DENTAL CARIES EXPERIENCE AND ASSOCIATED RISK FACTORS AMONG PRE-SCHOOL GOING CHILDREN IN BURETI SUB COUNTY KERICHO COUNTY, KENYA

BY

JAPHETH CHERUIYOT

A RESEARCH THESIS SUBMITTED TO THE IN PARTIAL FULFILLMENT OF THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (EPIDEMIOLOGY AND POPULATION HEALTH) OF MASENO UNIVERSITY.

SCHOOL OF PUBLIC HEALTH AND COMMUNITY DEVELOPMENT

DEPARTMENT OF PUBLIC HEALTH

MASENO UNINVESITY

DECLARATION

Student Declaration

This thesis is my original work and has not been presented for an award of a degree in any other university.

Signature……..……Date……

Japheth Kibet Cheruiyot

PG/MPH/0157/11

Declaration by supervisors

This thesis has been submitted for examination with our approval as university supervisors

Signature…….Date……

Prof. David Sang'
Department Biomedical Science and Technology
School of Public Health and Community Development

Signature…… Date…….

Dr. David Masinde

Department of Public Health
School of Public health and Community Development

DEDICATION

I dedicate this work to all preschool children who yearns for good oral health

OPERATIONAL DEFINITION OF TERMS

Caries-free child: Child without caries and restorations at 3 and 6 years of age

Dental carriers: Gradual irreversible dacay of teeth resulting from a series of biochemical events occurring at a localized tooth site

Dental caries experience: It is caries status of the teeth including the restored and removed teeth on one occasion.

Prevalence: The number of new and existing cases of dental caries

Preschool children: Children who are attending preschool (grade 1, baby class, nursery, introductory, kindergarten schools) or shortly before standard one

LIST OF ACRONYMS AND ABBREVIATIONS

Dmft scale: Decay, Missing, and Filled Tooth

FDI: Federation of Dental Internationale

WHO: World Health Organization

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

APPENDICES

ABSTRACT

Globally, dental caries is one of the most prevalent dental health problem that affects children. It is number four main cause of morbidity among under five year old children in Bureti Sub County and accounts for up to 20% of morbidity cases. Its prevalence and associated risks factors in Bureti Sub county is not known hence the purpose of this study. The main purpose of the study was to determine dental caries prevalence, caries experience, and their associated risk factors among pre-school going children of Bureti Sub County, Kericho County. The Study population was all pre-school going children aged 3-6 years. The specific objectives were to determine the prevalence of dental caries among pre-school going children in Bureti Sub County ; to determine dental caries experience among pre-school going children in Bureti Sub County and to describe the risk factors associated with prevalence of dental caries and caries experience among pre-school going children of Bureti Sub County . The study utilized cross sectional descriptive design that involved quantitative techniques. The teeth of the children was examined at that point in time by a qualified dentist and their caregivers/parents were interviewed on oral health hygiene practices. The dmft scores was recorded. A sample of 371 pre-school children was examined and the dental caries experience determined. The independent variables included Socio-demographic variables such as age, gender, economic status of the family, parents education level and tooth hygiene practices such as source of drinking water and dental care visits. The dependent variable was dental caries experience (dmft) and presence or absence of dental caries (cases). A proportionate stratified sampling technique was used to sample schools. Data was analyzed using Stata version 12 and data presented in tables and graphs. Chi test and regression analysis were used to test for associations between outcome/dependent variables and independent variables. The mean age of children was 53.22±17.29 months, with boys being majority (51.7%). The child age of starting brushing teeth was 3.5±0.94 years. Majority (63.88%) had dental caries. The mean dmft was 3.54±1.95 with the greatest component being decayed teeth (53.1%). Majority of the children (62.26%) brush teeth with tooth paste and brush at least once weekly (61.73%). The main risk factors for dental caries were mother's occupation (OR=3.18), eating of sugary foods (OR=2.49), lack of brushing (OR=3.08), bottle feeding at night (OR=7.17), and poor social demographics. The study concluded that the prevalence of dental caries was high (63.88%) and severe (mean dmft=3.54±1.9) which indicate high dental care treatment need. Consumption of sugary foods rich in cariogenic particles, poor social demographics of the caregivers, poor brushing of teeth, bottle feeding (p-value≤0.05) are associated with high dental caries prevalence and dental caries experience. The study recommends that there is need for initiation of oral health education program and mobilization of oral health workers to perform regular dental checkups in schools. More research needed on factors influencing dental health seeking behavior.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Globally, dental caries is one of the prevalent chronic diseases in man and is one of the most prevalent dental health problem that affects children (Abdullah et al., 2008). Dental caries are defined as gradual irreversible decay of teeth resulting from a series of biochemical events occurring at a localized tooth site (Abdullah et al., 2008).

Dental caries is an infectious contagious disease caused by altered molecular interactions between the teeth's surface/subsurface and microbial biofilm. This lead to demineralization of the inorganic portion with subsequent destruction of the organic substance by producing cavities in the enamel and collateral damage in dentine and pulpar tissue (Kiwanuka et al., 2004; McDonald, Stookey and Avery, 2004). According to Kiwanuka et al., (2004) and Selwitz et al., (2007) the high consumption of dietary sugars, chronic exposure to fluoride and poor preventive measures such as lack of brushing, non use of tooth paste and use of bottle water especially at night contribute significantly to occurrence of dental caries (Kiwanuka et al., 2004; Selwitz et al., 2007). Tooth decay spread to the surrounding tissue causing inflammation and abscess formation, which can cause other health problems (Selwitz et al., 2007; WHO, 2007).

Dental caries experience is the caries status of teeth including restored and removed teeth scored on one occasion. The incidence and distribution of dental caries differ significantly in different countries (Peterson et al., 2004; Akpata, 2004; Beiruti, 2004). The prevalent of dental caries among pre-school children of developed and developing countries has declined significantly by the year 2000 (Currie et al., 2011; WHO, 2007) although some studies indicate the rising trend among the pre-school going children (Begzati et al., 2011). The World Health Organization (WHO) Oral Health Area profile program showed that 68% of 12 year old in one eighty four countries examined had less than three decayed/missing/filled teeth (dmft) (Petersen, 2004). The report demonstrated a gradual decrease in the incidence rates of dental caries among 12 year old children over a 30-

year period. This was not the case in developing countries such as South Asia and Sub Saharan Africa where an increasing trend was observed (Petersen, 2004).

In India, Simratvir et al., found the prevalence of dental caries among children less than 15 years at 51% (Simratvir et al., 2009) while Mahejabeen et al., found 54.1% (Mahejabeen et al., 2006). A similar pattern was observed in Pakistan where Davani et al., found 51% prevalence of dental caries (Dawani et al., 2012).

The WHO/FDI has set a goal target for dental caries 50% reduction among 5-6 years old children by the year 2000 and this has not been achieved (Liompart et al., 2010). A Brazilian found 55% prevalence of dental caries among children less than less than 6 years (Ogido et al., 2004). In South Africa, the incidence rate of dental caries stood at 1.1% in the year 2003 (South Africa Oral Health Survey, 2003). In Nigeria, Adekoya et al., (2006) found the prevalence of dental caries at 13.9% and a mean dmft of 0.14. The Philippines study by Carino et al., (2003) found the prevalence at 59% and 92% among two year and six year old children, respectively.

The occurrence of dental carries has been attributed to the patient's socioeconomic status (Tickle et al., 2001), malnutrition (which affect tooth structure & delay tooth eruption and increase caries) (Abdolfotouh et al., 2000), oral hygiene, high fluoridation of drinking water (Warpeha, 2001) and poor access to dental health care. Another study done in Yemen in 2006 shown that the problem is more prevalent in urban areas compared with rural areas (Al-Haddad, 2006).

The burden of suffering from dental caries is a common phenomenon and it cuts across all socio- economic strata. Pain and dentoalveolar abscess are the severe complications that can arise from untreated dental caries. These complications poses great burden to children and can disrupt their early developmental activities.

This study therefore seeks to investigate the caries experience and associated risk factors among pre-school going children in Bureti Sub County, Kericho County, Kenya.

1.2 Statement of the Problem

Dental caries in preschool going children are both an individual and community health problem. Dental caries can pose great physical pain and complications such as dental alveolar abscess if not well treated. In Bureti Sub County, dental caries is number four main cause of morbidity among under five year old children (DMOH, 2013) and accounts for up to 20% of morbidity cases. This dental alveolar complication affects child early developmental milestones of children including poor dental structure and significant weight loss. This poses great burden not only to the patient, but also to his/her parents and society. It also leads to psychological trauma among affected children as it is associated with stigma and has been shown to affect negatively the academic performance. It also increases school absenteeism and also reduces quality of life among affected children as it reduces ability of children to learn, sleep, play, eat and smile.

Late diagnosis and treatment of dental caries leads to occurrence of dentalalveolar complications and this is associated with increased cost for treatment, hospitalization and overall increase in burden of health care.

1.3 Justification of the study

The prevalence of dental caries among preschool children is not well documented in many developing countries including Kenya. In Bureti Sub Countyt, dental caries is the fourth common cause of morbidity (DMOH, 2013) and its prevalence is not well documented. The cases being seen at health facilities are the tip of the iceberg.

There is paucity of information on prevalence and risk factors of dental caries in Kericho County specifically and Kenya in general. Studies on dental caries has not been done in Bureti Sub County of Kericho County, Kenya. The prevention of caries complications such as dentoalveolar abscess will not only reduce the cost of treatment but will also reduce pressure on health care system.

Pre-school going children are the most vulnerable group to dental caries. Dental caries has been chosen over all other oral diseases because of its increasing trend and it is accompanied by complications if not treated. The findings of this study will inform public oral health policy in relevant Government departments and Non-Govermental Organizations.

1.4 Study Objectives

1.4.1 Main Objective

To determine the dental caries experience and associated risk factors among pre-school going children in Bureti Sub County, Kericho County, Kenya

1.4.2 Specific Objectives

1) To determine the prevalence of dental caries among pre-school going children in Bureti Sub County
2) To determine dental caries experience among pre-school going children in Bureti Sub County
3) To describe the risk factors associated with prevalence of dental caries and caries experience among pre-school going children of Bureti Sub County

1.5 Research Questions

1. What is the prevalence of dental caries among pre-school going children in Bureti Sub County?
2. What is the caries experience among pre-school going children in Bureti Sub County?
3. What are the risk factors associated with dental caries among pre-school children in Bureti Sub County?

1.6 Significance of the study

The presence of dental caries in children is an indicator of the oral health status of children. The prevalence of untreated dental caries is a measure of poor utilization of dental care. This research will inform oral health policy and its implementation against dental caries. It will also act as baseline study for development of other related studies addressing the oral health question among children. Addressing dental caries helps in preventing and reducing caries complications such as dento-alveolar abscess. It will also contribute in attainment of WHO/FDI goal target of reducing the prevalence of dental caries among children by 50% by the year 2020.

1.7 Study Limitations

1. Oral examination was done using natural light hence minute dental carries lesions might not have been detected.
2. This study did not used radiographs for diagnosis of dental carries lesions and proximal dental carries lesions may have been missed

3. Only children who were at school during data collection period were sampled and those absent were not included

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Globally, epidemiological studies have shown the general decline in dental caries among children, mostly in Western Europe and America (Marthaler, 2004; Downer et al., 2005; Hugoson et al., 2008). However, there is stagnation in dental caries decline among pre-school children since the end of 1980's (Hugoson et al., 2008; Stecken-Blicks et al., 2004). The situation in developing countries especially Sub Saharan Africa is not well documented and there are scanty studies that are mostly old and cross sectional in nature (Hugoson et al., 2008). This chapter will highlight the burden and specific prevalence and associated risk factors of dental caries in global, regional and local context.

2.2 Prevalence of dental caries

The prevalence of dental caries in children is an indicator of burden of oral health status. It is the most prevalent non communicable disease worldwide (NIH, 2000). The distribution and severity varies in different countries, within the same country and regions (Petersen et al., 2005; Akpata, 2004). It is believed that dental caries is more prevalent among Asians and Latin Americans than Africans despite some statistics showing decreasing incidence of dental caries in developed countries but on increase in developing countries (Masumi et al., 2012; Hawkes, 2006).

In United States, dental caries is five times more common than Asthma (NIH, 2000). The prevalence of dental caries in Maharashtra, India was 80.9% (Shingare et al., 2012). In Sweden, epidemiological data for the primary dentition are only available at 3 and 6 years of age (Socialstyrelsen, 2006). In Mercedonia, the prevalence of dental caries among school going children under twelve years was 60.8% (Ambarkova and Ivanova, 2014).

A study on dental caries experience in preschool children in Lahore, Pakistan found the prevalence of dental caries among preschool children at 1.85 ± 3.26. Furthermore, the study found significant association between prevalence of dental caries and low socioeconomic status, female gender and rural residence (Sufia et al., 2011).

A Nigerian study by Odegua and Alade (2017) found the prevalence of dental caries in primary school pupils in Port Harcourt at 12.6% with lower prevalence of dental caries among the private school pupils (10.2%) than in public school pupils (15%). It was further observed that the prevalence of dental caries among the females was higher (14.5%) than among males (10.5%) though there was no statistical difference between males and females (P = 0.22). The Nigerian study also found that the prevalence was highest among the 6 and 8 year olds compared to 3 to 6-year-old children (11.9%) (Odegua, and Alade, 2017). A study carried in Benin City by Okeigbemen, and colleagues found the prevalence of dental caries at 20.4% (Okeigbemen,, Nnawuihe, and Osemwegie, 2015).

The Kenya National Oral Health Demographic Survey KNORS) report of 2015 indicate that the prevalence of dental caries among children aged 5, 12 and 15 years in Kenya was 23.9%. The KNOHS report further indicates that the prevalence of dental caries was highest among 5 years old children at 46.3% compared to other age groups (KNOHS, 2015). This is similar to previous study done in 1992 which found the prevalence of dental caries to be 40-50% among children aged 13-15 (Ng'anga et al., 1992) in Nairobi, while in 2006 Kassim et. al., found the prevalence among adults living in a rural arid region to be 43% (Kassim et al., 2006).

A Nganga et al. study carried out among 262 public primary schools going children aged 6-8 years in Nairobi found Fifty-four per cent of the 6- to 8-year-olds caries-free. The mean dmft in the 6- to 8-year-olds was 1.7. The study found no statistical significant difference ($p > 0.05$) in the prevalence of caries between males and females in the younger age group. In general, the study showed a low caries prevalence in Nairobi children (Nganga et al., 1992). Another Kenyan study by Ngatia et al., (2001) found the 63.5% prevalence of dental caries among children aged 3-5 years.

2.3 Dental caries experience

World Health Organization (WHO) has reported dental caries as a pandemic disease and that the global prevalence of dental caries among school aged children is 60% to 90% (Petersen et al., 2005). In several industrialized countries the prevalence and severity of dental caries have declined substantially because of

preventive oral health care programmes and changes in living conditions and lifestyles (Petterson et al., 1996). In developing countries, especially sub-Saharan Africa, the prevalence varies according to country population group and socio-economic status (Cleaton-Jones, et al. 1999).

In Lahore, Pakistan, a study on dental caries experience in preschool children found the mean dmft score for the entire child population at 1.85 ± 3.26. Furthermore, the study found significant association between dmft scores and low socioeconomic status, female gender and rural residence (Sufia et al., 2011).

A Nigerian study by Odegua and Alade (2017) found than among three hundred and forty-four children had primary dentition, 13.1% had a dmft >0, with 37.8% from private school pupils. The study found he mean dmft index of 0.25 (±0.76) with those in private school pupils had a mean dmft of 0.17 (±0.63), while the public school pupils had a mean dmft of 0.33 (±0.87). However, the study did not had any statistically significant differences in dmft score between the private and public schools (P = 0.06). The study further found that the mean dmft of the 3 to 6-year-old children was 0.25 (±0.82) with 94.3% decayed, 4.6% missing (extracted), and 1.1% filled teeth. Furthermore the study did not find any missing maxillary teeth (Odegua and Alade, 2017)

A study carried in Benin City by Okeigbemen, and colleagues found the total mean dmft of 0.36 with females having higher dmft score (O.41) than males (0.33) (Okeigbemen, Nnawuihe, and Osemwegie, 2015).

The Kenya National Oral Health Demographic Survey KNORS) report of 2015 indicate that the dental caries experience (mean dmft) among children aged 5, 12 and 15 years in Kenya was 0.8 The KNOHS report further indicates that the caries experience was highest among 5 years old children with mean dmft of 1.87 compared to other age groups (KNOHS, 2015). It was noted that the mean dmft was higher among females at 1.38 compared to males with 0.82 and that it was highest among children in peri urban areas (dmft 0.86) compared to those in urban with mean dmft of 0.65 (KNOHS, 2015). The national survey revealed that there was no variation in the caries experience I the rural, urban and peri-uirban children respondents. This is similar to a study done in Kenya by Nganga et al. (1992) found the mean dmft of 1.7 in the 6- to 8-year-olds children. Another Kenyan study done in Nairobi by Ngatia et al., (2001) found the mean dmft among children aged 3-5 years of 2.95.

Consequently, there appears to be a need for treatment, including a need for preventive treatment in the primary dentition after 6 years of age. These studies indicate the importance of a treatment approach that places a high priority on preventive and interceptive treatment of caries in the primary dentition even after 6 years of age.

2.4 Risk Factors for Dental Carries and caries experience

The risk factors for dental caries can be direct or indirect cause of the disease. Children with white spot lesions are considered at high risk for caries since these are precavitated lesions that are indicative of caries activity (Vadiakas, 2008). Plaque accumulation is strongly associated with caries development in young children (Alaluusua, et al. ,1994). As a corollary to the presence of plaque (Lee, et al. 2008), a child's mutans streptococci levels (Litt et al., 1995), and the age at which a child become colonized with cariogenic flora (Thibodeau et al., 1993) are valuable in assessing risk, especially in preschool children.

Fermentable carbohydrates are a necessary link in the causal chain for dental caries. However, a systematic study of sugar consumption and caries risk has concluded that the relationship between sugar consumption and caries is much weaker in the modern age of fluoride exposure than previously thought (Kiwanuka et al., 2004). Furthermore, there is evidence that night-time use of the bottle, especially when it is prolonged, may be associated with early childhood caries (Reisine et al., 1998). Despite the fact that normal salivary flow is an extremely important intrinsic host factor providing protection against caries, there is little data about the prevalence of low salivary flow in children (Cataldo et al. 2001).

Socio-demographic factors have been studied extensively to determine their effect on caries risk. Children with immigrant backgrounds have 3 times higher caries rates than non- immigrants (Nunn et al., 2009). Most consistently, an inverse relationship between socioeconomic status and caries prevalence is found in studies of children less than 6 years of age (Vargas et al. 1998). Perhaps another type of socio-demographic variable is the parents' history of cavities and abscessed teeth; this has been found to be a predictor of treatment for early childhood caries (Southward, et al. 2008; Thitasomakul et al., 2009).

The most studied factors that are protective of dental caries include systemic and topical fluoride, sugar substitutes, and tooth brushing with fluoridated toothpaste. Teeth of children who reside in a fluoridated community have been shown to have higher fluoride content than those of children who reside in suboptimal fluoridated communities (Weatherell et al., 1997). Additionally, both pre- and post-eruption fluoride exposure maximizes the caries-preventive effects (Singh et al., 2003). For individuals residing in non fluoridated communities, fluoride supplements have shown a significant caries reduction in primary and permanent teeth. With regard to fluoridated toothpaste, studies have shown consistent reduction in caries experience (CDC, 2001).

Risk assessment tools can aid in the identification of re-liable predictors and allow dental practitioners, physicians, and other non dental health care providers in identifying and referring high-risk children. This is illustrated in table 2.1.

Table 2. 1: Clinicians Caries Risk Assessment Form for young Children 0-5 year olds

Overall assessments of child dental caries risk are high, moderate or low

Factors	**High Risk**	**Moderate risk**	**Protective**
Biological			
Parents/caregiver socioeconomic status	Yes		
Children has >3 between meal sugar-containing snacks or beverage per day	Yes		
Child is put to bed with a bottle containing natural or added sugar	Yes		
Child has special health care needs	yes		
Child is a recent immigrant		Yes	
		Yes	
Protective practices			
Child receives optimally fluoridated drinking water or fluoride supplements			Yes
Child has teeth brushed daily with fluoridated tooth paste			Yes

Child receives topical fluoride from health professional			Yes
Child has dental home/regular dental care			Yes
Clinical findings			
Child has white spot lesions or enamel defects	Yes		
Child has visible cavities or fillings	Yes		
Child has plaque on teeth		Yes	

Adopted with permission from Featherstone (2004).

Lyn et al., found that xylitol can decrease mutans streptococococci levels in plaque and saliva and can reduce dental caries in young children (Ly et al., 2004.). Tooth brushing effect on the occurrences of the dental carries has been difficult to measure but there is a weak relationship between frequency of brushing and decreased dental caries. It is difficult to distinguish whether the effect is actually a measure of fluoride application or whether it is a result of mechanical removal of plaque (Reisine et al., 2001). The dental home (regular periodic care by the same practitioner) is included in many caries-risk assessment models because of its known benefit for dental health (Nowak et al., 2002).

A study in benin city found that 57.6% had previously heard of the dentist while only 25% had been to a dental clinic with 56.4% cleaning their teeth twice daily mostly using tooth paste and brush. Furthermore 47.1% reported bleeding while brushing and 90.1% took snacks (Okeigbemen,, Nnawuihe, and Osemwegie, 2015).

The Kenya National Oral Health Survey report of 2015 indicated that only 9.0% of children surveyed reported that they have visited a dental clinic at least twice in the previous year, 28.0% have not visited the dental clinic in the past one year and majority 46.7% reported that they have never visited dental clinic in their life time (KNOHS, 2015). The national survey further indicates that majority (95.5%) of 5 year old children brush tooth themselves with 3.9% assisted by their mothers , 0.2 % assisted by their fathers and 0.3% assisted by others. Majority of the children (48.2%) brush their teeth once a day, 45.2% brush their teeth two or more times a day,

1.0% brush their teeth 2-3 times a month. A paltry 0.7% reported that they have never brushed their teeth before (KNOHS, 2015). The report further indicates that majority (82.8%) of children age 5 years brush their teeth using tooth paste, with 22.1% using wooden tooth pick, 2.2% using plastic tooth pick, 4.9% using charcoal, 41.2% uses chewing stick and 7.5% uses other methods.

On consumption of sugary foods, the National oral health survey report further indicated that majority (31.3%) of the 5 year old children consume fresh fruits frequently, 47.1% consumes honey frequently, 23.5% uses chewing gum frequently and majority (67%) consumes sugary biscuits, cakes, sweet pies and soft sugary drinks very frequently (KNOHS, 2015).

2.5 Conceptual framework

Oral health behavior can be considered as a proximal risk factor while socioeconomic status as a distal risk factor or an indicator of individual's dental caries experience. This interplay between socioeconomic status and oral health behavior could explain the disparities in oral health outcomes. Oral health related behaviours explains parts of the socioeconomic disparities in oral health outcomes (Sabbah et al., 2008; Mbawalla et al., 2010; Sanders et al., 2006). However, it has been shown that the effects of socioeconomic status on oral health outcomes are not mediated by oral health behavior. It is socioeconomic status' direct effect on oral health outcomes, independent of proximal determinants of oral health behaviours (Polk et al., 2010). This is best illustrated by caries risk factor model adopted from Petersen shown (figure 1). A study has demonstrated the link between education level of caregivers and prevalence of dental caries among children less than 7 years. Al Malik et al (2003) reported that children of mothers with college education had lower prevalence and severity of dental caries compared to children whose mothers had lower education levels.

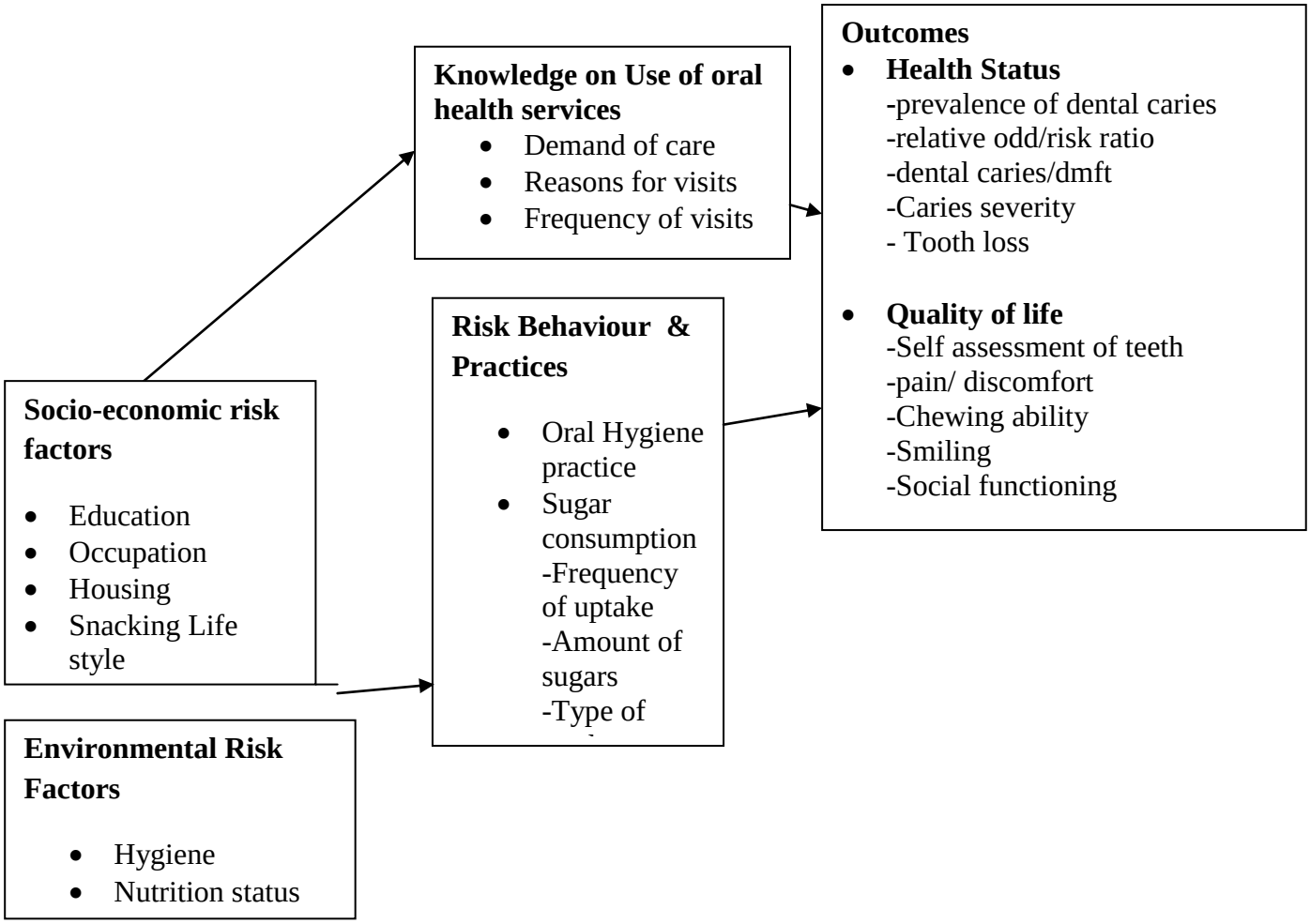


Figure 1. Modified Petersen dental caries risk factor operational framework (2005)

Rajab and Hamdan (2002) study in Jordan reported that the severity levels of dental caries among preschool children was significantly related to parents education level and awareness. A study by Bernard-Bonnin et al (1993) found that in Montreal, Canada less educated parents of children aged nine months to three years gives children a bottle of water at night instead of breast feeding while the educated one gives fluoride rich water. However, a study in urban Turkey showed that mothers education had no effect on severity level of dental caries but a higher education level of fathers was associated with higher incidences of caries (Eronat and Koparal, 1997).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methodology that was used in this study. It includes study design, study area, study population, sampling technique, research tools, eligibility, data collection, data analysis, and ethical considerations.

3.2 Area of Study

The study was conducted in selected pre-schools in Bureti Sub County of Kericho County. Bureti Sub County has approximately 22 public pre-schools and 27 private pre-schools. Bureti Sub County is situated in the South West part of Rift Valley Province. The Sub County lies between 0°50´ and 1°50´ South and Longitude 34° 35´ east. It borders Sotik to the South, Kericho to the North and Konoin to the East. Kericho County covers an area of about 600 Kilometers of which lies the famous Kericho tea estates and Bureti Sub County (Appendix 3). The Sub County is divided into 8 administrative locations with a total population of 60,000**.** It has one constituency namely; Bureti and 14 Civic Wards that constitute the Kericho County. Bureti Sub County has two educational zones- Kapkatet zone and Litein zone. Kapkatet zone has 24 public pre-schools and 8 private pre-schools. Bureti educational zone has 22 public pre-schools and 27 private pre-schools.

3.3 Study Design

This study was a cross-sectional descriptive study that comprise of quantitative technique. The data was collected and analyzed for the presence of dental caries and then classified as per the dmft scores.

3.4 Study Population

The study population comprised all the pre-school going children aged 3-6 years in Bureti Sub County. The target population was all pre-school children meeting the study inclusion criteria in all the sampled schools. The pre-school going children include those in grade 1, baby class, introductory, and kindergarten.

3.5. Inclusion and Exclusion criteria

3.5.1 Inclusion Criteria

1. Must be a preschool going child age 3-6 years and have willing parents who have lived in the Sub County for at least six months.

3.5.2 Exclusion Criteria

1. Those whose parents failed to provide permission or assent
2. Children who refuse assent
3. Edentulous children

3.6 Sampling Design

3.6.1 Sample Size determination

In order to be 95% sure that the proportion of children with dental caries among those attending kindergarten (preschool) is within plus or minus 5% of the population proportion of 50% a sample size was estimated using the following formula (Cochran, 1963).

$$n=\frac{Z^2pq}{d^2}=\frac{1.96^2x0.5x0.5}{0.05^2}=385$$

Where;

P= is the population proportion of children with dental caries, d=1-p; d= is the margin of error equal to the 5% used in this case, and $Z_{1-\alpha/2}$ = is the $(1-\alpha/2)\times 100\%$ quartile of the standard normal distribution. Population was less than 10,000. It was then adjusted using population finite correction.

Adjusting for finite population size $\left(\frac{385}{1+385/9000}\right)=369$ participants as our number to study.

A conservative value of 50% was used as the proportion of those with dental caries among the children attending pre-school was not known. The total number used in adjusting for finite population was obtained from survey conducted across the schools in the two zones. The sample size was allocated to the schools proportionately. Total sample size for girls and boys are equal but will be allocated proportionately in each school. The table 3.1 provides the distribution

Table 3.1: Distribution of study participants

School	Zone	Type	N	N_Boys	N_Girls	n_Boys	n_Girls	n
Bargiro	Litein	Public	44	24	20	10	8	18
Kapkarin	Litein	Public	101	57	44	23	18	41
Ngeny	Litein	Public	95	45	50	18	20	38
Sinendet	Litein	Public	32	18	14	7	6	13
sambon AIC	Litein	Private	38	22	16	9	7	15
Isaiyana	Litein	Private	57	26	31	10	13	23
Sunshine	Litein	Private	80	40	40	16	16	32
Samoget	Litein	Private	52	22	30	9	12	21
Tiiritab Moita	Kapkatet	Public	62	32	30	13	12	25
Mabwaita B	Kapkatet	Public	27	15	12	6	6	12
Sebetet Pri	Kapkatet	Public	75	33	42	13	17	30
Kaptirbet	Kapkatet	Public	35	18	17	7	7	14
Nganaset	Kapkatet	Public	105	48	57	19	23	42
Koitabai Shephered	Kapkatet	Private	36	23	13	9	5	15
Perea Junior	Kapkatet	Private	60	33	27	13	11	24
Doves Kales Valley	Kapkatet	Private	14	8	6	3	3	6
Total			**913**	**464**	**449**	**185**	**183**	**369**

3.6.2 Sampling procedures

Proportionate stratified random sampling was used to recruit the research participants. In each strata (school), participating schools was chosen by simple random sampling per nature of registration (public or private). The number of pre-school children sampled in each strata and screened was obtained from the proportionate allocation of sample size to every strata (pre-school) as shown in table 3.1. In each strata, simple random sampling was used to identify the participants. The randomly generated numbers that are coded to represent specific school/pupils was made and randomly picked. The generated numbers was equal to the number of desired sample. Every pre-school child meeting the study inclusion criteria was sampled. This continued until the desired sample size in every strata (school) was achieved.

3.7 Piloting of study tools

Data collection tools were pretested in Sotik sub county schools, which had the same characteristic and was not included in the study area. A total of 30 questionnaires were used. The results were analyezed and its outcome was used to improve the data collection tools**.**

3.8 Data collection tools and Procedures

3.8.1 Data collection

The recruitment commenced after Maseno University Ethics Research Committee (MUERC) approved the study. Administrative approval and permit from the sampled schools was sought and obtained before the study had been approved by MUERC. The data collection was done by the principal investigator. Those willing to participate were furnished with consent and assent forms to take to their parents/guardians. Upon return, children whose parents/guardians assented was then given questionnaires to take home for their parents/guardians to provide relevant information appertaining dental caries. Data was collected using self-administered structured questionnaire. The questionnaires were sent home to the parents through the preschool teachers. The questionnaire was constructed in English and interpreted to Kiswahili language. For easy analysis, the tool and respective child`s clinical data was identified with similar identification codes. Completed questionnaire with assent attached was returned to school through the child within a period of one week after the date of issue.. The principal investigator (a qualified dentist medical officer) obtained clinical data by conducting oral examination on every participating child and data was recorded in a prescribed form. For every participant diagnosed with untreated active dental-alveolar lesion, their respective class teachers were informed and a written instruction was provided to their parents guiding them on how and where to seek prompt treatment for such conditions.

3.8.2 Selection and training of data assistants

Prior to data collection, a one-day training workshop was conducted for research assistants, and included the following: an overview of what the study protocol, clinical skills in dentistry and data collection methods.

This training was followed by pre-testing of the tools at one pre-school (Sosit primary school) that was not sampled in the study. Lessons learnt were discussed by both the research assistants and the principal investigator to help further modify the tools and clarify some of the issues. The issues that emerge during

piloting informed the final development of the data collection tools (questionnaire) and once tool was ready, it was centrally coded and sent to the study sites for data collection.

The data was collected via self-administered structured questionnaires. The information collected included variables age, sex, demographic characteristics of their parents and their dental findings. Clinical examination was conducted by the principal investigator and was assisted by one trained record clerk. Clinical examination was performed inside a classroom next to the window under natural light using a sterile dental mirror and a WHO probe as diagnostic aids. The child sat on an ordinary chair facing away from the examiner. Cotton roll was used to remove plaque on tooth surfaces to enhance visibility. One brave child was examined first as an acting role model while other children watch to alleviate fear and anxiety.

The clinical examination consisted of assessment of decayed, missing and filled teeth using WHO guidelines (1997). Lesions was recorded as present when a carious cavity was apparent on visual inspection. Then the dmft score for every child was calculated and recorded. Teeth lost as a result of any other reason except pain and/or presence of a cavity prior to extraction was excluded.

Upon completion of every examination, each child was provided with a tube of toothpaste and a toothbrush as a sign of appreciation for their research participation. Children who did not participate in the study and may have wished to be examined was considered and professionally advised accordingly. However, they were not provided with toothpaste and toothbrush.

3.9 Data analysis

Objective 1: ***To determine the prevalence of dental caries among preschool going children in Bureti Sub County***

A case of dental caries is define as the any child who has been orally examined by a qualified dentist whose teeth has gradual irreversible decay . The prevalence was calculated by determining the proportion of preschool

going children wih dental caries. The prevalence was obtained by dividing the total number of cases of dental caries among preschool children divided by the total number of preschool going children.

Objective 2. ***To determine the dental carries experience among preschool going children in Bureti Sub County***

Dental caries experience is defined as the caries status of the teeth including the restored and removed teeth on at one occasion in time. This is computed by counting them and summing them to get a total dmft score. Any of the following parameters constituted dmft scores- Tooth decay, Missing teeth, and Filled teeth. Each parameter is scored by the number of teeth with any or combinations of the parameters indicated. The mean dmft was obtained by dividing the total number of children by the total summation of dmft scores.

Objective 3. To describe the risk factors of dental caries and caries experience among preschool children in Bureti Sub County

The data collected from the respondents was entered and analyzed using Stata version 12. The analyses consisted of three main steps. First descriptive analyses were used to describe the sample such as socio-demographic characteristics and dental visits was analyzed. Secondly, bivariate analysis was done to establish associations and relationships between independent variables (Socio-demographic such as age, gender, economic status of the family, parents education level and mouth and teeth hygiene practices such as source of drinking water and dental visits) and the outcome variable (dental caries experience and prevalence of dental caries). Thirdly, all the factors that were significant at bivariate level were entered into a multiple logistic regression model to identify significant predictors of dental experience. Significance was considered at 5% α-level.

3.10 Ethical Consideration

Approval to carry out this study was sought from Maseno University's Ethics Review Committee (MUERC). Permission was sought from the District Education Officer (DEO) and the head teacher before any recruitment was done. Voluntary and informed consent and permission was sought from the respondents' parents and an

individual assent from every pupil was obtained as well. The purpose of the study, risks, benefits, compensation and maintenance of confidentiality and privacy was explained to the respondents and their parents before recruitment. This ensured voluntary participation in the study. The information given by the respondents was kept confidential and anonymous. Those who opted out voluntarily were assured that they will not loose any benefits they have been enjoying at school if any. The respondents were informed that they are free to ask any questions for clarification whenever necessary. The study findings were shared with the respective schools management and will be published and disseminate in scientific conferences and seminars.

CHAPTER FOUR: RESULTS

4.1 Demographic characteristics

A sample of 371 children and their parents/guardians was sampled from randomly selected 16 preschools with Bureti Sub County. The mean age of the respondents was 53.22 (SD=17.29) months. The mean age of children starting brushing was 3.55 (SD=0.94) years. The demographic characteristics of the sample were summarized in table 4.1.

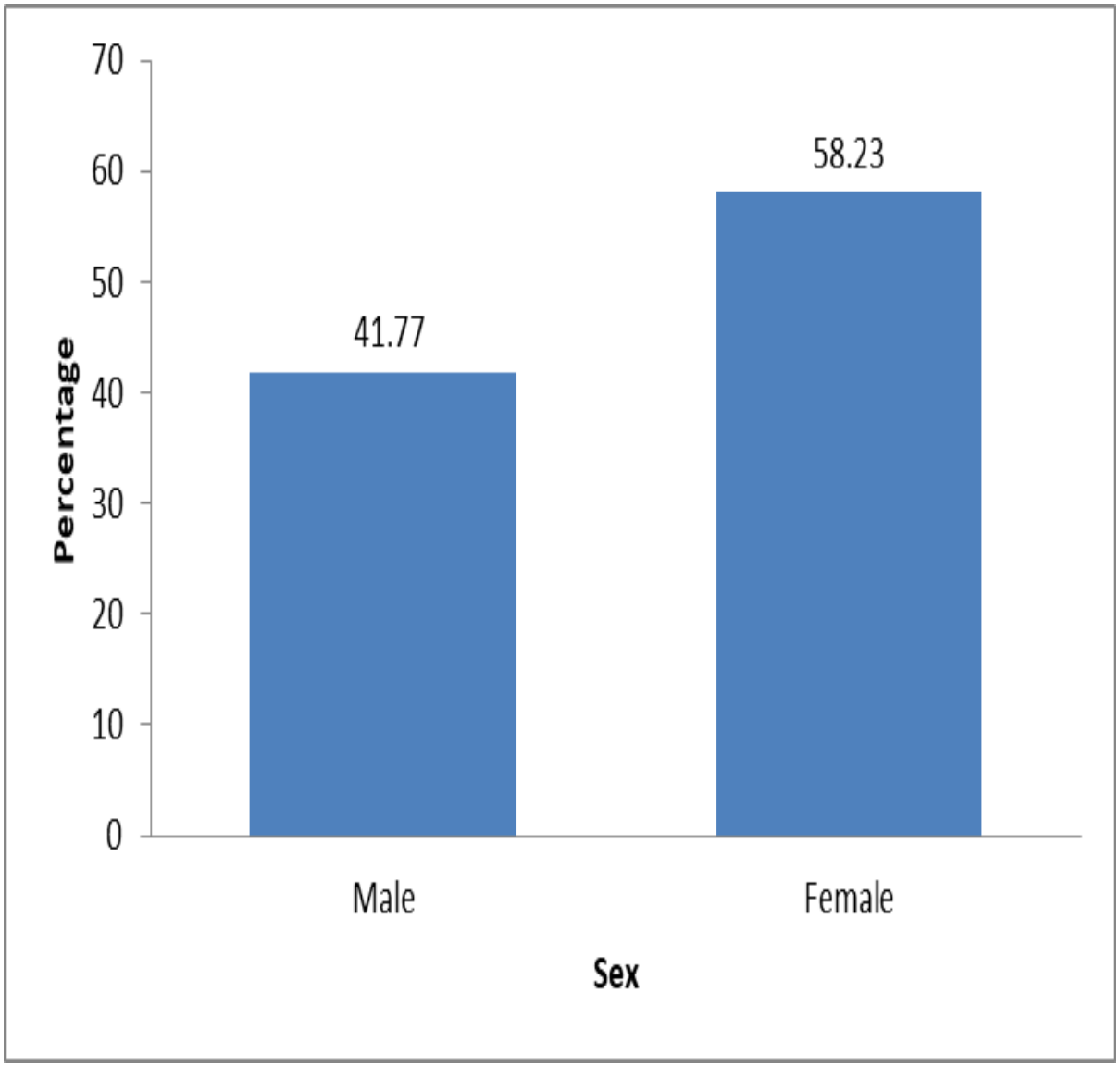
Table 4.1 Demographic characteristics

Characteristic	Subgroup (category)	Frequency (n)	Percent (%)
Sex	Male	192	51.75
	Female	179	48.25
Religion	Christian	328	88.41
	Muslim	43	11.59
Class	Baby class	191	51.48
	pre unit	38	10.24
	top class	142	38.27
School Category	Private	141	38.01
	Public	230	61.99
Fathers' Occupation	Formally Employed	142	38.27
	Self employed	127	34.23
	Unemployed	102	27.49
Mother's occupation	Formally employed	84	22.64
	Self employed	115	31
	Unemployed	172	46.36
Father's highest education level	Primary	0	0
	Secondary	247	66.58
	University/college	96	25.88
	None	28	7.55
Mothers' education level	Primary	89	23.99
	Secondary	162	43.67
	University/college	36	9.7
	None	84	22.64
Type of housing	Stone wall	138	37.2
	Timber	130	35.04
	Mud wall	103	27.76

There was a slight majority of males of 51.75%. Majority of the respondent does profess Christian faith (88.8%) and the 34.23% and 38.27% of the fathers were self-employed and formally employed, respectively.

4.2 Prevalence of Dental Caries

The overall prevalence of dental caries was 63.88% and among the males, it was 41.77% (138) while 58.23% for females



.

Figure4.1. Prevalence of dental caries per gender

When demographic characteristics was stratified by dental caries, it was found that the prevalence of dental caries was higher among preschool children and mostly in public schools and of the female gender compared to private schools counterparts and males. Details are as shown in table 4.2.2

Table 4.2: Cross Tabulation of Dental Caries with demographic characteristics

		Dental Caries				
Characteristic		Yes	%	No	%	P-value
Class						
	Baby class	100	42.19	91	67.91	<.0001
	Pre unit	24	10.13	14	10.45	
	Top class	113	47.68	29	21.64	
Sex						
	Male	99	41.77	93	69.4	<.0001
	Female	138	58.23	41	30.6	
Median Age		62	(36, 72)	43	(37, 68)	0.2358
Religion						
	Christian	222	93.67	106	79.1	<.0001
	Muslim	15	6.33	28	20.9	
School Category						
	Private	89	37.55	52	38.81	0.8112
	Public	148	62.45	82	61.19	

	Tooth Decay		
	N	Mean	Median
Class			

4.3 Dental Caries Experience

The mean dmft score among school going children was 3.54 with standard deviation of 1.95. The mean dmft for girls was 4.68 while boys had mean of 3.17. The dmft range was 0- 8. When demographic characteristics was stratified by the caries experience, it was found that the mean dental caries experience was higher among preschool children in public schools and of the female gender compared to private schools counterparts and in males. See table 4.3

Table 4.3 Dental caries experience

		dmft		
		N	Mean	Median
Class				
	Baby class	163	3.00	3 (2-4)
	Pre unit	38	3.76	3.5 (3-4)
	Top class	137	4.98	5 (4-6)
Sex				
	Male	178	3.17	3 (2-4)
	Female	160	4.68	4 (4-5)
Religion				
	Christian	309	4.10	4 (3-5)
	Muslim	29	1.59	2 (1-2)
School Category				
	Private	136	3.30	3 (2-4)
	Public	202	4.28	4 (3-5)

	Baby class	65	1.00	1 (1-1)
	Pre unit	19	2.00	2 (2-2)
	Top class	113	3.52	3 (2-4)
Sex				
	Male	99	2.04	1 (1-3)
	Female	98	3.05	3 (2-4)
Religion				
	Christian	183	2.66	2 (1-4)
	Muslim	14	1.00	1 (1-1)
School Category				
	Private	62	1.26	1 (1-1)
	Public	135	3.13	3 (2-4)

		Missing Teeth		
		N	**Mean**	**Median**
Class				
	Baby class	163	1.49	1 (1-2)
	pre unit	38	1.50	1.5 (1-2)
	top class	132	1.92	2 (1-2)
Sex				
	Male	173	1.51	1 (1-2)
	Feale	160	1.83	2 (1-2)
Religion				
	Christian	304	1.72	2 (1-2)
	Muslim	29	1.03	1 (1-1)
School Category				
	Private	131	1.45	1 (1-2)
	Public	202	1.80	2 (1-2)

		Filled Teeth		
		N	**Mean**	**Median**
Class				
	Baby class	149	1.47	1 (1-2)
	pre unit	24	2.00	2 (2-2)
	Top class	53	1.19	1 (1-1)
Sex				
	Female	122	1.15	1 (1-1)
	Male	104	1.83	2 (2-2)
Religion				
	Christian	211	1.49	1 (1-2)
	Muslim	15	1.07	1 (1-1)
School Category				
	Private	133	1.59	2 (1-2)
	Public	93	1.28	1 (1-2)

4.4 Risk Factors for dental caries and caries experience

The risk factors for dental carries were investigated in this study. These include too much sugary food, use of bottle water and poor brushing methods.

When respondents were asked whether eating too much sugary food, or not brushing teeth, or bottle feeding at night, or brushing with tooth paste, or limiting the amount of sugary food or giving a child bottle of water at night instead of milk, are causing tooth decay in children, they gave varied reasons with majority reporting consumption of sugary food and not brushing being the cause of tooth decay in preschool children. The details are as shown in Table 4.4

Majority, 229 (61.73%) reported that their children brush teeth weekly, with 5(14.82%) who are not able to brush teeth because they are too young and unable to do so. Majority, 225(60.65%), brush teeth with sticks and another 14 (3.77%) do not brush at all yet they are able to do so. Most 273 (73.55%) children eat candy food in different frequencies. Up to 251 (67.6%) children have never visited a dental specialist for oral health services. Approximately 40.16% of children have never talked with their parents over oral health.

Table 4.4 Household oral behavioral characteristics

Characteristic	Category	n	%
Sugary foods	Yes	235	63.34
lack of brushing	Yes	264	71.16
Breast feeding	yes	122	32.88
Bottle feeding	Yes	149	40.16
Brushing with tooth paste	yes	108	29.11
limiting sugary food	yes	107	28.84
Taking bottle of water at night instead of milk	Yes	177	47.71
Child frequency of brushing teeth	daily	87	23.45
	weekly	229	61.73
	not applicable	55	14.82
Brushing teeth with tooth brush	Yes	231	62.26
Brushing teeth with sticks	Yes	225	60.65
Not brushing teeth	Yes	14	3.77
Child eats candy food	Yes	273	73.58
Parent talk with child over oral health	Yes	149	40.16

When the respondents were asked on the frequency of brushing their teeth, majority 229 (61.73%) reported that they brush their teeth once a week while 87(23.45%) reported that they brush at least once every day. Some respondents 14 (3.77%) reported that they do not brush their teeth .

4.5 Association between Dental Caries and Risk Factors

Table 4.4 shows the risk factors of dental caries such as employment status, gender, age, school category (Public vs Private), Religion and Class. As shown in Table 4.5, pre-school going children who were of the same gender, same age, same school category, belong to the same religion and are in the same class, and whose mother is unemployed is more than 3 times likely to get dental caries as compared to a child whose mother is formally employed (OR: 3.18, 95% CI: 1.49-6.79). There was no significant difference in risk of developing dental caries between a child whose mother is self-employed as compared to a child whose mother is formally employed (OR: 0.81, 95% CI: 0.30-2.13).

Table 4.5 Adjusted logistic regression analysis

Characteristic		OR	Lower 95% CI	Upper 95% CI
Mother's occupation (ref=Formally employed)	Self employed	0.81	0.30	2.13
	unemployed	3.18	1.49	6.79
Father's highest education level(ref=Secondary)	University/college	0.31	0.13	0.76
Mother's highest education level(ref=Primary)	Secondary	0.14	0.06	0.34
	none	0.74	0.32	1.69
	University/college	0.41	0.13	1.31
Type of house living in(ref=Stone wall)	Timber	16.66	7.88	35.23
	mud wall	7.21	2.97	17.50
Eating sugary foods(ref=Yes)	yes	2.09	1.11	3.93
lack of brushing(ref=Yes)	yes	2.13	1.08	4.19
Breast feeding(ref=Yes)	yes	0.17	0.08	0.39
Bottle feeding(ref=Yes)	yes	7.17	3.99	12.90
Brushing with tooth paste(ref=Yes)	yes	0.02	0.00	0.11
Taking bottle of water at night instead of milk(ref=Yes)	yes	2.00	1.18	3.39
Child's frequency of brushing teeth(ref=Daily)	not applicable	0.37	0.12	1.13
	weekly	0.16	0.06	0.42
Brushing teeth with tooth brush(ref=Yes)	No	0.61	0.31	1.18
Child eats candy food(ref=Yes)	No	0.18	0.10	0.35
Child Frequency of seeing dental specialist(ref=Never seen one)	once a year	0.44	0.21	0.91
	once in 6 months	0.31	0.10	0.96
Age started brushing teeth		0.58	0.37	0.92

A child who does not brush teeth is two time (OR=2.13) more likely to develop dental caries as compared to a child who brushes teeth.

Table 4.5 illustrates the analysis of the risk factors of dmft while accounting for the same oral health characteristics. The expected number of dmft's for a child whose mother is unemployed is 0.62 times whose mother is formally employed. The expected number of dmft's for a child who is not bottle feeding is 1.31 times the expected number of a child who is bottle feeding.

Table 4.5: Adjusted Poisson regression analysis for dmft and risk factors

Characteristic		Estimate	exp(Estimate)	Standard Error	t Value	P-Value
Mother's occupation (ref=Unemployed)	Formally Employed	-0.48	0.62	0.14	-3.48	0.0005
	Self employed	-0.01	0.99	0.07	-0.16	0.8727
Father's highest education level(ref=none)	Secondary	-0.31	0.74	0.11	-2.89	0.0038
	University/college	-0.06	0.94	0.10	-0.6	0.5518
Mother's highest education level(ref=University/college)	Primary	-0.36	0.70	0.12	-3.02	0.0026
	Secondary	-0.48	0.62	0.10	-4.96	<.0001
	none	-0.58	0.56	0.12	-4.72	<.0001
Type of house living in(ref=mud wall)	Stone wall	-0.07	0.93	0.12	-0.62	0.5337
	Timber	-0.28	0.76	0.09	-3.15	0.0016
sugary foods(ref=Yes)	No	0.11	1.12	0.07	1.51	0.1314
lack of brushing(ref=Yes)	No	0.25	1.29	0.07	3.73	0.0002
Breast feeding(ref=Yes)	No	-0.21	0.81	0.07	-3.18	0.0015
Bottle feeding(ref=Yes)	No	0.27	1.31	0.07	3.66	0.0003
Brushing with tooth paste(ref=Yes)	No	-0.34	0.71	0.06	-5.58	<.0001
Taking bottle of water at night instead of milk(ref=Yes)	No	0.05	1.05	0.07	0.72	0.4705
Child's frequency of brushing teeth(ref=weekly)	daily	-0.30	0.74	0.09	-3.5	0.0005
	not applicable	-0.13	0.88	0.09	-1.44	0.1489
Brushing teeth with tooth brush(ref=Yes)	No	0.09	1.09	0.08	1.05	0.2924
Child eats candy food(ref=Yes)	No	-0.06	0.94	0.09	-0.69	0.4876
Child Frequency of seeing dental specialist(ref=once in 6 months)	never seen one	-0.11	0.89	0.12	-0.97	0.3335
	once a year	-0.34	0.71	0.13	-2.59	0.0095
Age started brushing teeth		0.17	1.19	0.06	3.11	0.0019

CHAPTER FIVE: DISCUSSION

5.1 Prevalence of dental caries

The prevalence of dental caries in the study population was high (63.88%). This finding is similar to NIH findings which showed that in United States, Dental caries is prevalent and upto five times more frequent than Asthma (NIH, 2000) and upto 80% in Maharashtra, India (Shingare et al., 2012). This is also similar to Ambarko and Inova study findings which found that in Mercedonia, the prevalence of dental caries among school going children under twelve years was 60.8% (Ambarkova and Ivanova, 2014).

In middle East, Wayne et al., (2002) and Almalik et al., (2003) found that the prevalence of dental caries among preschool children (≤ 6 years) was 62% and 73%, respectively. Wayner et al., findings are similar to the findings of the present study while Al Malik et al., findings are a bit higher and all this could be due to similarities and differences in cultural and social consumption of sugary stuff with cariogenic risks. This Middle East study findings appears to be consistent with a believe that dental caries is more prevalent among Asians and Latin Americans than Africans (Masumi et al., 2012; Hawkes, 2006).

The present study finding contradicts a Nigerian study by Odegua and Alade (2017) that found much lower prevalence of dental caries in primary school pupils in Port Harcourt at 12.6% with lower prevalence of dental caries among the private school pupils (10.2%) than in public school pupils (15%). However, similarities with the present study was observed in Odegua and Alade study that showed that females (14.5%) has higher prevalence of dental caries than males (10.5%) though not statistical difference (P = 0.22) and that the prevalence was higher among the 6 and 8 year olds compared to 3 to 6-year-old children (11.9%) (Odegua & Alade, 2017).

A study carried in Benin City by Okeigbemen, and colleagues found the prevalence of dental caries at 20.4% (Okeigbemen, Nnawuihe, and Osemwegie, 2015) and this is much lower than the present study.

The present study are consistent with Marthaler (2004) and Stecksen-Blicks et al. (2004) studies that found that more than 50% of 4 year old children have dental caries and that the dental caries increases over age, with peak

at 15 years as shown by Hugoson et al., 2008. This is consistent with Nganga et al., (1992) findings that found that among the 262 public primary schools going children in Nairobi, the prevalence of dental caries was forty six per cent among 6- to 8-year-olds children. This variation could be attributed to differences in geographical locations as Nairobi is an urban area where access to oral health was likely to be higher and more accessible than the rural based setting of this study (Bureti Sub County). However, this was contradicted by a study in Yemen in 2006 which showed that the prevalence of dental caries is higher in urban areas compared to rural areas (Al-Haddad, 2006). This finding is consistent with the WHO (2004) report which showed that the prevalence of dental caries is a worldwide distributed problem irrespective of sex, age and other socio-demographic characteristics of children.

In Uganda, Kiwanuka et al., (2004) reported the prevalence of dental caries of 64% among 3- year old in Nakawa, a peri-urban location. The results are similar to the present study and this could be attributed to similarities in the peri-urban location of the two studies, which is believed to have similarities in access to dental care services and oral health in general.

Sheinam (2002) demonstrated that dental caries increases over time which she attributed to recent relative increase in economic growth which has led to high consumption of sugary food. This is consistent with our findings which showed that the mean age of children with dental caries was 62 months while those without dental caries were 43 months old. Furthermore, those children on top class had a mean teeth decay of 3.52 compared to their junior counterparts pre-unit with mean teeth dacay of two and baby class with mean of one. However, it contrast sheinam 2002 findings by the fact that our findings showed that children in private schools tend to have less prevalence of dental caries (37.5%) compared to those in public schools (62.45%).

Furthermore, based on the ownership of the school, the mean teeth decay for private schools was 1.26 against a higher mean teeth decay of 3.13 for public schools. This shows that children in public schools were severely affected more than their private schools counterparts and whose parents were employed or has above secondary

education level tend to have children with dental caries compared to those in public schools and those whose parents were unemployed or those with less than secondary education qualification. This could be a attributed to more teachers' and parental guidance and counseling in private schools compared to public schools.

This study finding is lower than the findings of the Kenya National Oral Health Demographic Survey KNORS) report of 2015 which indicated that the prevalence of dental caries among 5 years old children was 46.3% (KNOHS, 2015). It is also consistent with another study finding in Nairobi carried out in 2001 that found 63.5% prevalence of dental caries among 3-5 years old pre-school going children (Ngatia et al., 2001). This being urban area showed that there are other factors other than residence that could be significantly affecting the prevalence of dental caries and this include parental role in oral health education and access to oral health services.

The present study found the prevalence of 42.19%, 10.13% and 47.68% among children age baby class, pre-unit and top class, respectively. Their ages were 3, 4 and 5-6 respectively. The higher increasing age of children may result from the increased time of exposure of the primary dentition to cariogenic foods. Thus the increasing age of children seems to be the risk factor for development of primary dentition. The findings of the present study therefore seems to attain the oral health goals of the year 2000 for World Health Organization that recommended 50% of the 5-6 years old children should be caries free. This findings compares variably with the study by Ngatia et al., (2001) where 52% and 68% of the 3 years (baby class) and 5 years (top class) had dental caries, respectively. In Uganda, Kiwanuka et al. (2004) reported a dental caries prevalence of 45% among 3 years old, 59% among 4 years old and 65% among the year old children. In Philippines, the prevalence of dental caries was 51% for 3 year olds, 53% for 4 year olds and 69% for 5 year old children (Corino et al., 2003). This contrasts the present study findings that were slightly lower than 50% dental caries prevalence for all the three age categories.

5.2 Dental caries experience

Dental caries experience was assessed using the dmft index which is universally employed to measure caries. It was observed that the present study findings are consistent with data reported by World Health Organization (WHO) that dental caries is a pandemic disease and wide spread (60% to 90%) among school age children, including preschools'(Petersen et al., 2005). The mean dmft in the current study was 3.54±1.95 with a range of 0-8. The decay component contributed 63% of the score. The present study finding on caries experience is much higher than a Sufia et al., study in Pakistan where it has lower mean dmft among preschool going children. Sufia et al., study in Lahore, Pakistan found a mean dmft score at 1.85 ± 3.26 with no significant association between dmft scores and low socioeconomic status (Sufia et al., 2011).

Kiwanuka et al., Ugandan study reported a mean dmft of 2.6 among 3- year old children (Kiwanuka et al., 2004) and in Nigeria, Adekoya et al., (2006) found a lower mean dmft of 0.14 among 3-6 year old school going children while Odegua and Alade reported the mean dmft of 0.25 (±0.82) with 94.3% decayed, 4.6% missing (extracted), and 1.1% filled teeth among 3-6 year old children though the study was silent on any missing maxillary teeth (Odegua and Alade, 2017). A study in Benin also reported a much lower dental caries experience with a mean dmft of 0.36 with females having higher dmft score (0.41) than males (0.33) (Okeigbemen, Nnawuihe, and Osemwegie, 2015). These observations could be due to similarities in behavioural and environmental charecterestics of children under six years of age that expose children to high caries experience.

Thus the caries experience reported in the current study seemed comparably higher to that reported in Uganda, Benin and Nigeria and may reflect differences in dietary patterns. The decay component of the caries experience is reason highly attributed to failure by the WHO to attain its goal target for dental caries 50% reduction among 5-6 years old children by the year 2000 (Liompart et al., 2010).

It is noteworthy that the decayed component of the dmft score contributed large proportion in the current study. This implied that majority of the carious lesions were untreated. Lack of adequate and accessible dental

facilities in most government hospitals may be part of the reason. The high cost of dental treatment in private clinics may also limit access to services due to lack of affordability by most parents. Other contributing factors could be low dental awareness and negative attitudes of the caregivers which may translate to the high rate of unmet dental treatment need observed in the study population.

The present study finding is consistent with Ngatia et al., study which found a mean dmft of 2.9 among 3-5 year old children and decayed component contributed over 96% of the score in Nairobi, Kenya (Ngatia, et al., 2001). The caries experience (mean dmft) in the present study is lower than Ngatia et al., and this could be due to differences in consumption of cariogenic snacks which may be more prevalent in urban school children.

The present study demonstrated that the dental caries experience increase with age as the mean dmft was 3.0, 3.76 and 4.98 for baby class, pre unit and top class, respectively. This therefore showed that age is an exposing factor to development of dental caries experience. The male child had higher dmft index (4.18) compared to female (3.17). This difference could be due to socio-cultural factors with the females being more meticulous in personal hygiene and subsequent translation to better oral health. In terms of school categories, public schools had higher dmft index of 4.28 compared to 3.30 in private schools. This phenomenon could be explained by the fact that private schools tend to be stricter in access to cariogenic snacks compared to public schools and may also be due to more freedom to buy cariogenic snacks in public schools compared to more confined private schools. The religion aspects was not significantly associated with dmft index though majority was Christians and had higher dmft index compared to Muslims. All these findings are more or less the same as Ngatia et al (2001) Nairobi, Kenya and Kawanuka et al., (2004) Ugandan study findings. However, this finding appears to contradict the report of the Kenya National Oral Health survey 2015 which showed that the dental caries experience (mean dmft) among children aged 5, 12 and 15 years in Kenya was 0.8 and that the caries experience was highest among 5 years old children with mean dmft of 1.87 compared to other age groups (KNOHS, 2015). It was noted that the mean dmft was higher among females at 1.38 compared to males with 0.82 (KNOHS, 2015).

5.3 Risk factors for dental caries and dental caries experience

The level of oral health related knowledge among parents and caregivers is likely to influence the development of dental health habits in their children from the early age. This is due to the ability of children to model dental behaviors from their parents/caregivers. However, few studies have explored the relationship between parents/caregiver's level of oral health related knowledge and practices and preschool going children's prevalence of dental caries.

In the present study, oral health knowledge was relatively high. A significant number of respondents (28.8%) thought that limiting sugary food is the best way of reducing dental caries. The study found that despite high oral health knowledge among children, majority of them were engaging in dental caries risky behaviours such as eating of sugary food (63.3%), lack of brushing (71.1%), and not brushing teeth with tooth brush (62.3%). Furthermore, children (73.6%) eats candy food with high carcinogenicity, with majority (33%) eating them more than twice a week and weekends (30%).

This finding is consistent with Kiwanuka et al (2004) findings that found that upto 98% of the children examined brushed teeth at least once daily and 99% used tooth paste unlike in the present study where 23.4% brush their teeth daily with majority (61.73%) brushing at least once every week. However, there was no association between frequency of brushing teeth and incidences of dental caries, though more children brushing at least once weekly tend to have more incidences of dental caries compared to those brushing daily. This contradicts a number of studies that has demonstrated that poor oral care practices (poor brushing of teeth, lack of use of tooth paste, poor knowledge of caregivers) are significantly associated with occurrence of dental caries (Hallonsten et al., 1995; Mattila et al., 2000; Raadal et al., 2000).

The role of infant feeding practices on caries initiation was not known by the majority of the parents/caregivers. The practice of breast feeding and the 'bottle feeding at night' was reported to cause caries by 32.88% and 40.2% of the parents/caregivers, respectively. The Kenya Ministry of Health encourages exclusive breast-feeding especially in the first six months during ANC and MCH/FP clinics, though may not be accompanied by

adequate oral health education. All these reflect a knowledge gap among parents/caregivers on the effect of infant feeding practices on dental caries prevention. Thus oral health education emphasizing the role of infant feeding practices on dental caries among 3-6 year old children is important and necessary among the parents and caregivers.

On multivariate analysis, the risk factors for development of dental caries include unemployed mother (odd ratio=3.18), type of housing (odd ration=16.16 for timber and OR=7.21 for mud wall), eating sugary food (odd ratio= 2.09), lack of brushing (odd ratio=2.13), bottle feeding (odd ratio=7.17) and bottle of water at night instead of milk (odd ration=2.0). This means that a child whose mother's employment status is unemployed has more than three times more likely to develop dental caries than for children whose mothers are formally employed. Furthermore, those living in timber or mud wall houses are more than seven times more likely to develop dental caries than children whose parents are living in stone wall house. The expected number of dmft's for a child whose mother is unemployed is 0.62 times the expected number of a child whose mother is formally employed. This is similar to a study by Bernard-Bonnin et al (1993) that found children under three years of less educated parents in Montreal, Canada gives children a bottle of water at night instead of breast feeding while the educated one gives fluoride rich water. This findings are similar to the report of the Kenya National Oral Health survey 2015 which showed that the risk factors for dental caries include low mothers employment and income status, poor housing and lack of breast feeding (KNOHS, 2015).

The mothers and fathers education level was not significantly associated with dental caries and dmft (OR=0.74; OR= 0.31, respectively). This is similar to a study carried out in urban Turkey that found that mothers education had no effect on severity level of dental caries but a higher education level of fathers was associated with higher incidences of caries (Eronat and Koparal, 1997). However, some studies has demonstrated the link between education level of caregivers and prevalence of dental caries among children less than 7 years. Rajab and Hamdan (2002) study in Jordan reported that the severity level of dental caries among preschool children was significantly related to parents education level and awareness. Al Malik et al (2003) reported that children of

mothers with college education had lower prevalence and severity of dental caries compared to children whose mothers had lower education levels. This finding appears to agree with the report of the Kenya National Oral Health survey 2015 which showed that education level of the mother and father were not significant risk factors for dental caries (KNOHS, 2015).

This study has therefore demonstrated the link between dental caries prevalence and low socio-economic status (Low education of parents/caregivers;). Low socio-economic status means the children may not afford good food and may end up eating cariogenic food, which are cheaper and accessible to them. This is consistent with the findings of two geographically different studies that emphasized the importance of socio-demographic variable of the parents in development of early childhood caries (Southward, et al. 2008; Thitasomakul et al., 2009).

Lack of brushing teeth was identified as a risk factor with those not brushing having two times more risk for developing dental caries than those who brush (odd ration =2.13) and that those eating sugary food are twice likely to get dental caries (odd ratio= 2.09). The expected number of dmft for a child who is not bottle-feeding is 1.31 times the expected number of a child who is bottle feeding. All these reflects the knowledge gaps and there is need for oral health education among parents/caregivers. There are consistent with many epidemiological studies relating to the dental health of toddlers and preschool children from the Nordic countries (Wendt et al., 1991, 1992, 1999; Grindefjord et al., 1993, 1995b; Hallonsten et al., 1995; Mattila et al., 1998, 2000; Raadal et al., 2000; Karjalainen et al., 2001; Stecksen-Blicks et al., 2004; Skeie et al., 2005b; Hugoson et al., 2008). These findings are similar to the report of the Kenya National Oral Health survey 2015 which showed that the risk factors for dental caries include low use of tooth paste and poor brushing techniques (KNOHS, 2015).

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

1. The prevalence of dental caries among children aged 3-6 years was high (63.88%) despite relatively high oral health knowledge of the causes and prevention of dental caries among parents/caregivers.

2. The main risk factors associated with prevalence of dental caries and caries experience were unemployed status of the mother (OR=3.18), household type of housing (OR=16.16 for timber and OR=7.21 for mud wall), eating sugary food (OR= 2.09), lack of brushing (OR=2.13), bottle feeding (OR=7.17) and bottle of water at night instead of milk (OR=2.0).

3. The caries experience as measured by the mean dmft-index was relatively high (3.54±1.9 with the an interquartile range of 2-5

6.2 Recommendations

1. The sub county health management teams should Initiate health education programs integrated with ANC, MCH/FP and school health education programs.

2. The sub county medical officer of health should mobilize community oral health officers to perform regular dental check ups of preschool going children and educate their caregivers to enable prompt referral to the nearest dental health facility

3. More research should be conducted on factors influencing dental health seeking behaviors and dietary habits of preschool children in peri-urban and rural areas.

REFERENCES

Petersen, PE. (2004). Strengthening the prevention of HIV/AIDS related Oral Disease: A Global Approach. Community Dentistry and Oral Epidemiology. *Community Dentistry and Oral Epidemiology, 32*, 399-401.

Abolfotouh M.A., Hassan KH., Khattab M..S, Youssef RM, Sadek A, El-Sebaiei M. (2000). Dental Caries: Experience in Relation to Wasting and Stunted Growth Among Schoolboys in Abha, Saudi Arabia. *Ann Saudi Med, Abolfotouh MA, Hassan KH, Khattab MS, Youssef RM, Sadek A, El-Sebaiei M. Dental Caries: Experience in Relation to Wasting and Stunted 20*(5-6), 360-3.

Adekoya – Sofowora CA, W. N. (2006). Caries prevalence, dental attendance, behaviour of Suburban Children Survey in Nigeria. *Adekoya – Sofowora CA, WO Nasir, AO Oginni, M Taiwo. Caries, Prevalence, DenAfrican Health Sciences, 6*(3), 145-150.

Akpata, ES. (2004). Oral Health in Nigeria. *International Dental Journal, 54*, 361-366.

Al Malik MI, Holt RD, and Bedi R. (2003). Prevalence and patterns of caries, rampant caries and oral health in two-five year old children in Saudi ARABIA. *Journal Dent Child (chic), 70*(3), 235-42.

Ambarkova V.& Ivanova V. (2014). Dental caries experience among primary school children in the Eastern region of the republic of Macedonia. *Oral Health Dent Manag, 13*, 1-7.

Begzati A., M. K. (2011). Dental health evaluation of children in Kosovo. *Europ J of Dent, 5*, 32-39.

Beirut D, H. W. (2004). Oral Health in Syria. *International Dental Journal, 54*, 383-388.

Benard-Bonnin AC, Pelletier H, Turgeon JP, Allard-Dansereau C, Petit N, Chabot G, Masson P. (1993). Cariogenic feeding habits and fluoride supplementation during infancy and early childhood. *Can J Public Health, 84*(2), 90-2.

Burt BA and Satishchandra P. (2001). The relationship between low birthweight and subsequent development of caries: A sys¬tematic review. *J Dent Ed, 65*(10), 1017-23.

Carino KM, Shinada K, Kiwaguchi Y. (2003). ECC in northern Phillipines. *Comm Dent Oral Epi, 31*(2), 81-9.

Cataldo WL, Oppenheim FG. (2001). Physical and chemical aspects of saliva as indicators of risk for dental caries in humans. *J Dent Ed, 65*(10), 1054-62.

Cleaton-Jones P, Fatti P. (1999). Dental caries trend in Africa. *Community Dent Oral Epidemiol., 27*(5), 316-20.

Currie C, Hurrelmann K, et al. (2000). *Health and health behaviors among young people. Health policy for children and adolescents.* WHO, 2000 WHO policy series. Copenhagen: WHO regional office for Europe.

Department of Health. (2003). *National Children's Oral Health Survey.* Johannesburg: Department of Health, South Africa.

Downer MC, Drugan CS, Blinkhorn AS. (2005). Dental caries experience of British children in an international context. *Community Dent Health, 22,* 86-93.

Eigbobo JO & Alade G. (2017). Dental caries experience in primary school pupils in Port Harcourt, Nigeria. *Sahel Med J , 20*, 179-86.

Eronat N. and Koparal E. (1997). Dental caries prevalence, dietary habits, tooth brushing and Mothers' education in 500 urban Turkish children. *J Marmara Univ Dent Fac, 2*(4), 599-604.

Eunice Ogido, Cassia Dezan, Wanda Garbeilini,Fernanda Salomao, and Maria Morita. (2004). Prevalence of dental carries among children in Brazilian city. *J Appl Oral Sci , 12*(1), 34-8.

Hugoson A, Koch G, Nydell Helkimo A, Lundin SA. (2008). Caries prevalence and distribution in individuals aged 3-20 years in Jönköping, Sweden, over a 30-year period (1973- 2003). *J Paediatr Dent, 18*, 18-26.

Kassim BA, Noor MA, Chindia ML. (2006). Oral Health status among Kenyans in a rural arid setting: dental caries experience and knowledge on its causes. *East Afr Med J., 83*(2), 100-5.

Kenya Ministry of Health. (2015). *Kenya National Oral Health Survey Report 2015.*

Kiwanuka SN, Astrm AN,and Trovikta. (2004). Dental caries experience and its relationship to social and behavioural factors among 3- years old children in Uganda. *International Journal Paediatr Dent, 14*, 336-346.

Liompart G, Marin GH, Silberman M, Merlo I, Zurriaga O. (2010). Oral health in 6- year old schoolchildren from berisso, Argentina: falling far short of WHO goals. *Med Oral Patol Oral Cir Bucal, 15,* 101-105.

Litt MD, Reisine S,& Tinanoff N. (1995). Multidimensional causal model of dental caries development in low-income preschool children. *Public Health Reports, 110*(4), 607-17.

Ly KA, Milgrom P, Rothen M. & Xylitol. (2006). Xylitol, sweeteners, and dental caries. *Pediatr Dent , 28*(2), 154-63.

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

Malmivirta and Alaluusua. (1994). Early plaque accumulation — A sign for caries risk in young children. *Early plaque accumulation — A sign for caries risk in young children, 22*(10), 273-6.

Marthaler TM. (2004). Changes in dental caries 1953-2003. *Caries Res, 38,* 173-81.

Masumo R, Bardsen A, Mashoto K, Šstrøm AN. (2012). Prevalence and socio-behavioral influence of early childhood caries, ECC, and feeding habits among 6-36 months old children in Uganda and Tanzania. *BMC Oral Health , 12*(14).

Mbawalla, H.S., J.R. Masalu, and A.N. Åstrøm. (2010). Socio-demographic and behavioral correlates of oral hygiene status and oral health related quality of life, the Limpopo- Arusha School project (LASH): A cross-sectional study. *BMC Pediatrics, 10*(87).

Murray JJ and Naylor MN. (1996). Fluorides and dental caries. In: Murray JJ, ed. Prevention of Oral Disease. *Oxford University Press, Oxford*, 32-67.

Narendar Davani, Nighar Nisar, Nazeer Khan,Shahbano Syed and Navara Tanweer. (2012). BMC Oral Health. *BMC Oral Health, 12*(59).

Ng'ang'a PM, & Valderhaug. (1992). Dental caries in primary school children in Nairobi, Kenya. *Acta Odontol Scand, 50*, 269–72.

Ngatia EM, Imungi JK, Muita JW, Nganga PM. (2001). Dietary patterns of and dental caries in nursery school children in Nairobi, Kenya. *East Afr Med J, 78*(12), 673-7.

Nunn ME, Dietrich T, Singh HK, Henshaw MM, Kres- sin NR. (2009). Prevalence of early childhood caries among very young urban Boston children compared with US Children. *J Public Health Dent, 69*(3), 156-62.

Okeigbemen, SA, UC Nnawuihe, and C Osemwegie. (2015). Dental caries experience and oral health behavior among 7-15 years old children attending military and paramilitary schools in Benin City. *Savannah Journal of Medical Research and Practice, 4*(1).

Peressini S, Leake JL, Mayhall JT, Maar M, Trudeau R. (2004). Prevalence of early childhood caries among First Nations' children, District of Manitoulin, Ontario. . *Int J Paediatr Dent, 14*(2), 110-10.

Petersen PE. (2004). Challenges to Improvement of Oral Health in the 21st century-The approach of the WHO Global Oral Health Programme. *International Dental Journal, 54*, 329-343.

Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. (2005). The global burden of oral diseases and risks to oral health. *Bull World Health Organ , 83*, 661-9.

Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. (2005). The Global burden of oral disease and risks to oral health. *Bull World Health Organ, 83*(9), 661-9.

Petterson GH & Brathall D. (1996). The caries decline: A review of reviews. *Eur J Oral Sci, 104*, 436-443.

Polk, D.E., R.J. Weyant, and M.C. Manz. (2010). Socio-economic factors in adolescents' oral health: are they mediated by oral hygiene behaviors or preventive interventions? *Community Dent Oral Epidemiol, 38*, 1-9.

Reisine S, & Douglass JM. (1998). Psychosocial and behavioral issues in early childhood caries. *Community Dent Oral Epidemiology, 26*(1), 45-8.

Reisine ST & Psoter W. (2001). Socioeconomic status and selected behavioral determinants and risk factor for dental caries. *J Dent Ed, 65*(10), 1009-16.

Sabbah, W., et al.,. (2008). The role of health related behaviors in the socioeconomic disparities in oral health. *Soc Sci Med*, 1-6.

Sanders, A., Spencer, A. and G. Slade. (2006). Evaluating the role of dental behavior in oral health inequalities. *Community Dent Oral Epidemiol, 34*(1), 71-79.

Shingare P, Jogani V, Seveker S, Patil S,and Jha M. (2012). Dental caries prevalence among 3 to 14 year old school children, Uran, Raigad district, Maharashtra. *J Contemp Dent Pract , 2*, 11-40.

Simratvir M, Moghe GA, Thomas AM, Singh N, Chopra S. (2009). Evaluation of caries experience in 3-6-year-old children, and dental attitudes amongstthe care-givers in the Ludhiana city. . *J Indian Pedod Prev Dent, 27*, 164-169.

Singh S, Myburgh NG and Lallo R. (2010). Policy Analysis of Oral Health Promotion in South Africa. *Global Health Promotion, 17*(1), 16-24.

Sub County Medical Officer of Health. (2014). *Health statistics for Bureti Sub County.*

Sufia S, Chaudhry S, Izhar F, Syed A, Mirza BA,& Khan AA. (2011). Dental caries experience in preschool children: is it related to a child's place of residence and family income? . *Oral Health Prev Dent, 9*(4), 375-9.

Surgeon General. (2000). *Oral Health in America.* National Institute of Dental and Craniofacial Research. Rockville: National Institute of Health.

Thibodeau EA, O'Sullivan DM, & Tinanoff N. . (1993). Mutans streptococci and caries prevalence in preschool children. . *Community Dent Oral Epidemiol , 21*(5), 288-91.

Tickle M, Craven RJ, Milsom KM,& Kay EJ. . (2001). The relative effects of residential and school environments on the dental caries experience of 5- and 12-year-old children in the north west of England. *Health Education Journal , 60*(2), 120-6.

Vadiakas G. (2008). Case definition, aetiology and risk assessment of early childhood caries (ECC): A revisited review. *Euro¬pean Arch Paed Dent, 9*(9), 114-25.

Weatherell J, Deutsch D, Robinson C, Hallsworth AS. (1977). Assimilation of fluoride by enamel throughout the life of the tooth. *Caries Res, 11*(2), 85-115.

World Health Organization. (1996). *Application of the international classification of disease to dentistry and stomatology.* Geneva: WHO.

APPENDIX 1. HOUSEHOLD QUESTIONAIRE

SOCIOECONOMIC CHARECTERESTICS

1. What are your occupation? Father..... .....
   Mother..... Guardian (if applicable) .....

2. What is your highest education level? (a) University (b) College (c) Secondary (d) Primary (e) None

3. Which kind of house do you live in at home? (a) Stone walled (b) Mud walled (c) Timber/wood walled

HOUSEHOLD HEALTH RELATED CHARACTERISTICS

4. Which of the following are causes of tooth decay in children?

   (a) Eating too much sugary foods.....(i) Yes (ii) No

   (b) Lack of brushing (i) Yes (ii) No

   (c) Breast feeding on demand (i) Yes (ii) No

   (d) Bottle feeding at night (i) Yes (ii) No

   (e) brushing with tooth paste (i) Yes (ii) No

   (f) limiting the amount of sugary foods (i) Yes (ii) No

   (h) giving a child bottle of water at night instead of milk (i) Yes (ii) No

10. At what age did your child start brushing your teeth .....

11. How often do your child clean her/his teeth? (a) Once daily (b) more than once daily (c) weekly (d) don't know

12. What do your child use to clean your teeth? (a) A tooth brush (b) chewing gum (c) Others, specify .....(d) don't know

13. Do you know if your child eat candy food? (a) Yes (b) No

14. If Yes to question 13, how often does s/he eat candy foods? (a) daily (b) More than twice a week (b) only weekends (c) once a month (d) Others, specify ..... (e) don't know

15. How frequent do your child see a dental specialist (a) once in three months (b) once in 6 months (c) Once a year (d) none/ have never seen one before (e) Less than one in two years

16. Have your ever talked with your child about tooth decay/oral health? (a)Yes (b) No

17. If Yes, how frequent do they talk about oral health?.....

ORAL HEALTH CLINICAL EXAMININATION

Each case of tooth decay, missing teeth and filled teeth caries one (1) marks and the dmft is calculated by summation of the total marks. The guiding tool is shown below.

SERIAL No.	**DENTAL CARIES EXPERIENCE**	**PRESENT**	**ABSENT**
1	Tooth Decay		
	Missing Teeth		
	Filled teeth		
	Dmft (Total scores above)		
2	Tooth Decay		
	Missing Teeth		
	Filled teeth		
	Dmft (Total score above)		

APPENDIX II: ASSENT FORM

You must read this greeting to the respondent and proceed with the interview only after he/she gives consent.

Good morning/afternoon, Madam/Sir. My name is Dr. Cheruiyot Japheth. I am here today from Maseno University, Kisumu to collect information and data for the study on dental caries experience and associated risk factors among pre-school going children. This research has been approved by the Institutional Research and Ethics Committee (IREC) of Maseno University.

I will be asking you questions on demographics and public health issues related to oral health. I will also examine the teeth. I plan to do this study among over 300 pre school going children.

Benefits

This is a research project and the findings may be used by the Government's policy makers and health providers to design appropriate policies and plans to provide better oral health services for your children in the future. Your participation will help us to gain a better understanding of the issues affecting management of dental caries.

Risks

Am aware of the fact that some of the questions regarding oral health may be sensitive and time consuming. Everything you will tell me will be kept confidential. Under no circumstance will we link your name to the data during analysis and dissemination of the study findings. **If you choose not to participate, it will not affect you in anyway. If you feel uncomfortable in the course of the survey, you can withdraw at any time.** If you agree to participate, it will take 15 minutes to complete the interview and oral examination. If you have any further questions during the period and in the future, please do not hesitate to contact the research team using the telephone numbers below.

May we proceed? Verbal consent: Yes……No……..

Date **…**……..

Thank you for participating.

Contacts for the research team,

Dr. Japtheth Cheruiyot

MASENO UNIVERSITY, PRIVATE BAG, MASENO, KENYA

Phone; 0720333561**, E- Mail address**; Japheth_cheruiyot@gmail.com

TAARIFA YA KUTOA IDHINI

Jina langu ni daktari Japheth Cheruiyot. Mimi ni mwanafunzi katika chuo kikuu cha Maseno. Ninafanya utafiti katika shule za nasari za divisheni ya Bureti. Lengo la uchunguzi huu ni kutafuta mashimo kwenye meno ya watoto kati ya umri wa miaka tatu hadi tano na jinsi ambavyo unahitajika kufanya. Pia utafiti huu utaangazia ujuzi wako kuhuzu meno. Nitachunguza kama kuna mashimo na kuuliza maswali. Wakati wa uchunguzi, mtoto hatasikia uchungu wala kungolewa meno.

Manufaa

Iwapo mtoto wako atapatikana na mashimo kwa meno, utashauriwa juu ya shida hilo na mahali pa kutafuta mzaada. Matokeo yatamfaidi mwanao kwa vile tutawakilisha shida zenu kwa idara ya wizara ya afya na wizara ya elimu.

Idhini

Mimi……..kama mzazi au mlezi nimesoma nakala hii na nimemruhuzu mtoto wangu……. Afanyiwe uchunguzi wa meno.

Sahihi wa mzazi au mlezi

Sahihi…….Tarehe……..