

**Parental knowledge, attitudes and perceptions of dental caries  
and dental sealants as a preventive strategy of dental caries**

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## SUMMARY

**Introduction:** Children's oral health care should be a public health priority and parental knowledge, attitudes and perceptions (KAPs) are likely to play a role in achieving and maintaining a desired level of oral health in children.

**Aims and Objectives:** The aim of the study was to understand parents role and the use of dental sealants in Grade 1 learners' oral preventive health in the Chatsworth Circuit of the uMlazi District, KwaZulu-Natal.

The objectives of the study were to establish parental knowledge, attitudes and perceptions of Grade 1 learners towards dental caries through the use of a self-administered questionnaire, to determine parental self-oral health care practices (and consequent influence on the child) through the use of a self-administered questionnaire, to assess parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries through the use of a questionnaire and group focus discussions, to determine the relationship between gender, parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review, and lastly to determine the current oral health promotive strategies implemented by the KwaZulu-Natal (KZN) Department of Health through a review of the available policy documents and statistical records.

**Methods:** The study participants were the parents ( $n=295$ ) of grade one learners aged between five and six years old who attended schools in the Chatsworth Circuit of the uMlazi education district. From a sample population of 50 schools, twelve schools were selected from an ordered list, using systematic sampling technique. Information was obtained using a self-administered questionnaire that included questions on demographic data, oral health behaviour and knowledge patterns, income and education status, and knowledge of oral health prevention practices. Further data was obtained by conducting focus group interviews at five schools with 10 participants in each group. Ethical approval was obtained from the Humanities and Social Sciences Research Ethics Committee at the University of KwaZulu-

Natal (Reference: HSS/0327/013M) and gatekeeper permission was obtained from the relevant sections in the Department of Education and the Department of Health in the eThekweni District, KwaZulu-Natal. All participants were assured of confidentiality. Privacy and confidentiality were maintained and participant anonymity was guaranteed through the use of codes.

**Results:** Although the majority of respondents understood the role of diet and self-care practices such as tooth-brushing in the prevention of dental caries, almost 80% of these respondents did not floss or use a mouthwash (70%). Similar scores were reported by respondents for their children's oral health care practices. The study participants (74%) did not perceive dental caries in deciduous teeth as being important precursors for caries in adult teeth. The results indicate that 65% of respondents were aware of dental sealants. However only 67% of participants were willing to have sealant placements performed on their children. A significant number (33%) of respondents were uncertain or unwilling to have this procedure done. The association between the participants' level of education and the child's self-care practice was of statistical significance ( $p=0.002$ ). Almost two-thirds of the respondents (77%) had at most a high school education and about 43% of the respondents were dependent on the social welfare system ( $p=.003$ ). The results indicate that extractions is the most frequent clinical procedure with almost 192 722 procedures carried out in the eThekweni District, KwaZulu-Natal in 2011. The results further indicate that 75% ( $n=295$ ) of the participants experienced difficulties in accessing facility-based oral health care due to transport problems.

**Discussion:** The results of this study reveal gaps in parents' knowledge, attitudes and perceptions towards dental caries, oral hygiene practices, diet and nutrition, and dental sealants. The study findings further reiterate that parental attitudes and perceptions does appear to influence children's attitudes and perceptions towards oral health self-care. This is reflected in the statistical significance between the participant's level of education and the child's self-care practice. Income also appears to play a role in determining attitudes towards oral health self-care practices.

More research needs to be conducted to unravel the reasons for parents not wanting to have sealant placements done on their children despite knowledge of its known benefits. This study thus supports the premise that perceived parental knowledge of oral health self-care does not necessarily translate into practice.

It is also important to note that oral health service delivery in the public sector is still curative driven with very little focus on prevention and promotion of optimal oral health care. The low number of dental sealant placements provides further evidence that there is a mismatch between oral health policy priorities and oral health service delivery.

**Conclusion:** The study therefore concludes that parental knowledge, attitudes and perceptions towards dental caries could be influenced by education and income. Knowledge and awareness of the value of dental sealants did not necessarily translate into support for this procedure as a preventive strategy for dental caries. The literature provides supportive evidence for parental involvement in oral health promotion decision-making but the factors that influence this decision making, must be considered. More research needs to be conducted to further investigate strategies to improve parental involvement in oral health promotion decision making, specifically in the area of children's oral health care.

**Keywords:** Parental knowledge, Dental Caries, Dental Sealants, Oral Health, South Africa

## DECLARATION OF CANDIDATE

I, Brenton Ganesh Nair, declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, is my original work.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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## GLOSSARY OF TERMS AND DEFINITIONS

- Caries lesion:** The formation of cavities that are caused by the action of bacteria
- Dental caries:** A chemical dissolution of the tooth mineral surface resulting from metabolic events taking place in the dental biofilm covering the affected area
- Dental sealant:** or ‘pit and fissure sealant’ is used to describe “a chemically active liquid material that is introduced into the occlusal pits and fissures of caries susceptible teeth, that after application, either cures chemically (auto-polymerisation), or is cured with a visible light source (light-cured), thus forming a micromechanically bonded protective layer that prevents the invasion of caries-producing bacteria, and simultaneously cuts off the access of surviving caries-producing bacteria from their source of nutrients
- Parent:** is defined as one who gives birth to, or nurtures and raises a child: a father, mother, grand-parent, guardian, care-giver or sibling over 18 years old

## LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
CPQ	Child Perceptions Questionnaire
DMFT	Decayed, missing or filled teeth
DOH	Department of Health
FIS	Family Impact Scale
KZN-DoH	KwaZulu-Natal Department of Health
KZN-DoE	KwaZulu-Natal Department of Education
MCWH	Maternal Child and Women's Health
NGO	Non-Governmental Organisation
NHI	National Health Insurance
OLT	Operant Learning Theory
P-CPQ	Parental-Care-giver Perceptions Questionnaire
PHC	Primary Health Care
SBSP	School based sealant programmes
SCT	Social Cognitive Theory
StatsSA	Statistics South Africa
TPB	Theory of Planned Behaviour
UKZN	University of KwaZulu-Natal
WHO	World Health Organization

# CHAPTER 1: INTRODUCTION

## 1.1 Introduction

This study is aimed at answering research questions pertaining to parental knowledge, attitudes and perceptions of dental caries and dental sealants as a preventive strategy of dental caries. Dental caries is one of the most common disease, and is a major public health concern in South Africa and worldwide. There are numerous strategies aimed at the prevention of dental caries occurring, and this study seeks to gain an understanding of the parental knowledge, attitudes and perceptions of dental caries and dental sealants as a preventive strategy of dental caries in the Chatsworth Circuit of the uMlazi education district. This chapter will describe the background of the study, as well as the problem statement, research questions, aim and objectives, and the chapter outline.

## 1.2 Background

Dental caries (tooth decay) is one of the most prevalent chronic diseases facing people worldwide (Nakhjavani, Forutan & Nakhjavani 2013), and occurs as a result of a number of factors (substrate, bacteria, time and carbohydrates). Individuals are susceptible to this disease throughout their lifetime (Selwitz, Ismail & Pitts 2007). The disease develops in both the crowns and roots of teeth, and can occur at any stage in our life-cycle (Zafar, Yasin-Harnekar & Siddiqi 2009).

Dental caries is a preventable disease but remains poorly defined and relatively unexplored in terms of being researched in the context of developing countries, particularly in sub-Saharan Africa (Al Agili, Niazy & Pass 2012; Postma, Ayo-Yusuf & van Wyk 2008a; Kiwanuka, Astrøm & Trovik 2004). While not life-threatening, its impact on individuals and communities is considerable, resulting in pain; impaired function; deleterious influence on the child's growth rate; body weight; and ability to thrive, thus reducing quality of life (Zafar, Yasin-Harnekar & Siddiqi 2009). Early onset and rampant clinical progression makes dental caries a serious public health problem, which is compounded by the high cost of treatment (Al Agili, Niazy & Pass 2012; Zafar, Yasin-Harnekar & Siddiqi 2009). While the causes of dental caries are known and can be prevented, their high prevalence in South African children indicates that the benefits of prevention are not reaching this population group (Postma, Ayo-Yusuf & van Wyk 2008a; Department of Health, 2003).



The principal reasons for the increase in dental caries prevalence are increasing sugar consumption and inadequate exposure to fluorides, dental sealants, dietary advice and oral hygiene instruction (Douglass et al. 2001). The World Health Organisation (WHO) in its' 2003 Oral Health Report, noted that dental caries can be controlled by the collaborative action of communities, professionals and individuals by reducing the impact of sugar consumption and emphasizing the beneficial impact of preventive measures (Petersen 2003). The four main preventive strategies are oral cleanliness (tooth brushing, flossing and other aids), topical and systemic fluorides, dental sealants and dietary control (Petersen 2003). Research indicates that dental sealants are an effective preventive strategy towards dental caries and “need to be included in the basic minimum package for oral health service delivery” (Singh 2011, p. 261).

Parental knowledge, attitudes and perceptions (KAPs) have been identified as some of the factors influencing dental health and disease in children (Talekar et al. 2005; Douglass, Douglass & Silk 2004). Parental decisions are influenced by their attitudes, which reflect on the oral health of the child. Maternal and care-giver factors are important because young children are unable to care for themselves and are dependent these adults for their daily care, whether the influences are positive or negative (Nakhjavani, Forutan & Nakhjavani 2013; Adeniyi et al. 2009; Mohebbi et al. 2008). Nakhjavani, Forutan & Nakhjavani (2013) reported that from a young age, the family plays a vital role in the psychological, physical, and social aspects of a child's health, and that the duty and responsibility of parents is to maintain and improve their child's health. In this study parents are defined as a person who gives birth to, or nurtures and raises a child: a father, mother, grand-parent, guardian, care-giver or sibling over 18 years old.

A child's eating and tooth brushing behaviours are learnt in early childhood and the home environment exerts substantial influence on the development of these behaviours. Maternal or caregivers nutritional knowledge, the impact of parental feeding practices, television viewing and peer pressure play a role in influencing their child's eating behaviour (Campbell, Crawford & Heskett 2006). In other studies, the influence of parents oral hygiene practices such as their tooth brushing practices, knowledge of fluoride and poor perceptions on the importance of good oral health were found to have an impact on their child's oral health behaviour (Pine, Adair & Nicoll 2004; Blinkhorn, Wainwright-Stringer & Holloway 2001).

Improved knowledge does not mean that people will pursue healthy behaviour, nor does it mean that people will not pursue risky behavioural practices, nor does it guarantee behaviour modification practices (Gift, Corbin & Nowjack-Raymer 1994). An improvement in the understanding and knowledge of dental caries prevention could provide parents with the resources to ensure that their children improve their oral health and hygiene practices if they choose to do so, and ultimately prevent dental caries from occurring in their children (Nakhjavini, Forutan & Nakhjavani 2013).

Furthermore, the attitudes of parents to their children's dental care may be influenced by prevailing child-rearing norms within their communities (Nakhjavini, Forutan & Nakhjavani 2013; Pine, Adair & Nicoll 2004), including cultural and socio-economic factors (Pine, Adair & Nicoll 2004). Modern child raising norms emphasise children as individuals with their own rights and voices to self-determination, of which obedience is not a virtue. Forcing their children to maintain prescribed oral health regimes, or to follow controlled diets may, for many parents, present a dilemma to their child's ideology of freedom of thought and action (Pine, Adair & Nicoll 2004). Considering parents' important role in the well-being of young children, it is beneficial to determine their knowledge and attitudes as it affects the dental care children receive at home, as well as their access to dental services (Talekar et al. 2005).

### **1.3 The purpose of the study**

Research indicates that families play an important role in children's oral health. Parents help define oral health practices early in their child's life and also determine when to establish regular dental care (Hilton et al 2007). Parents are decision makers in matters of children health and healthcare, thus they play an important role in achieving the best oral health outcomes for their young children.

In South Africa, health care in the public sector, including oral health, is based on the primary health care approach, which provides the citizens with tiered access to all services, starting at clinics where primary health care services are offered, and moving upward through more specialised (tertiary) levels of care. In South Africa most oral health care is defined as:

*“essential health that is based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost the community and country can afford to maintain at every stage of their development in a spirit of self-reliance and self-determination”* (World Health Organisation 1978, p. 1-2).

In accordance with this approach, oral health care needs to be oriented towards a preventive and promotive approach that should include community participation in decision making processes. Although the mechanisms to prevent dental caries are well documented and easy to implement, there is a dearth of literature to support the existence of a well-coordinated oral health promotion programmes in KwaZulu-Natal. There are also gaps in the literature on the role of community participation in oral health decision-making in KwaZulu-Natal.

In KwaZulu-Natal, the National Children’s Oral Health Survey 1999/2002 revealed that the prevalence of dental caries in six year-olds with primary dentition was as high as 64.8% (Department of Health 2003). This Survey described the percentage of children in South Africa who required treatment for dental caries as ranging from 45%-60%, and that between two and three teeth in a six year-old child’s mouth needed dental treatment (Department of Health 2003). This indicates that there is a need for a reduction in the dental caries rate, and for improved oral health prevention.

The Chatsworth Circuit of uMlazi District in KwaZulu-Natal has a diverse population with people in varying socio-economic levels, and is very reflective of urban and peri-urban settings in KwaZulu-Natal. Many residents access care through the public sector, with a dental clinic being available on a daily basis at the RK Khans Provincial Hospital, this being the first level of care. Those needing more specialized care due to the nature and complexity of the conditions that they present with, or the care that they require, are referred to regional and tertiary hospitals in the eThekweni health district. However, the level of unmet oral health need for children is relatively unknown for this district, and no study has been conducted to determine parental understanding of oral health self-care. This study therefore arose out the need to explore these parents’ and care-givers’ understanding of oral health self-care in relation to the prevention of dental caries.

The study can make a contribution to highlighting the gaps and opportunities for parental involvement in influencing children's oral health care. Although the study findings is restricted to the Chatsworth area, the study can make a contribution to health policy decisions and oral health promotion planning by creating an awareness of the need for parental and community participation in oral health decision-making in KwaZulu-Natal.

#### **1.4 The Research Questions**

The research questions in this study are:

1. What are the knowledge, attitudes and perceptions of parents of grade one learners towards dental caries in the Chatsworth Circuit of the uMlazi school district?
2. What oral health self-care practices are parents of grade one learners implementing in the Chatsworth Circuit of the uMlazi school district? Do parents in the Chatsworth Circuit of the uMlazi school district teach their children to adopt these self-care oral health practices?
3. What role does parental income, level of education and socio-economic status play in their knowledge, attitudes and perceptions of oral health self-care practices of parents and children in the Chatsworth Circuit of the uMlazi school district?
4. What are the knowledge, attitudes and perceptions of grade one learners parents in the Chatsworth Circuit of the uMlazi school district towards dental sealants?
5. Do public oral health preventive strategies include dental sealants as part of the primary oral health care package offered to schools in the Chatsworth Circuit of the uMlazi school district?

## **1.5 Aim and objective**

The study aims to understand parents role and the use of dental sealants in Grade 1 learners' oral preventive health in the Chatsworth Circuit of the uMlazi District, KwaZulu-Natal.

### **Objectives**

1. To establish parental knowledge, attitudes and perceptions of Grade 1 learners towards dental caries through the use of a self-administered questionnaire.
2. To determine parental self-oral health care practices (and consequent influence on the child) through the use of a self-administered questionnaire.
3. To assess parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries through the use of a questionnaire and group focus discussions.
4. To determine the relationship between gender, parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review.
5. To determine the current oral health promotive strategies implemented by the KwaZulu-Natal (KZN) Department of Health through a review of the available policy documents and statistical records.

## **1.6 Chapter outline**

The study is presented in the following chapters:

Chapter 2: Literature Review. This chapter outlines key concepts that are relevant to the study, as well as reports on a review of the literature.

Chapter 3: Methodology. The methods used to conduct the study are reviewed in this chapter, and includes study area; study population and size; data collection; and data analysis methods.

Chapter 4: The results of the study are presented in this chapter.

Chapter 5: The results of the study are discussed in this chapter.

Chapter 6: In this chapter the conclusion and recommendations of the study are presented.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The study aims to gain an understanding of parental knowledge, attitudes and perceptions of dental caries and dental sealants as a preventive strategy of dental caries. The chapter begins with a review of the current literature reviewing concepts such as the prevalence of dental caries in children in South Africa; provides a review of the causes and management of dental caries in children; relevant prevention measures, specifically dental sealants; and a situational analysis of the uMlazi education district.

### **2.2 Dental caries in children**

The physical, psychological and economic consequences of early childhood dental caries can be avoided, or at least minimised, through the education of prospective and new parents on good oral hygiene and dietary practices, and the use of oral preventive agents such as fluoride and dental sealants (Nakhjavani, Forutan & Nakhjavani 2013). Early childhood caries management requires family engagement in day-to-day behaviour modifications (tooth brushing, topical fluorides, dental sealants and dietary control) that address caries disease aetiology (Gussy et al. 2006). The strategies practised at home are collectively referred to as oral health self-care practices, and include tooth-brushing, use of fluoridated toothpaste, dietary intake and oral health education.

The anatomical structure of posterior teeth makes them more susceptible to dental caries which results in a significant amount of tooth decay occurring at these sites (Yengopal et al. 2009a). Seventy one percent of occlusal decay can be prevented after a once-off dental sealant application (Locker, Jokovic & Kay 2003). Its caries-preventive effect relies on the sealing of pits and fissures of molars through micro-retention, created through tags after enamel acid etching (Feigal 2002; Simonsen 2002). Recommendations made by systematic reviews are that dental sealants should be placed as part of an overall prevention strategy to prevent dental decay in the permanent teeth of children and adolescents (Yengopal et al. 2009a; Ahovuo-Saloranta et al. 2008). Apart from these studies concluding that sealants are effective in caries prevention, the research suggests that sealants can prevent the progression of early non-cavitated carious lesions. Despite epidemiological studies supporting dental

sealant usage and the technology of sealants having improved, this has been limited (Ahovuo-Saloranta et al. 2008; Beauchamp et al. 2008; Wendt, Koch & Birkhed 2001).

Therefore an ‘upstream’ approach (where the parent demands a service or procedure from a practitioner instead of the practitioner recommending the procedure to the patient) is recommended for an oral health promotion programme requires creating awareness among parents on the aetiology of dental caries and the various preventive interventions. By empowering communities with information about the benefits of preventive care, including the benefits of dental sealants for their children, the result could contribute to a more positive oral health outcome (Watt 2007; Talekar et al. 2005; Pine, Adair & Nicoll 2004).

Epidemiological studies have focused on the knowledge and attitudes of dental professionals towards dental sealants, and have described factors that led to their under-utilisation (Asawa et al. 2014; San Martin et al. 2013). These studies identified several ‘downstream’, such as cost and parents inability to pay for dental sealants, as major barriers to patients receiving this service, as well as poor knowledge and attitude displayed by some dental service providers (Asawa et al. 2014; San Martin et al. 2013). Asawa et al. (2014) suggests that professional organisations should take a more active role in promoting dental sealants to its members, and that oral health professional organisations and governmental agencies should increase their efforts in educating patients of the benefits of dental sealants. A further recommendation is that dental sealant manufacturers should make an effort to promote dental sealants (Asawa et al. 2014; San Martin et al. 2013).

Considering parent’s important role in the well-being of young children, it is beneficial to establish their knowledge and attitude towards oral health care, as this affects the dental care children receive and their access to dental services (Nakhjavini, Forutan & Nakhjavani 2013; Talekar et al. 2005). A child’s eating and tooth-brushing behaviours are learned in early childhood and the home environment exerts substantial influence on the development of these behaviours (Nakhjavini, Forutan & Nakhjavani 2013; Department of Health 2003). Maternal or caregivers nutritional knowledge, impact of parental feeding practices, television viewing and peer pressure play a role in influencing the child’s eating behaviour (Campbell, Crawford & Heskett 2006). In a number of studies, the influence of parents oral hygiene practices such as tooth-brushing practices, knowledge of fluoride and poor perceptions on the importance of

good oral health, were found to have an impact on the child's oral health behaviour (Pine, Adair & Nicoll 2004; Blinkhorn, Wainwright-Stringer & Holloway 2001).

### **2.3 Prevalence of dental caries in children in South Africa**

In South Africa, the National Children Oral Health Survey of 1999/2002 illustrated that children living in the urban areas have significantly higher rates of dental caries than children living in rural areas, and that oral health need varied widely from province to province (Department of Health 2003). The survey also described the percentage of children in South Africa who required treatment for dental caries as ranging from 45%-60 %, with the mean number of teeth needing care ranging from between two to three teeth per child (Department of Health 2003). The greatest need was recorded in the Western Cape, where almost 80% of children needed oral health care, while the lowest need for dental caries care was recorded in Limpopo Province (Department of Health 2003).

In KwaZulu-Natal, the prevalence of dental caries in 6-year olds with primary dentition was recorded as 64.8% (Department of Health 2003). Oral health need varied widely with the 4-5, and 6-year old age groups, requiring more conservative and emergency relief of pain care in comparison to the older groups. The need for preventive services was greatest in the 12-year group, and for extraction was lowest in both 12 and 15-year-old children (Department of Health 2003). A review study of dental caries rates in South Africa and its consequent implications for oral health planning was conducted by Singh (2011). The study described the most common oral health needs identified in children being personal preventive services and restorative treatment.

### **2.4 Dental caries prevention in children**

A number of authors have suggested that a framework for any oral health promotion programme should include the following five approaches, namely, medical, behaviour change, education, client-centred approach and societal change (Pine, Adair & Nicoll 2004; Petersen 2003). In addition, dental caries preventive programmes in children cannot be conducted in isolation, and should be a collaborative health promotion effort (Petersen 2003). A framework for any oral health promotion programme should include the following five approaches, namely, medical, behaviour change, education, client-centred approach and



societal change (Pine, Adair & Nicoll 2004; Petersen 2003). Within that framework, the management of caries in children comprises of a range of comprehensive strategies, with the four main preventive strategies being tooth-brushing, topical fluorides, dental sealants and dietary control (Petersen 2003). Dental caries preventive programmes in children cannot be conducted in isolation and should be a collaborative health promotion effort (Petersen 2003).

A review of literature on oral disease prevention have highlighted the limitations of educational interventions in producing sustained improvements in oral health, or for reducing oral health inequalities (Watt & Marinho 2005). However, undertaken in specific communities, nor were they designed at a grass-roots level that takes into consideration the socio-economic and educational levels of the targeted populations.

Dental caries preventive strategy should focus on educational programmes to improve children's feeding practices, and to reduce levels of oral bacterial infection by using correct tooth-brushing techniques (Featherstone 2004). Oral health education programmes play a vital role in caries prevention, and should be directed at populations at risk, including school-going children, new mothers and disadvantaged populations (Grobler, Louw & Kotze 2001). Limited evidence exists on the cost effectiveness of oral health prevention programmes in South Africa (Kitchens 2005). However, international epidemiological studies found that in many cases, clinical personnel are involved in delivering these interventions, thereby increasing their costs considerably (Nakhjavini, Forutan & Nakhjavani 2013; Kitchens 2005).

The use of fluoride is another preventive strategy towards dental caries prevention. The effect of fluoride in reducing caries is well established and may be delivered either topically or systemically (Grobler, Louw & van Kotze 2001). The most common method for systematically applied fluoride is fluoridated drinking water, which have proven effectiveness in reducing the severity of dental decay in entire populations (Grobler, Louw & Kotze 2001). In its absence, other modalities such as the administration of salt fluoridation or fluoride supplements (beverages, tablets, drops) can be utilized (Marinho et al. 2003). Supervised regular use of fluoride mouth rinse and rinsing at certain intervals resulted in the reduction in dental caries increment in children (Marinho et al. 2003). Another effective vehicle to dispense fluoride is through the use of fluoridated toothpaste (Marinho et al. 2003). However Marinho et al. (2003) reported that the effectiveness of fluoridated toothpastes is limited to the behaviour of the individual as well as the family in purchasing and using these

toothpastes. These authors further argued that the uptake and use of fluoridated toothpastes is not uniform and less likely in disadvantage groups (Marinho et al. 2003). However Singh (2011) proposes that if fluoridated toothpaste was made available at an affordable cost then this would be a viable and cost-effective measure that could lead to effective caries prevention in children.

In South Africa, an epidemiological study was conducted by Grobler, Louw & Kotze (2001) to determine the relationship between dental caries experience, degree of fluorosis and different concentrations of fluoride in the drinking water of children. This study concluded that a positive association between high fluoride levels in the drinking water and dental caries existed (Grobler, Louw & Kotze. 2001). Fluorides provide more protection for smooth surfaces of teeth than rough surfaces, the key method of protecting tooth surfaces with pits and fissures, particularly on chewing surfaces, is dental sealants (Nakhjavani, Forutan & Nakhjavani 2013; Gift, Corbin & Nowjack-Raymer 1994). On the 08<sup>th</sup> of September 2000 the Minister of Health, after consulting with the Minister of Water Affairs and Forestry, enacted regulations pertaining to the fluoridation of water which was published in a gazette (Government Gazette No 21533 Notice No. R873, 2000). These regulations made it compulsory for all water providers, unless exempted, to fluoridate the water that they supply to the local authorities to a level of 0.2 milligrams fluoride per litre of water (Government Gazette No 21533 Notice No. R873, 2000). However these regulations have not yet been fully implemented. Thus most South Africans who live in areas where water is supplied by the water providers are consumers of water that has a fluoride content that is below the level required to have an anti-cariogenic effect.

A critical review of current dental health preventive strategies at national, provincial and local levels reveals that these strategies are poorly implemented, inconsistent, fragmented and not evaluated at design, implementation, and post-implementation levels (Postma, Ayo-Yusuf & van Wyk 2008a; Kiwanuka, Astrøm & Trovik 2004). Reviews of literature on oral disease prevention have highlighted the limitations of educational interventions in producing sustained improvements in oral health, or for reducing oral health inequalities (Watt & Marinho 2005). However the researcher in this study criticises these studies limitations in that they are not aligned to specific communities, nor are they designed at a grass-roots level that takes into consideration the socio-economic and educational levels of the targeted populations.

Dental caries preventive strategy should focus on educational programmes to improve children's feeding practices, and to reduce levels of oral bacterial infection by using correct tooth-brushing techniques (Featherstone 2004). Oral health education programmes play a vital role in caries prevention and should be directed at populations at risk, and these include school-going children, new mothers and disadvantaged populations (Grobler, Louw & Kotze 2001). Limited evidence exists on the cost effectiveness of oral health prevention programmes in South Africa (Kitchens 2005). However, international epidemiological studies found that in many cases clinical personnel are involved in delivering these interventions, thereby increasing their costs considerably (Nakhjavani, Forutan & Nakhjavani 2013; Kitchens 2005).

The implications of these studies are that preventive strategies cannot be implemented in isolation to reduce the rate of childhood dental caries, and must be part of a more holistic, multi-factorial approach that is needed for oral health prevention programmes (Watt 2007). Key principles of the programme, as stated in the Ottawa Charter for Health Promotion, must include:

- community empowerment;
- participation of key stakeholders;
- use of a broad approach focusing upon common risks;
- establishing partnerships across all relevant sectors;
- addressing oral health inequalities;
- use of evidenced-based dentistry;
- healthy public policies;
- and directing sufficient resources towards monitoring and evaluating oral health interventions (World Health Organisation 1986).

Watt (2007) recommended that oral health prevention programmes should be aimed at target audiences in the greater population through the use of mass-media platforms. Additional programmes should be focused at people on an individual basis (such as tooth-brushing programmes). Oral health promotion programmes should be aimed at two audiences: the greater population using mass media to disseminate oral health education; and at individuals using small-group or individual behaviour change such as tooth-brushing programmes. However behaviour or lifestyle changes alone will not produce major health gains (Watt 2007).

## **2.5 Dental sealants as an evidenced-based strategy**

Epidemiological studies have found strong evidence of dental sealant effectiveness on sound posterior teeth in children and adolescents (Al Agili, Niazy & Pass 2012; Hiiri et al. 2010; Gooch et al. 2009; Griffin, Gray & Kohn 2009; Yengopal et al. 2009a). The studies concluded that dental sealants should be part of an overall prevention strategy based on an assessment of caries risk, and provided through clinics, mobile units or school settings. This could reduce dental caries in the pits and fissures of posterior teeth by 60% from two to five years after placement (Al Agili, Niazy & Pass 2012; Gooch et al. 2009). Placement of auto-polymerised dental sealants can reduce caries by 78% in the first year and by 59% at four years or more (Gooch et al. 2009).

Evidence in the literature from epidemiological studies makes the following conclusions and recommendations relevant to this study. On the effectiveness of dental sealants, the reviews confirm the efficacy of dental sealants in preventing dental caries in children, in both primary and permanent teeth. There is some evidence that placing sealant material over arrested caries or incipient lesions does not increase the risk of further development of caries under the sealant (Beauchamp et al. 2008). Dental sealants should be placed on the primary molars of children who are susceptible to caries, as well as on the first and second permanent molar teeth within four years after eruption (Beauchamp et al. 2008). This study concluded that dental sealants should be placed as part of an overall prevention strategy based on assessment of caries risk (Beauchamp et al. 2008). Other preventive measures include applying topical fluoride, education, nutritional counselling and regular clinical reviews (Hiiri et al. 2010; Yengopal et al. 2009a; Yengopal et al. 2009b; Ahovuo-Saloranta et al. 2008; Beauchamp et al. 2008).

The strong scientific evidence lays a firm foundation for school-based sealant programmes. This health promotional activity is an important and effective public health approach that complements clinical care systems in promoting the oral health of children and adolescents. School programmes can increase access to services, such as dental sealant placement, especially among vulnerable children less likely to receive private dental care (Hiiri et al. 2010; Yengopal et al. 2009a; Yengopal et al. 2009b). In addition, school programmes have the potential to link learners with treatment services in the community and facilitate enrolment of eligible children in public insurance programmes (Gooch et al. 2009). School-based sealant programmes have the potential to reduce racial and economic disparities (Gooch et al. 2009). However, the extent to which the sealant programmes can eliminate the

disparity will be influenced by the target populations selected and the processes involved (Siegal et al. 2001). While South Africa does not have a fully functional public health insurance system as yet, school children in public schools are offered oral health services through a publicly funded school and general oral healthcare service.

One limitation of a preventive strategy that uses sealants is that clinical personnel are required in delivering this intervention in a specified clinical environment, hence increasing the cost of the programme (Gooch et al. 2009; Yengopal et al. 2009b). A second limitation is that the process of applying dental sealants to molars is technique-sensitive, and the successful retention of dental sealants on teeth is dependent on the clinical competency of the dental practitioner as well as on the type of material used (Hiiri et al. 2010; Gooch et al. 2009; Griffin, Gray & Kohn 2009; Yengopal et al. 2009b).

South Africa is in the pilot-phase roll-out of a national healthcare funding programme known as the National Health Insurance scheme (NHI) roll-out (Department of Health 2011). This has been described in a policy document (green paper) as being an ‘innovative system of healthcare financing that will ensure that everyone has access to appropriate, efficient and quality health services’ (Department of Health 2011). As more South Africans have access to healthcare, the financial burden on the public health system could be decreased in the long-term if more preventive strategies are implemented. There could result in a reduced prevalence of dental diseases, and hence a decrease in the demand for costly curative dental care (Department of Health 2011).

One limitation of this preventive strategy is that clinical personnel is required in delivering this intervention in a specified clinical environment, hence increasing the cost of the programme (Gooch et al. 2009; Yengopal et al. 2009b). A second limitation is that the process of applying dental sealants to molars is technique-sensitive, and the successful retention of dental sealants on teeth is dependent on the clinical competency of the dental practitioner, and on the type of material that has been used (Hiiri et al. 2010; Gooch et al. 2009; Griffin, Gray & Kohn 2009; Yengopal et al. 2009b).

A third limitation is the cost implications of placing dental sealants. A study by Weintraub et al. (2001) assessed the dental experience of 15 438 children over a seven-year period. The study investigated the likelihood of restorative treatments and associated cumulative medical aid insurance expenditure for teeth with or without dental sealants. The study found that

dental sealant placement was associated with expenditure savings to medical aid companies (Weintraub et al. 2001).

## **2.6 Disadvantages of dental sealants**

There is a dearth of literature on the possible disadvantages of dental sealants, with a review indicating that they can be categorised into two types, namely clinical and functional.

**a. Clinical disadvantages:** Pulgar et al (2000) state that most of the composites and dental sealants used in dentistry are based on bisphenol A diglycidylethermethacrylate (Bis-GMA). These authors further argue that there have been concerns about the estrogenicity of bisphenol A (BPA) as complete polymerization may not occur, thus allowing for the leeching of this material into children's saliva. Chen and Suh (2013) found that short-term administration of BIS-GMA and/or bisphenol A in animals or cell cultures can induce changes in estrogen-sensitive organs or cells, but concluded that the quantity of BPA was minimal and the use of dental sealants was considered safe.

**b. Functional disadvantages:** Tilliss et al. (1992) argue that there is no need for the adjustment of the occlusion of the individual patient post-dental sealant placement. However they also argue that there are perceptible occlusal changes which the patient may become aware of, and are the result of the type of dental sealant used. These authors found that children were unable to abrade the sealants on their own, and this may lead to jaw discomfort, pain and minor occlusal changes, and which could be largely eliminated once the sealant was adjusted at subsequent dental treatment sessions (Tilliss et al. 1992).

A review of the disadvantages of dental sealants reveals that they are either minimal, or can easily be prevented through appropriate clinical techniques, and thus are considered to be safe for use.

## **2.7 South African oral health policy and oral health promotion programmes on the use of dental sealants**

The Ottawa Charter provides a vision for improving population health (World Health Organisation 1986). Although the principles of the Ottawa Charter do inform the South African health policy's primary health care orientation, the high prevalence of dental caries in six-year-old children in KwaZulu-Natal indicates that current strategies and interventions are not successful, indicating the need for a stronger focus on prevention. Rather than implementing narrowly-focused behavioural, lifestyle and educational 'downstream' interventions, future 'upstream' action is needed to create a social environment that supports and maintains good oral health (Watt 2007).

Traditionally, health education has focused on education and towards individual behaviour or lifestyle changes. This approach alone will not be effective in achieving sustainable oral health improvements, specifically for people who receive minimal basic oral health care in the public sector (Nakhjavani, Forutan & Nakhjavani 2013). One criticism of this approach is that it focuses on modifying individual behavioural practices and inadvertently amounts to victim blaming (Watt 2007). This researcher suggests that a paradigm shift is therefore needed away from the biomedical and behavioural approach to one that addresses the underlying social determinants (the common risk factor approach) of oral health through a combination of complementary public health strategies.

Singh (2005) and Singh (2011) found little evidence at present to suggest that the impact of dental caries is addressed in either maternal and child policy developments or in general health policy and service provision policies in South Africa. Despite the development of dedicated child health programmes at both national and provincial levels, there are significant gaps between policy initiatives and their successful implementation. The limitations described in a review of the oral health component in South African health policies was that most strategies completely ignored the social, economic and environmental impact on the caries process (Singh 2005). No mention in any health policy documents is made of the impact of fluoride additives and dental sealants in controlling the development of dental caries and found there is no evidence of policy efforts to guide dental preventive programmes in South Africa (Singh 2005). The development and implementation of oral health promotion and service delivery strategies appear to be dominated by dental professionals who continue to focus on curative rather than preventive measures, such as dental sealants (Singh, Myburgh & Lalloo 2010).

## **2.8 Factors that play a role in the use of dental sealants**

Parents help define oral health practices early in their child's life and also determine when to establish regular dental care. The influence of parents' tooth brushing practices, knowledge of fluoride and poor perceptions on the importance of good oral health; have a negative impact on their child's behaviour (Finlayson et al. 2005; Pine, Adair & Nicoll 2004; Blinkhorn, Wainwright-Stringer & Holloway 2001). Parents' reliance on personal oral health experiences to guide their care of their child's teeth contribute to many children experiencing early childhood caries and delayed dental care. In a study by Horton and Barker (2009), parents misdiagnosed their child's caries as tooth "stains" in need of cleaning, and delayed care seeking until the child developed tooth pain (Horton and Barker 2009).

A review of these studies (Horton and Barker 2009; Finlayson et al. 2005; Pine, Adair & Nicoll 2004; Blinkhorn, Wainwright-Stringer & Holloway 2001) indicate that none of them focused exclusively on the parents of children at risk of dental caries. It will be useful in planning an oral health prevention programme by first exploring parental knowledge, attitudes and perceptions towards dental caries and the management of preventive strategies for this disease, and to use the information generated in the planning of oral health education, promotion and treatment interventions.

Other factors that may play a role in the use of dental sealants are discussed below, and include age, level of education and literacy, socio-economic status, perceptions of blame, access to healthcare and oral health education.

### **2.8.1 Age**

Parental age is an important social background factor in preschool children's dental health. A previous study revealed that maternal age should be accounted for in studies of mother–infant interactions, and child outcomes, as linear age-effects and late childbearing represent unique categories of risk for poor parenting outcomes and thus poor child dental health (Nakhjavani, Forutan & Nakhjavani 2013).

### **2.8.2 Level of education and literacy**

The number of parents who practiced home oral hygiene practices, such as tooth-brushing and dental education, as a means to reduce dental caries in their children was related to their level of education (Nakhjavani, Forutan & Nakhjavani 2013). Parents of healthy children had



a statistically significantly higher level of education than parents of diseased children ( $p < 0.05$ ). The level of education did not influence their knowledge but rather the ability to put the knowledge into practice. Parents who received a combination of verbal and written information from healthcare workers were more likely to have children with good oral health. In contrast parents who had only received verbal information from healthcare workers were more likely to have children with poor oral health (Nakhjavini, Forutan & Nakhjavani 2013).

Another factor to be considered is the level of literacy of caregivers, which has been shown to be significantly associated with children's oral disease. A direct relationship was found between the oral health literacy among caregivers and its impact on oral health outcomes in early childhood (Vann et al. 2010).

### **2.8.3 Socio-economic status**

Parent's behaviour is influenced by family income (Nakhjavini, Forutan & Nakhjavani 2013), with a study by Arnrup et al. (2002) concluding that parents who had a significantly lower socio-economic status had a higher level of dental fear compared to parents of higher economic status (Arnrup et al. 2002). Children of parents from a low socio-economic status also had sweets more often compared to children of parents of a higher socio-economic status. Parents of lower socio-economic status showed a lower responsibility-taking related to the child's treatment-refusal. Parents of uncooperative children have been shown to display differences in a number of areas, not only in socio-economic status and dental fear, but also in aspects such as dental knowledge and responsibility-taking (Arnrup et al. 2002).

In South Africa, the socio-economic status of the white population is still considerably higher when compared to that of the Asian, coloured and black populations (Postma, Ayo-Yusuf & van Wyk 2008a). The literature review by these researchers revealed that low socio-economic status could be associated with an increase in childhood caries prevalence. They concluded that the prevalence of childhood caries was lower in the white population group compared to the black and the coloured populations, as the former enjoyed a higher socio-economic status and were able to afford preventive check-ups and treatment (Postma, Ayo-Yusuf & van Wyk 2008a).

In this study, the high dental caries rates in South Africa is not seen just as a racial problem, but as a result of social inequalities, access to oral health care, utilisation of dental services and attitudes of dental personnel towards preventive strategies, such as dental sealants. Analysis of attendance rates at Soweto dental clinics for the period 1995-2002 found that the patient attendance rates increased during the year after the implementation of free primary oral health care in 1995 with an increase in dental operator workload (Harkinson & Cleaton-Jones 2004; Bhayat & Cleaton-Jones 2003). These high workloads, when combined with the knowledge and attitude of dental practitioners towards dental caries may influence these dental practitioners willingness to place dental sealants in children (Bhayat & Cleaton-Jones 2003).

A national survey conducted in Greece to evaluate the attitudes and knowledge of Greek dentists concerning dental sealants and other preventive measurements, as well as the extent of, and the reasons for using or not using dental sealants in their clinical practice. The study found that they had insufficient knowledge and lacked clinical practice, which lead to low usage rates (Michalaki et al. 2010). The findings of that study correlates with a systematic review of literature on dental sealants usage by Aleksejūnienė et al. (2010). Their research found that the low use of dental sealants relate to dentists' orientation toward restorations rather than prevention, distrust in sealant treatment, lack of confidence in caries risk assessment and concern about sealing over caries (Aleksejūnienė et al. 2010). This researcher concludes from these studies that dental practitioners take on the role as custodians of oral health care, and as a result, the population has little or no control over their choices of preventive methods for dental caries. The lack of knowledge, and of established guidelines pertaining to the use of sealants, could affect the rate of placement of dental sealants.

A study conducted by Orrell et al. (2003) indicated that socio-economic status had a minimal impact on adherence to antiretroviral therapy (ART) access in South Africa. Health promotion activities directed towards the prevention and treatment of HIV/AIDS focuses on individual risk factors as a means of addressing health inequalities by inducing a behavioural change (Orrell et al. 2003). The underlying assumption in this behavioural approach is that once individuals acquire the relevant knowledge they will alter their risky behaviour. Another reason could be that because populations acknowledge certain diseases as life-threatening they alter their risky behaviour. This researcher concludes that an implication of the Orrell et al. (2003) study for oral health prevention strategies and programmes is that by equipping

people with knowledge, they are more likely to change their behavioural practices and alter risky behaviour patterns.

In order to redress some of the imbalances in the health care system that occurred under apartheid, the post-1994 government began looking at instituting a national health insurance scheme for South Africa (African National Congress 1994). This scheme is based on the premise that there is a need to develop new models of oral health care that are appropriate to South African conditions, by giving priority to comprehensive preventive, promotive and curative primary health care, as outlined in the National Health Plan for South Africa, 1994 (African National Congress 1994).

The national health insurance system is presently being rolled out in a pilot phase in certain districts of South Africa. It is envisaged in the National Health Plan for South Africa - 1994, that as the national health insurance scheme starts to work, there will be an increase in the availability of oral health services and an increase in the number of dental sealants placed in children's mouths (African National Congress 1994). One of the key principles of the scheme, as outlined in the National Health Act, 61/2003, is that it seeks to bring about reform that will lead to improved health provision, promote equity and improve efficiency (Government Gazette No. 469 of 2004). Its other principles as indicated in the Government Gazette No. 469 of 2004, include: social solidarity, the right to access, effectiveness, appropriateness, equity, affordability, and efficiency (Government Gazette No. 469 of 2004). In order to achieve this, the national health insurance scheme is based on a number of key principles that have been outlined in the National Health Act, 61/2003 as being:

*“a complete transformation of healthcare service provision and delivery, a total overhaul of the entire healthcare system, a radical change in management and administration, and the provision of a comprehensive package of care that is underpinned by a re-engineered primary healthcare system”* (Government Gazette No. 469 of 2004, p. 2-3).

It is envisaged that the national health insurance scheme will lead to improved health outcomes for the people of South Africa (Government Gazette No. 469 of 2004). This research postulates that while there are no specific references to oral health or the impact of oral health promotion in the Act, it is understood that improved oral health promotion, based on the principles of the primary health care approach, will lead to improved oral health outcomes (Government Gazette No. 469 of 2004).

#### **2.8.4 Perceptions of blame**

In oral health promotion programmes, the behavioural/lifestyle approach is limited in addressing the oral health inequalities, and is considered ineffective, costly and victim-blaming in nature (Watt 2007). The perception of blame can be included in the framework that influences prevention and management of dental caries. Various studies describe the ‘fear-avoidance model’ that describes the role of fear and perception of blame in avoidance behaviour in general health treatment (Leeuw, Goossens & Linton 2007; Locker 2003). A study done amongst 1000 parents of six year old children found that parents expressed guilt as a result of being unable to prevent early childhood caries (Mofidi, Zeldin & Rozier 2009). These authors also stated that many parents believed that health care clinicians perceived early childhood caries as a parenting failure.

A study by Wigen, Skaret and Wang (2009) explored the associations between avoidance behaviour and dental anxiety in both parents and children with regard to the caries experience in five year-old children (Wigen, Skaret & Wang 2009). They hypothesised that parents’ dental avoidance behaviour and dental anxiety were related to dental caries in their five year-old children. From their results, they concluded that parents who avoid bringing their children to scheduled dental appointments had a personal history of previous behaviour management problems and experiences as a child (Wigen, Skaret & Wang 2009). A review of the literature therefore suggests that there is an immediate need to cultivate and reinforce positive attitudes among parents, and to substantially raise their dental awareness through child oral health oriented programmes. This suggests that an ‘upstream’ approach is required to promote the use of dental sealants as a preventive strategy for dental caries in South African children.

#### **2.8.5 Access to healthcare**

Although there has been over twenty years of democratic governance in South Africa, there are still many disparities in gaining access to appropriate preventive primary health care for certain gender and race groups (KwaZulu-Natal Department of Health 2013). Whilst statistics are scarce, a comparative study of access to oral health care (and specifically regarding gaining access to dental sealants placement treatment) was conducted by Dasanayake et al. (2001) in the state of Alabama, USA, in 2000. They found that females (24% of the female population) were more likely to have dental sealants than males (20% of the male population); and that whites (28% of whites who made up 39.5% of the total

population) were more likely to have sealants than non-whites (20% of the total population). This data must be considered against a background of a population where there are 51% males and 58.4% blacks (compared to 39.5% whites). While it may be inappropriate to compare a developed country and a developing country it may be safe to assume that race and gender affect access to healthcare and dental sealants placements. It is important to include references to race in South Africa, in view of the racially linked socio-economic disparities that exist in South Africa.

With KwaZulu-Natal the Provincial Department of Health strengthened the Oral Health Screening Programme by integrating them with School Health Services, thereby ensuring that more learners have access to the service as well as ensure early detection and treatment of oral diseases (KwaZulu-Natal Department of Health 2013).

Burt (2005) states that there is a solid body of evidence to show that there are social, psychological, and even spiritual dimensions of health and disease, and that some of the social determinants include housing, availability of public transport, crime levels, street lighting, access to parks and open spaces, economic status and other social and political factors. Social and environmental disadvantages can lead directly to poor health behaviour and subsequent poor health (Burt 2005). In a study conducted in Belfast, Ireland by Burt (2005) it was found that parents' employment status and attitudes were identified as determinants of the dental health of their children. He argues that "if diseases such as coronary heart disease have a social dimension, why should not the oral diseases also have social determinants?" (Burt 2005, p. 244). There are common risk factors for coronary disease and oral diseases and caries may be considered as being a social disease. This highlights the need to consider the social aspects of communities when researching preventive strategies and their implementation.

#### **2.8.6 The socio-economic and dietary implications of caries**

Poor oral health is detrimental to children, as it affects their nutrition, growth and development (Bagramian, Garcia-Godoy & Volpe 2009). If left untreated, these childhood oral diseases can lead to pain, development of oro-facial anomalies and other serious health problems, such as severe toothache, dental abscess, and other serious dental conditions (Bagramian, Garcia-Godoy & Volpe 2009). The social impact of untreated oral diseases in children can be considerable, and can affect a child's eating habits and nutritional intake,

growth and early childhood development (Bagramian, Garcia-Godoy & Volpe 2009). Early childhood caries (ECC) is a diet-induced disease that is characterized by early onset (usually from the eruption of the anterior teeth) and rapid progression (Bagramian, Garcia-Godoy & Volpe 2009; Zafar, Yasin-Harnekar & Siddiqi 2009). It can result in functional, aesthetic and psychological disturbances of the child. Some of the late consequences of ECC may continue long after its initial treatment, and present as malnutrition, low self-esteem, decay and malocclusion in permanent dentition (Bagramian, Garcia-Godoy & Volpe 2009; Zafar, Yasin-Harnekar & Siddiqi 2009). Childhood and early adolescence are two crucial periods in the development of healthy dentition, and ECC is a major public health problem, as it is the most common chronic infectious childhood disease (Zafar, Yasin-Harnekar & Siddiqi 2009). Some of the effects of ECC include pain, impairment of function, deleterious influence on the child's growth rate, body weight, and ability to thrive, and these factors lead to a decline in the child's quality of life (Zafar, Yasin-Harnekar & Siddiqi, 2009). Treatment of ECC includes atraumatic restorative treatment (ART), fluoride applications, oral hygiene instruction, dietary counselling, and restorative measures (Zafar, Yasin-Harnekar & Siddiqi 2009). Children who have ECC are likely to experience caries as they grow up, and are thus ideal candidates for dental sealants (Zafar, Yasin-Harnekar & Siddiqi 2009).

### **2.8.7 Oral health education**

The KwaZulu-Natal Department of Health scaled up initiatives to improve healthy living with the launch of the Healthy Lifestyles Programme in February 2012, to promote overall health and wellbeing, as well as the Healthy Lifestyle Legacy Project, which aims to reposition healthy living in all facilities and communities. Additionally, the number of schools accredited as Health Promoting Schools has increased from 210 (2011/12) to 247 (2012/13) (Department of Health 2013). By incorporating oral health education into these programmes, as outlined in National Health Act, Act 61 of 2003, the demand for dental sealants will increase, and the end-result will be the long-term overall improvement in children's oral and general health status (Government Gazette No. 469 of 2004).

### **2.8.8 Non-communicable diseases (NCDs)**

In post-Apartheid South Africa there have been significant changes within the country in terms of the economy and development (Department of Health 2013). Whilst significant progress has been made across many of the millennium development goals (MDGs), there have been challenges in terms of inequality, demography, migration, urbanisation, consumption and production which continue to threaten to derail development (Department of Health 2013). The United Nations has identified one of these major challenges to economic development as being the epidemic of non-communicable diseases (NCDs) (World Health Organisation 2011). The World Health Organisation considers the four main non-communicable diseases to be: cardiovascular disease, cancer, chronic respiratory disease, and diabetes. These diseases share four common risk factors, which are tobacco use, unhealthy diet, physical inactivity, and the harmful and excessive use of alcohol (World Health Organisation 2011).

In September 2011 the United Nations adapted the Political Declaration on the Prevention and Control of Non-Communicable Diseases in order to combat the threats posed by non-communicable diseases, to which South became a signatory (World Health Organisation 2011). In KwaZulu-Natal, the provincial government recognised the threat of non-communicable diseases, which are closely linked with healthy lifestyles, and targeted them during 2012/13. This was done by promoting improved community-based strategies, based on the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-2017 that was launched in late 2012 by the Department of Health (2013).

The impact of non-communicable diseases is more severe in low and middle-income countries (LMICs) with non-communicable diseases accounting for two out of three deaths and half of all disabilities worldwide (World Health Organisation, 2011). The World Health Organisation (2011) states that non-communicable diseases exact a heavy toll on the physical health and economic security of low and middle-income countries and are their leading causes of mortality and morbidity in these countries. Additionally, non-communicable diseases are affecting people at younger ages and disproportionately impacting on vulnerable and marginalised populations. Non-communicable diseases lead to increased out-of-pocket payments, decreased productivity and a loss of income, and this affects the poor greatly (World Health Organisation 2011). Non-communicable diseases contribute to malnutrition that can lead to an increase in the caries rates (World Health Organisation, 2011). Children

who have caries and are in pain may not be able to eat healthily, and as a result could experience malnutrition, thus compounding the effects of the non-communicable diseases. By ensuring that teeth remain healthy through the formative years, as outlined in the National Health Act, 61/2003, it is envisaged that children will be able to eat healthy foods and thus have a lower incidence of non-communicable diseases (Government Gazette No. 469 of 2004).

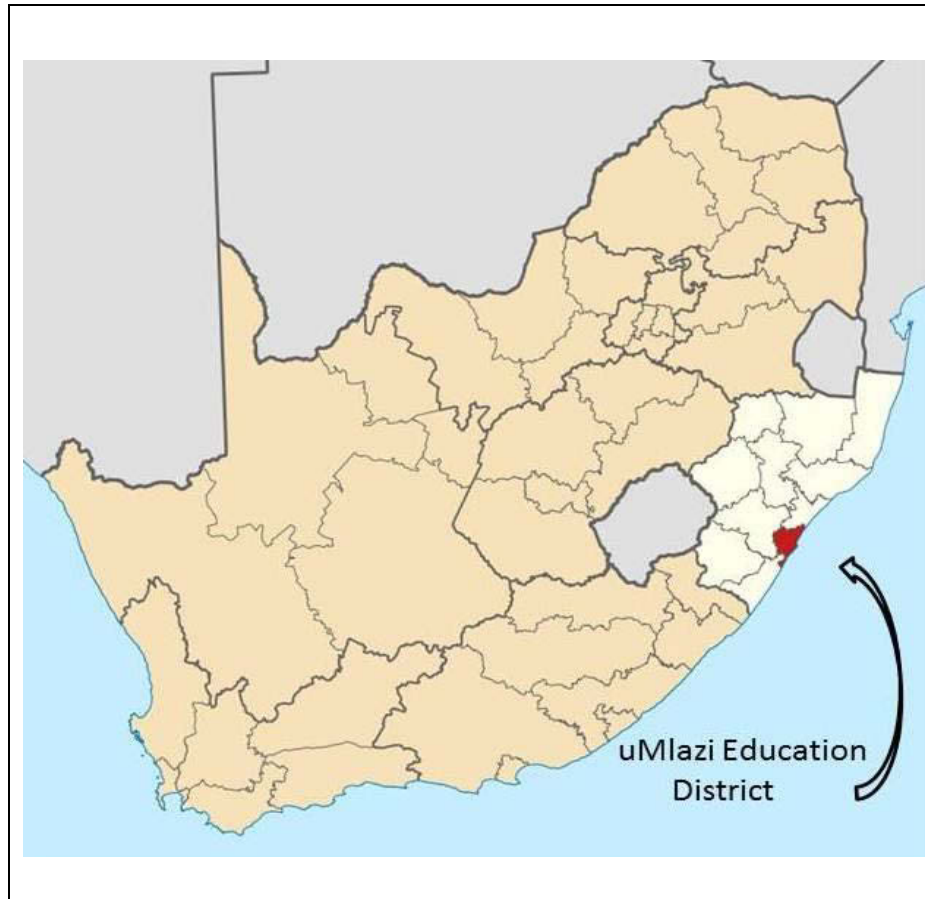
Whilst the efforts of the World Health Organisation and the South African National Department of Health are noted it is also necessary to have an understanding of the current socio-economic and demographic situation in the uMlazi education district so that effective measures could be tailored to suit this specific community. This situational analysis is presented in the following paragraphs.

## **2.9 Situational analysis of the uMlazi education district**

### **2.9.1 Demographic profile**

South Africa has nine provinces, with the eastern coastal province of KwaZulu-Natal being the largest geographically (7.6% of South Africa's land surface) and the second most populous (21.4%) with a population of 10 449 300 people being counted in the 2011 census (Statistics South Africa, 2013). It shares borders with Swaziland and Mozambique in the North, Mpumalanga in the North-West, Free State and Lesotho in the West and the Eastern Cape in the South (Statistics South Africa 2013). This study was conducted in the uMlazi Education District, which falls within the eThekweni Health District of KwaZulu-Natal, which includes the eThekweni Municipality, within which the city of Durban is located, the largest east coast port city of South Africa in the province of KwaZulu-Natal, the metropolitan area being home to 34% of KwaZulu-Natal's population (Statistics South Africa 2013). There are 3.4 million people residing in the city and of these 73.8% are blacks, 2.5% coloureds, 7% Indians and 16.6% whites, with the rest being classified as other (Asian, foreign) (Statistics South Africa, 2013). Children aged between 0-9 years account for 9% of the population in eThekweni (Statistics South Africa 2013). The youth unemployment rate is 39% and there is an annual population growth of 1.08% (Statistics South Africa 2013). Durban is the third largest South African city and spans an area of approximately 2 297km<sup>2</sup> (Statistics South Africa 2013).





**Figure 2.1:** Map of South Africa and of the uMlazi education district

Source: KwaZulu-Natal Department of Health Geographic Information Systems Unit

### **2.9.2 Socio-economic and epidemiological profiles**

The 2011 census revealed that there were 956 713 households in eThekweni, with an average size of 3.4 persons (Statistics South Africa, 2013). Of these households, 79% were formal dwellings (Statistics South Africa, 2013). Most households (84.4%) are located in urban areas, with 0.5% being in farming areas and 14.7% in tribal and traditional areas. In terms of basic essential services the census found that 60.2% of households had access to piped water, 63.4% had flushing toilets and 89.9% had electricity (Statistics South Africa 2013). However when an analysis of the source of water was conducted in the 2011 census, it was revealed that whilst 90.5% of the population sourced water from regional and local water providers, 1.5% of households obtained water from boreholes (Statistics South Africa 2013). Other water sources include: springs (0.3%); rain water tanks (0.3%); dams and pools (0.5%); rivers and streams (0.5%); water vendors (1.5%); and water tankers (2.1%) (Statistics South Africa 2013).

In terms of education, the census revealed that 42.6% of the eThekweni population had (up to primary level education), 52.7% had attended secondary school, and only 3.4% had received some form of higher education (Statistics South Africa 2013). The average household incomes of the eThekweni households are presented in Table 2.1 below. It can be seen that the majority of households earn incomes in the lower quintiles, with 72.1% receiving a total annual household income of less than R76 400 (Statistics South Africa, 2013).

**Table 2.1:** Average Household Annual Income in the eThekweni region (2011)

<b>Income</b>	<b>Percentage of households</b>
No income	17,1%
R1 - R4,800	4,2%
R4,801 - R9,600	6,2%
R9,601 - R19,600	14,3%
R19,601 - R38,200	16,9%
R38,201 - R76,400	13,4%
R76,401 - R153,800	10,7%
R153,801 - R307,600	8,6%
R307,601 - R614,400	5,7%
R614,001 - R1,228,800	2%
R1,228,801 - R2,457,600	0,6%
R2,457,601+	0,3%

*Source:* Statistics South Africa 2013

## **2.10 Chapter conclusion**

The chapter has indicated that the current management strategies used by South African oral healthcare workers consist of mostly curative rather than preventive treatment, and that although strategy documents include the use of sealants, these are seldom used.

## **CHAPTER 3: METHODS**

### **3.1 Introduction**

This chapter presents the methods and processes used in this study with respect to meeting the study objectives. Research is a way to gather information and make a sound decision or judgment or develop new knowledge (Berg & Latin 2008). Singh (2006) defines research methodology as being the systematic procedures and processes by which the researcher starts from the initial identification of the problem to its conclusions. The role of methodology in a research study is to form a basis from which to undertake research work in a valid manner, using scientific methods. This chapter therefore presents the research methods used in this study.

### **3.2 Research design**

Research design is an operational procedure that refers to the way in which the study will be conducted (Berg & Latin 2008). Singh (2006), and Hek and Moule (2006), state that research design is a choice made by a researcher about the components of the study and the development of certain components of the design.

The research design utilised is a cross-sectional and exploratory knowledge, attitudes and perceptions (KAPs) study of parents' attitudes towards dental caries and dental sealants as a preventive strategy for dental caries. The knowledge, attitudes and perceptions of the study respondents is vital as it serves as a platform from which the researcher can gain an understanding of a community, and design interventions that would seek to address problems or remedy situations based on the communities.

### **3.3 Study population**

A population is an all-inclusive group that has been operationally defined by the researcher. This population will therefore possess certain traits, features or characteristics that are researched, which are known as parameters, and from which inferences or generalisations can be drawn. A sample is a sub-set of this population that contains the essential elements of that population (Charmaz, McMullen & Josselson 2011; Berg & Latin 2008; Hek & Moule 2006). The study population consisted of parents of children attending the first grade (5-6 years old) in public primary schools in the Chatsworth Circuit of the uMlazi school district, KwaZulu-

Natal. These schools are geographically located in the suburbs of Malvern, uMlazi and Chatsworth. Names and residential addresses of all fifty public primary schools in the Chatsworth Circuit of the uMlazi school district was obtained from the provincial KwaZulu-Natal Department of Education (KZN-DoE) and every fourth school on the list was selected into the study sample (Appendix 5). In the 2013 academic year, 5832 grade one learners were enrolled at public primary schools in the Chatsworth Circuit.

### **3.4 Study sample**

There are two dominant types of sampling: probability sampling and non-probability sampling. Probability sampling consists of various methods such as random (systemic, stratified, purposive and cluster sampling) and simple random (systemic random, stratified random, purposive random and cluster random) sampling (Berg & Latin 2008; Hek & Moule 2006; Singh 2006).

The sampling technique used in this study is the systematic random sampling technique. In this method of sample selection the sample is selected using an arbitrary method that is known to be representative of the total population.

#### **3.4.1 Sample size**

Singh (2006) suggests that one should select between 10-20% of the accessible population from the sample in order for it to be more accurate and precise. Of the 5832 learners in grade one in 2014, in 50 schools, twelve (12) public primary schools in the Chatsworth Circuit of the uMlazi school district were selected. The sample size of twelve (12) primary schools was discussed with the statistician based at the University of KwaZulu-Natal, School of Health Sciences. Using a simple systematic random sampling technique, every fourth school on the list was selected into the study sample. The list of schools was placed into an alphabetically ordered list in order to allow for simple systematic random sampling to occur. The total number of schools ( $n=50$ ) was divided by 12 (which was the study sample size) to obtain a number of four, and thus every fourth school was selected from the ordered (alphabetical) list. If a selected school refused to participate in the study, a substitute school using the same simple systematic random sampling technique was selected. A 95% confidence interval (CI) level was established, and sampling errors were kept within 5%. A required study sample of

816 participants (which represented approximately 14% of the target population) was calculated, using a CI of 95%.

### **3.5 Inclusion/exclusion criteria**

#### **Inclusion criteria**

- The biological parent, sibling over 18 years old, care-giver, grand-parent or guardian who nurtures and raises the child.
- Parents whose children are 5-6 years of age that attend the randomly selected school.
- Parents residing in the geographical region of the uMlazi school district.

#### **Exclusion criteria**

- Parents whose children do not reside in the geographic region of the school circuit.

For the purposes of this study, the term Parent will apply to the potential participants identified in the above criteria.

### **3.6 Data collection instruments**

The research tools used in the study are discussed below.

#### **3.6.1 Questionnaires**

A questionnaire is a survey form that is prepared and distributed to obtain responses to specific question. The questionnaire may be regarded as a form of interview on paper (Hek and Moule 2006). Questionnaires are impersonal, and as there is no interviewer to explain ambiguities or to check misunderstandings, the questionnaire must be especially clear in its wording. It is also important to take care over its construction. Singh (2006) describes two commonly used types of questionnaire items: the unrestricted, or open form items; and the restricted, or close form items.

The open form questions are of most value when unrestricted, as in-depth responses are needed, and this allows for a more comprehensive response to be offered by the research participant. The closed form questions facilitates the tabulation and analysis of data, thereby

improving the reliability and consistency of the data. Both quantitative and qualitative data can be collected using questionnaires.

The questionnaire was the first tool used to collect data in this study. The questionnaire collected data on parental knowledge, attitudes and perceptions of dental caries and the various methods of prevention such as dental sealants. The questionnaire consisted of thirty questions, and is a modified version of the previously validated Child Oral-Health-Related Quality of Life (COHQoL) questionnaire. The Child Oral-Health-Related Quality of Life (COHQoL) questionnaire is currently the most frequently used instrument in assessing child health related questions (Thomson et al. 2013). It is a set of scales measuring the negative effects of oral disease on the well-being of 6 to 14-year-old children and their families. The scales comprise the Child Perceptions Questionnaire (CPQ), the Parental-Caregiver Perceptions Questionnaire (P-CPQ) and the Family Impact Scale (FIS). The reliability and validity of its P-CPQ component and the FIS have been confirmed by Thomson et al. (2013) and Kramer et al. (2013) and shown to be valid and responsive in longitudinal research.

The questionnaire was designed to ascertain the effect of various factors influencing parents' attitudes towards dental caries and dental sealants as a preventive strategy. Other factors investigated were access to dental services, and reinforcing factors such as the influence of others in a family's decision to obtain dental sealants for child members of the family. The questionnaire was divided into five sections, which measured various themes as illustrated below:

Section A –Biographical data (parent's age, gender, marital status, family size, education).

Section B – Knowledge of tooth decay (causes and prevention of dental caries)

Section C – Perceptions towards tooth decay and its prevention ((regular source of dental care, family income and medical aid insurance),

Section D – Attitudes to dental services

Section E – Preventive care services available.

### **3.6.2 Focus groups**

In qualitative research, interviews and observation remain the predominant means for collecting data. Qualitative interviewing generally entails open-ended questions. Interviews may be informal conversational interviews, semi-structured interviews, or standard open-ended interviews (Berg & Latin 2008; Hek & Moule 2006; Patton 2002). These allow for rich

exploration, but makes summarisation difficult. Focus groups can be used as a research method in order to document perceptions, gather early impressions or reinforce data that has already been collected (Berg & Latin 2008). In focus group semi-structured interviews, an interview guide is prepared, but the researcher is free to probe, or to skip or add questions. Focus groups were used to encourage research participants to generate and explore their own questions and develop their own analysis of common experiences, and were helpful in identifying group norms and cultural values towards oral health, and in facilitating the expression of ideas, experiences, and perspectives through debate within the group.

A semi-structured interview schedule, using a setting/scenario approach was used to conduct the focus group discussions. The discussion consisted of open-ended statements and questions, and a visual aid (a photograph of a dental sealant being placed onto a tooth – Appendix 12) was used to enhance concepts. These discussions were, with the participants' written consent, tape-recorded. The nature of the interview allowed the participants freedom to interact actively in a relaxed environment. The questions that were posed by the researcher were designed to encourage and stimulate dialogue and allow participants to explain and give reasons for their responses and thereby generate more understanding of their knowledge of, and attitudes towards dental caries and remove dental sealants as a preventive strategy. Certain inclusion and exclusion criteria were established in order to ensure the reliability of the data elicited from the focus group interviews.

#### ***Inclusion criteria for focus group phase***

- Participants must be a parent or primary caregiver over 18 years of age.
- Participants must have completed the questionnaire.
- The identity number of participants correlates with the sequence of numbers recorded in the questionnaire.
- Participants must be willing to consent to tape-recording the focus group discussion.

#### ***Exclusion criteria for focus group phase***

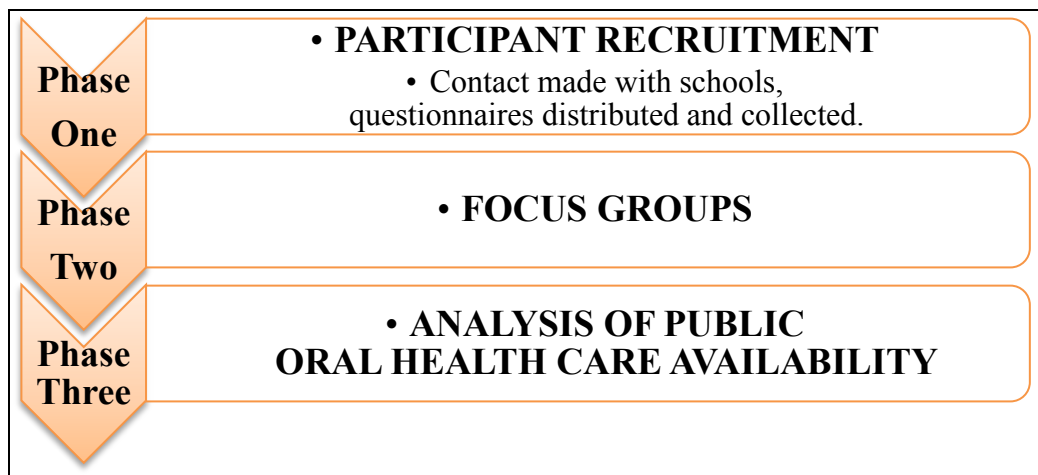
- Participants younger than 18 years of age.
- Participants that have not completed the questionnaire.
- The identity number of participants does not correlate with sequence of numbers recorded in the questionnaire.
- Participants who do not consent to tape-recorded the focus group discussion.

### 3.7 Pilot study

The questionnaires were assessed by a panel of researchers from the University of KwaZulu-Natal School of Health Sciences to establish content validity. The instrument was pre-tested in a pilot study that was conducted amongst ten parents whose children attended a primary school not selected on the KwaZulu-Natal Department of Education (KZN-DoE), Chatsworth Circuit, uMlazi school district list. The questionnaire was also examined by an experienced researcher who assessed the contents of the questionnaire and recommended minor adjustments be made. The necessary adjustments were made to ensure that the research instruments were valid. In order to ensure the validity of the qualitative data, the questions that were posed to the focus group participants were piloted on a lay-person and on an experienced researcher. The comments and suggestions received from these two individuals were incorporated into the final focus group question schedule. Additionally the same questions were posed to all the focus groups in order to maintain consistency and ensure validity.

### 3.8 Phases in data collection

Data collection refers to the systematic collection of data from a study population, with this study this occurred in three phases, which are outlined in Figure 3.1:



**Figure 3.1:** Phases of the study

The table below outlines the different phases in which data was gathered in order to answer the objectives of the study.



**Table 3.1:** Phases of study related to study objectives

<b>Objectives</b>	<b>Where addressed in study</b>
To establish parental knowledge, attitudes and perceptions of Grade 1 learners' towards dental caries through the use of a self-administered questionnaire.	Phase 1 – questionnaires
To describe parental self-oral health care practices (and consequent influence on the child) through the use of a self-administered questionnaire.	Phase 1 – questionnaires
To establish parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries through the use of a questionnaire and group focus discussions.	Phase 1 – questionnaires Phase 2 - Focus groups
To determine the relationship between parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review.	Phase 1 – questionnaires Phase 2 - Focus groups
To determine the current oral health promotive strategies implemented by the KwaZulu-Natal Department of Health through a review of the available policy documents and statistical records	Phase 3 - Statistics and reports from the Provincial Department of Health

The different phases are now discussed in detail.

### **3.8.1 Phase 1 - Questionnaires**

After ethics and gatekeeper approval was obtained, an appointment was made to meet with the school principal and/or the executive members of the school governing body. The researcher outlined the study to the school principal and got his/her support for the study. From personal observation it was found that educators at schools usually have a system to communicate with parents of learners, usually in the form of a diary or a notebook. Educators send notices and documents to parents via this book, which parents acknowledge receipt of by signing the notebook. The notebook is then returned to the school for the educator to

review. Parents were issued with a bi-lingual self-administered questionnaire (English and isiZulu languages) and a notice from the school providing the school's approval of the study, together with the invitation letter, questionnaire and consent form, which were attached to a school notice and inserted into the parent-school communication book. Parents were requested to return completed questionnaires, with their children to the school, where they were collected by the school principal. The researcher collected the questionnaires weekly for one month to ensure that as many completed questionnaires and consent forms as possible were collected.

Each questionnaire was coded to monitor the response rates. The data was then entered into Excel® spreadsheets, coded and cleaned, and then subjected to further analysis, using Pearson's Chi-Squared Test to determine if there is independence of the parameters. A level of significance of  $p < .005$  was established as being significant. Spearman's rank correlation coefficient is a nonparametric measure of statistical dependence between two variables, and assesses how well the relationship between two variables can be described. Levels of significance were set at the 0.01 level and 0.05 level for the 2-tailed tests.

### **3.8.2 Phase 2 - Focus groups**

The next phase of data collection was the focus group discussions, which consisted of a purposively sampling of parents from five of the 12 selected schools. The researcher obtained a schedule of school events for the current year and used this to arrange focus group discussion sessions. At the beginning of various school meetings or events, the principal made an announcement to parents asking who had previously completed the questionnaires to participate in the focus group discussions. Between eight and ten grade one learners' parents who raised their hands to volunteer to become participants were randomly selected at each of the five schools.

The focus group discussion was a semi-structured face-to-face group discussions to meet some of the objectives of the study. The focus groups were used to encourage research participants to generate and explore their own questions, and to develop their own analysis of common experiences. They were helpful in identifying group norms and cultural values towards oral health, and in facilitating the expression of ideas, experiences, and perspectives

through debate within the group. The formation of the focus group was facilitated with the assistance of the school principal.

A semi-structured schedule (Appendix 11), using a setting/scenario approach was used to conduct the focus group discussions. These consisted of open-ended statements and questions, and a visual aid (a photograph of a dental sealant being placed onto a tooth – Appendix 12) was used to enhance concepts. These discussions were tape-recorded, with the participants' written consent. The nature of the interview allowed the participants freedom to interact actively in a relaxed environment. The questions that were posed by the researcher were designed to encourage and stimulate dialogue and allow participants to explain and give reasons for their responses and thereby generate more understanding of their knowledge of, and attitudes towards dental caries and remove dental sealants as a preventive strategy.

Parents were interviewed in groups of between eight to ten people. These focus groups meetings were scheduled after a school governing body meeting or school event to encourage participation in the study as the parents were already at the school. Written consent (Appendix 8) was obtained from the parents before the focus groups. The interview lasted a maximum of sixty minutes. Parents were informed that they had the option to exit the focus group session at any stage without penalty and were advised about appropriate conduct as well as the need for respect and confidentiality. Each member had to be allowed to speak and to have their opinions respected.

The whole focus group discussion was audio-recorded (after the participants' consent was obtained) with a digital audio voice recorder and later transcribed. All interviews were conducted in the English language with an isiZulu language translator being present in all focus group discussions to facilitate discussions from isiZulu language participants. The translator was trained by the researcher on his conduct at interview sessions in order to standardise focus group discussions and was remunerated for the services that he rendered. Recordings in isiZulu were translated and back-translated, and checked by an independent English and isiZulu language speaker.

Data collected in focus group discussions was analysed using a standard qualitative methodological approach, known as the open coding method of thematic analysis (Fereday and Muir-Cochrane 2006) and the software package NVivo® 10 was used for this purpose.

Each of the five focus group transcripts were scrutinised for key concepts and themes. The data content was arranged thematically and then key words were used to identify a common link. Statements expressing similar sentiments were grouped into themes that represented the main messages conveyed by the data. To minimise bias all interviews were independently scrutinised by an independent researcher and any discrepancies in the allocation of themes were discussed and resolved. The results for the focus group interviews were triangulated with the results of the questionnaires.

The transcripts of the focus group discussions were written verbatim and included poor grammar, incomplete sentences and other language errors and no data cleaning was conducted, in order to preserve the integrity of the data. Thereafter, the transcripts and the results (as included in the study) were made available to a convenience sample of the focus group participants for verification in order to ensure that the researcher had adequately understood the intent of participants and captured this correctly in the transcripts and the interpretation thereof. The participants were also afforded the opportunity to further clarify or elaborate on their responses.

### **3.8.3 Phase 3 – Service delivery statistical records analysis**

A data-capturing sheet was developed to record the number of primary health care clinics and other health care clinics offering oral health services in the Chatsworth Circuit of the uMlazi education district. This included types of dental services offered and statistics on service delivery in the district. These statistics were requested and obtained from the oral health section at the Provincial Department of Health in Pietermaritzburg. Information on the type and number of procedures and services that were rendered in both the uMlazi district and the eThekweni health district were obtained and analysed. Data triangulation was conducted by cross-checking the responses of participants from the questionnaire phase, the focus group phase and the records of any existing oral health services in the district.

### **3.9 Data analysis**

Singh (2006) writes that the analysis and interpretation of both qualitative and quantitative data “represent the application of deductive and inductive logic” to the research process. Data needs to be classified and then analysed and synthesised in such a way that the research questions are answered, or so that the hypothesis may be verified or rejected.

All quantitative responses were collated and entered into a computer database using Microsoft Excel® and examined statistically using the statistical software package for social sciences (SPSS®) version 21 (SPSS Inc., Chicago, Ill). Statistics were generated for biographic and demographic characteristics, the relationship among these different parental factors have in parents' efforts to reduce dental caries in their children, and parents' knowledge of preventive strategies against early childhood caries. The results are reported in tables, graphs and diagrams using percentages. The researcher checked the data twice before analysis was conducted to ensure accuracy. Bivariate statistical tests such as frequency distribution and chi-squared tests, were conducted in all categories of the data collected to ensure that the data collected was accurate and comprehensive. The responses to the open-ended questions were scrutinised for key concepts and themes and then thematically grouped to identify a common link. Statements expressing similar sentiments were grouped into themes that represented the main messages conveyed by the data and then analysed using the software package NVivo® 10.

### **3.9.1 Hypothesis testing (inferential statistics)**

The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test statistic. A significant result is indicated with " $p < 0.05$ ". The Chi square test was performed to determine whether there was a statistically significant relationship between the variables.

The results of this study indicate that there were significant results between variables in a number of instances. These include knowledge of causes of dental caries and: education levels ( $p .002$ ); family income ( $p .007$ ) and medical aid membership ( $p .043$ ). Other significant results include the relationship between consumption of sweets and chocolates and income level ( $p .044$ ) and between knowledge of dental sealants and income levels ( $p .018$ ).

### **3.9.2 Correlations (inferential statistics)**

Bivariate correlation was also performed on the (ordinal) data. Spearman's rank correlation coefficient or Spearman's rho (denoted by the Greek letter  $\rho$ ) is a nonparametric measure of statistical dependence between two variables. It assesses how well the relationship between two variables can be described. It assesses how well the relationship between two variables can be described. Significance was established at 0.01 level (2-tailed) and at 0.05 level (2-tailed).

### 3.10 Validity, reliability and bias

#### 3.10.1 Validity

Validity is defined as the extent to which a test measures what it is supposed to measure (Berg & Latin 2008). Several types of validity are used to demonstrate research instrument accuracy (Berg & Latin 2008), and these include:

- a) **Face Validity** – this is the weakest type of validity because it only assesses the accuracy of the instrument in terms of determining whether the instrument actually measures what it is supposed to measure.
- b) **Content validity** – refers to the extent to which the questions accurately measure the desired information.
- c) **Internal validity** - refers to the soundness or overall quality of research and answers questions such as: were appropriate statistical techniques used to analyse the data and was the study conducted in a manner that allowed for the best possible effect of a variable to be demonstrated (Berg & Latin 2008). Singh (2006) comments that internal validity derives from the control of variables (a thing subject to change or fluctuation). In this study, variables were controlled by, for example, training the translator to ensure consistency during focus group interviews. Initial construct validation of short-form versions of the Parental-Caregiver Perceptions Questionnaire (P-CPQ) and the Family Impact Scale (FIS) were used in the validity and responsiveness of the newly developed version. The questionnaire was pre-tested in a pilot study among ten parents whose children attended a primary school not selected on the Department of Education (KwaZulu-Natal), Chatsworth Circuit, uMlazi school district list. Pre-testing the questionnaire and focus group schedule was conducted in order to identify any problems with the instrument and make any changes.
- d) **External validity** - deals with the potential application of the results of a study, or its generalizability (Berg & Latin 2008; Hek & Moule 2006). External validity (sampling for representation) is the condition permitting the generalisation or inference of the sample findings to the population from which the sample was selected (Singh 2006).

### **3.10.2 Reliability**

Reliability measures the consistency or repeatability of the test scores or data (Berg & Latin 2008). High levels of reliability are required in research, as this ensures that the results are dependable. Reliability of the data in this study was tested using internal consistency. To minimise bias, all interviews were anonymised to maintain validity and then independently scrutinised by an independent researcher. Any discrepancies in the allocation of themes were discussed and resolved. Confidentiality was further maintained through the use of codes, and the independent researcher was blinded to the study in terms of location, names of schools, and names of participants, thus reducing bias.

### **3.10.3 Bias**

In order to reduce the potential bias that may occur, statistics are needed to reduce the subjectivity in analysing data (Berg & Latin 2008). This researcher acknowledged that due to his personal beliefs and motivations as a dental therapist, an element of bias towards the use of dental sealants as a caries prevention measure may exist. The researcher sought to reduce this potential bias in the different stages of the study development (from conceptualisation to project development, data collection, data analysis) through a number of measures. These included the use of a clearly identified population and sample selection, attempts to reduce the non-response participation rate, and through the use of a previously validated questionnaire.

## **3.11 Ethical Considerations**

In research that involves human sample subjects, the researcher has certain responsibilities towards research participants. The researcher must protect the dignity and welfare of research participants and these participants must have the freedom to withdraw from the study without penalty. The research participants' identities must be protected, and the confidentiality of research data maintained. The following ethical considerations were observed before and during the study.

The study only commenced once ethical approval was obtained from the relevant ethics committee at the University of KwaZulu-Natal (ethics committee reference HSS/0327/013M refers). The researcher also completed an ethics online course in order to comply with the requirements of the University of Kwazulu-Natal research ethics committee.

### **3.11.1 Gate-keeper permission**

#### **3.11.1.1 Department of Education**

Permission was obtained from the Department of Education to conduct research in primary schools in the Chatsworth district. The District Director of the Department of Education also received a copy of the research proposal that outlined the aims and objectives of the research, together with the questionnaire and interview schedule, as well as assurances of confidentiality and anonymity (Appendix 6).

#### **3.11.1.2 School principal**

Principals of the primary schools were approached and permission to communicate with parents during the hosting of a school event at their premises was obtained. The summary of the proposed research and the questionnaire were made available and verbally explained to the principal or deputy-principal in order to encourage participation in the research.

#### **3.11.1.3 Department of Health**

The KwaZulu-Natal provincial oral health manager's office in the Department of Health was approached with a letter requesting permission to access information on oral health services in the eThekweni district (Appendix 13).

#### **3.11.1.4 Confidentiality and privacy**

In order to protect the research participants from any negative effects of harm, confidentiality and anonymity needed to be maintained. Therefore, researchers treated all information and data in as confidential a manner as possible. In order to maintain and protect the identity and confidentiality of participants, where possible, codes or identification numbers were assigned to subjects and research records (Berg & Latin 2008).

All records collected are being kept at the University of KwaZulu-Natal (Discipline of Dentistry) in a locked cupboard or in a password protected hard-drive. After a period of five years, this data will be destroyed through shredding the paper records and by deleting the data on the hard-drive.



### **3.11.1.5 Informed consent**

Researchers have an ethical commitment to ensure that a potential research participant has sufficient information and comprehension to make a sound decision about participating in a study. In the case of minors, assent and parental consent are required (Berg & Latin 2008). Written informed consent was obtained before data collection. The consent letter was explained verbally and participants were allowed to read through it to agree before signing. Participants were free to withdraw at any stage of the research if they so wished, without penalty or loss of potential benefits.

### **3.12 Chapter summary**

Meeting the study's six objectives required conducting interviews and focus group discussions, and undertaking an audit of public oral health services in the uMlazi Education District, and the eThekweni Health District in KwaZulu-Natal. Data was obtained from 295 parents/caregivers of grade 1 children who attended 12 of the 50 schools in the district using random and purposive sampling and focus group discussions, and from the Oral Health Directorate in the KwaZulu-Natal department of Health. Qualitative and quantitative data was obtained, with the analysis entailing both deductive and inductive reasoning. Triangulation of the data from the three data collection methods enabled an accurate analysis of the current situation to take place.

## **CHAPTER 4: RESULTS**

### **4.1 Introduction**

This chapter presents the results obtained from the questionnaires and focus group discussions. The knowledge, attitudes and perceptions of parents towards dental caries and towards dental sealants as a preventive strategy for dental caries will be assessed, together with the self-care practices that are currently being implemented by parents and their children. An analysis of the results obtained pertaining to the relationship between certain variables such as age, level of education and socio-economic status on knowledge, attitudes and perceptions of the respondents will also be reported on. The chapter will also ascertain what preventive strategies are currently being implemented by the Department of Health to prevent dental caries in children.

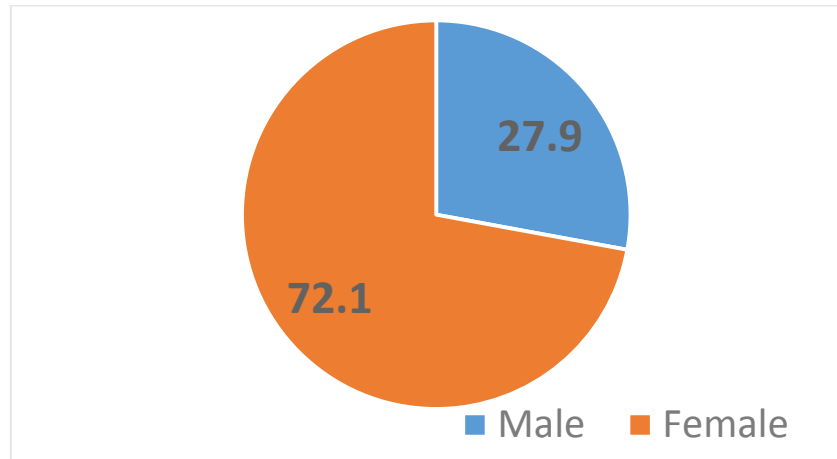
The results are presented by commencing with a presentation of the data gathered from phase one (the questionnaire), together with the findings of phase two (focus group interviews), which have been integrated into the results of the questionnaire in order to triangulate the data reported in the questionnaires with the focus group results in order to establish a common link between results. The chapter concludes with a report on the results of phase three, which is an analysis of the oral health care services that are available in the uMlazi district.

### **4.2 Biographical details**

The study sample comprised of 313 parents of grade one that attended school in the Chatsworth Circuit, uMlazi District. Of the 313 questionnaires only 295 were utilised in the study, as 18 questionnaires were returned incomplete, and were not considered. There were five groups of 10 respondents ( $n=50$ ) in the focus groups. Some of the more important results of the study pertaining to the objectives of the study are presented in the following sections

### 4.2.1 Gender distribution

This section summarises the biographical characteristics of the research participants. The figure below indicates the gender distribution of the participants.

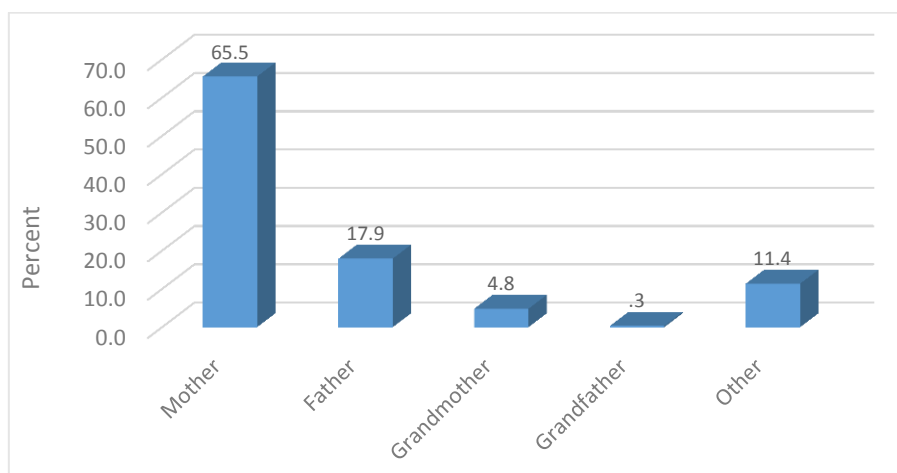


**Figure 4.1:** Gender distribution of the participants

The study revealed that nearly three quarters of the participants ( $n=295$ ) were female (72.1%).

### 4.2.2 Relationship to child

The relationship of the participants to the child is illustrated below.

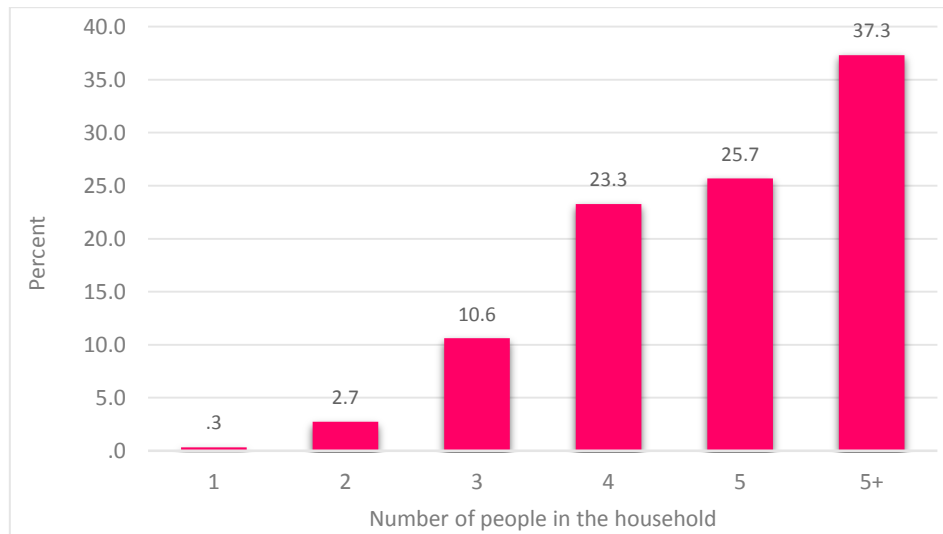


**Figure 4.2:** Relationship of the participants to the child

Approximately two-thirds (65.5%) of the participants ( $n=295$ ) were the mothers' of the children, whilst fathers made up 17.9% of the participants.

### 4.2.3 Number of people in the household

The figure below indicates the number of people in the households.



**Figure 4.3:** Number of people per household

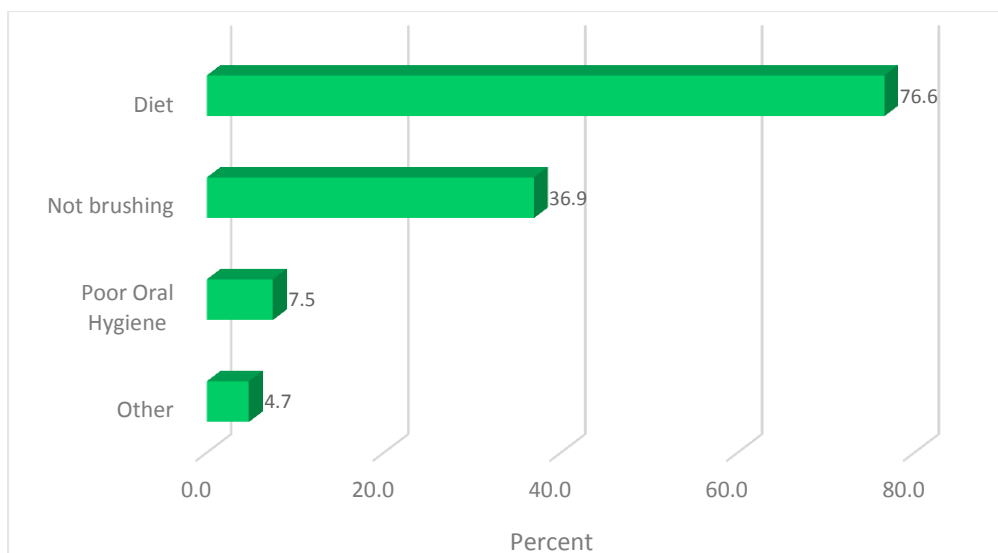
More than 86% of the participants indicated that there were 4 or more people in the household.

**4.3 Objective 1:** To assess parental knowledge, attitudes and perceptions of grade one learners towards dental caries through the use of a self-administered questionnaire. The results for objective 1 are presented with respect to Sections B - E of the questionnaire and focus group.

#### 4.3.1 Knowledge of tooth decay

This section deals with the knowledge of participants regarding factors such as the causes of rotten teeth, prevention methods and oral hygiene practices.

Participants suggested the following as causes of rotten teeth. It must be noted that multiple responses were allowed; hence the total does not add up to 100 %.



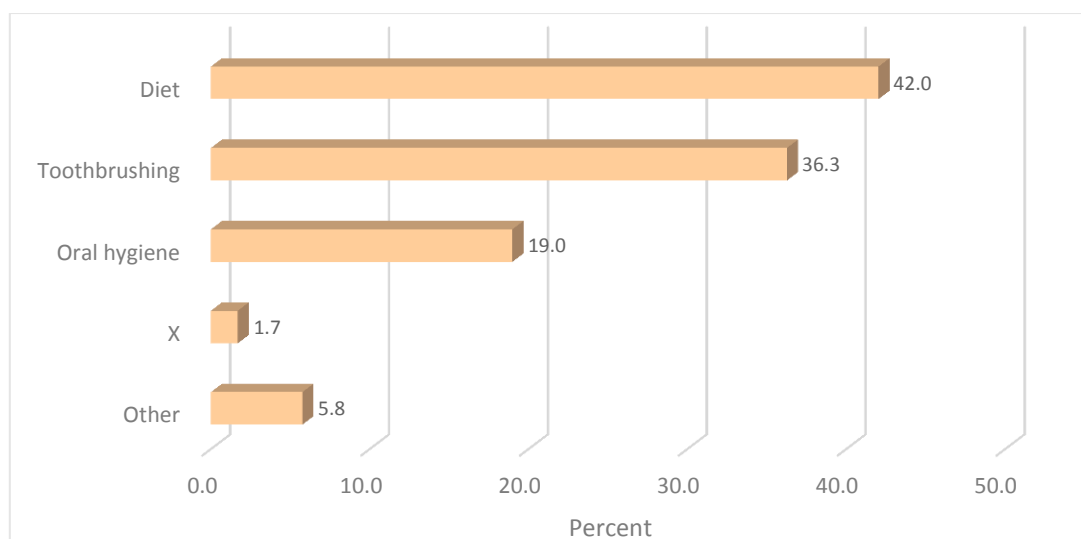
**Figure 4.4:** Causes of rotten teeth

More than three-quarters of the participants (76.6%) identified diet as being the primary cause of rotten teeth, whilst only less than 8% identified poor oral hygiene programmes.

Participants in focus group “B” identified ‘too much sweet thing’ and “not brushing properly” as being causes of decay. The same participant also stated that “biting too hard can also cause rotten teeth.” A focus group “C” participant stated that rotten teeth are caused by bacteria and sugars found in sweets, drinks biscuits and chips. A participant in focus group ‘A’ identified worms as being a cause of rotten teeth and stated that his grandparents spoke of using a herbal treatment, mixed with water, and this are mixed with water and the worms come out. It is a tomato-like concoction (which is known as *induma* in the isiZulu language) and a hollow-ended pipe containing the herbal mixture is placed against the tooth and the worms came out. However the participant acknowledged that there are no worms but most probably the rotten parts of the tooth that break up and that is seen in the water that is found coming out of the pipe.

The responses to the question “Do you think that rotten teeth can be prevented or controlled?” are indicated in the figure below.

A large number of participants (81.6%) agreed that rotten teeth could be controlled, whilst 6% bore no knowledge as to the causes of dental caries. Some of the methods in which rotten teeth can be controlled, as suggested by the participants, are depicted below.



**Figure 4.5:** Participants’ responses to methods of control of caries

A large number of participants reported that diet (42%) and tooth brushing (36.3%) were the prime variables involved in the caries control. In the focus group interview a participant from group “D” spoke of the difficulties experienced in getting children to brush their teeth, stating that “they brush but I try to make it fun and it works for me but when I am not around it doesn’t work out very well.” Other participants in the same focus group suggested that behavioural adaptations were necessary, meaning that “if you brush with your kids they will brush as well, but if you don’t then they may not.”

#### **4.3.2 Attitudes towards dental caries**

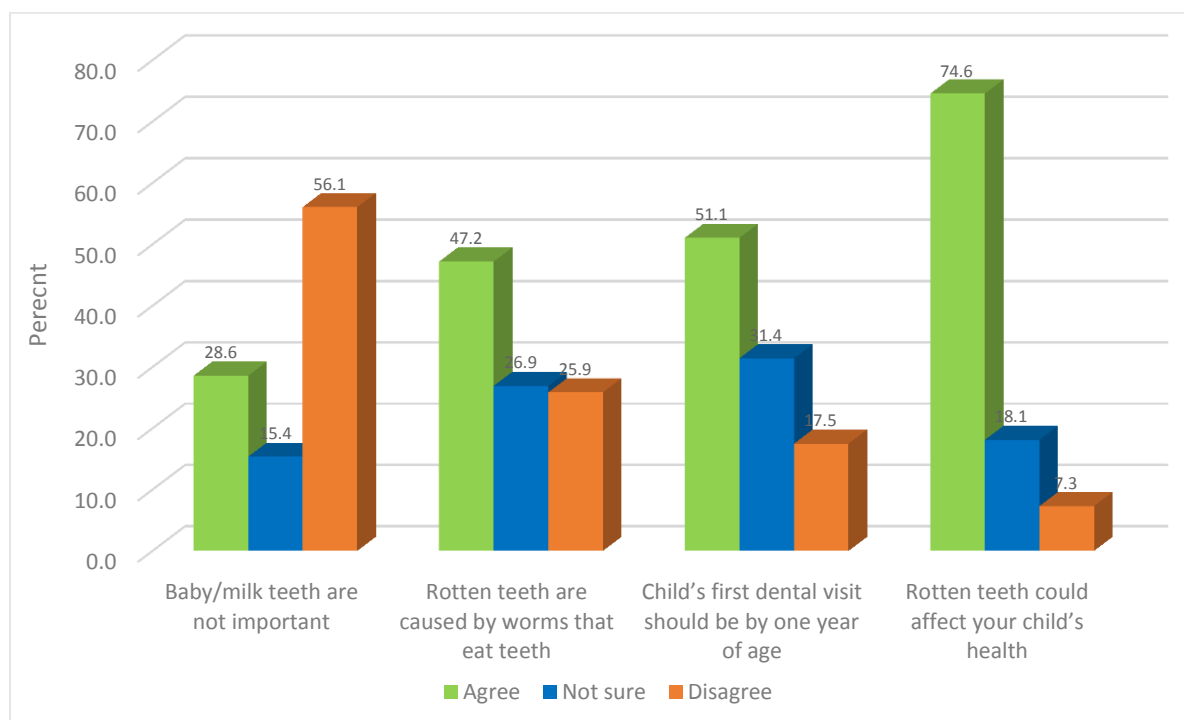
The same participant went on to conclude that one should make tooth brushing a fun activity or make it a discipline or daily ritual. He suggested that tooth brushing could be incorporated into children’s chores and set it as morning and evening rules. The same participant stated that tooth brushing is the most common oral hygiene method and can be fun through the use of musical brushes or cartoon characters. Another participant from Group “E” proposed that whilst tooth brushing was important for oral hygiene the brand of brush or tooth paste was not important but that using the correct technique was more important.

A participant from focus group “B” stated that whilst they were able to control their children’s diet and oral hygiene practices at home they were unable to exert such control “at school or when children visit in-laws, at school, Diwali or at Christmas time.” This was reinforced by a group “A” participant who stated that they were unable to stop their children from eating sweets when the child was out of their control and not at home. Participants were

questioned regarding their perceptions of their children’s oral health. Their responses to the various variables are outlined in the figure below.

The figure below represents the scoring patterns for the variables. It shows that more than half of the participants (56.1%) indicated that milk teeth were important and that rotten teeth (74.6%) could affect the child’s health whilst 51.1% of the participants indicated that their child’s first dental visit should occur by the age of one year. A group “D” participant stated that he made his daughter brush her teeth morning and afternoon, and rinse out with Listerine anti-bacterial mouthwash after every meal.

This has that helped her because she has lost all her milk teeth and her permanent teeth that are growing are perfect with no cavities. A group “E” focus group participant stated that when their child had problems with their milk teeth then “We just feel that we will take them when they are ill.” This has implications for young children’s future oral health status.

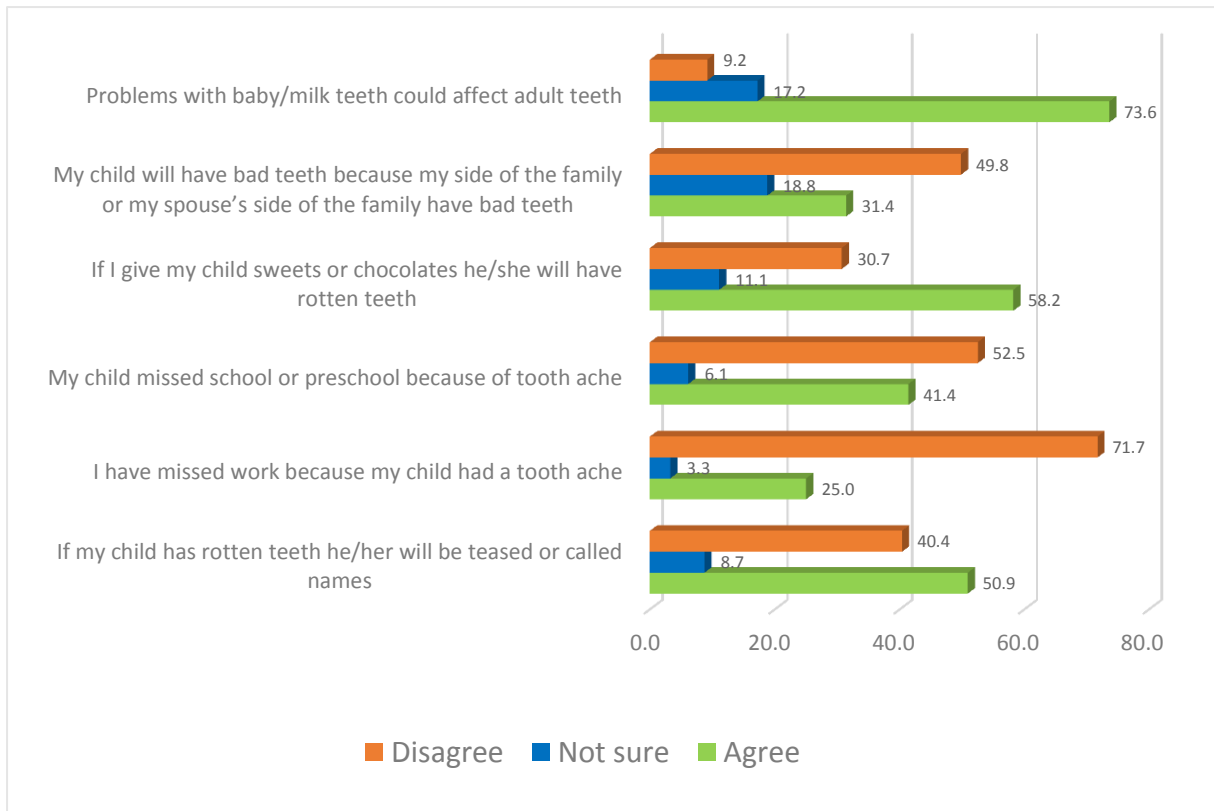


**Figure 4.6:** Scoring patterns for the variables

### 4.3.3 Perceptions towards dental caries

This section deals with the perceptions that parents have towards tooth decay and the prevention thereof. The figure below is a summary of the parents’ opinions on the state of their children’s dental health.

Nearly three-quarters of the participants (73.6%) reported that unhealthy milk teeth can lead to problems when permanent teeth develop. Almost half (49.8%) of participants reported that “bad teeth” were inherited. Children missing school because of caries was reported by 41.4% of the participants, and 25% of adults missed work because their children were suffering from tooth decay. A large number of parents (50.9%) reported that their child will be teased or called names if he/she had rotten teeth.



**Figure 4.7:** Parental knowledge and experiences of their child’s dental health

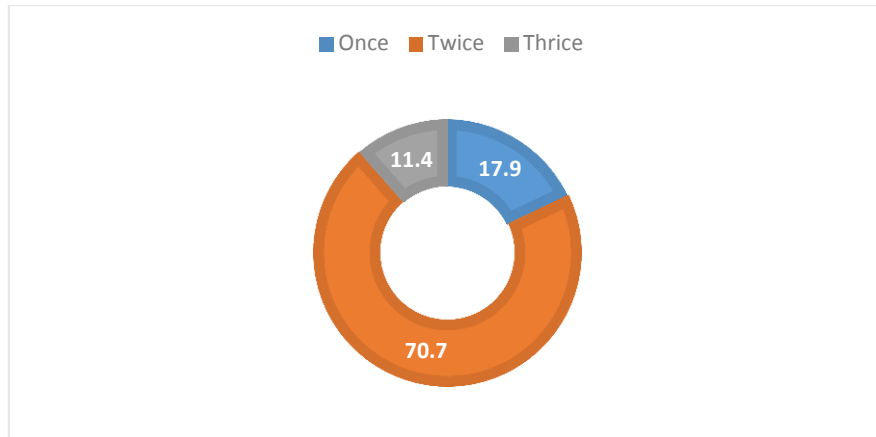
**4.4 Objective 2:** To determine parental self-oral health care practices (and consequent influence on the child) through the use of a self-administered questionnaire.

The results for objective 2 are presented with respect to Sections B - E of the questionnaire and focus group.



#### 4.4.1 Frequency of tooth-brushing

The figure below indicates the frequency of the participants' children brushing their teeth (per day).

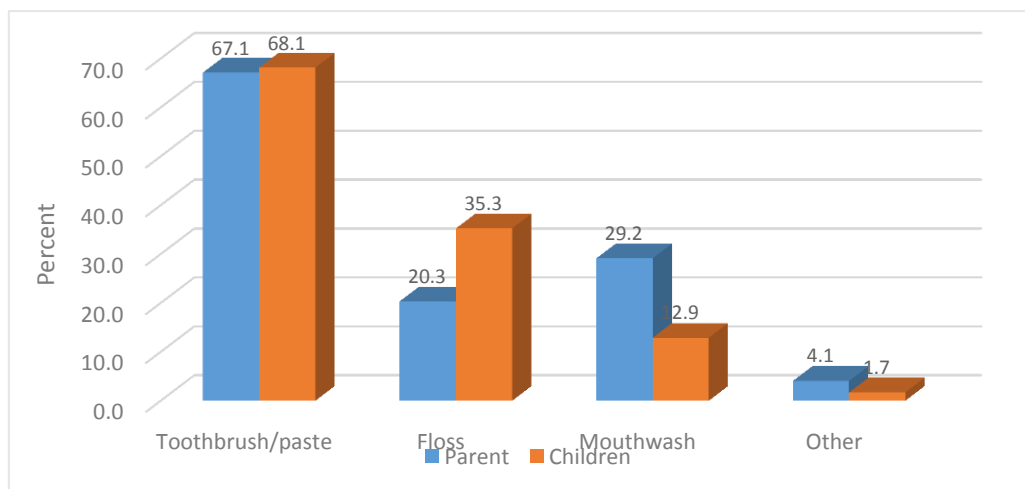


**Figure 4.8:** Frequency of tooth-brushing

Most participants (70.7%) indicated that their children brushed their teeth twice a day. This is in keeping with recommended guidelines.

#### 4.4.2 Oral hygiene tools

The following were identified as the most common methods used by “parents” and children to clean their teeth. Note that multiple responses were allowed, hence the total does not add up to 100 %.



**Figure 4.9:** Oral hygiene methods

Whilst most parents (67.1%) and children indicated (68.1%) that they used toothbrushes and toothpaste only 20.3% of parents and 35.5% of children flossed. The validity of this is questionable, as will be discussed in the discussion chapter. An interesting result is that whilst 29.2% of parents reported using a mouthwash whilst only 12.9% of children have been reported using mouthwashes.

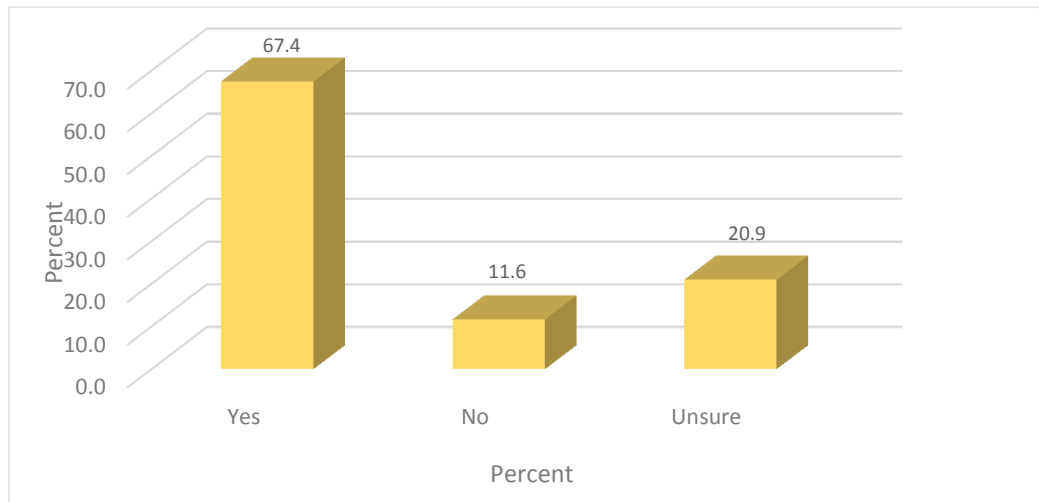
**4.5 Objective 3:** To assess parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries through the use of a questionnaire and group focus discussions.

The results for objective 3 are presented with respect to Sections B - E of the questionnaire and focus group.

Approximately a third of the participants (34.7%) had heard of sealants, and in four of the five focus group discussions all the participants had not heard of dental sealants. In focus group “B” one participant reported that her cousin is a dental therapist and had told her about dental sealants and so her son went for it and “so far his teeth that were previously decayed are good and have had no problems at all with them since.” However she was unaware of the dental sealant placement procedure because she was not present when it was done.

The participants were provided with a brief education statement of dental sealants. The post-knowledge of participants regarding using sealants was assessed by asking participants if do they now think that placing dental sealants was a good idea. Equal numbers of participants ( $n=32$ , 27.8%) indicated yes or that they still uncertain, with 13 participants (11.3%) responding negatively. Two-thirds of participants identified that sealants would help prevent decay. Of this, 27.8% were also in favour of using sealants. A participant in focus group “D” stated that she was concerned about the side effects of dental sealants. The researcher informed her that there have been no reported side-effects from the years 1980 to 2012.

Participants’ responses to the question “If this procedure is offered to your child as part of the school programme, will you want your child to have this procedure?” are indicated below.



**Figure 4.10:** Acceptance of dental sealants

Approximately two-thirds (67.4%) of the participants would agree with having the procedure of dental caries placement for their children. Some of these reasons are: to prevent teeth from rotting (44.1%); to keep teeth healthy (12.5%); upon the dentists recommendation (9.2%); and to save teeth (7.5%). Participants suggested that dental health services can be improved through the following methods: provision of more clinics (15.3%); additional staff (5.8%); and increased oral health education provision 931.9%).

**4.6 Objective 4:** To determine the relationship between parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review.

The results for objective 4 are presented with respect to Sections B - E of the questionnaire and focus group. The results related to the objective of having to determine the relationship between parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review are reported on below.

#### 4.6.1 Age distribution

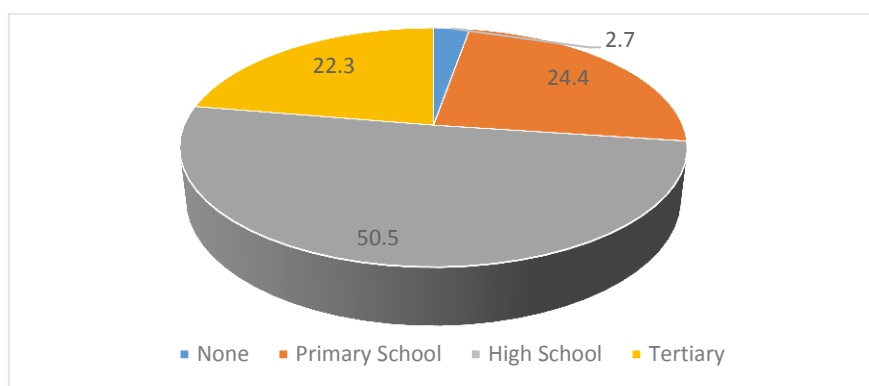
The age distribution of the participants is as follows:

**Table 4.1:** Participants age distribution

Age	Number	Percentage
<20-29 years	38	12.8%
30-39 years	83	28.3%
40-49 years	69	23.4%
40-59 years	56	18.9%
60> years	49	16.6%
TOTALS	295	100%

#### 4.6.2 Level of education

More than two-thirds of the participants (72.7%) had at most a high school education. The figure below indicates the education levels of the participants.



**Figure 4.11:** Education level of participants

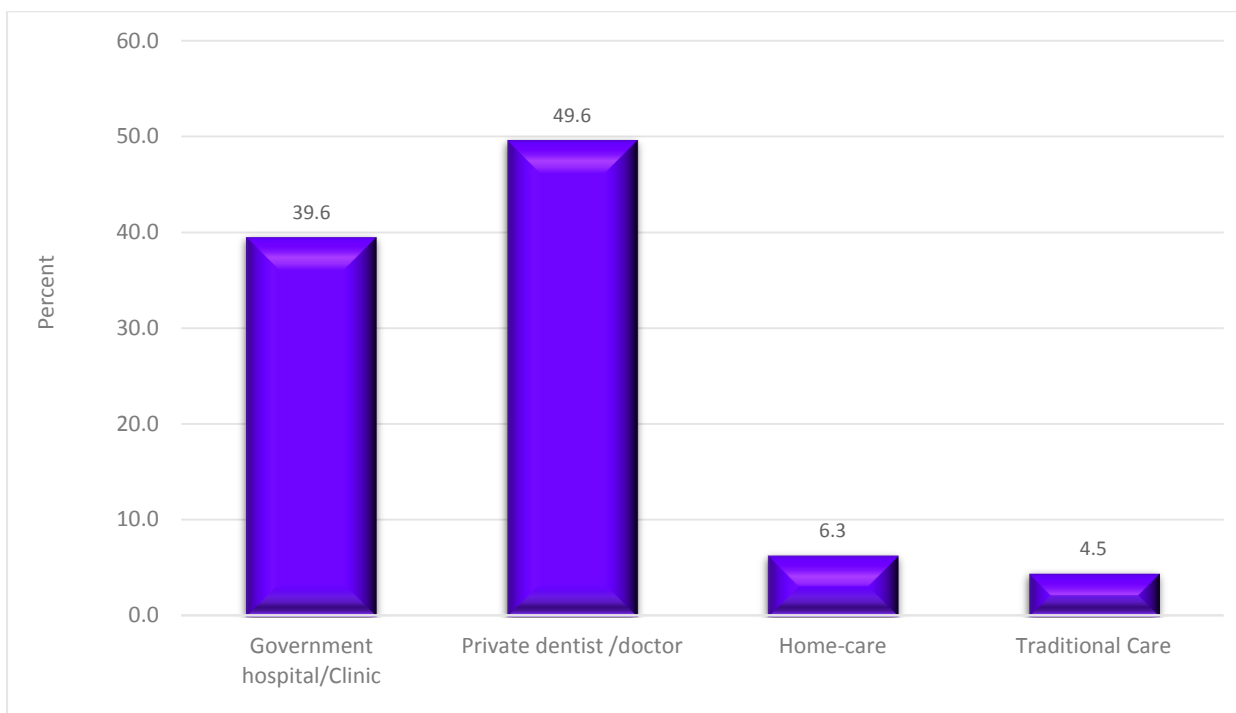
#### 4.6.3 Income and socio-economic status

The cross tabulation table indicates that 90.7% of the participants received a monthly income of R20 000 or less, and that 55.7% who earned less than R6000 received their monthly income via wages or salaries. Within the category of less than R6000, 52.0% were from salaries or wages. Of the participants 126 (42.7%) received their monthly incomes in the form of social grants, donations or pensions. More than three quarters (77.5%) of participants indicated that they did not belong to a medical aid scheme, whilst 22.5% belonged to a medical aid. This potentially has an impact on the oral health care purchase patterns of participants who belong to medical aid societies compared to those who do not have medical aid.

**4.7 Objective 5:** To determine the current oral health promotive strategies implemented by the KwaZulu-Natal (KZN) Department of Health through a review of the available policy documents and statistical records

The results for objective 5 are presented with respect to Sections B - E of the questionnaire and focus group. This section is concerned with parents' use of, and attitudes towards, oral health care facilities and services.

Participants identified the following as places where they take their children when they need dental assistance.



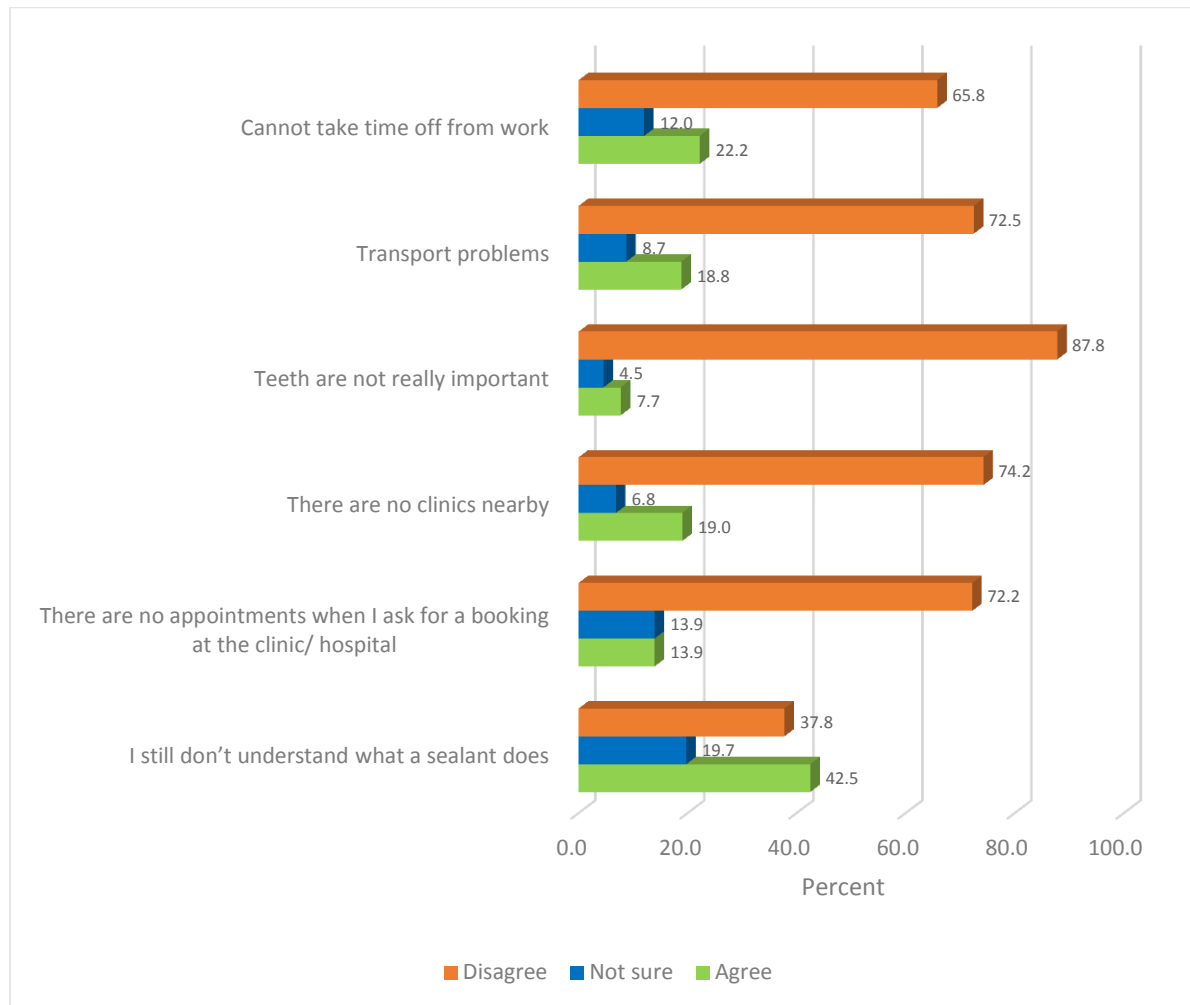
**Figure 4.12:** Utilisation of oral health care facilities

Nearly 90% of the participants sought professional dental advice, with the remainder trying alternative methods for relief, such as home remedies and traditional care.

#### **4.7.1 Preventive Care Services**

This section deals with participants' knowledge of preventive dental services. In responses to the question "Have you heard of any preventive services offered where you stay?" the majority of the participants (84.4%) indicated that they had not heard of preventive services.

Participants indicated their levels of agreement with factors that might be responsible for preventing them for taking their children for treatment. This is reflected in the figure below.



**Figure 4.13:** Barriers to accessing oral health care

All factors have higher levels of disagreement with the statements (though the factors are stated negatively). Participants disagree most with “Teeth are not really important”, indicating that they consider the state of health of their children’s teeth to be very important.

Regarding the parent’s role in improving their children’s oral health participants reported the following ways in which as a parent/care giver play roles in improving the child’s dental health: educating children on oral health prevention and promotion (42.7%); health promotion (8.1%); and dietary advice provision (18.6%).

The results related to determining the current oral health promotive strategies implemented by the KwaZulu-Natal Department of Health through a review of the available policy documents and statistical records are reported below.

An analysis of the oral health services that are offered to people living in the study (see Appendix 14) reflects that mostly low-level curative services (restorations and extractions) are offered. In the National Oral Health Policy provision is made for a “basic basket of oral health care”. However the general population seems to be unaware of this, as evidence by the responses of the focus group discussions where most participants indicated that they mostly received extractions and were unaware of prevention and oral health education that was also available.

A participant in focus group “C” stated that if you required such services you had to ask, and they were not made available as a matter of course. Other participants did not know that certain health services were available at no cost to children under the age of six, and a participant in group “A” admitted that she did not take her child for dental treatment but used a home remedy as the perceived cost was too great, yet her child would have been eligible for free treatment at a public health care facility. The need for the public to be educated at to the locations of the public oral health care facilities, and the services that they offer, are thus highlighted.

#### 4.7.2 Dental services offered in eThekwini district and the KwaZulu-Natal province

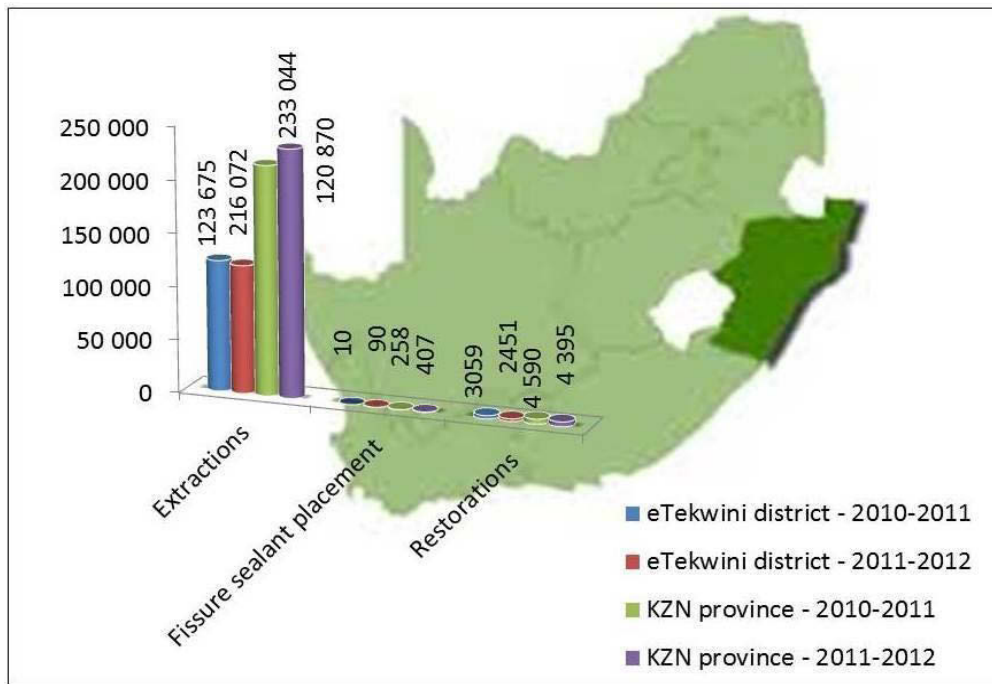
An analysis of dental services offered in both the eThekwini district and the KwaZulu-Natal province reveals an absence of preventive and restorative dental services, with a skew towards curative services (relief of pain and sepsis).

**Table 4.2:** Dental services rendered by the public sector (eThekwini District)

<b>Treatment</b>	<b>April 2010-March 2011</b>	<b>April 2011-March 2012</b>
extractions	192 722	92 384
restorations	3 059	2 451
fissure sealants	10	90
<b>Total dental visits</b>	<b>123 675</b>	<b>120 870</b>

*Source:* Department of Oral Health, Kwazulu-Natal, 2014: 1-3)

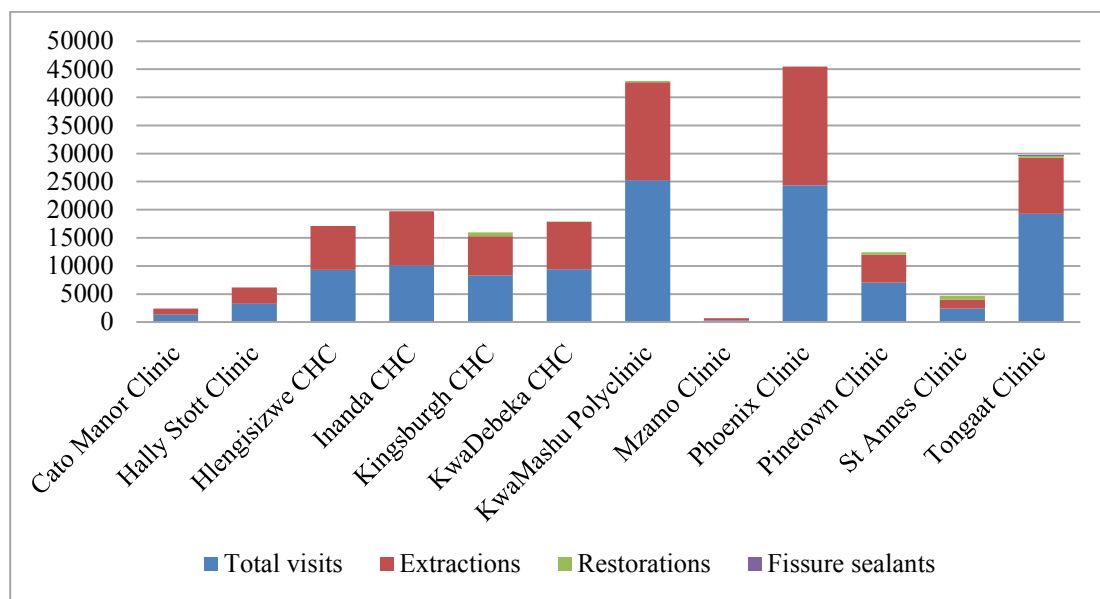
The figure below reveals that there is a very low percentage overall of preventive dental treatment (2, 48%) when compared to curative dental treatment which comprises the bulk (97, 52%) of dental services rendered in the district. An analysis of the services rendered by the public service in KwaZulu-Natal is illustrated in the figure below:



**Figure 4.14:** Analysis of dental services offered in both the eThekweni district and the KwaZulu-Natal province (2010/11 and 2011/12)

Source: Department of Oral Health, Kwazulu-Natal, 2014: 1-3)

Further analysis of the services offered by the twelve clinics and community health centres (CHC), as illustrated in the figure below, reveals that only three facilities (one CHC and two clinics) offered fissure sealants as part of the services that they rendered in the years 2010-2012.



**Figure 4.15:** Dental services rendered by dental clinics and CHCs in the eThekweni district (2011/2012)



#### **4.8 Summary**

The sample consisted of the parents of 313 children, of which nearly three-quarters of the participants ( $n=295$ ) were female (72.1%). Approximately two-thirds (65.5%) of the participants ( $n=295$ ) were the mothers of the children. The results also revealed that more than two-thirds of the participants (77.7%) had, at most, a high school education and that 90.7% of the participants received a monthly income of R20 000 or less. Another finding of this study is that 6% had no knowledge of the causes of dental caries, with almost half (49.8%) of the participants reporting that “bad teeth” were inherited.

The results further revealed that there are a range of factors (such as parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries) that influence the use and acceptance of dental sealants as a preventive strategy and dental sealants as a dental preventive measure in the uMlazi education district. This range of influences also affects parents’ knowledge, attitudes and perceptions towards dental caries. These results are discussed in detail in the next chapter, where links with the literature will be also be demonstrated.

## CHAPTER 5: DISCUSSION

### 5.1 Introduction

This chapter reviews some of the results that have been previously presented. Additionally the results will be compared to the findings of other studies and the literature. The results that will be discussed will serve as a basis for answering the research questions and addressing the objectives of the study. The research aim study was to understand parents' role and the use of dental sealants in Grade 1 learners' oral preventive health in the Chatsworth Circuit of the uMlazi District, KwaZulu-Natal.

This could result in providing answers that would assist in understanding what preventive methods are currently being implemented by the Department of Health to prevent dental caries in children, and in assessing the knowledge, attitudes and perceptions of parent's towards dental caries and dental sealants as a preventive strategy for dental caries in their children. Further, this study seeks to gain an understanding of how the public-sector oral health preventive strategies and programmes are being utilised in the Chatsworth circuit of the uMlazi school district.

The study revealed that nearly three-quarters of the participants ( $n=295$ ) are female (72.1%). These results indicate that mostly females are the primary caregivers and are largely involved in the physical and health care of children. However no significant relationship could be established using the Pearson Chi-Squared Test (where  $p=.005$ ) between gender and any of the variables such as oral health practices or dental treatment such as regular dental visits. It is implied in the study that females are the primary caregivers. This has implications when oral health programmes are designed, as the focus should be directed towards females as the primary caregivers.

The questionnaire was given to the child who then took the questionnaire home and handed it over to the parent. Most of the participants (70.3%) are the mothers and grandmothers of the children in the study sample. This adds value to the assumption that females are the primary caregivers. This has implications for oral hygiene education and prevention, with the need to direct such interventions to mostly females, who are the primary caregivers. The Pearson Chi-Squared Test revealed that a significant relationship existed between the relationship of

the care-giver to the child and the parents' knowledge levels relating to the availability of preventive services ( $p=.001$ ) and of fluoride ( $p=.001$ ). Nakhjavini, Forutan & Nakhjavani (2013) state that family imposes the most important effects on the physical and social aspects of a child's health from birth and especially early childhood. As such, parents' who are the primary care-givers, who in this study mothers and grandmothers, should be knowledgeable of preventive services that are available for their children in order to utilise these and thus ensure optimal oral health for their children/grandchildren. Schroth, Brothwell and Moffat (2007) reports that in a study done in Manitoba, Canada regarding early childhood caries, 85.2% of the caregivers were mothers (83.3%) or grandmothers (1.9%). The need for increased oral health education and promotion efforts directed to mothers and grandmothers, but without excluding male care-givers, is thus highlighted.

More than 86% of the participants indicated that there were four or more people in the household. This may have an effect on disposable income that is available for the purchase of oral health care and oral hygiene products, as well as oral hygiene practices. An analysis of the various variables did not reveal any level of correlation or significance (where  $p=.005$ ) between the number of people in the household and oral health knowledge, attitudes, perceptions and oral health practices.

More than three-quarters of the participants (77.5%) indicated that they did not belong to a medical aid scheme/private health insurance. This, potentially has an impact on the oral health care purchase patterns of participants who belong to medical aid societies compared to those who do not have medical aid. A significant number of participants who belong to medical aid schemes sought oral health care in the private sector ( $p=.000$ ) and did not experience any transport problems in order to access oral health care for their children ( $p=.000$ ). Conversely, a significant number of parent's (72.5%,  $p=.020$ ) reported experiencing transport difficulties in accessing oral health care, or did not take their children for regular dental care ( $p=.033$ ).

The study reported that only 22.5% of the respondents had private health care insurance, whilst the remaining 77.5% were unfunded. Participants on a medical aid plan or private health insurance with no/minimal dental benefits may not access dental care due to their having to pay out-of-pocket expenses in purchasing such care, and this researcher suggests that this may lead to an increase in the prevalence of dental caries. This is in keeping with the Postma, Ayo-Yusuf & van Wyk (2008a) study that found that low economic status could be

associated with an increase in the prevalence of dental caries. A study conducted in Limpopo Province, South Africa, reported that amongst adolescents, those with health insurance were significantly more likely (41.8% vs. 23.2%;  $p < 0.001$ ) to have visited an oral health care facility by the age of fourteen years (Ayo-Yusuf, Okgabare & Ayo-Yusuf 2011).

Challenges in terms of inequality, demography, migration, urbanisation, consumption and production still exist despite significant progress made across many of the millennium development goals (MDGs), and these new challenges continue to threaten to derail development (Department of Health, 2013). Non-communicable diseases contribute to malnutrition and this may lead to an increase in the caries rates (World Health Organisation, 2011). Children with carious teeth that are painful may not be able to eat healthily and as a result experience malnutrition, thus compounding the effects of the non-communicable diseases. However, by ensuring that teeth remain healthy through the formative years, children, will be able to eat healthy foods and thus have a lower incidence of non-communicable diseases (Government Gazette No. 469 of 2004). This researcher postulates that by ensuring good oral health there could be a reduction in the prevalence of non-communicable diseases in South Africa.

The objectives of the study will be listed below, followed by a brief discussion of some of the research findings that address the objective.

#### **5.1.1 Objective 1: To assess parental knowledge, attitudes and perceptions of grade one learners towards dental caries through the use of a self-administered questionnaire.**

An analysis of the data pertaining to participants' knowledge of factors such as the causes of rotten teeth, prevention methods and oral hygiene practices revealed that 76.6% knew that diet played an important role in the prevention of dental caries. Oral hygiene practices such as not brushing (36.9%) and poor oral hygiene (7.5%) were also identified as causes of dental caries. These low factor response rates indicate a poor knowledge of the multi-factorial causes of caries, and have implications for oral health prevention programmes.

Gift, Corbin & Nowjack-Raymer (1994) state that dental caries results from the concurrent risk factors of cariogenic micro-organisms, a caries-conducive diet and the presence of a susceptible tooth. They also state that the most effective manner in which to prevent dental

decay is a combination of diet, oral hygiene, fluorides and dental sealants. The results of this study reveal gaps in parents' knowledge, attitudes and perceptions towards dental caries, oral hygiene practices, diet and nutrition, and dental sealants. Whilst accepting that knowledge does not always translate into action these gaps could be largely addressed through the use of population and individual-based oral health education, promotion and prevention strategies and programmes.

A large number of participants (81.6%) agreed that rotten teeth could be controlled, with many suggesting that diet (42%), tooth brushing (36.3%), and oral hygiene (19%) as being important in caries control and prevention. Lower income participants significantly reported that rotten teeth could not be controlled ( $p=.007$ ) and that rotten teeth were caused by worms ( $p=.000$ ). A significant correlation between participants' responses that worms cause rotten teeth and participants' knowledge of how rotten teeth are caused (Spearman's  $\rho$  -.141) was revealed in this study. This indicates poor knowledge of the causes of caries and has implications for oral health prevention, as poor parental knowledge of oral hygiene or diet could negatively influence the child's oral health (Nakhjavini, Forutan & Nakhjavani 2013).

Participants' responses regarding their perceptions of their children's oral health revealed a wide range of responses. For example, 56.1% of the participants stated that their children's deciduous teeth were not important but 76.4% agreed that rotten teeth could affect their children's health. More than half the participants (51.1%) agreed that their child's first dental visit should occur on or before the child reaches the age of one year old. This has implications for young children's future oral health status. Spearman's  $\rho$  revealed that there is a significant correlation (.143) between a child who commenced dental check-up visits at one year of age and tooth-brushing habits, with these children undertaking regular tooth-brushing at least twice a day.

Schroth, Brothwell & Moffatt (2007) reported on an early childhood caries study carried out in Manitoba, Canada, wherein it was revealed that 74.7% of parent's felt that the first dental visit should be made by the age of one year, and that 91.2% stated that milk teeth were important (Schroth, Brothwell & Moffatt 2007). Almost three-quarters of the participants (74.1%) were either uncertain or unsure of the cause of dental caries and suggested that worms were responsible. This level of misinformation and lack of knowledge has implications for oral health education and prevention, as indicated in the Anrup et al (2002)

study which demonstrated a link between socio-economic status, dental knowledge and responsibility-taking.

A little more than half of the participants (55.8%) were aware of fluoride and its use in caries prevention. Most participants (82.6%) reported knowing that fluoride assists in protecting teeth against decay. However, 12.9% thought that fluoride was expensive and 14% stated that fluoride was only provided by doctors or dental professionals.

Whilst a significant number of participants ( $p=.040$ ) knew that fluoride made teeth stronger, a significant number ( $p=.000$ ) thought that fluoride was only provided by a doctor or dental professional. Schroth, Brothwell & Moffat (2007) reported that in the Manitoba, Canada early childhood caries study, 75.5% of parents felt that fluoride toothpaste prevents decay. This lack of knowledge has implications for parents' oral hygiene care practices that they render to their children (Schroth, Brothwell and Moffat 2007).

### **5.1.2 Objective 2: To determine parental self-oral health care practices (and consequent influence on the child) through the use of a self-administered questionnaire.**

Most participants (70.7%) indicated that their children brushed their teeth twice a day, with 17.9% brushing just once a day. This is in keeping with recommended guidelines for tooth brushing to occur at least once/twice daily. There was a significant correlation between the children who brushed their teeth once or less than once a day and children missing school because of toothache (Spearman's  $\rho = -0.180$ ), or the parents having to miss work in order to take their children suffering with toothache for dental treatment (Spearman's  $\rho = -0.178$ ).

Participants identified the most common methods used by parents' and children to clean their teeth as being toothbrushes and toothpaste (parent's, 67.1% and children, 68.1%); flossing (parent's, 20.3% and children, 35.5%); and using a mouthwash (parent's, 29.2% and children, 12.9%). Spearman's  $\rho$  did not reveal any significant correlation between the use of the various oral hygiene tools and poor oral hygiene and rotten teeth.

The majority of participants agreed that various measures such as daily tooth-brushing (88.1%); reducing sugar consumption (72.9%); regular dental visits (47.5%); and oral health

education (69.8%) could lead to improved oral health. Studies have indicated that children with caries may suffer from difficulty in eating, sleeping, reduced growth and altered behaviour (Asawa et al. 2014; Nakhjavani, Forutan & Nakhjavani 2013 and Al Agili, Niazy & Pass 2012). This indicates a need for oral health education programmes that would address the various influences (tooth-brushing, dangers of sugar consumption, and the need for regular dental visits).

### **5.1.3 Objective 3: To assess parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries through the use of a questionnaire and group focus discussions.**

Two-thirds of participants identified that sealants would help prevent decay. Despite being informed of what dental sealants were 42.5% of respondents still did not know what are sealants. An implication of this is the need for easy-to-understand oral health promotion and education material (such as the use of pictures and illustrations) that would meet the learning and cognitive needs of the target population, in terms of language, syntax and ease of understanding. Bonetti et al (2010) states that the main problem may be a lack of understanding of the mechanism by which the sealant works. Bonetti et al (2010), further suggest that psychological theories such as the Theory of Planned Behaviour (TPB), the Social Cognitive Theory (SCT) and the Operant Learning Theory (OLT) be utilised in efforts to ensure that parent's KAPs toward dental sealants are increased.

A significant number of participants ( $p=.022$ ) who received monthly incomes of R20 000 or more, and in the form of salaries ( $p=.000$ ), knew about dental sealants, and a positive correlation between income and knowledge levels of sealants can be established.

In response to the question "If this procedure (dental sealants) is offered to your child as part of the school programme, will you want your child to have this procedure?", 67.4% of the responses were in the affirmative. A significant relationship between the various variables, such as income and level of education, and the effect of the variables on the willingness to have dental sealants placed in children's teeth was established. Ayo-Yusuf, Okgabare & Ayo-Yusuf (2011) reported that in a study conducted in Limpopo province, South Africa amongst 12-14 year olds, only 3.5% had a dental sealant in situ. The need for increased uptake of dental sealants is evidenced in the potential to prevent dental caries, with sealants being shown to have the potential to reduce caries by up to 60% over a four-year period (Ahovu-Saloranta et al. 2008 and Van Wyk, Kroon & White 2003). However, the uptake of dental

sealants is very low, even in developed countries. For example, in a study conducted in Jeddah, Saudi Arabia in 2011 it was found that only between 9% of the eligible children who were covered by national healthcare insurance had at least one dental sealant in place (Al Agili, Niazy & Pass 2012). Postma, van Wyk & Ayo-Yusuf (2008b) reported that, in a study conducted in South Africa, they found that 20% of 14 year old children had caries and that it was important to provide dental sealants on molar teeth up to the age of 15 (Postma, van Wyk & Ayo-Yusuf 2008b). This researcher concludes with Postma, van Wyk & Ayo-Yusuf (2008b) and suggests that dental sealants be made available to a wider target of children, and that this suggestion be supported by key role-players (caregivers, the oral health sector, the education sector).

#### **5.1.4 Objective 4: To determine the relationship between parental age, level of education and socio-economic status on knowledge, attitudes and perceptions towards dental sealants and dental caries through statistical tests of association and compared to the literature review.**

The study revealed that there were correlations between age, oral hygiene practices and education. These correlations are important because the relationship between the oral healthcare practices of children are influenced by the parents oral healthcare practices, as illustrated by authors such as Nakhjavini, Forutan & Nakhjavani 2013; Adeniyi et al. 2009, and Mohebbi et al. (2008) who reported on the influential role parents played in, and contributes to, the oral hygiene and oral health status of their children. It was found that amongst the 30-39 year age-group (n=83) a large number of respondents only had education up to a primary school level, and of the 69 respondents aged between 40-49 years only nine had education higher than a primary school level. There was a significant relationship (p 0.23) between age and their children's oral hygiene practices, with respondents aged between 30-30 years displaying greater attention to their children's oral hygiene practices, and younger and older parents displaying less attention. However no significant relationships between age and knowledge of dental sealants; and knowledge of fluorides. These results may be indicative of the need to ensure that further oral health education needs to be designed to meet the needs of a largely poorly-educated community, and younger parents who may have. This need is reinforced by the finding of the study, wherein even after being educated about dental sealants 42% of the respondents of the focus groups were still unsure about the advantages of dental sealants, and these parents are unlikely to advocate for the placement of dental sealants in their children's teeth.



With more than two-thirds of the participants (72.7%), having at most a high school education, there is a significant correlation between the level of the caregiver's education and the oral health care of the child. An analysis of the correlations using the Pearson Chi-Squared test reveals significant correlations between a child having decayed teeth and the level of education ( $p=.002$ ). More educated parents' were more likely to think that caries could be prevented ( $p=.002$ ) and that rotten teeth could affect a child's health ( $p=.005$ ). The implication of this result is that oral health education and promotion should be made available in a simple-to-understand format, and be largely aimed at those in the lower education quintiles.

Nakhjavini, Forutan & Nakhjavani (2013) found, in a study that they conducted in Tehran, Iran, that there was a significant direct correlation between respondent mothers levels of education and their knowledge of preventive dentistry methods. These authors also reported that there is a significant relationship between mothers' occupational status and their knowledge of preventive services, with housewives displaying significantly lower oral health preventive measures than employed mothers. Nakhjavini, Forutan & Nakhjavani (2013) reinforce the results of this study by offering as evidence the Khosh, Sar and Khorshidian study which was conducted in Tehran, Iraq in 2004, and where the results revealed that uneducated and unemployed mothers had low levels of oral health knowledge when compared to employed and educated mothers.

This in keeping with the findings of Campbell, Crawford & Heskett (2006) and Pine, Adair & Nicoll (2004) who reported that mothers' and caregivers' nutritional status, eating habits and tooth brushing knowledge have an impact on the children's oral health behaviour and status. The researcher suggests that the educational status of the participants in this study may also have affected their ability to provide detailed and comprehensive responses to the questions contained in the questionnaire, and may have limited their participation in the focus group discussions.

The results revealed that 90.7% of the participants received a monthly income of R20 000 or less. Overall, 29.3% of all the participants earned less than R6 000. Of the participants, 126 (42.7%) received their monthly incomes in the form of social grants, donations or pensions, indicating a large reliance on the social welfare system. An analysis of the correlations using the Pearson Chi-Squared test reveals significant correlations between a child having decayed

teeth and income ( $p=.007$ ), and the manner in which the income is received ( $p=.003$ ), and this researcher suggests that those participants who receive incomes in the form of donations or social welfare payments are more likely to have children with poor oral health. This may be because of their having a limited disposable income that is available for the purchase of oral health care and oral hygiene products. It is thus implied from this result that children from the lower income groups experience poorer oral health status than those children who come from high income earning families. This is in alignment with the results of various studies, such as those undertaken by Arnrup et al. (2002) and Postma, van Wyk & Ayo-Yusuf (2008b), wherein a direct link was demonstrated between socio-economic status and oral health status.

#### **5.1.5 Objective 5: To determine the current oral health promotive strategies implemented by the KwaZulu-Natal (KZN) Department of Health through a review of the available policy documents and statistical records**

This section deals with participants' knowledge of preventive dental services. The majority of the participants (84.4%) indicated that they were unaware of dental preventive services that are available in the public sector. This reinforces the need for improved oral health education programmes at a primary health care level. The various influences and variables related to oral health preventive care will be illustrated in the sections that follow. The World Health Organisation states that comprehensive strategies to prevent caries in children cannot be conducted in isolation but must be a collaborated health promotion effort between the following role-players: healthcare professionals, educators and healthcare providers; caregivers; and the child (Petersen 2003). A framework for any oral health promotion programme should include the following five approaches, namely, medical, behaviour change, education, client-centred approach and societal change (Pine, Adair & Nicoll 2004; Petersen 2003). Therefore, the researcher argues that the need for sound oral health prevention and oral hygiene education for parents are essential.

Most participants took their children to state oral healthcare facilities (39.6%) or private dental practitioners (49.6%), whilst smaller numbers (10.8%) reported using home-care or traditional care when dental care was required. Whilst two-thirds of participants (66%) reported that it was easy to obtain a dental appointment, twenty percent reported transport as being an issue in gaining access to oral health care. Issues pertaining to the inability to access care may lead to the child's oral health being compromised, with the resultant more

expensive or invasive treatment being required. This has cost-implications for less-wealthy and non-insured patients.

The results of the analysis of dental services revealed a disproportionately high ratio of extractions to restorations and dental sealants (39:1). The ratio of restorations to dental sealants is 305:1 and the ratio of extractions to dental sealants is 19 272:1. Therefore, it is clear that there is a need for dental public health strategies to reduce the large number of extractions and to increase the number of restorations and dental sealants that are offered in the public sector. These results indicate that there is a focus on the delivery of curative rather than preventive oral health care, and indicate the need for a realignment of the focus from curative to preventive oral health care strategies. Oral health education, promotion, nutrition information and oral health awareness programmes are some of the strategies that could be employed to reduce the extraction rate and improve oral health in the population (Postma, van Wyk & Ayo-Yusuf 2008b). Another strategy that could contribute to the improved oral health status of children is the use of school-based oral health programmes. The National Children Oral Health Survey of 1999-2002 found that between 45%-60% of South African children required treatment for dental caries (Department of Health 2003). In KwaZulu-Natal, the prevalence of dental caries in six-year olds with primary dentition is recorded as high as 64.8% (Department of Health 2003). School dental health programmes can increase access to services especially amongst vulnerable children who are less likely to receive private dental care (Hiiri et al. 2010; Yengopal et al. 2009a; Yengopal et al. 2009b). This researcher suggests that by initiating oral health prevention education, screening and treatment at an early age, using the platform of school dental health services, there could be an improvement in the oral health status of children, and that these benefits could continue into adulthood.

This researcher suggests that possible barriers to these strategies include patient willingness to change their behaviours, costs, the knowledge, attitudes and perceptions of people towards regular dental check-ups and the attitude of people preferring extractions rather than restorations as a treatment of choice even when the option of alternate treatment modalities such as restorations is made available to them.

Another suggested strategy is engaging the community to participate in their own health decision-making by becoming policy advocates and participants in policy-making. This is in keeping with the primary healthcare approach that calls for community involvement and

participation in their own healthcare needs. In South Africa the national and provincial departments of health subscribe to the principles of “*Batho Pele*” (people first) which are based on a number of principles including consultation (communities will be consulted about the level and quality of public services they receive and, where possible, will be given a choice about the services offered) (Department of Health 2003).

#### **5.4 Chapter summary**

From the analysis of the results presented in this chapter it is clear that if communities receive oral health education, are able to gain improved access to quality oral health care, and are able to improve their socio-economic status through a multiplicity of interventions, then parents will be positively influenced to encourage their children to maintain their oral health and there will be an increase in the uptake of dental sealants as a preventive measure. However, the implications of this study is that there exists a need for comprehensive and sustained oral health education to occur at all levels of society. Such education must also be aimed at educating the public on other factors that affect oral health (such as diet, weight management, exercise), in keeping with the principles of the common-risk approach to improving health status. Additionally, it is recommended that oral health education and prevention programmes be developed that seek to gain the support of the entire community (leaders, educators, healthcare professionals, policy actors) so as to ensure the success of the oral health education and promotion programme.

Whilst recognising that different parental factors play a role in the dental health of children, this study recommends that oral healthcare professionals and educators be involved in rendering oral healthcare education to children so that an increased awareness of dental prevention measures can be created. Oral health education such as tooth brushing techniques education and education on the different oral hygiene strategies (diet, flossing, fluorides, and regular check-ups) should be incorporated into the basic health education provided at schools. There should be integration of oral health promotion into general health promotion strategies and programmes. By increasing parents’ knowledge and changing their attitudes, it is envisaged that the implementation of oral health education and prevention programmes that are aimed at both the child and the parents’ will be successful. This is based on the theory of models of change, and that the educated person will be motivated to seek dental prevention care for their children (upstream demand). Improved oral health has a number of allied benefits such as improved general health and a reduction in the number of lost school and work days.

## **CHAPTER 6: CONCLUSIONS**

### **6.1 Introduction**

This chapter provides concluding remarks about the study and makes recommendations that could be used to improve the oral healthcare of children in the Chatsworth Circuit of the uMlazi education district.

### **6.2 Strengths of the study**

The researcher argues that one of the strengths of this study is that the focus is on assessing parent's knowledge, attitudes and perceptions of parents' of grade one learners. This age group presents an ideal opportunity for the placement of dental sealants as they are at the age where the first permanent molar is erupting or has just erupted. Another strength of the study is that the study population comprises a wide range of socio and economic differentials, ranging from income, education-levels and cultural and healthcare beliefs. This allows for an in-depth understanding, over a large and diverse population of participants' knowledge, attitudes and perception of dental caries and dental sealants. This also allows for oral health education, promotion and treatment recommendations that will address the needs of a wide and diverse population.

### **6.3 Limitations of this study**

In most studies of this nature there are a number of limitations that exist. One of the major limitations is that the study occurred in a location wherein the majority of patients are of the Black or Indian race. In its 2012/13 annual report, the KwaZulu-Natal Department of Health acknowledges that the White race group holds a significant advantage in terms of economic status, and that the Coloured, Indian and Black groups are disadvantaged economically (KwaZulu-Natal Department of Health, 2013). It is important to acknowledge that racial differences are often linked with disparities in socio-economic status, and are a reality in South Africa (Ayo-Yusuf, Okgabare & Ayo-Yusuf 2011). Burt (2005) states that there is a solid body of evidence to show that social determinants (housing, availability of public transport, crime levels, street lighting, access to parks and open spaces, economic status and other social and political factors) affect health status. Vast differences in terms of access to care and the availability of resources exist in South Africa, and these differences may even

occur in the study location itself. The study location itself is not reflective of the general demographic profile of South Africa. These factors limit the ability of the study to provide a true reflective picture of the reality of oral health care in South Africa.

Other factors such as financial and time constraints, access to healthcare, and quality of health care limit the ability of the study to have the results projected onto the greater South African population. In addition the effects of high unemployment levels; political ideologies; oral health and general health policy; other policy imperatives and HIV/AIDS and its impact on society have not been fully considered in this study.

More research is needed to determine whether the same knowledge, attitudes and perceptions towards fissure sealants exist in other populations and age groups in and across communities in South Africa. An important limitation of this study is that the knowledge, attitudes and perceptions towards dental caries and dental sealants by oral healthcare workers has not been researched. The practices of oral healthcare workers can either enhance the delivery of dental sealants if the KAPs are positive, or retard and derail this vital public dental intervention if the attitudes are negative. More research is also required to explore the long-term impact of knowledge acquisition of parent's. Potential bias could have resulted in parent's over-reporting their knowledge of dental sealants. More research is also required to explore the impact of oral health practitioners' attitudes towards and perceptions of involving parent's and the community in the oral health decision-making process. Another limitation of this study is that the results of the qualitative analysis cannot be generalised. However these results provide a rich textual analysis of participants' insights into oral health treatment and perceptions for their children/wards.

Despite these limitations, this study does provide useful data that could be used to re-orientate thinking towards improved oral health education and provision, especially among identified high-risk groups from lower-socio-economic groups. This data could also be integrated into programmes that are aimed at addressing the non-communicable diseases that affect South Africa.

#### **6.4 Conclusions and recommendations**

The results of the study indicate distinct gaps in parental knowledge. Some conclusions related to each objective are discussed below:

**6.4.1 Research question 1:** What are the knowledge, attitudes and perceptions of parents of grade one learners towards dental caries in the Chatsworth Circuit of the uMlazi school district?

Participants identified diet and lack of tooth-brushing as predominant factors that contribute to dental caries but were unable to further explain this relationship. A number of the study participants (9.2%) did not perceive dental caries in deciduous teeth as being important precursors for caries in adult teeth

**6.4.2 Research question 2:** What oral health self-care practices are parents of grade one learners implementing in the Chatsworth Circuit of the uMlazi school district? Do parents in the Chatsworth Circuit of the uMlazi school district teach their children to adopt these self-care oral health practices?

Only 67.1% of respondents indicated use of toothbrush and toothpaste for self-care practices. The respondents also indicated that only 68.1% of children brushed their teeth. The majority of respondents did not floss (79.7%) or use a mouthwash (70.8%). Similar scores were reported by respondents for their children's oral health care practices. This further supports the premise that knowledge of oral health self-care does not translate into practice. The study findings further reiterate that parental attitudes and perceptions does influence children's attitudes and perceptions towards oral health self-care.

**6.4.3 Research question 3:** What role does parental income, level of education and socio-economic status play in their knowledge, attitudes and perceptions of oral health self-care practices of parents and children in the Chatsworth Circuit of the uMlazi school district?

A statistical association was found between the participants' level of education and the child's oral health care ( $p=0.002$ ). Almost two-thirds of the respondents (72.7%) had most a high school education. About 43% of the respondents were dependent on the social welfare system. This reiterates an association between oral health practices and income.

**6.4.4 Research question 4:** What are the knowledge, attitudes and perceptions of grade one learners parents in the Chatsworth Circuit of the uMlazi school district towards dental sealants?

The results indicate that 34.7% of respondents were aware of dental sealants. However after being educated about sealants only 67.4% of participants were willing for sealant placement to be done on their children. About 32.6% of respondents were uncertain or unwilling to have this procedure done. These results are significant because it highlights the need for parental and community involvement in oral health planning. More research needs to be conducted to unpack the reasons for parents not wanting to have sealant placements done on their children despite knowledge of its known benefits.

**6.4.5 Research question 5:** Do public oral health preventive strategies include dental sealants as part of the primary oral health care package offered to schools in the Chatsworth Circuit of the uMlazi school district?

The results indicate that there is still a dependence on curative care with very little evidence of oral health promotive care. The low number of dental sealant placements provides further evidence that there is a mismatch between oral health policy priorities and oral health service delivery. The results indicate that extractions is the most frequent clinical procedure with almost 192 722 procedures carried out in 2011. Although the extraction figure had decreased to 92 384 in 2012, this is still very high in comparison to the 90 dental sealants placement.

The study therefore concludes that parental knowledge, attitudes and perceptions towards dental caries is influenced by education and income. Knowledge and awareness of the value of dental sealants did not necessarily translate into support for this procedure as a preventive strategy for dental caries. The literature provides supportive evidence for parental involvement in oral health promotion decision-making but the factors that influence this decision making, must be considered. More research and advocacy needs to be conducted to further investigate strategies to improve parental involvement in oral health promotion decision making, specifically in the area of children's oral health care.



This study has highlighted the need for improved oral health education and health promotion in the Chatsworth Circuit of the uMlazi education district, and especially in that efforts that are directed to children and to the primary care-giver need to be enhanced. This study makes the following recommendations that, whilst specifically directed to the Chatsworth Circuit of the uMlazi district, may be applicable to other areas in South Africa:

- There needs to be a reorientation of the public sector dental service delivery sector using the principles of primary healthcare to move away from being a curative service to a comprehensive preventive service approach through improved oral health education and promotion programmes;
- Different healthcare settings (such as schools) should be explored to offer dental sealant programmes to children in grade one and other grades;
- Mechanisms for community participation should be facilitated to include patients, parents and care-givers as part of the oral health policies and decision-making process which could occur in a school-setting or through practical awareness campaigns and strategies;
- More research should be conducted to identify oral health practices and attitudes and perceptions towards dental sealants as a preventive strategy;
- More research should be conducted to explore oral health practitioners' attitudes to, and perceptions of, including parents and care-givers in the oral health decision-making process.

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# APPENDICES

## APPENDIX 1: Ethical approval certificate



10 June 2013

Mr Brenton Ganesh Nair 9502362  
School of Dentistry  
Westville Campus

Protocol reference number: HSS/0327/013M  
Project title: Parental knowledge, attitudes and perceptions of dental caries, and dental sealants as a preventive strategy for dental caries.

Dear Mr Nair

Expedited approval

I wish to inform you that your application has been granted Full Approval.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor UBob (Chair) & Dr S Singh (Deputy Chair)

/px

cc Supervisor: Dr Shenuka Singh  
cc Academic Leader Research: Prof J van Heerden  
cc Post Graduate Administrator: Ms Phindile Nene

Humanities & Social Sciences Research Ethics Committee  
Professor Urmilla Bob (Chair) and Dr Shenuka Singh (Deputy Chair)  
Westville Campus, Geyan Mbeki Building  
Postal Address: Private Bag X54001, Durban, 4003, South Africa  
Telephone: +27 (0)31 260 2687/53504657 Facsimile: +27 (0)31 560 4509 Email: [u@hssc.kznu.ac.za](mailto:u@hssc.kznu.ac.za) / [sgs@hssc.kznu.ac.za](mailto:sgs@hssc.kznu.ac.za) / [phn@hssc.kznu.ac.za](mailto:phn@hssc.kznu.ac.za)  
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Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

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## **APPENDIX 2: Gatekeeper request - Department of Education (KZN)**

**The In-Charge**

**Department of Education (KZN)**

Dear Madam / Sir,

**RE: Request to conduct questionnaire and focus group discussions on oral health at primary schools in the Umlazi district.**

I am a student at University of KwaZulu-Natal, studying for Master's degree in Medical Sciences. As part of my degree program, I am required to conduct research in my identified field of interest. My topic is: "Parental knowledge, attitudes and perceptions of dental caries (tooth decay) and dental sealants as a preventive strategy for dental caries". The study will attempt to increase awareness about dental caries and the benefits of applying dental sealants to molar teeth.

Twelve primary schools in the Chatsworth Circuit, of the uMlazi school district have been selected using a systematic random sampling technique. I am requesting permission to give all parents of grade one learners in these selected schools questionnaires to answer. Five schools in the sample will be thereafter purposefully selected for focus group discussions. Each school will have one focus group and are planned to be held after a school-organised event. This data sharing exercise will be extremely considerate, not to disrupt the school event. Each focus group discussion will last approximately 60 minutes. I undertake to avail the data collected to you for your valuable comments.

Please find attached a brief description of the research proposal and questionnaire. I wish to commence with data collection on...

Yours sincerely,

BG Nair: Student.

SUPERVISOR: Dr. S. SINGH

Discipline of Dentistry

College of Health Sciences, University of KwaZulu-Natal

Tel: 031-2426214 Fax: 031-2608069, Cell: 0738417384 e-mail: singhshen@ukzn.ac.za

## APPENDIX 3: Department of Education Gatekeeper permission



education

Department:  
Education  
**PROVINCE OF KWAZULU-NATAL**

Enquiries: Sibusiso Alwar

Tel: 033 341 8610

Ref.:2/4/8/505

Mr Brenton Ganesh Nair  
31 Avenue  
Umhlatuzana Township  
DURBAN  
4092

Dear Mr Nair

### PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct a pilot and research entitled: **PARENTAL KNOWLEDGE, ATTITUDES AND PERCEPTIONS OF DENTAL CARIES, AND DENTAL SEALANTS AS A PREVENTIVE STRATEGY FOR DENTAL CARIES**, in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 01 August 2013 to 31 August 2015.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Mr. Alwar at the contact numbers below.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report / dissertation / thesis must be submitted to the research office of the Department. Please address it to The Director-Resources Planning, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to school/s and/or institution/s in the following District/s of the KwaZulu Natal Department of Education.

**Umlazi District**

**Nkosinathi S.P. Sishi, PhD**  
Head of Department: Education  
16 August 2013

#### KWAZULU-NATAL DEPARTMENT OF EDUCATION

POSTAL: Private Bag X 9137, Pietermaritzburg, 3200, KwaZulu-Natal, Republic of South Africa  
PHYSICAL: Office G25, 188 Pietermaritz Street, Pietermaritzburg, 3201. Tel. 033 3418610 Fax : 033 341 8612  
EMAIL ADDRESS: sibusiso.alwar@kzndoe.gov.za; CALL CENTRE: 0860 596 363;  
WEBSITE: [www.kzneducation.gov.za](http://www.kzneducation.gov.za)

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beyond the call of duty

**APPENDIX 4: Requisition to Conduct Questionnaire and Interviews on Oral Health at  
Primary Schools in the Chatsworth District (KwaZulu-Natal)**

**The School Principal**

**Chatsworth Circuit**

Dear Madam / Sir,

**RE: Request to Conduct Questionnaire and Interviews on Oral Health at Primary  
Schools in the Chatsworth District.**

I am a student at University of KwaZulu-Natal, studying for Master's degree in Health Sciences. As part of my degree program, I required to conduct research in my identified field of interest which is dental sealants. My topic is: "Parental knowledge, attitudes and perceptions of dental sealants as a preventive strategy for dental caries."

Your school has been randomly selected and with this letter, I am requesting to distribute self-administered questionnaires together with your school's notice to parents for a school held function. Your school may also be later selected for an interview of parents attending the function on school premises, during or after the school organised event. I assure you that this data sharing exercise will be extremely considerate, not to disrupt the school event. Each interview will last approximately 60 minutes. I undertake to avail the data collected to you for your valuable comments.

Please find attached a brief description of the research proposal and questionnaire.

I wish to commence with data collection on .....

Yours sincerely,

BG Nair: Student .....

SUPERVISOR: Dr. S. SINGH .....

Contact person:

Dr S Singh

School of Dentistry

Faculty of Health Sciences University of KwaZulu-Natal

Tel: 031-2426214 Fax: 031-2608069, Cell: 0738417384 e-mail: singhshen@ukzn.ac.za

**APPENDIX 5: List of schools in the Chatsworth Circuit, uMlazi District**

**Schools highlighted in bold have been systematic randomly selected for questionnaire distribution and (\*\*) identifies schools purposefully selected for focus group discussion**

**SCHOOL**

ALENCON P.	DEPOT ROAD MEMORIAL P.	KLAARWATER P.	PARKLANDS P.
ASTRA P.	ELORA P.	LOTUS P.	PARKVIEW P.
AYS MEMORIAL P.	EVEREST P.	M PADAVATAN P.	PINEWOOD P.
<b>BAHLEBONKE P.</b>	<b>FALCON PARK P.(**)</b>	<b>MALVERN P. (ANDES ST) (**)</b>	<b>ROSE HEIGHTS P.(**)</b>
BEACON RIDGE P.	GLEN HEIGHTS P.	MARIANHILL P	SATHYA SAI SCHOOL OF CHATSWORTH
BROOKLYN HEIGHTS P.	GLENRIDGE P.	MAWELEWELE P	SAVANNAH PARK S.
CAVENDISH P.	GLENVIEW P.	MFC CHRISTIAN SCHOOL PHS	SEVEN HILLS P.
<b>CRESCENTRIDGE P.</b>	<b>GREENVALE P.</b>	<b>MOHAMED EBRAHIM ISLAMIC</b>	<b>SHALLCROSS P.</b>
CRESTVIEW P.	HIGHLANDS P.	MONTFORD P.	SILVERGLEN P.
CROSSMEAD P.	IMBALIYETHU P	MOORLANDS P.	SIMLA P.
DARUL FALAAH COLLEGE	INSIZWAKAZI P.	MOORTON HEIGHTS P.	SUMMIT P.
<b>DAWNRIDGE P.(**)</b>	<b>KINGSWORD ACADEMY</b>	<b>NOMZAMO MANDELA(**)</b>	<b>SUNBEAM P.</b>
			SUNNYVALE P.
			TYBURN P.



## **APPENDIX 6: Information Sheet and Consent to Participate in Research**

### ***Information Sheet and Consent to Participate in Research***

Date: September 2013

Dear Parent

My name is Brenton Ganesh Nair from the University of KwaZulu-Natal, Faculty of Health Science, and Discipline of Dentistry. My contact details are: Cell: 0826263979 Email: brenton49@gmail.com.

You are being invited to consider participating in a study that involves research on preventive strategies for tooth decay. The aim of the study is to determine your knowledge, attitude and perception of tooth decay in your child. The purpose of the study is to encourage you to make your own healthier decisions by creating awareness on the benefits of dental sealants as another preventive method for early tooth decay. The study is funded by the University of KwaZulu-Natal.

You are assured of privacy and confidentiality as I will not be recording any personal contact details. I will be using codes which will ensure anonymity so you will not be individually identified. The study comprises two phases. The first phase is a structured self-administered questionnaire. In the second phase, you may be invited to participate in an open group discussion. You must complete the questionnaire to be eligible to present in group discussion. Respect must be given to other members of the group and everyone must be given a chance to speak. Duration of both phases is one hour or until I feel our group has reached saturation.

Participation in this research is voluntary and may withdraw your participation at any point. If you wish to withdraw you must leave the group in a non-disruptive manner. There is no reimbursement for participation in the study.

At the conclusion of the study all records collected will be kept at the University of KwaZulu-Natal (Discipline of Dentistry). This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (approval number HSS/0327/013M).

In the event of any problems or concerns/questions you may contact the researcher at (provide contact details) or the UKZN Biomedical Research Ethics Committee, contact details as follows:

Thank you

#### **BIOMEDICAL RESEARCH ETHICS ADMINISTRATION**

Research Office, Westville Campus, Govan Mbeki Building, Private Bag X 54001, Durban, 4000, KwaZulu-Natal

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

**APPENDIX 7: Questionnaire – English and isiZulu**

**Questionnaire No:** \_\_\_\_\_

**Title of Project: Parental knowledge, attitudes and perceptions of dental caries (tooth decay) and dental sealants as a preventive strategy for dental caries**

**Please complete the following questions by selecting your answers with a (X) or filling in the blanks. The questions below are about your child in grade one only.**

**Biographic and demographic information**

1. Identity Number (ID): Fill in the first six numbers and last two

						X	X	X	X	X		
--	--	--	--	--	--	---	---	---	---	---	--	--

2. Gender

Male		Female	
------	--	--------	--

3. What is your relationship to the child? \_\_\_\_\_

4. In which area/suburb are you living in? \_\_\_\_\_

5. Highest level of education

Did not attend school		Primary School		High School		College/University/Technikon	
-----------------------	--	----------------	--	-------------	--	------------------------------	--

6. Family income (monthly):

No income		Less than R6000		R6001-R20 000		More than R20 000	
-----------	--	-----------------	--	---------------	--	-------------------	--

7. How do you receive your money/ income?

Salary or Wage		Pension		Social Grant		Donation	
----------------	--	---------	--	--------------	--	----------	--

8. How many people currently live in your household? : \_\_\_\_\_

9. Do you belong to a medical aid scheme?

Yes		No	
-----	--	----	--

### Knowledge of tooth decay

10. What do you think causes rotten teeth? \_\_\_\_\_

---



---

11. Do you think that rotten teeth can be prevented or controlled?

Yes		No		I do not Know	
-----	--	----	--	---------------	--

If yes, what can you do to prevent rotten teeth in your child/children?

---



---

12. Please mark with an (X) your responses to the statements below:

STATEMENT	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
Rotten teeth could affect your child's health					
Rotten teeth are caused by worms that eat teeth					
Baby/milk teeth are not important					
Child's first dental visit should be by one year of age					

13. How often does your child brush his/her teeth? \_\_\_\_\_+++\_\_\_\_\_

14. List what you use to clean your teeth?

---



---

15. List what your child uses to clean his/her teeth?

---



---

### Perceptions towards tooth decay and its prevention

16. Tell me what you think about your child's dental health. Please indicate your response from the statements below with an (X):

STATEMENT	STRONG LY AGREE	AGRE E	NOT SURE	DISAGRE E	STRONGL Y DISAGRE E
Problems with baby/milk teeth could affect adult teeth					
My child will have bad teeth because my side of the family or my spouse's side of the family have bad teeth					
If I give my child sweets or chocolates he/she will have rotten teeth					
My child missed school or preschool because of tooth ache					
I have missed work because my child had a tooth ache					
If my child has rotten teeth he/her will be teased or called names					

### Attitudes towards dental services

17. If your child has a toothache, where do you go for treatment?

Government hospital/Clinic		Private dentist /doctor		Home- care		Traditional Care	
-------------------------------	--	-------------------------------	--	---------------	--	---------------------	--

other, please specify \_\_\_\_\_

18. When did your child last go for dental treatment?

6 months ago		6-12 months ago		more than 1 year ago		never (skip question 21)	
-----------------	--	-----------------------	--	----------------------------	--	-----------------------------------	--

19. What treatment did your child receive? \_\_\_\_\_

20. Tell me about your experiences at the dental hospital/ clinic/surgery. Please mark with an (X) your responses to the statements below:

21.

STATEMENT	STRONG LY AGREE	AGRE E	NOT SURE	DISAGR EE	STRONG LY DISAGR EE
Transport was a problem when I needed to take my child for treatment					
It was easy to get a dental appointment					
Dental staff gave me different treatment options					
I was afraid to ask questions or get more information on my child's teeth when I took him/her for treatment					

#### Preventive Care Services

**Preventive dental services are provided by dental professionals and the government (Department of Health). The purpose of these services is to stop tooth decay before it occurs. These services are made up of oral health education, dental care at home, fluoride uptake, and dental sealants.**

22. Have you heard of any preventive services offered where you stay?

Yes		No	
-----	--	----	--

23. What are the things you do to prevent tooth decay in your children? Select your choices with an (X) or fill in the blank. More than one can be selected.

Daily cleaning using toothbrush and toothpaste	
Cut down sugar/avoid sugar and sweets	
Visit the dentist regularly	
Educate the child about how to take care of his or her teeth	
Other, please specify in the space provided	

24. Did you hear about fluoride?

Yes		No (skip Q24)	
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If yes, please mark with an (X) your responses to the statements below:

25.

STATEMENT	STRONG LY AGREE	AGRE E	NOT SUR E	DISAGRE E	STONGL Y DISAGR EE
Fluoride makes the teeth more strong against decay					
Fluoride is very expensive					
Fluoride is only provided by dentists or doctors					

**I am now going to tell you about dental sealants. Dental sealants are a hard ‘glue-like’ material that is placed on the grooves of the back teeth (molars). They help to prevent these teeth from becoming rotten. This procedure is normally done in the dental clinic/surgery**

26. Have you heard about dental sealants?

Yes		No	
-----	--	----	--

27. Do you think it would be a good idea to place a sealant on your child’s back teeth to stop it from becoming rotten?

Yes		No		Not sure	
-----	--	----	--	----------	--

Please explain your answer:

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27. What could prevent you from getting this treatment for your child? Please mark with a (X) for each statement below that you feel applies to you.

STATEMENT	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
Cannot take time off from work					
Transport problems					
Teeth are not really important					
There are no clinics nearby					
There are no appointments when I ask for a booking at the clinic					
I still don't understand what a sealant does					
Other					

28. If this procedure is offered to your child as part of the school programme, will you want your child to have this procedure?

Yes		No		Not sure	
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Please explain your response:

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29. Please explain how dental health services can be improved?

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30. How can you as a parent/care giver play a role in improving your child's dental health?  
Please explain

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**Thank you for your participation.**

**ISITHASISELO 2**

**Uhlelo lwemibuzo No: \_\_\_\_\_**

**Isihloko sephrojekthi: Ulwazi ngomzali, ukubona nokuqonda ngokudleka kwamazinyo (ukubola kwamazinyo) kanye, nokubheka okokunameka amazinyo njengendlela yokuvimbela ukudleka kwamazinyo.**

**Uyacelwa ukuba ugwalise le mibuzo elandelayo ngokukhetha izimpendulo ngo (X) noma ngokugcwalisa izikhala. Imibuzo engezansi imayelana nengane yakho esebangeni 1 kuphela.**

**Ulwazi ngempilo nabantu ohlala nabo**

1. Inombolo kamazisi( ID): Gcwalisa izinombolo zokuqala eziyisithupha kanye nezimbili zokugcina

						X	X	X	X	X		
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2. Ubulili

Owesilisa		Owesifazane	
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3. Yini ubuhlobo bakho nengane? \_\_\_\_\_

4. Nihlala kuyiphi indawo? \_\_\_\_\_

5. Izinga eliphezulu lemfundo

Angiyanga esikoleni		Esikoleni samabanga aphantsi		Isikole samabanga aphakeme		Ikolishi/IYunivesithi/ IThekhnikhoni	
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6. Imali engenayo emndenini( ngenyanga):

Akungeni mali		Ingaphansi kuka R6000		R6001- R20 000		Ingaphezu kuka R20 000	
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7. Uyithola kanjani imali?

Iholo		Impesheni		Isibonelelo sikahulumeni		ukuphiwa	
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8. Bangaki abantu abahlala ekhaya lakho njengamanje? : \_\_\_\_\_

9. Likhona uhlelo lwemedical aid okulona?

Yebo		Qha	
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## Ulwazi ngokubola kwamazinyo

10. Ucabanga ukuthi yini eyenza amazinyo abole? \_\_\_\_\_

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11. Ucabanga ukuthi amazinyo abolile angavinjwa noma kungavikwa?

Yebo		Qha		Angazi	
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Uma kunguYebo, ungenzani ukuvimbela ukubola kwamazinyo enganeni/ezinganeni?

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12. Uyacelwa ukuba wenze uphawu (X) ukuphendula lezi zititimende ezingezansi:

ISITATIMENDE	NGIYAVUMA NGEMPELA	NGIYAVUMA	ANGINAQINISO	NGIYAPHIKA	NGIYAPHIKA NGEMPELA
Amazinyo abolile abanga izifo empilweni yengane					
Amazinyo abolile enziwa yizibungu ezidla amazinyo					
Amazinyo okuqala obuntwana awabalulekile					
Ingane kufanele iyohlolwa amazinyo okokuqala seyinyaka izelwe					

13. Ingane yakho iwaxubha kaningi kangaki amazinyo? \_\_\_\_\_

14. Yenza uhla lwalokho okusebenzisayo uma uhlanza amazinyo akho?

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15. Yenza uhla lwalokho ekusebenzisayo ingane yakho uma ihlanza amazinyo ayo?

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**Indlela obona ngayo mayelana nokubola kwamazinyo nokukuvimbela**

16. Ngitshele ukuthi ucabangani ngesimo sempilo yamazinyo omntanakho. Ngicela ukhombise izimpendulo zakho ezitatimendeni ezingezansi ngo (X):

<b>ISITATIMENDE</b>	<b>NGIYAVUMA NGEMPELA</b>	<b>NGIYA VUMA</b>	<b>ANGIN AQINIS O</b>	<b>ANGIVUMI</b>	<b>ANGIVUMI NGEMPELA</b>
Izinkinga zamazinyo obuntwana kungenzeka zibe nomthelela omubi emazinyweni obudala					
Ingane yami iyoba namazinyo amabi ngoba umndeni ngasohlangothini lwami noma umndeni ongasohlangothini longishade naye benamazinyo amabi					
Uma nginika ingane yami uswidi noma ushokoledi izobola amazinyo					
Ingane yami yaphutha esikoleni/enkulisa ngoba iphethwe yizinyo					
Angiyanga emsebenzini ngoba ingane yami beyiphethwe yizinyo					
Uma ingane yami inamazinyo abolile bazoyigcona noma bayibize ngamagamana angemahle					

### Indlela oqonda ngayo ngemisebenzi yezamazinyo

17. Uma ingane yakho iphethwe yizinyo, uyiyisa kuphi ukuze ithole ukwelashwa?

Ezibhedlela/ekliniki kaHulumeni		Kudokotela/kudokotela wamazinyo ozimele		Usizo lwasekhaya		Ukunakekelwa ngokomdabu	
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Okunye, uyacelwa ukusho \_\_\_\_\_

18. Yagcina nini ingane yakho ukuyothola ukwelashwa amazinyo?

Ezinyangeni ezingu 6 ezedlule		Ezinyangeni ezisukela ku 6-12 ezedlule		Ngaphezu konyaka owodwa		Ayikaze (weqe umbuzo 21)	
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19. Yathola kwelashwa kuni ingane yakho? \_\_\_\_\_

20. Ngitshele ngalokho okwenzeka esibhedlela samazinyo/ ekliniki/ endlini okusebenzela kuyo udokotela. Ngicela wenze uphawu (X) ezimpendulweni zakho ngezitatimende ezingezansi:

ISITATIMENDE	NGIYAVUMA NGEMPELA	NGIYAVUMA	ANGINAQINISO	ANGIVUMI	ANGIVUMI NGEMPELA
Izinto zokuhamba zaziyingka ngesikhathi ngidinga ukuyisa umntanami kokwelashwa					
Kwabalula ukubekisa isikhathi nosuku					
Abasebenza ezamazinyo bangikhethisa ezinhlotsheni ezehlukene zokwelapha					
Ngangesaba ukubuza imibuzo nokuthola olunye ulwazi ngamazinyo engane yami ngesikhathi ngiyiyise ukuyokwelashwa					

### Imisebenzi yokuNakekela ngokuVimbela

**Imisebenzi yokuVimbela kwezamazinyo inikezwa ochwepheshe bezamazinyo kanye nohulumeni (UMnyango wezeMpilo). Injongo yale misebenzi ukuvimbela ukubola kwamazinyo kungakenzeki. Le misebenzi yenziwa ngabafundisa ngezempilo ngomlomo, ukunakekela amazinyo ekhaya, ukusebenzisa ifluoride, nokunanyekwa emazinyweni.**

21. Uke uzwe ngemisebenzi yokuvimbela enikezwa lapho uhlala khona?

Yebo		Qha	
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22. Yiziphi izinto ozenzayo ukuvimbela ukubola kwamazinyo ezinganeni zakho? Khetha okubonayo ngophawu (X) noma ugcalise isikhala. Ungakhetha okungaphezu kokukodwa.

Ukuwahlanza nsukuzonke kusetshenziswa isixubho nomuthi wokuxubha	
Ukunciphisa ushukela/Ukuvika ushukela noswidi	
Ukuhambela udokotela wamazinyo njalo	
Ukufundisa ingane ukuthi ingawanakekela kanjani amazinyo ayo	
Okunye, uyacelwa ukuba ukubalule esikheleni esinikeziwe	

23. Sewezwa ngefluoride?

Yebo		Qha (yeqa no: 24)	
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Uma kunguYebo, khombisa ngophawu (X) izimpendulo zakho zezitatimende ezingezansi:

24.

ISITATIMENDE	NGIYAVUMA NGEMPELA	NGIYA VUMA	ANGIN AQINIS O	NGIYAPHIK A	NGIYAPHIK A NGEMPELA
Ifluoride yenza amazinyo aqine kakhulu ukuze angaboli					
Ifluoride ibiza kakhulu					
Ifluoride inikezwa kuphela odokotela bamazinyo noma odokotela					

**Manje-ke ngizokutshela ngokokunameka amazinyo. Okokunameka emazinyweni yinto eqinile 'efana neglu' efakwa ezikheleni ezisemazinyweni asemuva (omhlathi). Kusiza ukuvimbela ukuba lamazinyo angaboli. Lokhu kuye kwenziwe ekliniki yamazinyo/endlini kadokotela wamazinyo**

25. Wake wezwa ngokunanyekwa emazinyweni?

Yebo		Qha	
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26. Ucabanga ukuthi kungaba umqondo omuhle ukufaka okunamekwayo emazinyweni asemuva engane yakho ukuvimbela ukuba abole?

Yebo		Qha		Anginaqiniso	
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Uyacelwa ukuba uchaze ngempendulo yakho:

\_\_\_\_\_

27. Yini engakuvimbela ukuba utholele ingane yakho lokhu kwelashwa? Uyacelwa ukuba wenze uphawu (X) kuleso naleso sitatimende esingezansi ozwa sengathi sisho okwakho.

ISITATIMEN DE	NGIYAVU MA NGEMPEL A	NGIYAVU MA	ANGINAQIN ISO	NGIYAPHI KA	NGIYAPHI KA NGEMPEL A
Angikwazi ukungayi emsebenzini					
Izinkinga zezinto zokuhamba					
Amazinyo awabalulekile kangako					
Awekho amakliniki aseduze					
Asitholakali isikhala uma ngicela ukubekisa ekliniki/esibhedlela					
Angikakaqondi ukuthi kwenzani okokunameka					
Okunye					

28. Uma lokhu kunikezwa ingane yakho njengengxenywe yohlelo lwasesikoleni, ungathanda ukuba ingane yakho yenziwe kona?

Yebo		Qha		Anginaqiniso	
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Uyacelwa ukuba uchaze impendulo yakho:

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29. Sicela uchaze ukuthi imisebenzi yezempilo yamazinyo ingenziwa ngcono kanjani?

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30. Ugenza kanjani wena njengomzali/umbheki ukuba udlale indawo ekwenzeni ngcono isimo sempilo yamazinyo engane yakho? Ngicela uchaze

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**Siyakubonga ngokuba yingxenywe yalokhu.**

**APPENDIX 8: Participant’s consent**

**CONSENT**

I \_\_\_\_\_ have been informed about the study entitled “Parental knowledge, attitudes and perceptions towards dental sealants as a preventive strategy for dental caries by Brenton Ganesh Nair.

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answered to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any treatment or care that I would usually be entitled to.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher on phone number 0826263979.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

**BIOMEDICAL RESEARCH ETHICS ADMINISTRATION**

**Research Office, Westville Campus**

**Govan Mbeki Building**

Private Bag X 54001  
Durban  
4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609 Email: BREC@ukzn.ac.za

\_\_\_\_\_

**Signature of Participant**

\_\_\_\_\_

**Date**

\_\_\_\_\_

**Signature of Witness**

\_\_\_\_\_

**Date**

## **APPENDIX 9: Interview schedule**

### Interview schedule

#### **A) Determining parents views on their children's food choices via analysis of family's food environment**

##### 1. Home food availability

- Tell me about the sorts of foods that you tend to need to stock-up on every time you visit the supermarket or shop.
- Tell me about the sorts of things that might influence the foods and drinks you buy.(e.g. own and child's food preferences, availability, cost, ability to store, health concerns)

##### 2. Modelling of cooking and eating

- Tell me about food buying and cooking in your family.
- What do you think affects the kinds of food/dishes the cook in the house will prepare for the family (e.g. food likes/dislikes, time, cost, the kids will eat it, convenience)
- What are your thoughts about parents and children eating together?
- Tell me about mealtimes at your house.

##### 3. Peer modelling

- Tell me about your child's eating now he/she has started school.
- There is often discussion about kids wanting the food that other kids have. What are your thoughts on this?

##### 4. Mealtime rules/feeding strategies

- Tell me about mealtime rules and rituals in your family. (e.g. not to leave the table until the family has finished eating; can only have dessert if the main meal is eaten; must eat all the food on the plate; don't have television on during mealtimes)
- Tell me about what you would do if your child was refusing to eat their dinner.
- Tell me also about any rules you might have about eating at other times throughout the day.

##### 5. Television influence

- There seems to be a lot of discussion at the moment about food advertising and children's eating. Do you have any thoughts about this?

**B) Parents knowledge and attitude of ECC will be assessed by the following statements:**

1. Baby teeth are important
2. Problems with baby teeth will affect adult teeth
3. Rotten teeth could affect a child's health
4. Using fluoride toothpaste helps to prevent tooth decay
5. Mother's diet during pregnancy will affect baby's teeth
6. Good idea to give baby a bottle to comfort while teething
7. Frequently giving child soft drinks is okay for child's teeth
8. Frequently giving child juice is okay for child's teeth
9. Most children eventually develop cavities.
10. As baby gets older and can hold a bottle easily, he/she should use bottle whenever he/she wants
11. Okay to put baby to bed with a bottle
12. Bottle feeding after child is 1-year-old is bad for his/her teeth
13. Breast feeding is important for the health of child's teeth
14. Babies who do not have bottles will cry more
15. Children should see dentist or dental therapist by first birthday
16. Milk teeth need not be restored.



**C) List of statements and questions to assess knowledge and attitudes towards preventive strategies against ECC**

1. Do you think tooth decay can be prevented?
2. Brushing habits - how often does your child brush his/her teeth?
3. Brushing with toothpaste is sufficient to prevent tooth decay
4. What are some of things you do to prevent tooth decay in your children?
5. In your opinion, what is the best way to prevent tooth decay?
6. Have you heard about pit and fissure sealants?
7. Where did you hear about P&F sealants.
8. Tell me what you think about P&F
9. Nothing substantial can be done to prevent caries.
10. Would you take your child to the dentist only when a problem arises?
11. Would you take up the opportunity to place a protective cover over your child's tooth to prevent decay.
12. Where would expect to go for such treatment?

## **APPENDIX 10: Consent for Focus Group Discussion**

### **CONSENT FOR FOCUS GROUP DISCUSSION**

I \_\_\_\_\_ have been informed about the study entitled “Parental knowledge, attitudes and perceptions of dental caries (tooth decay) and dental sealants as a preventive strategy for dental caries”, by Brenton Ganesh Nair.

I understand the purpose and procedures of the study.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without penalty.

I am aware that the focus group discussion will be tape-recorded and later transcribed.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher on phone number 0826263979 or his supervisor Dr S Singh on 031-2426214 Fax: 031-2608069, Cell: 0738417384 e-mail: singhshen@ukzn.ac.za.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers, then I may contact:

### **Human Social Science Ethics (HSSE)**

University of KwaZulu-Natal research office Ms.  
Phumelele Ximba: University of KwaZulu-Natal, Westville Campus Research office, Private bag  
X54001, Durban, 4000, South Africa  
Telephone: (+27) 31 - 260 3587, Fax No.: (+27) 31 2602384  
E-mail: ximbap@ukzn.ac.za

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature of Witness**

\_\_\_\_\_  
**Date**

## **APPENDIX 11: Focus group interview schedule**

### ***Interview schedule (open ended statements to be used by researcher to prompt discussions)***

1. What have been some of your personal experiences going to the dentist?
2. How have your personal experience(s) influenced your decision to take your child to a dentist?
3. When you were a child, who made dental care decisions? e.g. mother, father, grandparent. Who makes them now?
4. Are there other people or things/information that influenced your dental care decisions?
5. What do you use to clean your teeth? What does your child use to clean his/her teeth? Who taught you to brush your teeth? Who taught your child to brush his/her teeth? Do observe your child brushing his/her teeth?
6. What toothpaste do you have at home? Does your child use special toothpaste at home? If so, which one? Why does your child use this toothpaste?
7. Do you think it's important for your child to brush their teeth at their age? How often does your child brush his/her teeth? Brushing with toothpaste is sufficient to prevent tooth decay? What is the most important ingredient in toothpaste? Have you heard about fluoride?
8. Tell me about the sorts of things that might influence the foods and drinks you buy? What are your own and child's food preferences?
9. Now let's talk about dental sealants. Have you heard about dental sealants? Where did you hear about dental sealants? Tell me what you think about dental sealants?
10. Do you know what types of dental sealants are available? Dental sealants have to be re-applied after sometime. How will this affect your income (in terms time away from work, transport, etc.)
11. What will stop/prevent you from using this procedure?
12. If you take your child to the dental clinic/surgery, will you request more information on dental sealants? Do you feel confident to tell the dental staff that this procedure could be of benefit to your child? Will you advise others to place dental sealants on their child's molars?

**APPENDIX 12:** Visual aid used to educate focus groups on what a dental sealant is

**Visual aid used to educate focus groups on what a dental sealant is**

**Image 1**



**APPENDIX 13: Request for information on district oral health care services rendered**

**The In-Charge**

**Department of Health (KZN)**

Dear Madam / Sir,

***RE: Request to access information on oral health services***

I am a student at University of KwaZulu-Natal, studying for Master's degree in Medical Sciences. As part of my degree program, I am required to conduct research in my identified field of interest, which are dental sealants. My topic is: "Parental knowledge, attitudes and perceptions of dental caries (tooth decay) and dental sealants as a preventive strategy for dental caries". The study will attempt to increase awareness about dental caries and the benefits of applying dental sealants to molar teeth.

I kindly request access to information on all public oral health services in the eThekweni district.

Please find attached a brief description of the research proposal and questionnaire. I wish to commence with data collection on...

Yours sincerely,

BG Nair: Student.

SUPERVISOR: Dr.S.SINGH

College of Health Sciences, University of KwaZulu-Natal

Discipline of Dentistry

Tel: 031-2426214 Fax: 031-2608069, Cell: 0738417384 e-mail: singhshen@ukzn.ac.za

## APPENDIX 14

### DATA CAPTURING SHEET FOR DISTRICT ORAL HEALTH SERVICES

**PROJECT TITLE:** Parental knowledge, attitudes and perceptions of dental caries and dental sealants as a preventive strategy for dental caries.

Number of Primary Health Care clinics in the district offering dental services <sup>1</sup>	One (based at RK Khan Hospital)
Number of clinics in the district	One (Woodhurst Clinic)
Types of oral health services offered in the district (with 2013 statistics in brackets)	Extractions (6724, 67.2%) Restorations (119+ 38= 157, 0.016%) Dentures provided (Nil, 0%) Total number of patients seen in 2013 (10 002 – 100%)
Types of preventive dental services offered in the district	Fissure sealants placed in 2013 (Nil, 0%) Schools visited – 7 out of 50 schools in the district (14%)
Statistics on service delivery in the district (2013)	As above

*Source:* Department of Oral Health, Kwazulu-Natal, 2014.

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<sup>1</sup> Note that in this case District refers to the Education District and not the Health District.