Stevens et al.,

2007). Since they are unable to properly clean their mouths at home, these women's oral bacteria count is likely to increase. When the infant is born and fatigue sets in, home care and dental treatment may be put on the back burner again. This oral neglect not only affects the mothers' mouths, but it affects the child's mouth too because of the transmission factor (Poureslami & Van Amerongen, 2009). The time during pregnancy is a golden opportunity to teach expectant parents about good oral health practices for themselves and their children (Fitzsimons et al., 1998; Stevens et al., 2007).

Oral Hygiene Practices and Nutrition

Parents may be unaware that their personal oral health practices and their nutritional choices have a direct effect on their child's oral health. Oral health care includes caring for teeth, gums and the surrounding soft tissues of the mouth (Fitzsimons et al., 1998). It is the parents' responsibility to care for the mouths of their young children as small children are unable to properly care for their own mouths. Parents have agreed that uncooperative children refusing to brush their teeth are a challenge that they do not know how to handle (Olley, Hosey, Renton & Gallagher, 2011). A parent's regular brushing and flossing can reduce their load of oral bacteria. Frequent professional dental hygiene visits where hard and soft deposits are removed from tooth surfaces can further reduce the risk of transfer of bacteria to their children (Akpabio et al., 2008; Gussy et al., 2006; Mohebbi, Virtanen, Murtomaa, Vahid-Golpayegani & Vehkalahti, 2008; Poureslami & Van Amerongen, 2009; Seow, 2012; Stevens et al., 2007). Parents' personal dietary preferences, healthy versus unhealthy, can influence the child's proclivity for certain snacks that could potentially lead to ECC (Feldens et al., 2007; Fitzsimons, Dwyer, Palmer & Boyd, 1998; Seow, 2012). The list of risk factors

that can influence a child's oral health also include, but are not limited, to low dental health literacy, active decay in a parent's mouth, putting the child to bed with a bottle that contains milk or juices, and continual drinking from sippy cup that contains milk, juice, or other sugary drinks (Ramos-Gomez et al., 2010).

Collaborative Healthcare Provider Practices

A collaboration of practices between medical and dental health professionals can help to increase a parent's knowledge regarding the necessity of taking a child for regular dental visits by the age of one year or six months after the eruption of their first tooth. The Canadian Interprofessional Health Collaborative is a "national hub for interprofessional education, collaboration in healthcare practice and patient-centered care" recognizing "that patients receive better care when health providers from all health disciplines work closely and learn from both their patients and other health care colleagues" (CIHI, 2015). Health professional education needs to provide training on interprofessional cooperation to build a foundation of interprofessional education for each health profession to help build communication, research and agreement among all practicing dental and medical personnel (Friedman et al., 2010). If health professionals do not learn these collaborative practices during their education, then it is likely that they will not incorporate interprofessional collaboration into their own professional practice.

This is particularly critical for dental professionals and their relationships with other health care professionals as dental care is largely provided through private practice providers whose services and fees are excluded from the Canadian medical system. Similarly, medical and other healthcare providers must collaborate with dental professionals to ensure that their patients and clients have comprehensive healthcare.

The North End Community Health Center (NECHC) where this research was based is a fine example of a truly collaborative primary health care center that serves the community through "health services, education, community development, outreach and advocacy" and where dental care is provided as part of the primary care service (North End Community Health Centre, 2015).

Education Theory for Teaching Parents

Dental professionals "perceptions of the world [may be] biased, and one source of bias is selective attention. Selective attention leads us to pay greater attention to certain aspects of our environment and, as a result, to overestimate the prevalence or importance of these aspects" (Adler & Ostrove, 1999, p.3). Dental professionals tend to look at issues through an oral health lens and may forget that others may not place as much importance on oral health. For people to become more connected and motivated with their own wellbeing there is a "need to bring awareness about health into the everyday world, not just in times of crises" (English, 2012, p.14).

Rudd (2004) found that people who come from low income or minority populations are less likely to seek out ways to prevent disease. If Rudd is correct, then how does one approach teaching this population of parents? English states, "adult health learning begins with the notion that everything is health and health is everything" (2012, p. 13). If we can aid parents to comprehend that they as individuals are responsible for their own health and help them grasp the importance of oral health to overall health then they are more likely to be motivated (Buerlein, 2011). Foley (2005) noted that it is participants' readiness to appreciate and examine their own involvement that helps adult educators learn the most. If parents can learn from past experiences, positive or negative,

it can help motivate them to learn how to better care for themselves and their child's oral health. It is believed that providing positive motivation can stimulate behavioral change (Barker, 1999). Motivation is not a professional telling someone 'you need to do this because I am the 'expert' and I say so'. Motivation is stimulating a person's interest, making the message realistic and applicable so that the person feels they can make a change (Barker, 1999).

Communication is an important factor to consider when providing educational sessions. It is a two-way dialogue and there is more to it than words; tone and body language can express more than words in many instances (Barker, 1999). Listening without interrupting, using an enthusiastic tone with encouraging facial expressions, eye contact, and body movement, even selecting appropriate clothing can all influence a learner's motivation (Barker, 1999). Along with motivation, people need to have a sense of self-efficacy (Bandura, 1977a), which is a belief that they can achieve the goals they are learning.

While an individual's motivation is critical, it is only one of several factors that contribute to their health. The theory of social determinants recognizes that one's health, both oral and overall, can be affected by influences such as location, upbringing, race, nourishment, safety, gender, employment, education, and personal interactions (English, 2012). In a report by Folinsbee and Kraglund-Gauthier (2007) participants' suggestions on health and learning show that it is not all about offering education about health, but that it is also vital to discuss the social determinants of health such as poverty, absence of employment opportunities, different cultural norms, and access to health services. "People may know what it takes to be healthy but are simply not able to implement what

it takes because of these factors" (Folinsbee and Kraglund-Gauthier, 2007, p. 48). Consequently, it is critical to consider the social determinants of health whenever possible in planning oral health educational interventions for parents.

Rationale for the Study

Within communities "the education of [parents] and caregivers should be promoted…because [parents'] behaviours influence their children's oral health status" (Akpabio et al, 2008, p. 2). Pregnancy is a suitable time to discuss ECC and how to prevent caries in young children (Stevens et al., 2007). Prenatal care programs are an excellent opportunity to teach parents about oral health and how it relates to overall health (Stevens et al., 2007). The ultimate goal of a reduction in ECC requires oral health education for pre and postnatal groups within their communities.

The intention of this study was to provide oral health information in pre/postnatal and baby wellness sessions to motivate participants, some of whom are at high risk for oral disease, to maintain their own and their child's oral health. The purpose of this study was 1) to determine if attending an oral education session can lead to an improvement in oral health knowledge and positive change in attitude as measured by scores on a questionnaire (modified from Stevens et al., 2007) and 2) to explore the motivations and attitudes of parents towards oral health through one-on-one interviews.

Chapter 3. Conceptual Framework

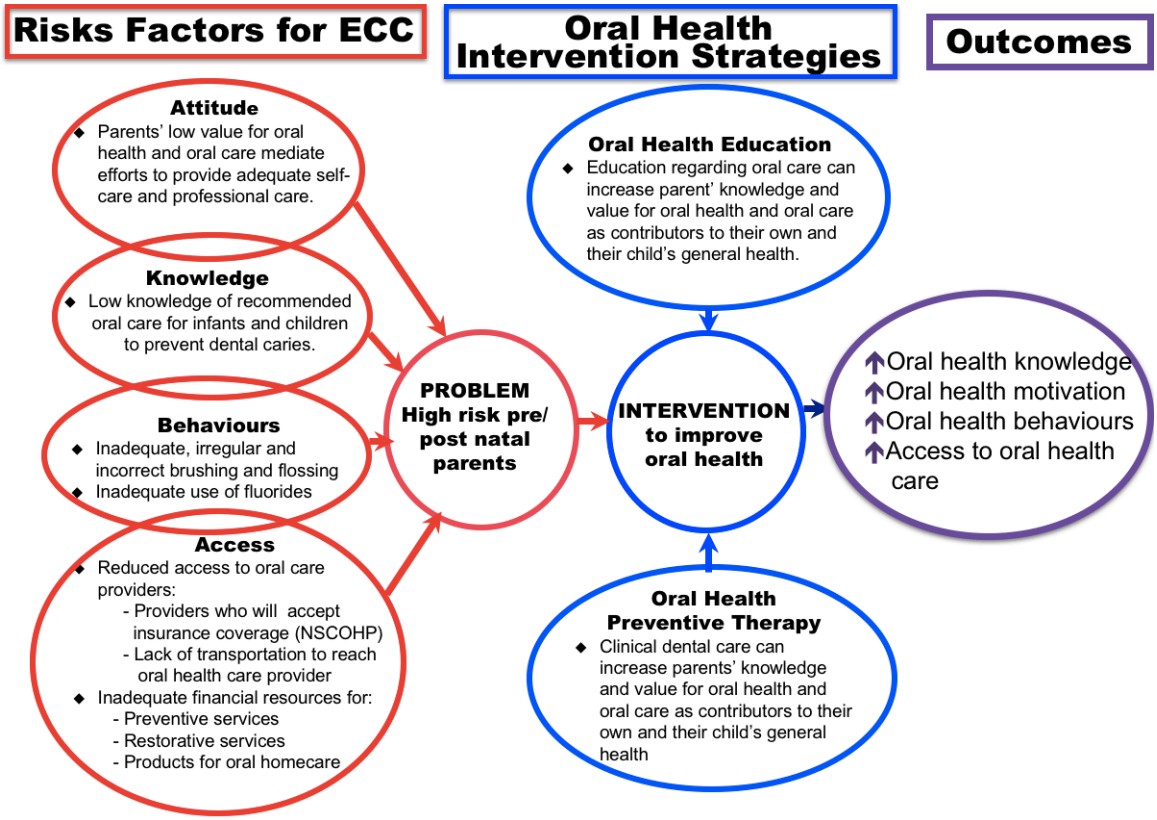
The image below (Figure 1) is an original conceptual framework that depicts the key concepts and their relationships in this research study. The intention of this study was to provide oral health information in pre/postnatal and baby wellness sessions to motivate parents, some of whom are at high risk for oral disease, to maintain their oral health and their child's oral health.

The worldwide public health problem (Berkowitz, 2003) of ECC, the rise in its prevalence (Seow, 2012), and the author's professional experience with many cases of ECC was the original stimulus for this research. ECC is a multifactorial disease process (Friedman et al., 2010) that most dental professionals must deal with on a weekly, often daily basis. As much of the research states that ECC is a preventable disease (Friedman et al., 2010; Kagihara et al., 2009), it must be asked *why then is ECC one of the most common early childhood diseases?*

Within the populations affected by ECC it is evident that children growing up in lower income areas do present with higher prevalence of ECC, but this is not just a poor person's disease (Dye, Vargas, Lee, Magder, & Tinanoff, 2011). Children from all social, economic, and ethnic backgrounds are susceptible to ECC (Friedman et al., 2010). Children who present with ECC are under the age of 71 months (Zafar et al., 2009) and cannot be held accountable for the condition of their mouths. Research shows that there is a strong correlation between a parent's oral health and their child's (Dye et al., 2011). Parents are usually the adults responsible for the general and oral health of their children, therefore educating parents about the effects of ECC and motivating them to improve

their own and their children's oral health behaviours may help prevent ECC (Akpabio et al., 2008).

Figure 1: Conceptual Framework



In this study, parents' attitudes and behaviours plus their previous oral health knowledge were considered as the risk factors shown in the conceptual framework. Problems that the parents have had in the past and present in accessing dental health care for themselves and their children were noted in past research. Each of these challenges listed are contributing factors to the problem which is pre/postnatal parents who are at a high risk of 1) placing low value on oral health (Congiu et al., 2014), 2) lacking knowledge about recommended oral care (Seow, 2012), 3) having inadequate self-care (Seow, 2012) and 4) having reduced access to the dental care that they require (Patrick et al., 2006; Seow, 2012).

The oral health intervention strategies in this study, education intervention sessions (Feldens et al., 2007; Patrick et al., 2006; Zafar et al., 2009) and oral health preventive therapy (Feldens et al., 2007; Taichman, Sohn, Lim, Eklund, & Ismail, 2009) aimed to increase each parent's knowledge and value for oral health and oral care as contributors to their own and their child's general health.

The anticipated outcomes of this conceptual framework were that parents would have an increase in their knowledge of oral health, and an increase in their motivation to improve behaviours that would benefit their oral health and the oral health of their child. With increased oral health knowledge, motivation and behavior change, it was anticipated that there would be an increase in the parents and child's utilization of oral health care services thus converting the 'potential demand' (i.e. desire for care and inability to obtain care) to 'effective demand' (i.e. desire for care and ability to obtain care) (Gluck & Morganstein, 2003). Together these form the foundation for parents and children to have healthier mouths for life.

Chapter 4. Methodology

Research Design and Plan

This research used a mixed methods design that included a pre-post intervention component and a qualitative component, and was conducted in two phases. In Phase I, participants attended an oral health education session where their oral health knowledge and attitudes were assessed prior to and immediately following an education session. In Phase II, participants who completed Phase I were offered a free dental debridement appointment. Dental debridement consists of the removal of all soft and hard deposits, which cause inflammation and disease, from around and under the gum line of a person's tooth (Weinberg, Westphal, Froum, Palat, & Schoor, 2009). During the debridement appointment participants were invited to participate in a brief semi-structured interview regarding their oral health motivations and behaviours. Phase II participants also completed a second postquestionnaire assessment of oral health knowledge and attitudes. The questionnaire and brief interview questions were pretested on 2 adults who were not clients of the North End Community Health Centre but were from a similar region with similar incomes and lifestyles.

Research Sites

The research project was based out of the North End Community Health Center (NECHC) in Halifax, Nova Scotia. The clinic is in a low-income section of Halifax and most of the patient population are from families at risk (Appendix A). The NECHC's mission is "to support North End Halifax to be a healthy community by offering leadership in primary health care through health services, education, community

development, outreach and advocacy" (North End Community Health Centre, 2015) The NECHC provides services beyond medical care; they help people with their basic daily needs through a collaborative community practice.

Five separate Phase I education sessions were held at three locations, all of which fall under the NECHC catchment area: 1) NECHC pre/postnatal and baby wellness sessions located at 2165 Gottingen Street, Halifax, Nova Scotia, B3K 3B5, 2) the Sobeys grocery store preplanned mommy and baby sessions (in conjunction with a nutritionist) located at 2651 Windsor St, Halifax, Nova Scotia, B3K 5C7, and 3) The Immigrant Services Association of Nova Scotia (ISANS) parents education group located at Mumford Professional Centre, 6960 Mumford Road, Suite 2120, Halifax, Nova Scotia, B3L4P1. A translator was present for the ISANS presentation to interpret the questionnaire and education session into Arabic as not all the participants spoke English. The number of participants at each session ranged from two to twenty.
The Phase II sessions (dental cleaning and one-on-one interview) were conducted at the NECHC dental clinic at 2102 Gottingen Street, Halifax, NS B3K 3B5.

Target Population and Sample Criteria

The target population for this research was pre and postnatal parents and primary caregivers from locations within the NECHC catchment area. This was a nonprobability convenience sample that were accessed from the NECHC pre/postnatal and baby wellness sessions, the mommy and baby sessions at Sobeys and the ISANS parents' education group. The target sample size for Phase I of the research was thirty (N=30) participants and for Phase II, ten (N=10) participants. The inclusion criteria were: parents or primary caregivers of children under the age of 71 months, or expectant mothers, from

the NECHC catchment area. The exclusion criterion was being under the age of 16 years. Participants age 16 and 17 years old were considered mature minors for the purposes of this study.

Research Instruments

Oral Health Knowledge and Attitudes Questionnaire

The questionnaire used to assess oral health knowledge was modified from the Rochester Adolescent Maternity Program (RAMP) questionnaire used by Stevens et al. (2007) (Appendix B). The author received consent from Dr. Iida to use and modify the RAMP questionnaire (Appendix C). The modified questionnaire comprised 13 questions to assess oral health knowledge and four questions to assess attitudes towards oral health. The last four questions on the modified questionnaire were not part of the original RAMP questionnaire and were designed for this study to discover the attitudes and motivations of the participants about their own general oral health. The modified questionnaire had a Flesch-Kincaid grade level of 5.6 (Appendix D), which made it easier for participants to read thus adding validity.

Interview Guide

The brief one-on-one interview conducted in Phase II of the study comprised the following questions: 1) How important are your teeth to you? 2) How important are your child's teeth? 3) What do you think your family/friends would say if I asked them how important their teeth are to them? 4) What do you do to you to make your mouth healthy? Is there anything else you could do? 5) What do you do for your child's/children's teeth? 6) Did the educational session you attended make you want to make changes in your home care practices? If so, what changes? Did it make you want to

make changes to your child's/children's home care practices? If so, what changes?

The interview questions have a Flesch-Kincaid grade level of 3.1 (Appendix E), which made it easy for participants to understand what they were being asked thus adding validity.

PHASE I

Recruitment

Participants were invited to attend an oral health education session that was incorporated into planned pre/postnatal and baby wellness sessions. Recruitment posters were placed at the NECHC two weeks prior to the first oral health education session advertising the nature of the education sessions provided along with the included incentives for participation. The NECHC staff who ran the pre/postnatal and baby wellness sessions verbally reminded each of their patients of this unique learning session and invited them to attend one of the three sessions. Participants from the Immigrant Services Association were invited to attend an oral health education session by an ISANS event planner. All participants who chose to participate in the oral health educational session were given a monetary gift card [$20] for a local grocery store. Anyone who attended the education session had their names placed into a draw for an Oral-B Vitality electric toothbrush which was handed out at the end of the session.

Educational Sessions

The author provided the oral health educational sessions. The sessions were not longer than an hour in length. At the beginning of each session a consent form was given to each participant and was read aloud by the author. After the Phase I consent forms

(Appendix F) had been signed and collected, along with the research identification labels (Appendix G), each participant was given a copy of the oral health knowledge and attitudes questionnaire (Appendix B) to complete. Each of the questionnaire questions was read aloud to the participants to help those who may not have been able to read. Approximately fifteen minutes was allotted for this task.

After the questionnaire was collected, the oral health educational session began. The topics of discussion (Appendix H) were: the functions of the teeth and supporting structures; social advantages of good oral health; brushing and flossing for both parent and child; and discussion of recommended bottle-feeding, breast-feeding, and sippy cup practices. A general nutrition discussion followed noting the bacteria in our mouths and how the bacteria can be transferred from parent's mouth to the child's. This discussion led back to brushing and flossing and the necessity for parents to keep their mouths clean to help their child's oral health. The education session was structured so that there was opportunity for the participants to discuss and ask questions on each topic while it was presented. In this way participants did not have to wait until the end of the education session to receive responses to their questions and they could concentrate on each new topic as it was presented. Once all questions had been answered and all discussions were completed, a second copy of the questionnaire was handed out and read aloud once more.

The draw for the Oral-B Vitality electric toothbrush was completed once all the post-questionnaires had been collected.

PHASE II

Recruitment

Each mother who participated in the oral health educational session was offered an opportunity to have a free dental debridement appointment with the author, at the NECHC's dental location (2102 Gottingen Street, Halifax, NS B3K 3B5). Participants were also invited to take part in a short semi-structured interview immediately prior to the debridement session. Incentives were offered to those who chose to participate in the interview in the form of a monetary gift card [$20] for a local grocery store.

Debridement and Qualitative Interview

All the Phase II debridement sessions and post questionnaires were completed eight to 12 weeks following the Phase I education sessions. At the beginning of the dental debridement appointment, participants were invited to answer six research interview questions (Appendix I) before the completion of the health history form required by the clinic.

Once the interview questions and health history were completed, each participant received dental scaling (debridement) to remove all deposits from their mouth. At the end of the participant's debridement appointment the participant was invited to complete the oral health knowledge questionnaire again. Each participant signed a Phase II consent form (Appendix J). The participant had the option of refusing to complete the interview and questionnaire without repercussions.

Qualitative Data Analysis

The participant responses to the six research questions were transcribed and analyzed looking for any common themes, particularly regarding participant's attitudes

and motivations.

Quantitative Data Analysis

The questionnaire was administered three times: immediately before the education session (prequestionnaire), immediately after the session (postquestionnaire) and, for a subsample of participants, several weeks later at the Phase II session (second postquestionnaire). Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS23) Program.

The **immediate impact of the education session on oral health knowledge** was assessed as follows. 1) For each of the individual oral health knowledge questions (Q1-13), the proportion of participants who gave a correct response on the prequestionnaire was compared to the proportion who gave a correct response on the postquestionnaire, using the McNemar test. The McNemar test is used to compare two matched groups of nominal data (Laerd, 2015). 2) The sum of each correct response was calculated to provide a 'knowledge score' for each participant (possible range 0-13). The mean knowledge scores of the group on the prequestionnaire and postquestionnaire were compared using a Wilcoxon test. The Wilcoxon test is used to compare matched groups of non-normally distributed scale data (Laerd, 2015).

The **retention of knowledge** gained during the education session was assessed for the subsample of participants who completed Phase II of the study as follows. The mean 'knowledge score' achieved immediately following the education session on the postquestionnaire was compared to that achieved at the Phase II session on the second postquestionnaire, using the Wilcoxon test.

The **immediate effect of the education session on participants' attitudes and**

motivations was analyzed as follows. Participant responses to each of the attitude and motivation questions (Q14-17) on the prequestionnaire were compared to their responses on the postquestionnaire using the McNemar test.

Ethics

Ethics approval was obtained from the Mount Saint Vincent University Research Ethics Board (**REB #:** 2015-093, Appendix K), followed by Dalhousie Universities REB (**REB #:** 2016-3827, Appendix L), and lastly the NECHCs REB (Appendix M).

Chapter 5. Results and Summary of Findings

Participants

Thirty-three participants attended one of the five oral health education sessions and completed the Phase I pre and post oral health knowledge and attitudes questionnaires. Of the 33 participants, five chose to complete Phase II where they received a free dental debridement session, completed the questionnaire for a third time and answered the six open-ended interview questions asked by the researcher.

It was originally planned for all the Phase I oral health education sessions to be held at the NECHC clinic, but due to recruitment difficulties, an additional two sessions were added at different locations. One of those sessions was during a preplanned mommy and baby class at a local grocery store (Sobeys Windsor Street location). The other was conducted at a parent's education workshop at the Immigrant Services Association of Nova Scotia (ISANS) office.

For the Phase II debridement sessions ten participants choose to participate and booked appointments for the debridement sessions. However, of the ten, only five completed their appointment. Four people did not attend their scheduled appointment and one cancelled due to a medical condition and did not reschedule. The five participants consisted of four mothers and one father.

Phase I

Knowledge

Participant responses to the 13 knowledge questions from the Phase I pre and post education session questionnaires are presented in Table 1. **Prior to** the education session, participants scored high on knowledge of flossing (Q2), regular dental visits (Q3) and the

negative effects of children sleeping with a bottle (Q7). However, they scored very low on questions about the contagious nature of dental decay (Q1, Q10, Q11), and the significance of prenatal dental care (Q4, Q5) and midlevel on questions about the seriousness of dental disease (Q12), and the timing of first tooth (Q6) and first dental visit (Q9). **After the education session,** the percentage of respondents with correct answers increased for all the questions, with the exception of Q3 (Table 1). The increase was statistically significant for those questions that participants had initially scored poorly on (Q1, Q4, Q5, Q9, Q10, Q11, Q12). Participants' total knowledge scores also increased, from 7.70±2.64 (mean±SD) (median 7) before the education session, to 11.24 ±2.27 (mean±SD) (median 12), immediately after the session. The increase was statistically significant ($p<0.001$) (Table 2; Figure 2).

Table 1

Oral Health Knowledge Scores Before and After the Education Session

Questions	Correct response	% correct on pre-test n=33	% correct on post-test n=33	p-value*
1-Dental decay or cavities are contagious.	**True**	24.2	81.8	**.000**
2-Flossing should be done daily to clean between the teeth.	**True**	93.9	100	.500
3-Regular dental visits help teeth and gums to be healthier.	**True**	100	100	-
4-Pregnant women should avoid dental treatment unless it is an emergency.	**False**	39.4	63.6	**.008**
5-A mother's poor oral health may cause delivery to be premature and/or low birth weight baby.	**True**	21.2	81.8	**.000**
6-The first tooth usually appears around 6 months of age.	**True**	66.7	78.8	.219
7-Sleeping with a bottle containing formula could cause cavities in a baby's teeth.	**True**	84.8	93.9	.453
8-Cavities in baby teeth are OK because the teeth will fall out eventually.	**False**	75.8	84.8	.453
9-The best time for a baby to have the first visit to a dental office is before their first birthday.	**True**	51.5	90.9	**.002**
10-It's ok for a mom to clean her baby's pacifier by putting it in her mouth before giving it back to her baby.	**False**	42.4	78.8	**.000**
11-The condition of your teeth can affect your child's teeth.	**True**	39.4	87.9	**.000**
12-Dental decay is a disease that can cause serious health problems.	**True**	57.6	87.9	**.002**
13-Bleeding gums are normal.	**False**	72.7	93.9	.065

*McNemar Test; n=33; bold indicates p<0.05

Table 2 provides a comparison of the total prequestionnaire scores to the total postquestionnaire scores showing a statistically significant increase in knowledge.

Table 2

Total Oral Health Knowledge Scores Before and After the Education Session

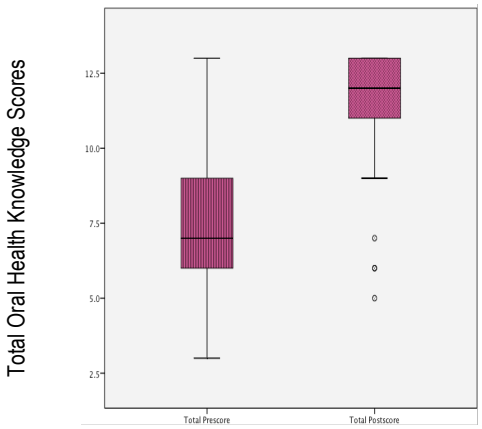
	Mean	Std. Deviation	P value*
Total Pre-score	7.70	2.64	0.001
Total Post-score	11.24	2.27	

* Wilcoxon test

The boxplot in Figure 2 compares the total scores of the prequestionnaire responses to the total scores of the postquestionnaire responses. The prequestionnaire score results have a median of 7 while the postquestionnaires have a median of 12. The box plot shows that even though there are 3 outliers on the postquestionnaire boxplot, the difference between the total prescores and total postscores was statistically significant (P=0.001)

Figure 2

Total Oral Health Knowledge Scores Before and After the Education Session

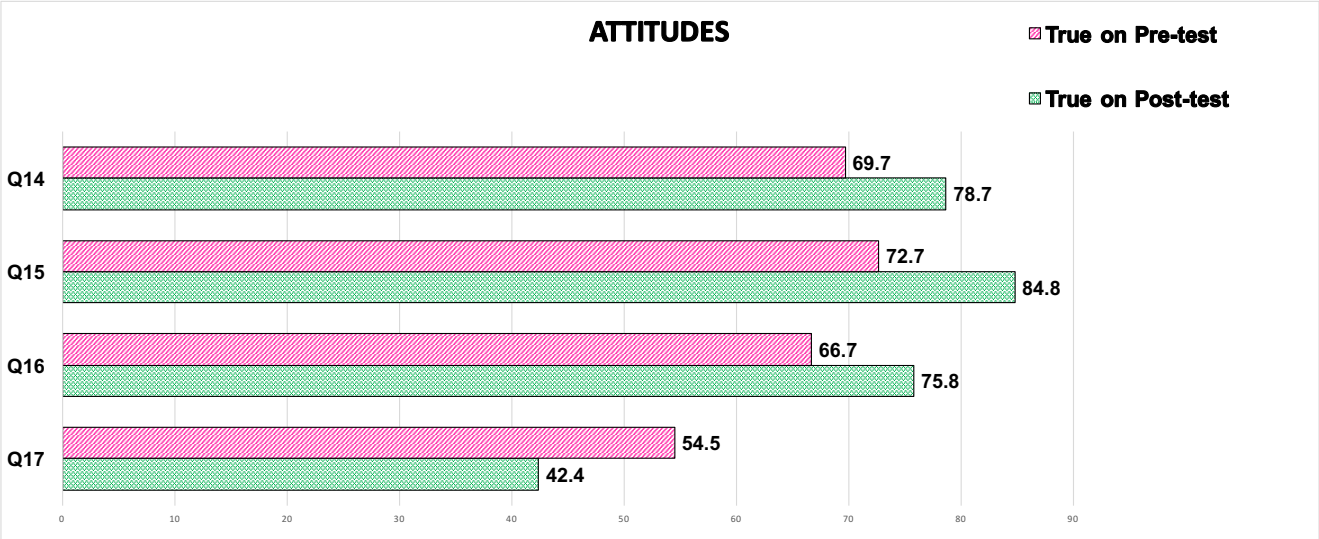


Phase I – Attitudes

Results of the attitude questions from the pre and postquestionnaires are presented in Figure 3. There were no statistically significant changes in participants' attitudes towards their own oral health and how they feel about their teeth before and after the education session (McNemar test; $p>0.05$). However, there were small shifts towards more positive responses for all questions.

Figure 3

Attitudes Before and After the Education Session



Q14: My teeth and mouth are healthy
Q15: I like the way my teeth look
Q16: I worry about my teeth and mouth
Q17: My teeth will decay no matter what I do

Phase II – Retention of Knowledge

The results of the five participants who completed the second postquestionnaire (during the Phase II debridement session) are presented in Table 3. There was no statistically significant change in knowledge scores between the postquestionnaire and

second postquestionnaire (Wilcoxon test; p=0.705), indicating that participants retained the knowledge from the Phase I oral health education session.

Table 3

Phase II: Summary of Retained Knowledge from Post/Post2 Questionnaires

Knowledge Scores	Mean	Std. Deviation	P value*
Post- questionnaire	12.60	.548	.705
Second Post- questionnaire	12.20	.583	

* Wilcoxon test

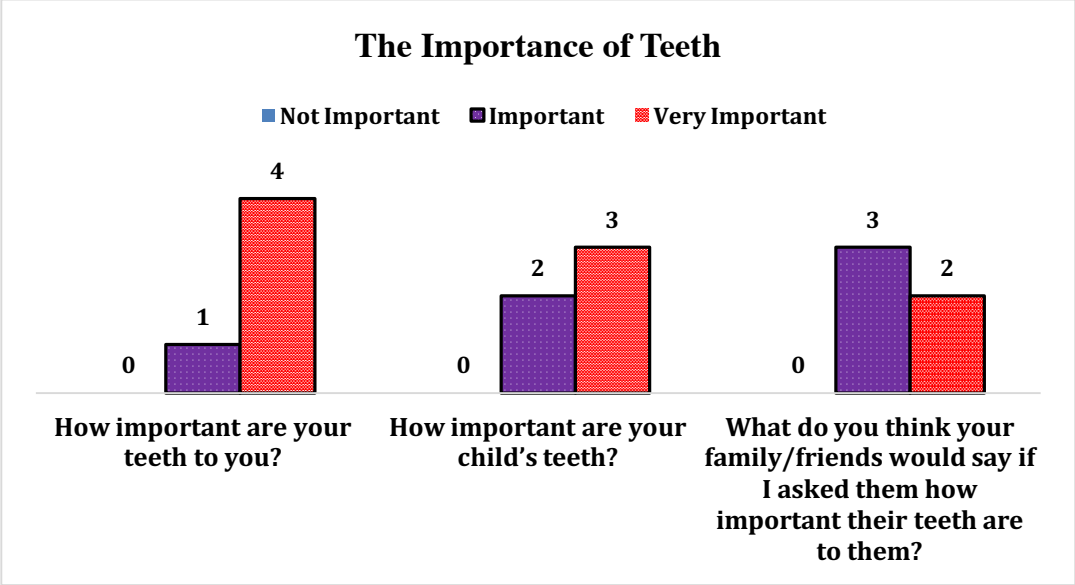
Phase II – Semi-Structured Interview

Out of the 33 participants who completed Phase I of this research project only five chose to complete Phase II. During Phase II, participants received a dental hygiene debridement session with the author, completed the Phase I questionnaire for a third time, and responded to six additional open-ended questions.

The first three interview questions were aimed at determining social, physical and developmental effects. The results of how the five Phase II participants felt about the importance of their teeth, their children's teeth and how important their family and friends would say their teeth are, can be seen in Figure 4.

Figure 4

Responses to Questions Regarding the Importance of teeth



When the parents were asked how important their teeth were to them one participant said important while the other four stated very important (Figure 4). Three of the five expanded their explanation and mentioned facts that were stated in the information session, that they needed their teeth for chewing, smiling and talking.

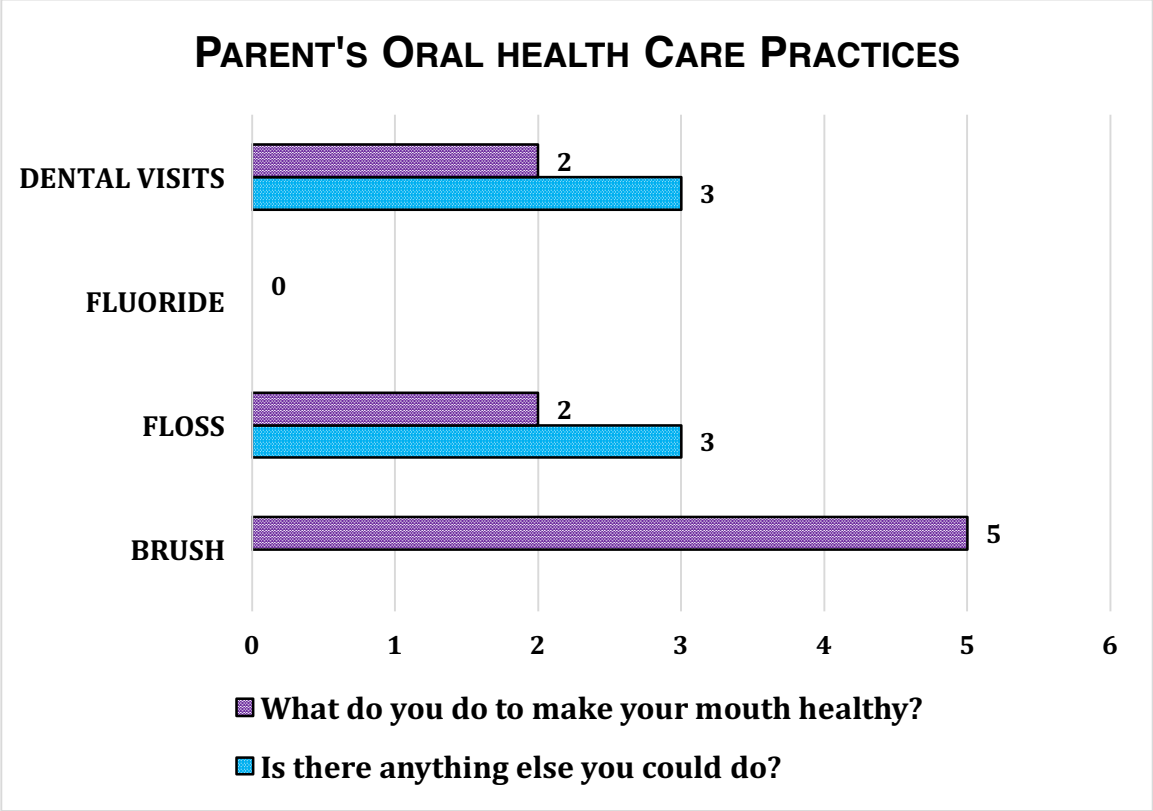
Although four parents said their own teeth were very important, only three said their child's teeth were very important. One mother stated that "Their teeth are very important. They need them for eating and I don't want them rotting out of their heads or being in pain". Another parent said, "important so that they have proper nutrition" and "it's with the baby teeth that you teach them good brushing habits that they can implement into their everyday life". One parent stated that her teeth were very important because she needed them for chewing but when asked about her child's teeth she stated they were important but did not proceed to explain why.

When asked what they thought their family and friends would say if questioned about the importance of their own teeth, three participants agreed that family and friends would say that their teeth were important while the two other parents stated they would think that baby teeth were very important. Two participants noted that their parents did not have all their teeth and that made them realize how important their remaining teeth were. Another participant stated that "My family thinks teeth are very important. I was raised to take care of my teeth and I am trying to pass that down to my kids too. I don't hang around with friends with nasty teeth so they must think their teeth are somewhat important". These comments may point to the potential influences of family and friends on parental beliefs and behaviours.

The last three questions asked were aimed towards participants' oral health behavioral practices. When parents were asked what they do to make their mouths healthy all five stated that they brushed their teeth daily, two of them flossed daily and visited the dentist on a regular schedule (Figure 5). When asked if they thought there was anything else they could do to keep their mouths healthy, three of them said floss and visit the dentist on a regular basis. One parent stated that "I could floss more" while another said that "right now my teeth are sore, my gums bleed a lot but I do brush and try to floss" and "Visiting a dentist more often, but that is not possible because of money issues." A third parent said "I should do more; I still eat a lot of sugar and I shouldn't. Just the maintenance of brushing and flossing is better, but the food I haven't changed, coffee with sugar is a hard habit to break".

Figure 5

Parent's Oral Health Care Practices



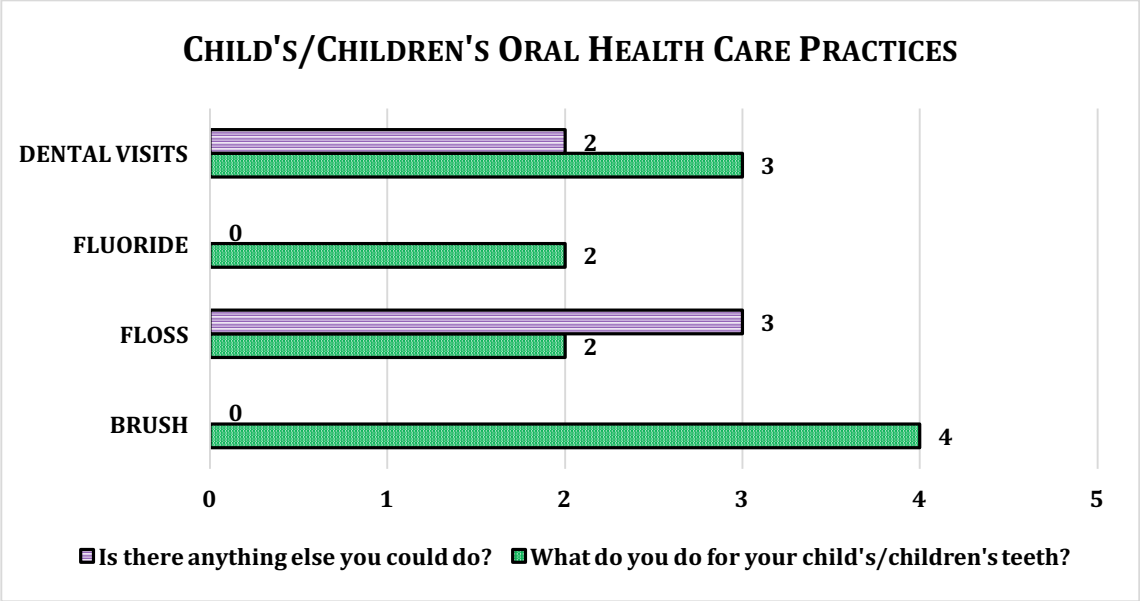
None of the parents mentioned using fluoride, whether it be in toothpaste, mouthwash, or a professional application at a dental office, as a cavity prevention method for themselves.

As we discussed what they do for their child's/children's teeth one of the parents said "I really am very terrible to be honest, TERRIBLE; I don't brush or floss their teeth like I should. They are 13, 8, and 5 and all of them have problems. My 8-year-old son just got two fillings in his baby teeth". Another parent said "I have a 3-year-old son and a 1 month old; we brush and floss his teeth and we will be seeing a dentist hopefully in the near future because MSI covers the dentist for him. He has a chipped front tooth".

This parent was the only one to mention knowing about the public dental insurance (MSI) coverage available for children's oral health benefits here in Nova Scotia.

Figure 6

Parent's Oral Health Care Practices for Their Child/Children



Four of the five parents stated that they help their child/children with their brushing (Figure 6). Two of the parents floss their child's/children's teeth, two of them provide their child/children with access to fluoride (how it was administered and how often it was administered was not stated) and three of the five parents take their children to regularly scheduled dental appointments. When asked if there was anything else these parents thought they could do to keep their child's/children's teeth healthy three of them stated flossing would help and two suggested regular dental visits (Figure 6). Although no parents cited fluoride as being important for themselves, two did suggest fluoride was important for their children.

The last question asked was *Did the educational session attended make them want to make changes in their own or their child's/children's home care practices? If so, what*

changes? One parent said "No honestly it didn't but I would like to. I can't even give an excuse as to why I didn't do it, I just feel like with 3 kids I don't have the time, but I need to. I am always saying you have to brush and floss your teeth before you go to bed but then they get in bed and that's it. I feel guilty, I feel like I know and am not doing". Another parent reported that, "When I was told at the session that cavities were contagious I have tried to stop licking spoons of food and blow on things that my kids are going to eat". Another parent stated, "It made me make a dental appointment for my son knowing that is was time to take him there".

Summary of Findings Phase I and Phase II

Phase I showed a statistically significant increase in the oral health knowledge scores after the educational session (Table 1, Table 2, and Figure 2). Results of the attitude questions from the pre and post questionnaires (Figure 3) show there were no statistically significant changes in participants' attitudes or how they felt about their teeth after the education session. However, there was a small shift towards more positive responses on the postquestionnaire which indicates that the intervention had an impact on some participants.

Phase II showed that participants are knowledgeable about the importance of oral health, and that they believe their teeth and their children's teeth are important. However there are some factors that appear to moderate or influence their practices such as inconsistent knowledge reinforcement and supportive or non-supportive family and friends. The Phase II findings were encouraging given the small number of participants.

Chapter 6. Discussion

The purpose of this mixed methods study was to determine if attending an oral health education session could lead to an improvement in oral health knowledge and attitudes among pre/postnatal parents and caregivers and to explore the motivations and attitudes of parents/caregivers towards oral health through one-on-one interviews in conjunction with a personal dental hygiene treatment session. As shown in the framework (Figure 1) the anticipated outcomes of this investigation were that the participants would have an increase in their knowledge of oral health, and an increase in their motivation to improve behaviours that would benefit their oral health and the oral health of their child(ren).

The results from this study indicate that the oral health education session did result in a significant increase in participants' overall knowledge of oral health and the participants who took part in Phase II of this study retained that knowledge for up to 12 weeks after the education session. However, the educational intervention had only a small effect on participants' attitudes and motivations which did not reach statistical significance (Figure 3).

The questionnaire results indicated that most of the target population studied could identify some basic facts about oral health care and how to prevent dental decay in their own mouth and the mouths of their children, and the intervention of an oral health educational session was successful in attaining statistically significant results from pre to postquestionnaire and sustaining knowledge improvement at the follow-up questionnaire in Phase II. Despite the overall increase in knowledge, one parent in Phase II was not able to give any reason why her child's teeth were important. As shown in Figures 5 and

6, we can see that all the parents brush their teeth and four of the five also brush their children's teeth, but when it comes to flossing only two of the parents floss their own teeth and their children's teeth on a daily basis. When parents were asked what more they could do for their teeth and their children's teeth, three said floss theirs and their children's teeth. Interestingly, although no parents mentioned the use of fluoride for their own purposes, two parents did indicate that their children had access to fluoride treatment, one was fluoride rinses at school and the other did not specify the mode of delivery. The use of fluoride, whether it be applied in dental setting, in a toothpaste, mouth rinse or in the communities' water supply, is beneficial to both children and adults and can reduce the likelihood of caries formation (Kagihara et al., 2009; Petersen, P., 2003; Taichman et al., 2009).

These results reflect that participants have unanswered questions about dental decay, more specifically ECC, which could be why it is still the most prevalent disease (CIHI, 2013). In this study, most parents did not know that they were transmitting cavity-causing bacteria from their mouths to their child's mouth. During the education sessions, this was the topic that raised the most questions and discussion. Parents seemed shocked and appalled that they could be passing bacteria from their mouths to their child. A mother during the Phase II interview stated that, "when I was told at the session that cavities were contagious I have tried to stop licking spoons of food and blow on things that my kids are going to eat".

Dental professionals know that bacteria, *streptococci mutans* and *lactobacilli,* are transferred within the saliva via vertical transmission when parents kiss their child, blow on their food, or lick a spoon (Rowan-Legg, 2013) and via horizontal transmission when

people outside the familial group pass their bacteria onto a child (Akpabio et al., 2008; Gussy et al., 2006; Kowash, Pinfield, Smith & Curzon, 2000; Poureslami & VanAmerongen, 2009; Seow, 2012). This is an important fact all parents should know and it is up to dental professionals to inform not only patients but also other health professionals these parents may see on a more regular basis, such as medical doctors and nurses (Friedman et al., 2010). Parents need to make efforts to reduce the levels of cariogenic bacteria in their own mouths to decrease their child's chance of developing ECC (Poureslami & Van Amerongen, 2009). Parents can do this with daily oral home care and by attending regular visits with their dental health professionals starting during the mother's pregnancy. Participants' responses to the Phase II open ended interview questions identified they knew they should brush, floss and visit the dentist on a regular basis but putting this knowledge into action is not always done.

The Phase I questionnaire results indicated that numerous participants were unaware of the fact that women do not have to avoid dental treatment during pregnancy. In women of childbearing age prevention of ECC should commence in the pre and postnatal stages. Pregnant women may be lacking awareness of the need for preventive dental practices during their gestation period. Providing dental care to pregnant women is safe and essential both for their own oral health and to postpone and reduce the initial transmission of bacteria to their child (Zafar et al., 2009).

There are many conditions that can occur in women's mouths during pregnancy, caused by changes in hormones, that should be monitored by an oral health professional. Over half of all expectant women suffer with pregnancy gingivitis (gum disease) and if left untreated this gum disease can lead to a more severe irreversible problem called

periodontitis (bone loss) which can be linked to low weight and/or preterm labour (Tonelli, 2009). Although keeping their mouths healthy while dealing with everything else (i.e. morning sickness) that goes along with pregnancy can be difficult, it is extremely important to do so because of the effects it can have on other factors of a pregnancy. This is another essential fact that all health professionals, medical and dental, should be aware of and be sharing with expectant patients.

The findings in this study show that education can improve oral health knowledge regardless of the attitudes and motivation of participants. Translating the knowledge changes in attitudes and subsequent behaviour is a bigger challenge. The participants gained information on how to keep their teeth clean and healthy, but for many this knowledge did not change what they thought of the condition of their own teeth or the health of their mouths. Possible influences as to why they felt this way could be that most participants were from low income families. Many verbally mentioned their lack of dental insurance coverage at the educational session indicating they were unaware of the Children's Oral Health Program, Nova Scotia government dental insurance program for children. It is possible that they may feel helpless because they have little or no access to the preventive dental treatment that they required.

As mentioned previously, in Nova Scotia children 14 years old and younger are covered for basic dental treatment through their MSI benefits (Government of Nova Scotia 2013). It is a well-documented that parents who do not have dental insurance to cover the cost of their own dental treatment (Dye et al., 2011; Isong, Dantas, Gerard, & Kuhlthau, 2014; Rowan-Legg, 2013) tend to neglect not only their own oral health needs but the oral health needs of their children, even when the child/children have coverage for

necessary dental treatment (Isong et al., 2014; Rowan-Legg, 2013). This suggests that problems with oral health cannot be reduced solely with universal access to dental care and that one needs to look at attitudes and motivation, to understand how to reduce the social and behavioral determinants of oral health (Rowan-Legg, 2013).

Attitude and motivation are very difficult to transform. Much of the time people may know what to do and how to do it but there is a lack of motivation to make the effort to change the behavior (Schecter & Lynch, 2011). Many people are motivated by seeing instant results but with oral health, like many other areas of one's body, one may not see results instantaneously and this could be discouraging for people. From personal experience the author has noted that people can be encouraged to brush and floss daily but this action alone will not reverse the current decay they already have in their mouths, therefore they soon forget or ignore instruction and the caries process becomes a vicious cycle. Some may think that no matter what they do they will get decay, as noted from the Phase II results (Figure 3). Health professionals are often discouraged to hear how few people floss daily (Gurenlian, 2017). Attempts to educate patients often feels like the instruction and information provided to patients is falling on deaf ears.

When professionals try to educate people about oral health their motivations and attitudes should always be considered. Motivation is defined by Barker (1999) as something that piques a person's interest generating an action. Barker (1999) defined attitude as a lasting set of beliefs that cause a person to act in a certain manner, but attitudes are only some of the factors affecting ones behaviours. For an oral health professional wanting to persuade patients to modify their behaviour, there are several things to keep in mind. Is the information pertinent to the patient? Will the patient

believe it will benefit them in the long run? If patients do not see the value in what their healthcare provider is advising them on then they will not be apt to change their behaviours (Barker, 1999).

At times, patient motivation is seen as lacking and has become a lingering source of frustration for many dental professionals trying to move their patients to follow oral health suggestions (Barker, 1999). Why don't patients follow the instruction presented? Is it too challenging, do they not believe their dental professional, or are they just lazy? Over half of all patients fail to follow the oral health instructions given by oral health professionals which in turn can contribute to more critical problems that cost time, money and resources that may not be available (Barker, 1999).

Often when patients do not follow the advice of their health professional the same advice is repeated again and again at subsequent visits. Patients tend to be motivated and change behaviours when they feel that the issue or problem relates to them and their lives. Repeating the same advice time and time again is misunderstood by health professionals as motivating their patients to change their behaviour but patients may simply see it as repetitive and condescending (Barker, 1999).

The way information is delivered to a patient can make a difference. Is the information given with passion or with indifference? If the healthcare provider is relaying the message with enthusiasm then their patient may comply and be willing to change the behaviour. However, if the message is delivered with indifference to a patient then the patient will not going to be eager to change what they are presently doing. (Barker, 1999). Is the information offered accurate and manageable? It is important to

only provide one piece of new information at a time. Health care providers should not overwhelm patients with too many new behaviors, for example, five new oral hygiene home products in one dental visit, as too much can make patients feel overwhelmed and then they will just do nothing (Barker, 1999).

The Stages of Change model considers a person's willingness to agree to behavioral changes for the sake of their health as a process rather than an event (Mason, 2010). People will rotate through different stages of readiness and an individual can be in any stage at any given point in time. This model is circular and people can enter or exit the cycle at any point and may often recycle through the stages (Mason, 2010). The stages of this model are:

- Precontemplation: unaware of health problems, without any thought of need for change.
- Contemplation: aware of a problem and thinking about the possibility of making change.
- Preparation: making a plan for change
- Action: practicing the behavior
- Maintenance: continuing desired health action
- Relapse: resumption of old behaviors (Mason, 2010, p. 136-137)

If health professionals know what stage their patients are at when it comes to oral home care, as well as the value they put on their oral health, then they would be better prepared to motivate their patients and recommend oral health practices that would work for both parents and their child/children.

The Health Belief Model holds that beliefs are reliant on prior incidences (Seow,

2012). It intersects with the Stages of Change Model at the stages of contemplation and preparation. A person needs to believe that they are vulnerable to a condition, that the condition is severe, that there is positive intervention for the condition, and that they can affect the obstacles to accept the intervention. Relating this theory to ECC, a parent needs to believe their child is vulnerable to caries, that baby teeth are important and that caries is a severe risk. They must also believe that ECC can be prevented and be willing to participate in their child's oral home care (Seow, 2012). If health professionals can prompt their patients to believe in their ability to control the situation in their mouths, and their child's mouth, then that belief could motivate them to practice recommended oral health behaviours at home.

One of the unexpected outcomes of this study was despite having had 33 participants complete the Phase I oral health education sessions, only five of those participants took part in Phase II, the free dental hygiene debridement. One of the main barriers that oral health professionals hear is that dental care is costly. When the Phase II participants were asked if they thought there was anything else they could do to make their mouths healthy, one of the participants responded, "visiting a dentist more often, but that is not possible because of money issues." Since the offer of a free dental hygiene service was outright declined by most of the participants and some who booked subsequently missed their appointment, it raises the question of whether money is the only issue. The Public Health Agency of Canada (PHAC) lists the determinants of health as: "Income and Social Status, Social Support Networks, Education and Literacy, Employment/Working Conditions, Social Environments, Physical Environments, Personal Health Practices and Coping Skills, Healthy Child Development, Biology and

Genetic Endowment, Health Services, Gender, and Culture" (2011). With considerable emphasis from most health professions on the social determinants of health (SDOH) and how they can affect one's life, there is evidence to suggest that income is not the only problem when it comes to dental health (Wallace & Macentee, 2012).

There is a story on the PHAC website about a boy named Jason that depicts a complicated set of reasons that could define the health of people and it goes like this:

> Why is Jason in the hospital?
>
> Because he has a bad infection in his leg.
>
> But why does he have an infection?
>
> Because he has a cut on his leg and it got infected.
>
> But why does he have a cut on his leg?
>
> Because he was playing in the junk yard next to his apartment building and there was some sharp, jagged steel there that he fell on.
>
> But why was he playing in a junk yard?
>
> Because his neighbourhood is kind of run down. A lot of kids play there and there is no one to supervise them.
>
> But why does he live in that neighbourhood?
>
> Because his parents can't afford a nicer place to live.
>
> But why can't his parents afford a nicer place to live?
>
> Because his Dad is unemployed and his Mom is sick.
>
> But why is his Dad unemployed?
>
> Because he doesn't have much education and he can't find a job.
>
> But why ...? (Health Canada, 2007, para.6)

This story illustrates how people can be caught in a cycle of life choices and circumstances that can have far reaching effects on them and on those they care about. Many other health determinants in addition to income and access to a free or affordable service have an impact on oral care seeking behaviours.

The theory of social determinants was the basis for this research (English, 2012). The three main social determinants of health considered in this study within the catchment area were income, social support networks, and education and literacy. All three of these are important when considering one's oral health. Income is a major determinant that allows a person to obtain dental health care. The cost of dental care rises each year so even if a person has dental health benefits from their employer they may not be able to afford the copayment, the amount of money a patient must pay above what their insurances pays, required of them even for basic preventive treatment (Isong et al., 2014). Most of the participants in this study indicated that they did not have health benefits of any kind, therefore dental treatment, preventive or emergency, was a luxury they could not afford. Even with the addition of limited dental care, emergency dental care twice a month and hygiene services every Friday, provided at the North End Community Health Center the community struggles to receive continual dental care treatment.

When regard to social support networks, family and friends, if a person is a member of a family that does not visit the dentist on a regular basis for preventive care then they are most likely not going to do so themselves. When the Phase II participants were asked if they thought their friends and family felt teeth were important three believed their friends and family may think teeth are important while the two other

participants stated their family and friends would consider teeth very important (Figure 4). The potential lack of support among family and friends regarding oral health care practices is an important fact to consider. This is even more critical for children who rely on their parents for their care and guidance; if their parents are not in the habit of regular dental care then they most likely will not take their children, even though Nova Scotia's Medical Services Insurances (MSI) covers children 14 years old and younger for preventive dental care. As an example, if one's family places little emphasis on oral care and the parents have those family members mind their children for nightly sleepover, the poor oral hygiene and dietary habits of the grandparents, aunts, uncles, or cousins could influence their children and undermine the practices the parents are attempting to instill in their children.

Education and literacy are fundamental to understanding and navigating our complex health systems and health information. Parents who lack oral health knowledge and the capacity to understand written and oral information are more likely to have unmet oral healthcare needs (Feldens et al., 2007). If a parent neglects their own oral health then it is likely that the oral health of their child will also be neglected (Akpaboi et al., 2008; Buerlein, Horowitz & Child, 2011; Plutzer & Spencer, 2008; Rowan-Legg, 2013; Saied-Moallemi et al., 2008). Studies have shown that educating parents about good oral hygiene and nutrition is possible but attitudes and awareness may be lacking and unfavorable towards preventive practices (Zafar et al., 2009). Many parents also believe that cavities are a normal occurrence and tooth decay is an unavoidable part of life (Amin & Harrison, 2009). It is these types of attitudes that health professionals must address to help people understand that decay of any kind is not normal, nor is it something to be

tolerated.

The original conceptual framework informing this research anticipates outcomes that demonstrate oral health improvements. Given the interventions, parents would have an increase in their knowledge of oral health, and an increase in their motivation to improve behaviours that would benefit their oral health and the oral health of their child. With improved oral health knowledge, motivation and behavior change, the framework posits that there would be an increase in the parents' and child's utilization of oral health care thus converting the need for care and inability to obtain care to the need for care and ability to obtain care.

The results of this study indicate that the education session significantly increased participant's oral health knowledge but had only a slight positive effect on attitudes and motivation. Only five (15% of) participants took advantage of the Phase II debridement sessions and one of these reported booking an appointment for their child as a result of the education session. This suggests the intervention may have had a small impact on utilization of oral health care services for some participants. Considering the study results and other factors discussed here, oral health professionals have a long and difficult road ahead to help improve the general population's oral health.

Many think that education must happen in a formal classroom setting, but this is not true. Moments of teaching and learning are happening every moment of every day all around us in everyday locations. One may learn how to bake a cake in their grandmother's kitchen, how to ride a bike in the back alley of an apartment building, or learn a complex algebra equation in their eleventh-grade math class. There is much evidence that suggests parents and children arrange daily routines where they brush and

floss their teeth together to form positive habits for both parties involved (Mohebbi et al., 2008). When a child watches their parents brushing and flossing their own teeth and has had one of their parents helping them brush from a young age, the child/children tend to pick up those habits or traits and continue to utilize them in their everyday practices. These positive oral health practices learned from a young age can translate into oral health good behaviours and attitudes for their future lives.

Many dental professionals tend to have selective attention and look at situations through an oral health lens which can make them biased and put too much emphasis on the patient's oral health (Adler & Ostrove, 1999). This tunnel vision can make the providers forget that the general population may not place as much importance on oral health as dental professionals. Dental professionals have a responsibility to educate others about oral health and how oral health is related to overall health. The author, a chairside dental hygienist and a dental hygiene educator, views the world through an oral health lens. Although the participants of this research have gained knowledge from the oral health education sessions, the results are consistent with past research that indicates knowledge is necessary but not sufficient to change behaviour (Barker, 1999). As a dental hygienist who attempts to educate patients chairside on a weekly basis the author and other oral health professionals know that motivation and attitudes must change for behaviours to change. Often people know what they are supposed to do, whether it be daily brushing and flossing, healthy eating or even exercising daily, but for one reason or another, they are unable, unwilling or just not motivated to do so. This behaviour can be seen in people who have had heart attacks but they cannot kick their smoking habits, people who have had severe strokes but continue to eat greasy, unhealthy foods. Helping

people to successfully modify risky behaviours is often challenging because they are not motivated to make changes (Kelly, 2000).

What does it take to become motivated to change unhealthy behaviour to behaviours that contribute to health? That is the essential question. One of the parents suggested that she was terrible when it came to helping her children with their oral home care and because of that all three of her children, ages five, eight and 13, have a history of dental decay. When asked if the education session had motivated them to make any changes in what they do with their children's oral health habits this parent reported that the session did not cause her to change anything when it came to her children's oral health habits. She stated that she would like to try and change but being a single mother with 3 kids she does not feel like she has the time or energy to change their routines. She expressed a feeling of guilt because although she knew what needed to be done, she couldn't seem to put knowledge into practice. This so clearly exemplifies the knowledge-doing gap, that people can be informed about what they should be doing but until they are motivated and change their attitudes, they will be unsuccessful in improving their oral health behaviours and those of their children. While there is much research on the knowing-doing gap, it would be useful to look at this concept in the context of people's motivations and attitudes towards oral health practices, and particularly in Nova Scotia where there is a Children's Oral Health Program with insurance benefits.

This study has several limitations. Since a nonprobability sample was used, this lowers the population validity, meaning the results may not be generalizable to the wider population. The relatively small sample size of this study may also have reduced its

statistical validity; for example, a larger sample size may have shown a statistically significant effect on participants' attitudes and motivations. A potential limitation related to the study instrument was that some of the eligible participants may have had limited reading skills. To mitigate this, a reading test to determine grade level was applied to the questionnaire and each questionnaire item was read aloud. Furthermore, translation was provided for those participants whose first language was not English. The small number of participants in Phase II of this study limited the conclusions that could be drawn regarding responses to open-ended questions. Data saturation was not reached, more interviews may have revealed additional information.

Chapter 7. Conclusions

All individuals come from different walks of life with different life and learned experiences. A middle-class family may all seek regular dental care whereas a low-income family may only see the dentist when in pain. Each patient the health professional contacts has a different life story; it can never be assumed that all patients have similar lives and dental experiences (Buchanan, 2006). This is a fact that was kept in focus while completing this research.

The purpose of this research was to determine if attending an oral education session could lead to an improvement in oral health knowledge and positive change in attitude as measured by scores on a questionnaire, and also to explore the motivations and attitudes of mothers towards oral health through one-on-one interviews.

The results of Phase I showed an increase in scores in the oral health knowledge from the prequestionnaires to the postquestionnaires. The results of the attitude questions from the pre and postquestionnaires showed no statistically significant changes in participants' attitudes or motivations, but there was a shift towards more positive responses for some participants.

The results of Phase II showed that participants are knowledgeable about the importance of oral health, they believe their teeth and their children's teeth are important, but other determinants of health may influence their behaviours making it difficult for them to put into practice the good oral health habits they should be doing for themselves as well as their children.

In summary, despite documented proof in this study that oral health education is successful at increasing parents' knowledge more research needs to be conducted on

ways to increase parent and patient motivation regarding oral health and which, in turn, should change their behaviours for the betterment of their oral health. Other possible areas of exploration would be first time parents, parental financial restrictions and/or needs, and parents'/patients' lack of understanding of preventive oral health services. Considering the impacts of all health determinants such as patients' or parents' social support networks may provide clues on how to further motivate and help alleviate some of the problems this population has been struggling with.

This study showed that providing positive motivation can stimulate behavioral change in some but it will take more than providing education and increasing knowledge to change individual's perceptions and motivations towards oral health. One strategy to encourage a family routine of brushing is that parents brush their teeth with the child/children, and help the child/children with their brushing. This provides a routine and is helpful in setting promising oral health practices.

Further areas to explore could be one idea recommended by Weinstein, Harrison, & Benton (2006) where they suggest that motivational interviewing, a development of counselling skills that help patients alter problematic behaviour (Reading, 2010), along with traditional oral health education, is an effective technique to positively influence the oral health behaviours of parents.

One must also consider the importance of reducing parents' dental fear. High levels of dental anxiety in parents could lead to unfamiliarity with oral health care and avoidance of dental care services not only for the parents, but also for their child/children (Akpabio et al., 2008). Again, strategies for reducing anxiety even before the parent encounters an oral health professional are needed.

Children represent a vulnerable population because they are unable to communicate and are dependent on their parents for all their needs. Because infants and children see their primary care health providers on a frequent basis during the first five years of life, primary care health providers can play an important role in the prevention of ECC (Kagihara et al., 2009). A collaboration of practices between medical and dental health professionals should be worked on so parents are aware of their options and responsibilities of providing oral health care to their children. According to Pourat et al. (2015) having medical and dental practices situated in one location can benefit patients in the following ways: less time off from work if they can visit both practices in one day; medical practitioners can provide oral screenings and make the appropriate referrals and vice versa; co-management of patients benefits the patient and practitioners. All of that equals patient-centered care, which addresses both dental and medical needs in a single practice facility. More research, training, and education should be completed to make this type of collaborative practice a reality.

Health care providers and educators must continue to provide the most current, evidence-based oral health knowledge, whether it be chair side or in a classroom, striving to motivate and encourage every individual to better oral health practices while taking into consideration the individual's social determinants of health and stages of change. Focusing attention on parents and children can help to establish good, lifelong oral health practices.

The main finding of this research was providing oral health information can increase knowledge, but translating knowledge into action is a difficult adjustment to make. In the future, a more in-depth qualitative community based research project within

this community's population could dig deeper into barriers to care and provide an indication of how one can help overcome these difficulties in the future.

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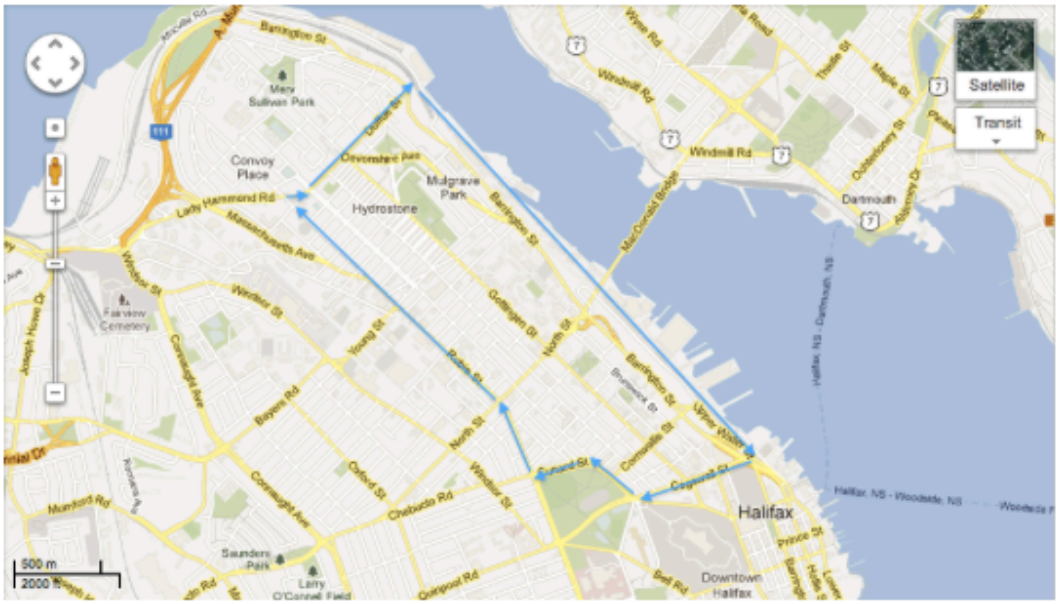
Appendix A: North End Community Health Centers catchment area



Our catchment area includes the odd #s on Cogswell St. to the even #s of Duffus St., and the odd #s of Robie St. to the water.

Map data © 2016 Google

Appendix B: Oral Health Questionnaire

Please choose **ONE** answer from the following 17 questions**.**

1. Dental decay or cavities are contagious. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

2. Flossing should be done daily to clean between the teeth. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

3. Regular dental visits help teeth and gums to be healthier. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

4. Pregnant women should avoid dental treatment unless it is an emergency. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

5. A mother's poor oral health may cause delivery to be premature and/or low birth weight baby. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

6. The first tooth usually appears around 6 months of age. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

7. Sleeping with a bottle containing formula could cause cavities in a baby's teeth. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

8. Cavities in baby teeth are OK because the teeth will fall out eventually. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

9. The best time for a baby to have the first visit to a dental office is before their first birthday. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

10. It's ok for a mom to clean her baby's pacifier by putting it in her mouth before giving it back to her baby. (Stevens et al., 2007)

    a. True
    b. False
    c. I do not know

11. The condition of your teeth can affect your child's teeth.

    a. True
    b. False
    c. I do not know

12. Dental decay is a disease that can cause serious health problems.

    a. True
    b. False
    c. I do not know

13. Bleeding gums are normal.

    a. True
    b. False
    c. I do not know

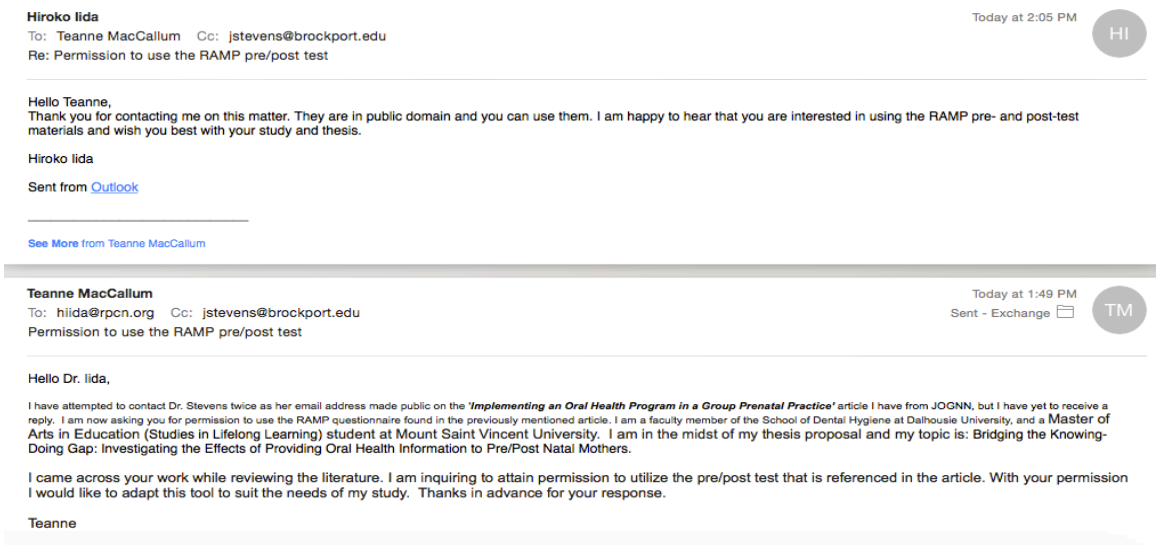
14. My teeth and mouth are healthy.
    a. True
    b. False

15. I like the way my teeth look.
    a. True
    b. False

16. I worry about my teeth and mouth.
    a. True
    b. False

17. My teeth will decay no matter what I do.
    a. True
    b. False

Appendix C: Letter of Permission



Hiroko Iida Today at 2:05 PM

To: Teanne MacCallum Cc: jstevens@brockport.edu

Re: Permission to use the RAMP pre/post test

HI

Hello Teanne,
Thank you for contacting me on this matter. They are in public domain and you can use them. I am happy to hear that you are interested in using the RAMP pre- and post-test materials and wish you best with your study and thesis.

Hiroko Iida

Sent from Outlook

See More from Teanne MacCallum

Teanne MacCallum Today at 1:49 PM

To: hilda@rpcn.org Cc: jstevens@brockport.edu Sent - Exchange

Permission to use the RAMP pre/post test

TM

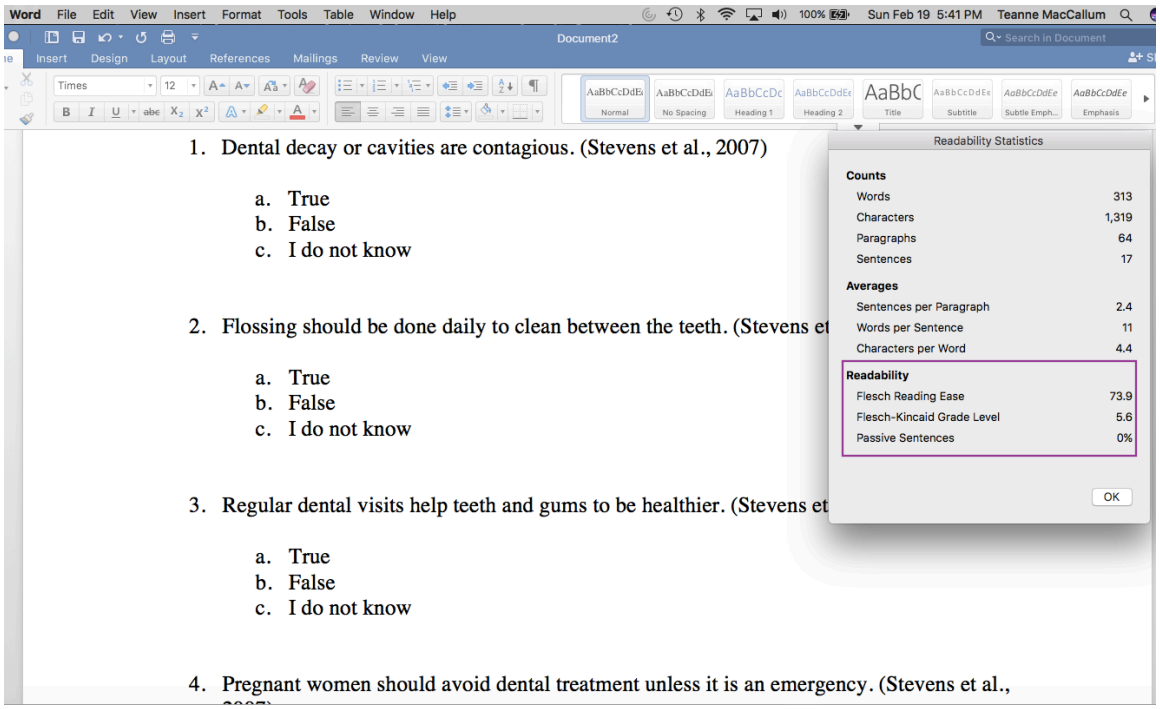
Hello Dr. Iida,

I have attempted to contact Dr. Stevens twice as her email address made public on the ***'Implementing an Oral Health Program in a Group Prenatal Practice'*** article I have from JOGNN, but I have yet to receive a reply. I am now asking you for permission to use the RAMP questionnaire found in the previously mentioned article. I am a faculty member of the School of Dental Hygiene at Dalhousie University, and a Master of Arts in Education (Studies in Lifelong Learning) student at Mount Saint Vincent University. I am in the midst of my thesis proposal and my topic is: Bridging the Knowing-Doing Gap: Investigating the Effects of Providing Oral Health Information to Pre/Post Natal Mothers.

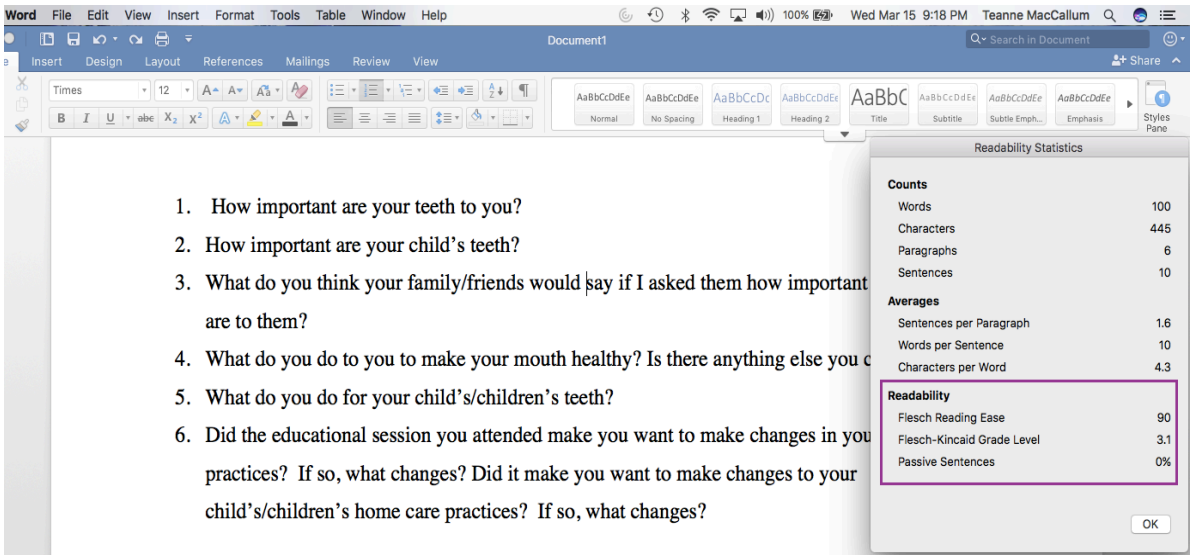
I came across your work while reviewing the literature. I am inquiring to attain permission to utilize the pre/post test that is referenced in the article. With your permission I would like to adapt this tool to suit the needs of my study. Thanks in advance for your response.

Teanne

Appendix D: Questionnaires Flesch-Kincaid Readability Score



Appendix E: Interview Questions Flesch-Kincaid Readability Score



Appendix F: Phase I Consent Form

CONSENT FORM PHASE I

Project title: Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Mothers

Lead researcher: Teanne MacCallum BDH
5981 University Avenue, Halifax, NS
(902) 494-8862 or tn952374@dal.ca

Thesis Committee
Jim Sharpe (Supervisor)
Joanne Clovis
Martha Brillant

Funding provided by: Faculty of Dentistry, Dalhousie University

Introduction
We invite you to take part in a research study being conducted Teanne MacCallum, a student at Mount Saint Vincent University, as part of her graduate degree program. Choosing whether to take part in this research is entirely your choice. You can still attend this education session if you decide not to participate in the research. The information below tells you about what is involved in the research, what you will be asked to do and about any benefit, risk, inconvenience or discomfort that you might experience.

You should discuss any questions you have about this study with Teanne MacCallum. Please ask as many questions as you like. If you have questions later, please contact Teanne by email or phone.

Purpose and Outline of the Research Study
The purpose of this study is to learn if attending an oral health education session can help your oral health knowledge and change attitudes about oral health.

Who Can Take Part in the Research Study
You may participate in this study if you are:

- sixteen years old of age or older AND
- you are a mother or primary caregiver of a child under the age of 71 months, OR you are an expectant mother.

What You Will Be Asked to Do
You are invited to attend one session on oral health as a part of your regular pre/post natal, baby wellness sessions. If you decide to be a part of the research study, you will be asked to complete a questionnaire before the session begins. After the 60-minute session you will be asked to complete the same questionnaire again. The entire process will take about one and a half hours. During the session, we will talk about facts that everyone should know about their teeth and mouths for all stages of life, when your baby should have their first dental visit and why teeth are important.

Possible Benefits, Risks and Discomforts
By participating in this research, you may have a better understanding of your oral health and the oral health of your child.

Risks: The risks associated with this study are minimal. You can choose not to answer any questions that make you uncomfortable and you are free to leave the study at any time.

Compensation / Reimbursement
To thank you for your time, everyone who attends the education session and completes both questionnaires will be given one $20 gift card for a local grocery store. Participants are also invited to receive a free dental cleaning from Teanne MacCallum at a later date.

There will also be a draw for an Oral-B electric toothbrush. Everyone that attends the session will be entered into the door prize draw, even if they decide not to participate in the research study.

How your information will be protected
Information that you provide to us will be kept private. Only the research team at MSVU and Dalhousie University will have access to this information. The research identification papers will be kept in a secure folder and all documents will be stored in a filing cabinet in a locked office at Dalhousie University. All electronic records will be kept secure in a file on the researcher's password-protected computer and backed up on a secure server at Dalhousie University. We will use a participant number (not your name) in our written and computer records so that the information we have about you contains no names. We will describe and share our findings in a thesis paper, presentations, and journal articles. We will be very careful to only talk about group results so that no one will be identified.

If You Decide to Stop Participating
You are free to leave the study at any time. Withdrawing from the study will not impact the care you receive from the NECHC in any way. You can choose to leave the educational session at any time or choose not to complete the questionnaires. If you decide to stop participating at any point in the study, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information. You can also decide for up to one month if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be analyzed.

How to Obtain Results
No individual results will be provided. However when the results of this study are completed, Teanne MacCallum will present the findings to the NECHC staff and you are welcome to attend this information session.

Questions
We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Teanne MacCallum at 902 494-8862, teanne.maccallum@dal.ca or Jim Sharpe (supervisor) at Jim.Sharpe@msvu.ca at any time with questions, comments, or concerns about the research study (if you are calling long distance, please call collect). We will also tell you if any new information comes up that could affect your decision to participate.

If you have questions about how this study is being conducted and wish to speak with someone not directly involved in the study, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research Office, at 457-6350 or via e-mail at research@msvu.ca

Appendix G: Research ID Numbers

RESEARCH IDENTIFICATION NUMBERS

ID # **10**

Name:_____
(please print)

Signature:_____

Appendix H: Oral Health Education Topics

Modified Oral Health Education Topics that correlate with Oral Health Questionnaire (Pre/Post)

Facts about oral health everyone should know	**Facts about oral health that pregnant women should know**
○ Gingivitis and periodontitis ○ Oral health connection to overall health ○ Caries process ○ The use of fluorides [all, including fluoridated water such as here in HRM] ○ The transfer of bacteria to children, spouses, family members	○ Pregnancy gingivitis ○ Association between poor maternal oral health and the risk for low birth weight/premature delivery ○ Nutrition during pregnancy and association with oral disease ○ The use of fluorides ○ The transfer of maternal bacteria to the child
Daily dos for everyone	**Do's during pregnancy**
○ Regular dental visits and dental cleanings ○ Oral health practices at home: brushing and flossing ○ Nutritional effects on oral health	○ Regular dental visits and dental cleanings during pregnancy ○ Oral health practices at home: brushing and flossing
General oral health	**Baby's oral health**
○ Healthy gums – bleeding is not ok ○ Healthy teeth – decay is not normal	○ Timing of baby teeth eruption ○ Early childhood caries (baby bottle decay)
Do's for parents	**Do's for baby**
○ Oral health for parents ○ Prevention of dental decay ○ Prevention of gum diseases	○ Oral health care for infant and toddlers at home ○ Prevention of early childhood caries
Dental visits for self	**First dental visit for children**
○ Regular dental visits ○ What to expect	○ Appropriate time for children's dental visit ○ What to expect at children's first dental visit
Why teeth are important	**Why baby are teeth important**
○ Chewing ○ Speaking ○ Smiling ○ Self esteem ○ Employability	○ Chewing ○ Speaking ○ Smiling ○ Holds space for their adult teeth ○ Normal growth and development

Appendix I: Interview Questions

1. How important are your teeth to you? [Social effects/physical]
2. How important are your child's teeth? [Social effects/developmental effects/physical]
3. What do you think your family/friends would say if I asked them how important their teeth are to them? [Social effects]
4. What do you do to you to make your mouth healthy? Is there anything else you could do? [Behavioral]
5. What do you do for your child's/children's teeth? [Behavioral]
6. Did the educational session you attended make you want to make changes in your home care practices? If so, what changes? Did it make you want to make changes to your child's/children's home care practices? If so, what changes?

Appendix J: Phase II Consent Form

CONSENT FORM PHASE II

Project title: Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Mothers

Lead researcher: Teanne MacCallum BDH
5981 University Avenue, Halifax, NS
(902) 494-8862 or tn952374@dal.ca

Thesis Committee
Jim Sharpe (Supervisor)
Joanne Clovis
Martha Brillant

Funding provided by: Faculty of Dentistry, Dalhousie University

Introduction
We invite you to take part in a research study being conducted Teanne MacCallum, a student at Mount Saint Vincent University, as part of her graduate degree program. Choosing whether or not to take part in this research is entirely your choice. You will still receive the free dental cleaning if you decide not to participate in the research. The information below tells you about what is involved in the research, what you will be asked to do and about any benefit, risk, inconvenience or discomfort that you might experience.

You should discuss any questions you have about this study with Teanne MacCallum. Please ask as many questions as you like. If you have questions later, please contact Teanne by email or phone.

Purpose and Outline of the Research Study
The purpose of this part of the study is to find out if attending the oral health education session helped your oral health knowledge. We also want to learn more about your attitudes and beliefs about oral health.

Who Can Take Part in the Research Study
You may participate in this study if you are:

- sixteen years old of age or older AND
- you are a mother or primary caregiver of a child under the age of 71 months, OR you are an expectant mother AND
- you participated in Phase I of the study

What You Will Be Asked to Do
During this portion of the research you will be asked to answer six questions about dental health and how important it is to you and your family members. Our conversation will be audio-recorded on an iPhone. You will also be asked to complete the questionnaire from Phase I again. This will take about 30 minutes then we will begin the dental cleaning.

Possible Benefits, Risks and Discomforts
There are no direct benefits to you from participating in this research. We may learn information that will help us develop oral health education programs, which may benefit other people in the future.

Risks: The risks associated with this study are minimal. You can choose not to answer any questions that make you uncomfortable.

Compensation / Reimbursement
To thank you for your time, everyone who completes the interview and the questionnaire will be given one $20 gift card for a local grocery store.

How your information will be protected
Information that you provide to us will be kept private. Only the research team at MSVU and Dalhousie University will have access to this information. Your research identification numbers will be kept in a secure folder and all documents will be stored in a filing cabinet in a locked office at Dalhousie University. Your interview will be transferred from the iPhone to a password-protected laptop and backed up on a password-protected server at Dalhousie University. Once the file is transferred it will be deleted from the iPhone. Once the interview is transcribed into writing we will delete all copies of the audio recording. We will use a participant number (not your name) in our written and computer records so that the information we have about you contains no names. We will describe and share our findings in a thesis paper, presentations, and journal articles. We will be very careful to only talk about group results so that no one will be identified. We may use quotes from your interview in our reports, however you will not be identified.

If You Decide to Stop Participating
You are free to leave the study at any time. Withdrawing from the study will not impact the care you currently receive from the NECHC in any way. You will still receive the dental cleaning if you choose not to complete the study. If you decide to stop participating, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information. You can also decide for up to one month if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be analyzed.

How to Obtain Results
No individual results will be provided. However when the results of this study are completed, Teanne MacCallum will present the findings to the NECHC staff and you are welcome to attend this information session.

Questions
We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Teanne MacCallum at 902 494-8862, teanne.maccallum@dal.ca or Jim Sharpe (supervisor) at Jim.Sharpe@msvu.ca at any time with questions, comments, or concerns about the research study (if you are calling long distance, please call collect). We will also tell you if any new information comes up that could affect your decision to participate.

If you have questions about how this study is being conducted and wish to speak with someone not directly involved in the study, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research Office, at 457-6350 or via e-mail at research@msvu.ca.

Signature Page – Phase II

Project Title: Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Mothers

Lead Researcher: Teanne MacCallum BDH
5981 University Avenue, Halifax, NS
(902) 494-8862 or tn952374@dal.ca

I have read (or have listened to) the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I understand that I have been asked to take part in an interview and to complete a questionnaire. I understand that the interview will be recorded. I understand direct quotes of things I say may be used without identifying me. I agree to take part in this study. My participation is voluntary and I understand that I am free to withdraw from the study at any time, until one month after my interview.

_____	_____	_____
Name	Signature	Date

Appendix K: MSVU REB

University Research Ethics Board

Certificate of Research Ethics Clearance

Effective Date	March 15, 2016	Expiry Date	March 14, 2017

File #:	2015-093
Title of project:	*Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Mothers*
Researcher(s):	Teanne MacCallum
Supervisor (if applicable):	Jim Sharpe
Co-Investigators:	Joanne Clovis, Martha Brilliant
Version :	1

The University Research Ethics Board (UREB) has reviewed the above named research proposal and confirms that it respects the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and Mount Saint Vincent University's policies, procedures and guidelines regarding the ethics of research involving human participants. This certificate of research ethics clearance is valid for a period of **one year** from the date of issue.

Researchers are reminded of the following requirements:	
Changes to Protocol	Any changes to approved protocol must be reviewed and approved by the UREB **prior** to their implementation. **Form: REB.FORM.002** **Info: REB.SOP.113** **Policy: REB.POL.003**
Changes to Research Personnel	Any changes to approved persons with access to research data must be reported to the UREB immediately. **Form: REB.FORM.002** **Info: REB.SOP.113** **Policy: REB.POL.003**
Annual Renewal	Annual renewals are contingent upon an annual report submitted to the UREB **prior** to the expiry date as listed above. You may renew up to four times, at which point the file must be closed and a new application submitted for review. **Form: REB.FORM.003** **Info: REB.SOP.116** **Policy: REB.POL.003**
Final Report	A final report is due on or before the expiry date. **Form: REB.FORM.004** **Info: REB.SOP.116** **Policy: REB.POL.003**
Unanticipated Research Event	Researchers must inform the UREB immediately and submit a report to the UREB within seven (7) working days of the event. **Form: REB.FORM.008** **Info: REB.SOP.115** **Policy: REB.POL.003**
Adverse Research Event	Researchers must inform the UREB immediately and submit a report to the UREB within two (2) working days of the event. **Form: REB.FORM.007** **Info: REB.SOP.114** **Policy: REB.POL.003**

*For more information: http://www.msvu.ca/en/home/research/researchethics/policies/default.aspx

DSeguin

Dr. Daniel Séguin, Chair
University Research Ethics Board

166 Bedford Hwy Halifax Nova Scotia B3M 2J6 Canada
Tel 902 457 6350 • msvu.ca/ethics

Appendix L: Dal REB

DALHOUSIE UNIVERSITY
Research Services

Health Sciences Research Ethics Board
Letter of Approval April 20, 2016
Ms. Teanne MacCallum
Dentistry\Dental Hygiene

Dear Teanne,

REB #: 2016-3827
Project Title: Investigating Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Mothers

Effective Date: April 20, 2016
Expiry Date: April 20, 2017

The Health Sciences Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.
Sincerely,

Dr. Brenda Beagan, Chair

Appendix M: NECHC REB

North End Community Health Centre
2165 Gottingen Street
Halifax, Nova Scotia B3K 3B5
Canada
Tel.: (902) 420-0303 / Fax (902) 422-0859
e-mail: northend@nechc.com
website: www.nechc.com

June 12, 2015

To: MSVU Research Ethics Board

Re: Teanne MacCallum's Ethics Application

To Whom it May Concern;

Teanne MacCallum approached the North End Community Health Center asking permission to provide oral health education sessions during our pre-natal and baby wellness days. We understand that Teanne will be using the data that she collects during these sessions for her master's thesis that she is completing at Mount Saint Vincent's University. This letter is to confirm that she has the NECHC's permission to provide these educational sessions and to collect data as she sees fit.

Teanne has also indicated that she will be offering free dental hygiene appointments to the attendees of the oral health education session. We support this endeavor and have given her permission to work out of the NECHC's dental clinic to provide these services.

If you have any questions or concerns in regards to this letter please contact Patti Melanson at pmelanson@nechc.com or (902) 422-5642 x 3.

Sincerely,

Patti Melanson