



**Duration of breastfeeding and dental carries among young children  
in selected health facilities of Addis Ababa, Ethiopia**

**By: Marta Yemane**

A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF NUTRITION AND DIETETICS, SCHOOL OF PUBLIC HEALTH, COLLEGE OF HEALTH SCIENCES, ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN PUBLIC HEALTH NUTRITION.

June, 2023

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY  
COLLAGE OF HEALTH SCIENCE  
SCHOOL OF PUBLIC HEALTH  
DEPARTMENT OF NUTRITION AND DIETETICS

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## List of Abbreviations and Acronyms

AAFP	American Academy of Family Physicians
AAP	American Academy of Pediatrics
AAPD	American Academy of Pediatric Dentistry
ADA	American Dental Association's
CDC	Center for Disease Control and Prevention
DHS	Demographic Health Survey
DMFT	Decayed, Missing and Feeling Teeth
EBF	Exclusive Breast feeding
ECC	Early Childhood Caries
ECOWAS	Economic Community of West African States
EDHS	Ethiopian Demographic Health Survey
GBD	Global Burden of Diseases
HIV	Human Immune Deficiency Virus
MS	Mutans Streptococci
NCD	Non-Communicable disease
OR	Odd Ratio
S-ECC	Severe Early Childhood Caries
UN	United Nations
UNICEF	United Nations International Children Fund
USA	United State of America
WHO	World Health Organizations

## **Abstract**

**Background:** Breastfeeding has many health benefits for infants, including protection against dental caries. However, the effect of breastfeeding duration on caries risk is unclear, as different studies have found different results. This may depend on multifactorial risk factors of dental caries such as biological, behavioral and socioeconomic factors. However, there is limited evidence on the magnitude and the association between duration of breastfeeding and dental caries among children aged 12 to 36 months in Addis Ababa, Ethiopia.

**Objective:** This study aims to assess the magnitude of dental caries and the association between the duration of breastfeeding and dental caries among young children aged 12 to 36 months old in Addis Ababa, Ethiopia.

**Methods:** A cross-sectional study of 380 children aged 12 to 36 months from 11 health centers in Addis Ababa, Ethiopia was done from September to December 2021. Questionnaires and dental exams were used to collect data. Dental caries was measured by the deft index. Multinomial logistic regression was used to find the factors related to caries. A p-value  $\leq 0.05$  and AOR 95% CI were used for significance and interpretation. SPSS software was used for data analysis.

**Result:** The results showed that the prevalence of dental caries was 53.4%, with 13.7% having high caries and 39.7% having low caries. The factors that were significantly associated with high caries were table sugar intake frequency (AOR=3.24, 95% CI: 1.29, 8.19), tooth brushing frequency of the mother (AOR=0.15, 95% CI: 0.03, 0.93), age of the child (AOR=0.21, 95% CI: 0.10, 0.49) and mother education level (AOR=4.41, 95% CI: 1.37, 14.18). The factors that were significantly associated with low caries were duration of breastfeeding (AOR=2.14, 95% CI: 1.02, 4.50), bottle feeding (AOR=0.42, 95% CI: 0.18, 0.97) and table sugar intake frequency (AOR=2.00, 95% CI: 1.03, 3.88).

**Conclusions:** Many children aged 12 to 36 months in Addis Ababa, Ethiopia had dental caries. Different factors such as breastfeeding, sugar intake, tooth brushing, age, mother education and income affected their risk of caries.

**Recommendations:** Health education programs should teach mothers and children how to breastfeed well, avoid bottle feeding and sugar, and brush their teeth regularly. Also, mother education level should be improved by social policies and interventions to prevent caries.

**Key words:** Dental caries, Prevalence, Children/infants, Breastfeeding duration, ECC, dmft/deft, decay

# 1. Introduction

## 1.1 Background

In young children, the first teeth appear at about six months old, and the primary dentition of these teeth is completed by thirty months (1). A deciduous tooth is a term used for baby teeth, milk teeth, or primary teeth which are developing during the embryonic stage. Although children's teeth still healthy, they can get affected by dental caries, which can lead to permanent damage (2). Dental caries is a tooth disease which resulted by bacterial fermentation of dietary carbohydrates. It is influenced by biological, behavioral and psychological factors (3). Dental caries in primary teeth of young children referred as Early Childhood Caries (ECC) (4).

ECC in primary tooth defined as the presence of one or more decaying, missing, or filled tooth surfaces, according to the American Academy of Pediatric Dentistry (4). Dental caries is a type of early, moderate, and late dental caries that affects the primary teeth of infants and toddlers. It starts as pale white or brown patches on the tooth's surface, which develops to eventually damage the crown and root (5).

Dental caries is the most common childhood non-communicable disease (NCD) continues to be a pandemic disease among young children globally (6). The 2019 Global Burden of Diseases (GBD) reported, oral diseases affect nearly 3.5 billion people worldwide, with more than 530 million children suffering from primary tooth caries (7). It is a global public health issues rated from prevalence from 23 % to 90% countries widely covered on average 50 % (8) and placed 12<sup>th</sup> most prevalent condition (9).

Reports show, the prevalence of dental caries is higher in Asia (36-85%), Africa (38-45%) and 22-61% in the Middle East (10). On the other hand, studies conducted between 2007 and 2017 in 193 UN member countries, dental caries was found to be 23.8% in children younger than 36 months and 57.3% in children 36 to 71 months (11). A recent review reported that dental caries prevalence was 48% globally and across the content; Africa: 30%, Americans: 48%, Asia: 52%, Europe: 43%, and Oceania: 82% (12).

Based on the Decayed, Missing/Extracted and filling teeth (dmft/deft) index according to WHO parameters, the magnitude of dental caries in some countries of Europe, America and Asia was found to be 59.6% in Ecuador (13), 11.4% in Sweden and 7-19% in Italy(14) , 62.6 to 87% in China (15), and 89.2% in Saudi Arabia (16).

The prevalence of dental caries varies depending on the population group and socioeconomic status in developing nations, particularly in Sub-Saharan Africa, including Ethiopia (17). Dental caries prevalence rates were 61.4%, 44.6%, and 65.6%, respectively, in African nations like Egypt (18), South Africa(19) , and Uganda (20) . In Ethiopia, including Addis Ababa the capital, there is a lack of studies about early childhood caries among 12 to 36 months old children.

In many parts of the world, this disease development has been observed in conjunction with the transition to a western diet and lifestyles changes (21). This in time has an impact on young children's quality of life and well-being (10,22) and also cause difficulties in sleeping and eating and may have an effect on children's growth, development and school performance (22). Some of the well-documented factors associated in the development of caries include high level of cariogenic bacteria, susceptible host and fermentable carbohydrate diet (23). Other risk factors that have been associated with dental caries with young age also include feeding practices, oral hygiene, socio-demographic factors and children with chronic illness or with special health care needs (24,25).

Breast feeding is one of feeding practices among young children which contributes to healthy development of children and recommended by World Health Organization (WHO) to feed exclusively for 6 months and continue with complementary feeding until two years and beyond (26).Breast milk for infants and mothers provides a lot of benefits; including health, economic, and psychological benefits. Compared to cow's milk, breast milk have more cariogenic properties that responsible for dental caries, because it contains more carbohydrates but less calcium, phosphorus, and protein (27). Breastfeeding and dental caries in very young children have a complex association that has been studied for a long time with conflicting results. A study revealed that breastfeeding for the 12 months not linked to a higher risk of dental caries and may even provide protection in comparison to formula milk feeding. Infants who are breastfed above the 12 months, however, show an increased risk of dental caries (28).

In Ethiopia dental caries has been identified as a public health concern among young children (29,30) and lacks national oral health data for children under the age of five, even though WHO recommends member state to formulate preventing strategies of childhood caries. On the other hand association between duration of breastfeeding and dental caries among this age group is complex and has been addressed for many years with contradictory results. Understanding the association between breastfeeding duration and dental caries in Ethiopia could help inform the development of more effective prevention strategies. So, it is worth addressing this gap and showing the magnitude of this problem in order to influence mothers/caretakers, health professionals, and oral health associations to give emphasis to this issue and integrate it with maternal and child care services.

## **1.2 Statement of the problem**

Dental diseases in young children have been associated with poor quality of life and are significant public health issue that makes it difficult to achieve and maintain oral health problems in children and adults (31). Children are prone to caries immediately after the first teeth erupt which is usually at six months old. Dental caries is the most common chronic oral disease in young children worldwide, with a prevalence of five times that of asthma and seven times that of hay fever (32). It is a preventable multi-factorial disease, associated with significant costs, morbidity, and some mortality.

Dental caries was related to a number of negative consequences, including rapidly developing diseases that cause anxiety, repeated antibiotic use, extreme pain, sepsis, and sleep loss in children (33). Due to associated pain and their unwillingness to eat, children with dental caries grow at a lower phase than caries-free children, and some of them are also severely underweight (31). Low- and middle-income countries are concerned about dental caries, which affects very young children, latter relates with a lifelong condition that tracks across adolescence and adulthood life (34). Dental caries is neglected and if left untreated can lead to very serious health problems (9).

Breastfeeding is the act of a mother, feeding her baby through her breasts or milking into a bottle or cup to feed the baby. It is well- accepted as the accepted method of nutrition for children (28,35). Breastfeeding is recommended as the best form of infant feeding because it has a number of health, nutritional, immunological, developmental, psychological, social, economic, and environmental advantages for babies and mother (28). And also it is an important technique for lowering infant morbidity and mortality because it provides vital nutrients for growth and development and enhances the immune system of the infant (36).

Based on the benefits given to children WHO recommend breastfeeding exclusively for six months and continuing with balanced complementary feeding until 24 months or beyond. On the other hand, the American Academy of Pediatrics (AAP) of 2012 recommends that infants should be exclusively breastfed for the first six months and continued breastfeeding together with complementary diets for a year or longer (36) This recommendation is based on the higher risk of childhood dental caries with longer duration of breastfeeding but at this moment AAP updated breastfeeding duration guideline to two years and above in 2022; align it with WHO, the American Academy of Family Physicians (AAFP), and the Canadian Pediatric Society (37).

Researchers found that breast milk in year two contains higher amounts of protein, lactoferrin, lysozyme, and immunoglobulin-A does in year one. It is very important for children's growth and development. Furthermore, it is associated with a decreased risk of developing breast and ovarian cancer, diabetes mellitus, and hypertension in mothers who breastfeed for two years (37) Breastfeeding is now supported and promoted in several countries around the world; however, there is debate on whether dental caries risk is linked to the carbohydrate content of the milk and factors that dictate the duration of contact between the breast and the erupted dentition (38).

Duration is the length of time for any breastfeeding, including nursing through exclusive breastfeeding and complementary feeding until the cessation of feeding breast and also duration and exclusivity are major determinants of feeding practices (39). Studies have given different definitions and cutoffs for breastfeeding duration. In Western countries, longer periods of breastfeeding usually mean breastfeeding after the age of 12 to 24 months, depending on the culture but according to WHO not clearly defined (40) while in Africa the median duration of breastfeeding ranges between 16 and 28 months (41). In sub-Saharan Africa recent study

revealed that the median duration of breastfeeding was 12 months (42) and in Ethiopia median duration of breastfeeding decreased from 25.2 months in 2000 to 23.9 months in 2016 (42).

There is significant evidence from the literature associating sugar consumption, dental caries, and poor oral hygiene. But researchers indicate disputed effects when examining associations between breastfeeding and dental caries. This means that some researchers suggested breastfeeding is related to caries development, while others claimed it is protective against caries (43). Breastfeeding for  $\geq 6$  months and for 24 months was associated with an increased risk of dental caries compared to  $< 6$  months (44,45). Breastfeeding  $\geq 12$  months significantly increased caries risk compared with those breastfed  $< 12$  months whereas, children breastfed  $\geq 6$  months did not significantly increase dental caries risk compared with those breastfed  $< 6$  months (46). In 2016 a review was published in the Lancet describing the lifelong effects of breastfeeding and showed that dental caries was the only negative health outcome related to longer periods of breastfeeding (47). The results of the above- mentioned studies vary depending on the different sample sizes used, breastfeeding time cutoffs, socioeconomic status of the population, and method of controlling confounders. On the other hand, studies found breastfeeding duration and dental caries in children had no association (48,49).

There has been no research in Ethiopia to investigate the relationship between breastfeeding duration and dental caries among children 12 to 36 months old; giving lack of attention primary teeth problems and the fact that breastfeeding has no negative effects. From different research reviews, the relationship between breastfeeding duration and dental caries has conflicting results. There is debate regarding the breastfeeding method for preventing dental caries and promoting good oral health. In addition, the mentioned studies did not take into account the role of an important confounding factor affecting both infant feeding practices and dental caries. It is well known that dental caries have negative impact on young children but still in Ethiopia the disease is not researched among this age group. And also, due to the inconsistency of the existing findings and all studies done based on different cultures of median breastfeeding duration, we aimed to determine the magnitude of dental caries and clarify the association between breastfeeding duration and dental caries among children aged 12 to 36 months in Addis Ababa, Ethiopia.

### **1.3 Significance of the study**

Dental caries is a preventable, global, non-communicable disease (NCD) of medical, social and economic importance. According to WHO, member states should prepare a national oral health and nutrition plan. Despite its high prevalence which leads to poor quality of life in young children, consensus on a guideline for dental caries prevention is still lacking. It is important to study the prevalence of dental caries in young children in this study area to be able to provide a clear picture about the situation of oral and dental health in such population so as to help the local authorities to make future plans to reduce as much as possible the incidence of dental caries.

This study is to give an idea about the actual situation of dental caries among young children in Addis Ababa. The results found here would probably be helpful in making future plans concerning the best methods to lower the level of such oral disease and used as base line data for dental health associations and health professionals to design and modify national oral health plan in line with nutrition intervention strategies and immunization services to mitigate early childhood caries.

The outcomes of this study will show the extent of dental caries in young children, as well as the relationship between duration of breastfeeding and dental caries. This study would close the knowledge gap that exists in Ethiopia regarding young children's caries in relation to duration of breastfeeding practices, as well as false assumptions that primary teeth are milk teeth and that nothing will happen before permanent teeth erupt, so there is nothing to contribute to adulthood disease. Based on the findings of this study, this incorrect knowledge would be corrected by providing awareness education to caregivers and even to health workers. In addition, this study will open a gate for dentists and nutritionists or other health service providers work together to tackle dental caries and to address a reachable service for children. The study also will provide base line information for researchers to conduct further investigations in this research area with different study designs.

## **2. Literature review**

Dental caries among young children remains a significant public health problem. It is a disease with multifactorial causes. Different kinds of literature have been reviewed based on the findings which are reliable with the research variables and objectives of this study from the global, African, and Ethiopia aspect. The reviewed literature was showing the prevalence of dental caries and the association of breastfeeding duration with dental caries.

### **2.1 Magnitude of dental caries**

Dental caries remains a major public health burden among young children worldwide. Based on studies, the magnitude of dental caries among young children from various parts of the world indicates that there are major issues in many countries. Globally, 1.76 billion young children with primary teeth are affected by early childhood caries (50). A study conducted in Qatar shows that the prevalence of young children's caries was reported as 89.2 % (51) and 36 % in Greece (52).

Similar to Greece, 40% has been reported in the USA among 2 to 11-year-old children (53). A recently published study from Germany shows 10% to 26% of caries exist among three years old children (54). In Italy, a study on the prevalence of caries among preschool children reports that the rate was 12.5% (55). According to a study done in one of China's province Zhejiang, caries prevalence measured in  $\text{deft} > 0$  among young children was 70.4 % and the mean  $\text{deft}$  scores of 3 years old children surveyed were  $2.96 \pm 4.07$  (56). A similar study conducted on preschool children in Marathahalli, Bangalore found a rate of dental caries of 40% with a mean  $\text{dmft}$  of 1.89 (57). Another study in the center of Kirikkale, Turkey showed that the prevalence of dental caries in preschool children was 45%, while the mean  $\text{dmft}$  was  $0.63 \pm 1.79$  (58). In Quito, Ecuador the prevalence of early childhood caries among children aged 1 to 5 years reported 59.6% (58). In Indonesia, Jakarta the prevalence of dental caries was 83%, with a mean  $\text{dmft}$  of 6.2 (59).

In several parts of Africa, research on the rate of dental caries has been conducted. Among them, the study conducted in Uganda reports the magnitude of dental caries at 48%, and the mean  $\text{dmft}$  for participants was 2.04 (60). The prevalence of dental caries in preschool children in Egypt was 61.4%, and the mean  $\text{dmft}$  was  $(2.930 \pm 3.281)$  (61).

The prevalence of dental caries is 16.0% with a mean dmft of 6 years in Nigeria (61). In Ethiopia there is no study conducted among young age children age 1 to 3 years that shows the prevalence of dental caries. To summarize, the prevalence of dental carries ranged from 16% to 89.2% among those reviewed countries.

## **2.2 Breastfeeding duration and dental Caries**

Feeding activities during infancy plays a significant role in the development of ECC because tooth are more vulnerable to caries immediately after the eruption (62). It has been confirmed that breastfeeding is essential for a baby's health and was recommended by WHO exclusively for six months with the addition of complementary foods at six months and continued breastfeeding for two years and above. According to some studies, dental caries in primary teeth may occur as a result of breastfeeding cariogenic properties. On the other hand, researchers found no association between the duration of breastfeeding and dental caries. A Canadian institution-based cross-sectional study reveals breastfeeding for more than 24 months is associated with dental caries (63).

A systematic review and meta-analysis conducted in Australia shows those children who breastfed after 12 months of age increased the risk of caries when compared with children who breastfed shorter than 12 months. On the other hand, children exposed to longer versus shorter duration of breastfeeding up to age 12 months had a reduced risk of caries (38). A Population-based birth cohort study conducted in Thailand on the contrary founds, breastfeeding for 6–11 months was significantly associated with a lower demf and protective risk of dental caries in primary teeth. And also prolonged breastfeeding was not associated with dental caries (48). A study done in Asia founds breastfeeding  $\geq 12$  months significantly increase ECC risk compared with those breastfed  $< 12$  months and analysis suggests ever breastfeeding may protect children from ECC, and breastfeeding duration  $\geq 12$  months is associated with higher ECC risk (46).

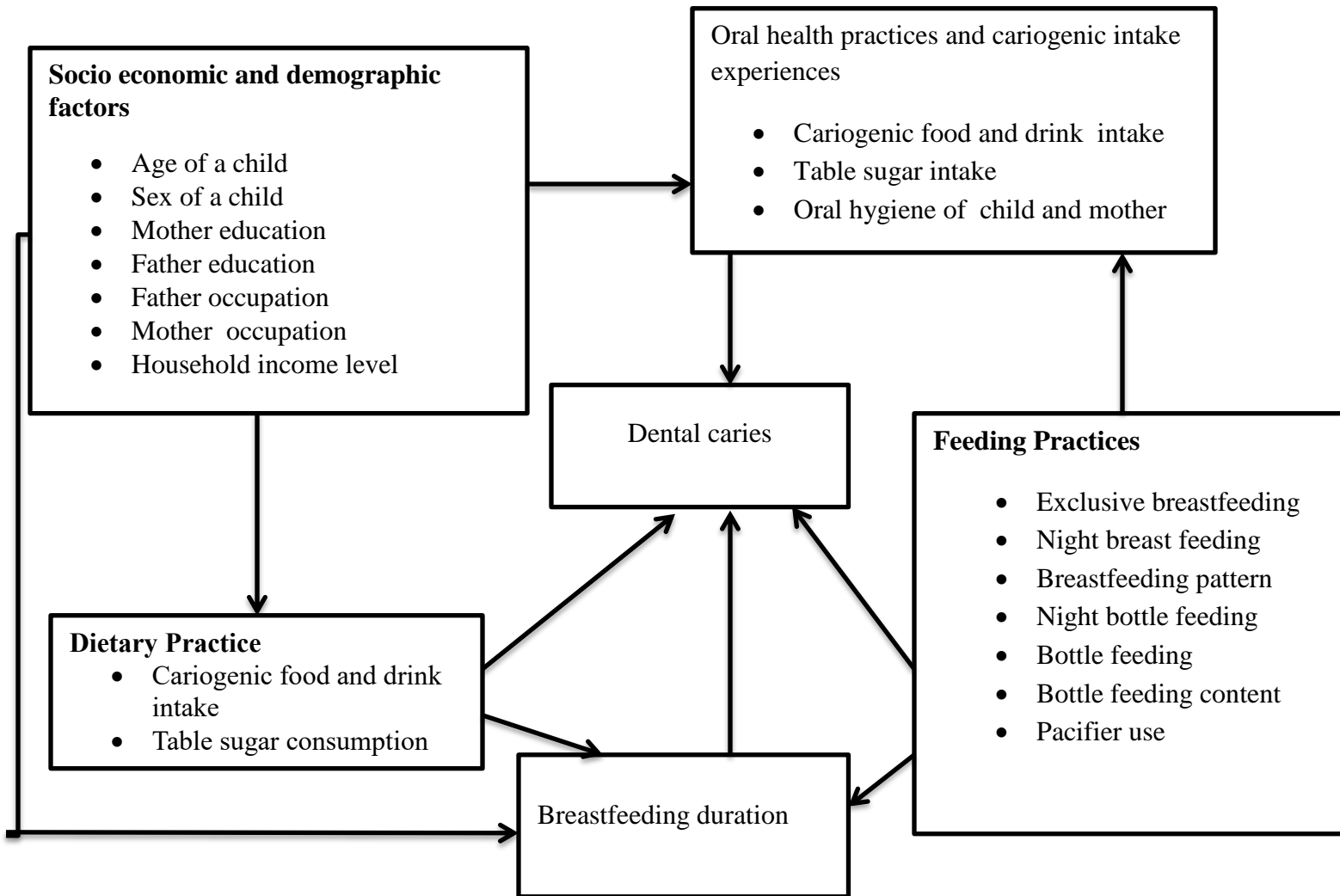
A Brazilian prospective cohort study found out, breastfeeding in late infancy were positively associated with dental caries in early childhood (64). A literature review done in France demonstrates, breastfeeding until the age of one year is not associated with an increased risk of dental caries and it is protective factor. At the same time, infants who are breastfeed beyond the age of 12 months demonstrate an increased risk of caries (28).

A cross-sectional study from Shandong, China shows, complete full breastfeeding within 6 months of birth primarily contribute to the high ECC risk at 3-year-old and risk factors for ECC different as age increases (15). On the contrary, children who breastfeed for less than six months have higher caries risk than children who breastfeed for six months. ECC risk is thought to be elevated by shorter breast-feeding time, but this association may decrease with age (65). A study done in Australia, reports there was no independent association between breastfeeding beyond 1 y of age and dental caries (66). A cross sectional study conducted in Spain explains breastfeeding from 18 months onwards is considered a risk factor for childhood caries among young children (67). A socially diverse birth Cohort Study in Netherlands explains prolonged breastfeeding more than 12 months was associated with dental caries among children (68). In summary association of breastfeeding duration and dental caries varies and inconsistent evidence till today across the studies. This is due to using different breastfeeding duration cutoff points and the way of controlling confounders.

### **2.3 Dental caries and other associated factors**

Dental caries in children are associated with different causing factors. The factors that are currently associated with dental caries in children rather than breastfeeding practice are sugared beverages (69,70), poor oral hygiene, and the presence of high counts of Streptococcus mutants in dental plaque, (71,72) social economic status especially low maternal education. A study conducted in Tanzania among children aged 2-4 years old shows that factors associated with dental caries were factory-made sugary foods but prolonged breastfeeding for more than 1 year and breastfeeding at night had no association with dental caries (73). Age, high-risk populations (HIV, mentally aided), low income, low socio economic-status, concentrations of mutants streptococci (MS) bacteria, transmission of MS bacteria from mother to child, dietary factors, and plaque levels have also frequently been associated with caries in young children (74). A study conducted in Dessie, Ethiopia shows determinants of dental caries among preschool children were first-born child, feeding at night; using sugar-based food and soft drink (29). In conclusion, dental caries associated risk factors for children rather than breastfeeding duration are the age of the child, parent's economic status and education, oral hygiene of mother and child, consumption of cariogenic foods, and feeding practices.

## Conceptual frame work



**Fig.1** Conceptual frame work adopted from Devenish et al, (2020) (66) and based on other relevant literature review .

### **3. Objective of the study**

#### **3.1 General Objective**

The general objective of this study was to assess the magnitude of dental caries and its association with duration of breastfeeding among young children aged (12-36) months in Addis Ababa, Ethiopia from September, 2021 to December, 2021.

#### **3.2 Specific objective**

- To determine the magnitude of dental caries among young children aged (12-36) years in Addis Ababa, Ethiopia from September, 2021 to December, 2021.
- To examine the association between duration of breast feeding and dental caries among young children aged (12-36) months in Addis Ababa, Ethiopia from September, 2021 to December, 2021

## **4. Methods and Materials**

### **4.1 Study Area and Period**

The study was conducted from September, 2021 to December, 2021 in Addis Ababa city. Addis Ababa is the capital city of Ethiopia and diplomatic capital of Africa which is located in the heart of the country. The city divided into eleven sub cities called kifle-ketemas and 116 woredas (districts). Based on world population review 2021, the Addis Ababa city population is 5,005,524 (75). The city own 52 hospitals; 12 public hospitals which run by the state, 40 private hospitals, 882 clinics and 112 health centers (76,77). The study chosen to conduct in Addis Ababa city in public health centers and it is possible to find children with having different life styles, diverse ethnicities, languages, cultures, religion and socioeconomic backgrounds.

### **4.2 Study Design**

An institutions based cross sectional study design was used to conduct the study.

### **4.3 Population**

#### **4.3.1 Source Population**

The source population was young children age between 12 to 36 months attending under five and immunization unit at selected primary health center in Addis Ababa.

#### **4.3.2 Study Population**

All young children aged 12 to 36 months who attend the health center at the time of data collection and meet the inclusion requirements at the selected health center.

#### **4.3.3 Inclusion Criteria**

Mothers who gave their consent and had young children between the ages of 12 and 36 months were included in the study. Children who had at least two tooth erupted were included in the study.

#### **4.3.4 Exclusion Criteria**

Children with major illnesses or mental disorders have an impact on the pattern and assessment of the caries condition.

## 4.4 Sample size and sampling procedure

### 4.4.1 Sample size determination

For the first objective, Sample size was calculated using single population formula by considering the following statistical Assumptions;

- P = the proportion of dental caries is 33.8% (78).
- Z = the corresponding Z score of 95% CI
- E= Margin of error (5%)
- n= Sample size

$$Z^2 * P * (1 - P) / E^2$$

n= ~345, Then after adding 10 % contingency rate the final sample size was 380.

For the second objective, double proportion formula was used to calculate the sample size for associated factors was determined using Epi info version 7 at confidence interval  $(1 - \alpha) = 95\%$  and power  $(1 - \beta)$  of 80% was calculated by considering some determinant for contribution of dental caries.

Table: 1 Sample size determination for dental caries associated factors among young children aged 12 to 36 months in selected health facilities Addis Ababa, Ethiopia, 2023.

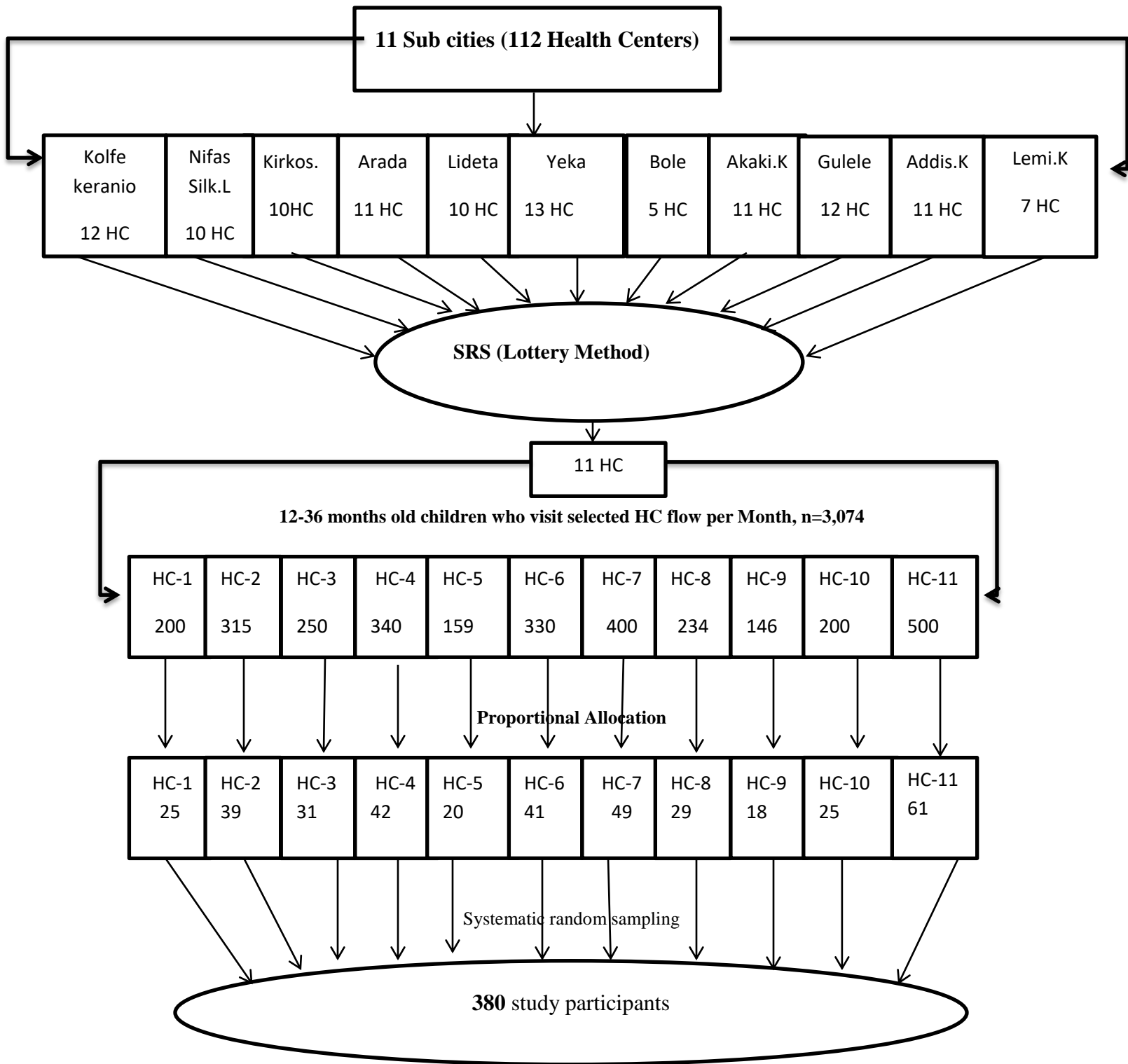
Variables	Assumptions	Sample size	Final sample size (+10% non-response rate)
Breastfeeding duration for 0 to 12 months (79)	P1=53.57% (non-exposed) without caries P2=15.42% (exposed) with caries	114	126
Consumption of sugar(80)	P1=76.5% (non-exposed) without caries P2=23.5% (exposed) with caries	66	73

Accordingly, single population proportion formula yields the largest sample size, so it is the final sample size for the study.

#### **4.4.2 Sampling procedure**

To begin with, lists of public health centers present in each sub city in Addis Ababa were identified based on sub city health office information, and there are 112 health centers in total. We used simple random sampling based on the lottery method to select one health center from each sub-city. Furthermore, baseline data from randomly selected health centers' patient flow charts were obtained for a month in each health center and the calculated sample size were proportionally allocated to each health center.

Systematic random sampling was used to select study participants in each health center based on allocated sample size. The sampling frame was based on card room information sent to the MCH department and was constructed by selecting the first sample as the start point and selecting every 3<sup>rd</sup> participant until the allocated number for that health center was reached.



**Figure: 2** Schematic representation of the sampling procedure.

## **4.5 Study Variables**

### **4.5.1 Dependent Variables**

Dental caries is primary variable that is calculated using the WHO's deft (decayed, extracted, and filling teeth) index score, which is then divided into three categories: high caries, low caries and caries free.

Children with deft score =0, Caries free, no tooth decay or fillings.

Children with deft score >0, have at least one tooth that is decayed, extracted or filled.

Children with deft score  $\geq 4$ , High caries means children with rampant carries or high caries.

### **4.5.2 Exposure Variable**

Duration of breast feeding: Classified based on WHO.

- Less than 6 months
- 6 to 11 months
- 12 to 23 months
- $\geq 24$  months

### **4.5.3 Covariate variables**

Feeding practices: sleeping with breast feeding, nocturnal breastfeeding, breastfeeding patterns, bottle-feeding, bottle-feeding content, bottle feeding at night and pacifier use.

Socio-economic and demographic characteristic: age of the child, marital status of parents, and gender of the child, educational status, occupational status and household income status.

Oral hygiene: onset of tooth cleaning, tooth cleaning frequencies, tooth cleaning method, tooth cleaning support, mother tooth cleaning frequencies and mother past oral case treatment.

Sugar intake: table sugar intake frequency, consumptions of cariogenic drinks and snacks frequency and cariogenic drinks and snacks type.

## 4.6 Operational definition

**Breastfeeding Duration:** The time during which breastfeeding continues and includes both exclusive and nonexclusive breastfeeding (39).

Breastfeeding duration for those who had never breastfed was defined as 0 months. Those who were still nursing were categorized as having breastfed for the same amount of time as their child's age at the time of the study.

**Bottle feeding:** Giving an infant any liquid whether breast milk or semi-solid through a bottle's nipple or teat (81).

**Sugar consumption:** Consumption of sugar that are added to foods and drinks by factories and naturally (82).

**Dental caries:** “the presence of one or more decayed, extracted (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months or younger”(83)

**ECC by severity:** any sign of smooth-surface in children younger than 36 months.

**Oral Hygiene:** is the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum disease (84)

**Dmft:** Describes the prevalence of dental decay in children and stands for decayed, missing and filled teeth in primary dentition for less than 71 months(4).

**Deft:** Describes the prevalence of dental caries in children less than 36 months and stands for decayed, extracted, and filled teeth (85).

## 4.7 Measurement

Dental caries among 12 to 36 months measured by WHO oral health assessment method called deft score. Primary outcome measure was from examination report of deft scores done by 5<sup>th</sup> year dental student and trained nurses. The prevalence of dental caries in primary teeth is commonly evaluated using the deft score. Each child's mean deft score is derived by adding up the number of primary teeth that have decayed, been extracted due to caries, and been filled.

Breastfeeding measured by WHO Breast feeding indicators: up to 36 months of children's age maternal memory found to be effective and reliable estimate of breastfeeding duration (86).

Covariate variables measured based on structured questionnaires: Covariates were identified through detailed review of the literature as potentially confounding the relationship between breastfeeding duration and caries.

Fluoride levels consider constant for all children assume that all children used municipal water (tap water) sources which had fluoride content in Addis Ababa City.

## **4.8 Data collection Tool and Procedure**

### **4.8.1 Data collection tool**

Structured questionnaires consisted of socio-demographic information, feeding practices of children, oral health practices and cariogenic intake experiences. The data collection tools were prepared based on reviewing different available literature and standard questionnaires that were already validated by Ethiopian Demographic Health Survey (EDHS) (87), Alhabdan et al (88) Nirunsittirat, et al (48), WHO infant and young children feeding manual, CDC oral questionnaires and NHANES 2012 Oral health survey.

The questionnaire was developed in English and translated into one of the commonly spoken local languages (Amharic) and then administered through face-to-face interviews. The final developed questionnaire was pretested on 5% of sample size. Oral assessment/ examination were done by 5<sup>th</sup> year Addis Ababa University dental students and trained health professionals based on World Health Organization (WHO) oral health survey procedure (89). Questionnaires were collected and supervised by Addis Ababa university dental student and the investigator. The objective of the study was explained for respondents and informed consent was obtained.

### **Clinical examination**

The investigator (PI), fifth year Addis Ababa University dental student and health professionals were trained by experienced dentist to carry out the clinical examination (deft score) of the children according to the World Health Organization oral health survey methods. Standardizations and calibration were done before data collection. The Cohen's kappa score inter-examiner reliability was 0.82 for deft scores, which shows better reliability. The children

were examined by using disposable explorer, portable chair, dental mouth mirrors and flashlights. During the examination, the older children were seated on a chair, and very young children were examined with the assistance of their mothers', by means of the "knee-to-knee" technique. Gauze pads were used to clean and dry teeth surfaces before examination.

Dental caries was assessed by means of visual examination. Children having one or more decayed (non-cavitated or cavitated), missing (due to caries)/extracted due to caries, or filled tooth (deft) in any primary tooth 12 month to 36 months of age were considered to have dental caries. Children with untreated caries were referred to hospitals especially to Yekatit hospital for treatment.

#### **4.8.2 Data quality Control**

The data collectors were trained for three days on the objective, methods, and each contents of question by the principal investigator and expert. Data quality control was done by ensuring that data are defined and line-up in proper columns, checking that there are no missing values for key parameters, reviewing statistical summaries and other necessary information. Data completeness and consistency was checked during interview time by supervisors and missed variables were turned back to the data collectors for correction by revisit.

Questionnaire was pre-tested in one of the health centers other than the selected health centers on 5% of participants. Reliability and Validity of the survey instruments evaluated and checked prior to their final distribution.

#### **4.9 Data analysis**

Data was collected through the mobile ODK application and transferred to Excel to check for its completeness and consistency before entering the SPSS (Statistical Package for the Social Sciences). After cleaning in Excel, data were exported to SPSS version 20 for further analysis. Descriptive statistics were performed for the primary exposure, outcomes, and covariates. Dental caries prevalence was computed according to deft index scores and done for each child. The findings were presented by frequencies and percentages, and summary measures were displayed using tables and graphs.

Multinomial logistic regression analysis was conducted to see the association between the dependent (dental caries), exposure (Breastfeeding duration), and covariates. Multicollinearity was checked using VIP (variance inflation factor) and tolerance.

All relevant variables and those having at least a marginal association of ( $p \leq 0.25$ ) in the bivariate multinomial logistic regression analysis were included in the multinomial logistic regression analysis to determine potential predictors of dental caries and confounders. The  $p$ -value  $\leq 0.05$  was considered statistically significant and COR, AOR with 95% CI was calculated and presented throughout the result and discussion part. Pearson and deviance statistics were also done to see whether the model was fit.

#### **4.10 Ethical consideration**

To begin with ethical clearance was obtained from School of Public Health, Collage of Health Science Addis Ababa University Institutional Review Board. Official letters were submitted for each eleven sub-cities and health centers to obtain permission and conduct the study. Additionally, each respondent gave written informed consent during the data collection process after being given a brief explanation of the study's objectives. To preserve anonymity, names and other identifiers were not included in the questionnaire. Every effort was made to uphold human rights, including the rights to informed consent, study participation, privacy and confidentiality, and protection from harm of any kind.

During data collection time, study participants were in a comfortable zone and confidentiality was maintained by using coding instead of writing a name. It had also been clearly stated to the participants that the information they were providing, whether orally or in writing was for research purpose. All in all, informed consent was obtained from mothers for their children and have right to refuse participation at any time. A COVID-19 precaution was done by wearing masks and gloves.

#### **4.11 Dissemination Plan**

The result of the study will be disseminated to Addis Ababa University, School of Public Health, Nutrition and dietetics Department, Ministry of Health, Addis Ababa City Health bureau, Ethiopia dental association and health facilities. In addition, great efforts will be made to disseminate the results through presentation in different seminars, workshop, and scientific conference. An effort was made to report the results of this research in scientific and peer reviewed journal.

## **5. Result**

### **5.1 Socio-demographic Characteristics of study participants**

A total of 380 mother-child couple aged 12 to 36 months presenting to the health center were identified and enrolled in the study, result a 100% response rate. Table: 2 show the socio-demographic characteristics of the participants. Among the children who participated in the study, (n = 184; 48.4%) were male, while (n = 196; 51.6%) were female. The mean ( $\pm$ SD) age of young children was 25( $\pm$  7.64) months, and n=214; 56.3 % of them were between the ages of 24 to 36 months. A large proportion (n=270; 71.1%) of mothers were currently married.

Sixty (15.8 %) of mothers had no formal education while (n=130; 34.2%) had completed higher level of education. On the other hand, (n=18; 4.7%) of fathers had no formal education while (n=229; 60.3%) of them completed technical school and above. In this study, 181(47.6%) of mothers' occupational status and 235(61.5%) husbands' occupational status were formal employment. One hundred and fifteen households (30.3%), reported monthly incomes ranging from 2000 to 4999 ETB.

Table 2: Socio-demographic characteristics among young children age 12 to 36 months and their mothers in selected health facilities in Addis Ababa, Ethiopia. 2023 (n=380)

Characteristics	Frequency (%)
Age categories of children	
12 month to 23month	166 (43.7%)
24 month to 36 month	214(56.3%)
Sex of children	
Male	184(48.4%)
Female	196(51.6%)
Marital Status	
Currently Married	270(71.1%)
Not married/single	71(18.7%)
Divorced/separated	13(3.4%)
Widowed	26 (6.8%)
Father education	
No formal education	18(4.7%)
Primary school	32(8.4%)
Secondary school	101(26.6%)
Technical school and above	229(60.3%)
Maternal education	
No formal education	60(15.8%)
Primary school	94(24.7%)
Secondary school	96(25.3%)
Technical school and above	130(34.2%)
Maternal Occupational status	
Unemployed	106(27.9%)
Formal employment	181(47.6%)
Non-formal employment	93(24.5%)
Husband occupational status	
Unemployed	51(13.4%)
Formal employment	235(61.5%)
Non –formal employment	94(24.7%)
Household Income level	
2000 birr to 4999 birr	115(30.3%)
5000 birr to 6999 birr	102(26.8%)
7000 birr to 9999 birr	70(18.4%)
10000 birr and above	93(24.5%)

## 5.2 Feeding practices and Duration of breastfeeding

### 5.1.1 Feeding practices

As shown in Table 3 below, mothers were asked about their children's feeding practices. From the 380 children who participated in the study, (n = 302; 79.5%) use breast milk, while (n = 47; 12.4%) use both breast milk and bottle milk or a combination of the two as a method of feeding.

Two hundred thirty four young children (n=234; 67 %) were exclusively breastfed from birth to six months. Children slept with breast feeding at night among those participated in the study were 164 (47%) while 185 (53%) were not sleep with breast at night. Mothers who had breast feed their children more than three times at night were 247(70.8%). On the other hand, on demand pattern of breastfeeding were 200(57%). Young children in this study start solid foods mostly passing age of six months 150(39.5%). And also, 35(44.9%) children were slept with feeding bottle at night. Children who was participated in this study uses pacifier 164(43.2%) and more than half of them 216(56.8%) do not use pacifier.

Table: 3. Magnitude of feeding practices among children aged 12 to 36 months in selected health facilities in Addis Ababa, Ethiopia. 2023. (n=380)

Characteristics	Frequency	Percent (%)
Manner of feeding		
Breastfeeding	302	79.5
Bottle feeding	31	8.2
Both	47	12.4
	380	100
Exclusive Breastfeeding		
Less than 6 months	115	33
For 6 months	234	67
	349	100
Slept with breastfeeding at night		
Yes	164	47
No	185	53
	349	100
Nocturnal breastfeeding		
Less than three times	81	23.2
More than three times	247	70.8
Don't wake up at night	21	6
	349	100
Breast feeding Patterns		
On demand	200	57.3
Schedule	32	9.2
Both	117	117

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	349	100
Age solid food start		
<6 months	88	23.2
At 6 months	142	37.4
>6 months	150	39.5
	380	100
Content of bottle feeding		
Formula milk	16	20.5
Milk with sugar	27	34.5
Milk without sugar	25	32.1
Drinks other than milk	10	12.8
	78	100
Slept with bottle		
Yes	35	44.9
No	43	55.1
	78	100
Use of pacifiers		
Yes	164	43.2
No	216	56.8
	380	100

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### 5.1.2 Duration of breastfeeding

When mothers were questioned about how long they continued to breastfeed their kids, 115(30.3%) children reported breastfeed for less than six months, 43(11.3%) feed for 6 to 12 months, 119(31.3%) reported that they fed for 12 to 24 months, while 72(18.9%) breastfeed for 24 months and above as recommended and the remaining 31(8.2%) not breastfeed at all.

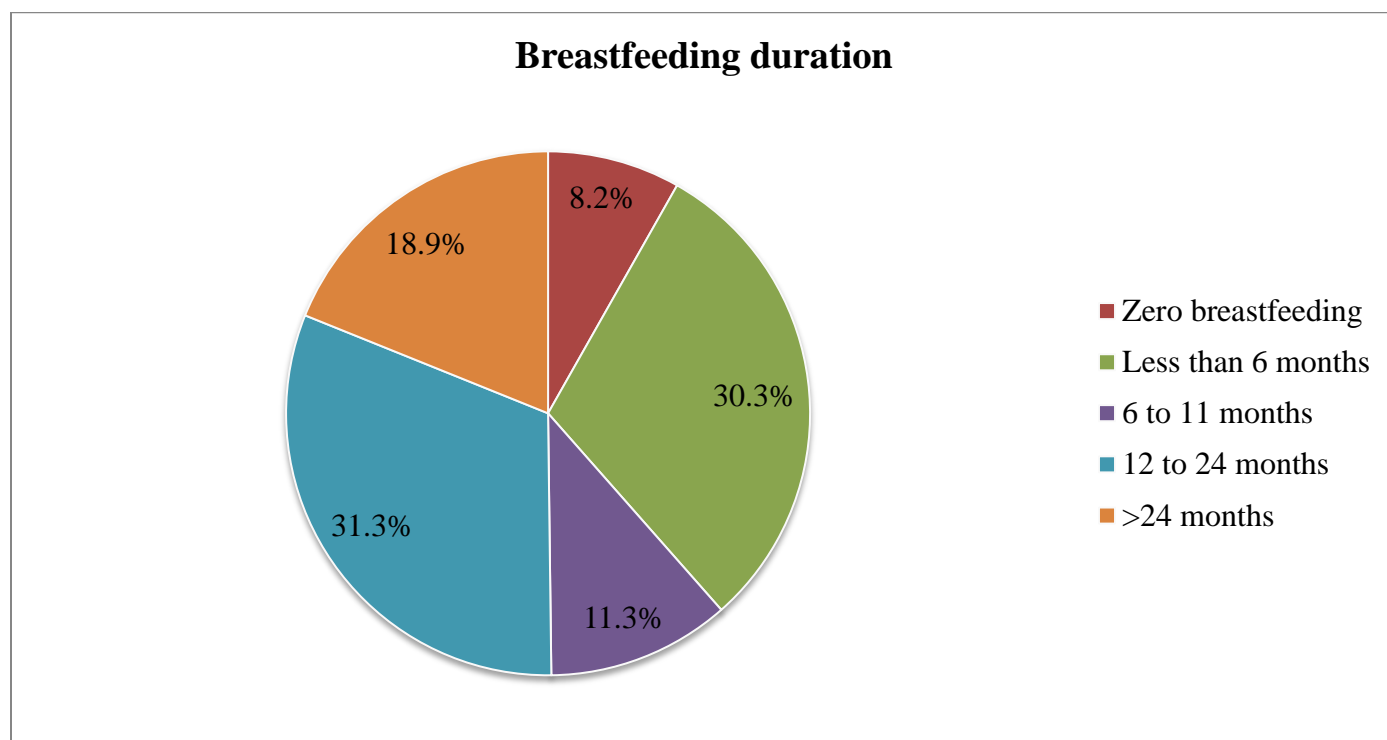


Fig: 3 Breastfeeding duration among young children aged 12 to 36 months in selected health centers in Addis Ababa, Ethiopia, 2023 (n=380).

### 5.2 Oral cleaning practices of children and mother's

Mothers asked about their children oral hygiene practices and One hundred (26.3%) of young children were started cleaning their tooth by mother's while two hundred eighty (73.7%) were not start cleaning. Seventy seven (77%) start cleaning after 12 months. Of one hundred (n = 100) children who clean their tooth, more than half 55(55%) of them use fluoride tooth paste, and nearly half 45(45%) use clean cloth as a method of tooth cleaning. Mothers were also asked for their oral hygiene practices, and 267(70.3%) of them having been treated for oral problems in the past. Among the mothers attending in the study, 264(69.5%) brushed or cleaned their teeth once a day.

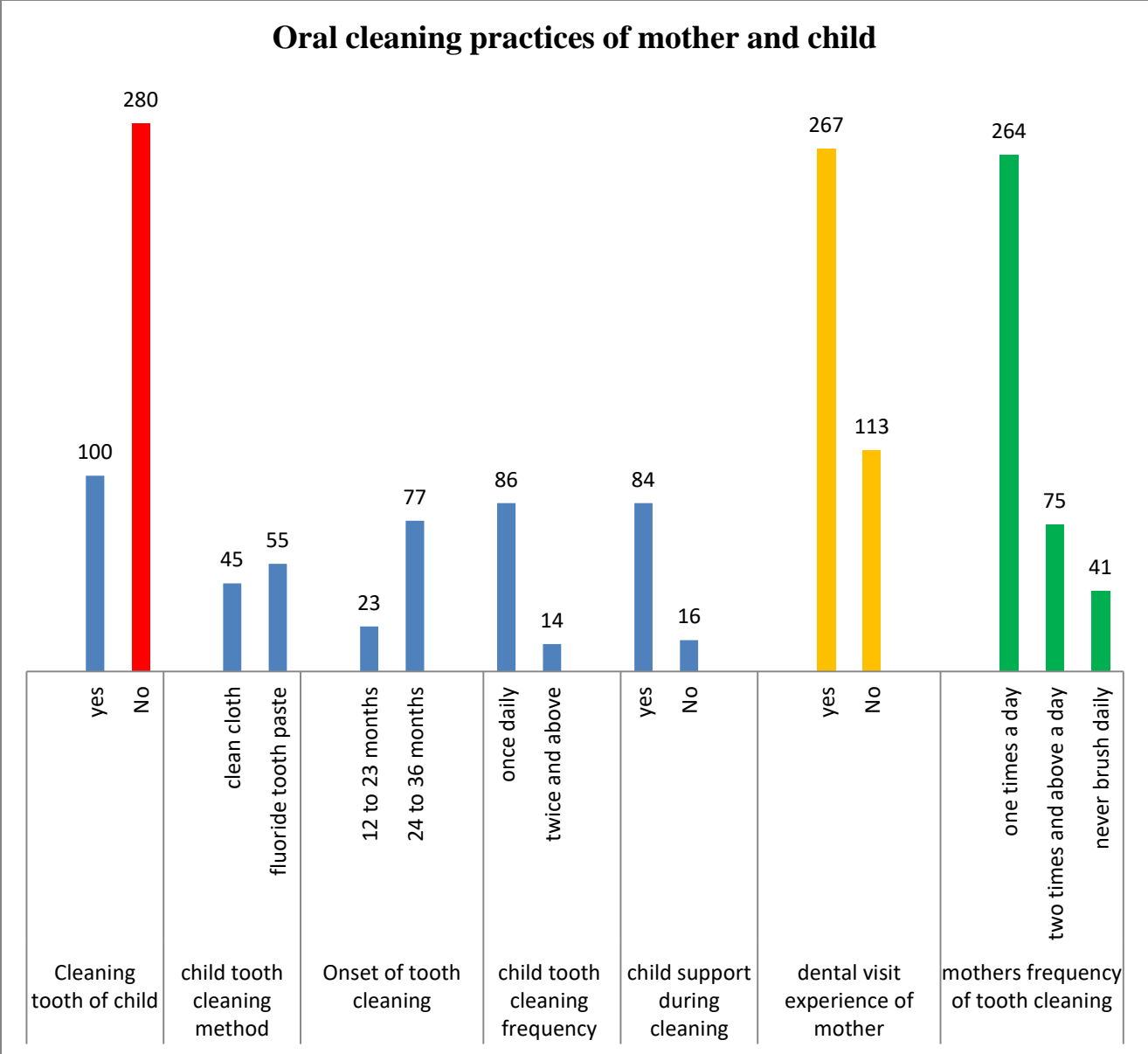


Fig.4 Oral hygiene practices among young children aged 12 to 36 months and their mothers in selected health facilities in Addis Ababa, Ethiopia, 2023 (n=380).

### 5.3 Magnitude of Intake/frequency of cariogenic snacks/drinks (added sugar between meals)

Mothers were asked about practices of cariogenic snacks /drinks of their children. Children consume sweet snacks about three and above times per day were 166(43.7%). Sweet juice 81(25.2%) and biscuit 77(23.9%) were most consumed snacks respectively. One hundred eighty two (47.9%) don't take sugar daily but 105(27.6%) of the study participants consume sugar daily.

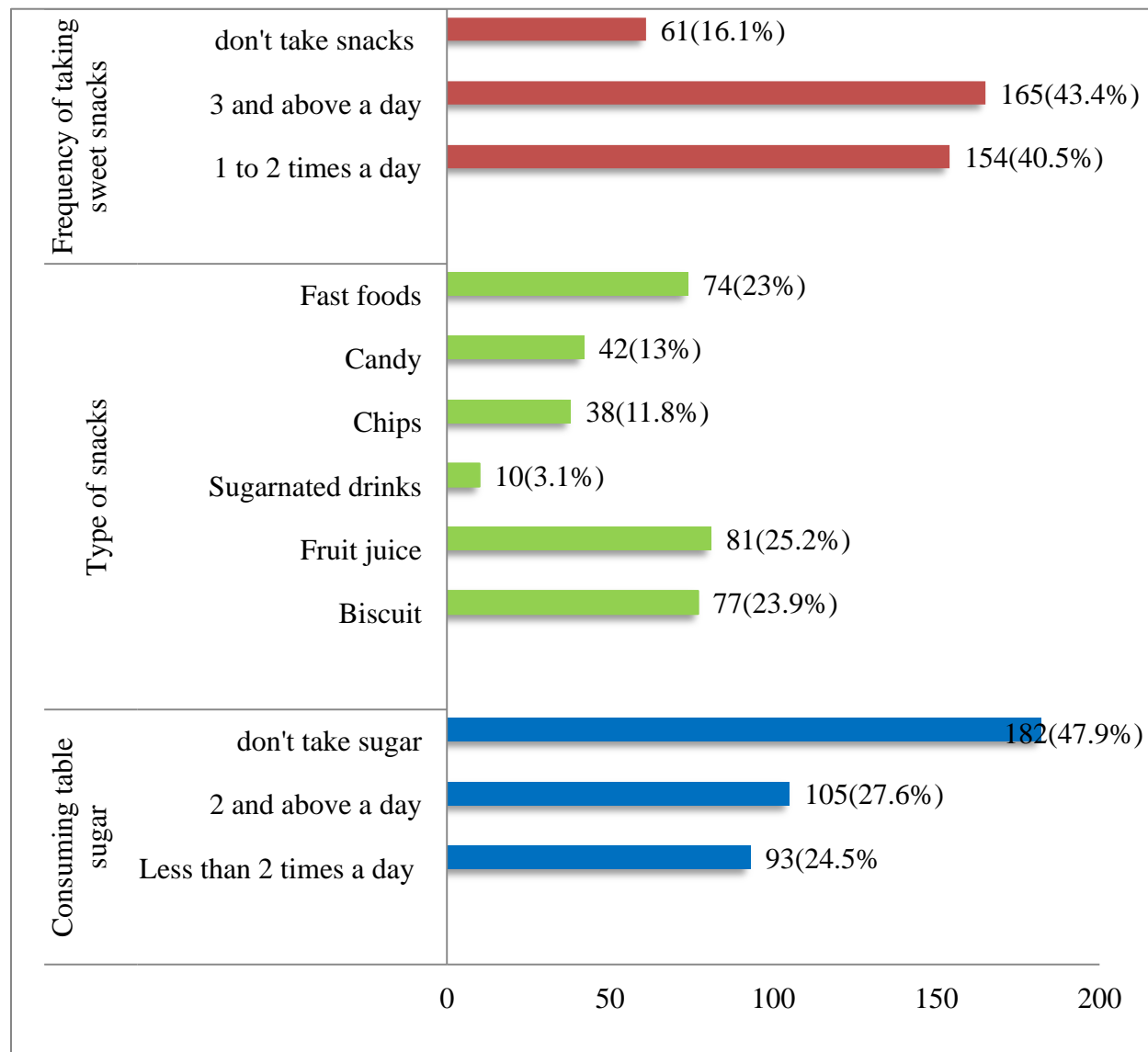


Fig: 5 Frequency intake of cariogenic snacks/drinks among young children 12 to 36 months in selected health facilities in Addis Ababa, Ethiopia, 2023 (n=380).

## 5.4 Prevalence of Dental Caries

### 5.4.1 The components of the dmft index

The decayed components were the greatest constituent of the dmft caries index compared to the missing and filled teeth (table 4). None of the children had their teeth filled at the time of the study.

Table: 4 Magnitude of dmft index among 12 to 36 children in selected health facilities in Addis Ababa, Ethiopia, 2023 (n=380)

dmft index component	Frequency (%)
decayed teeth only	176(46.3%)
missing and decayed teeth	27(7.1%)
filled teeth	0(0%)
Caries free (non-decayed , missing and decayed teeth )	177(46.6%)

### 5.4.2 Dental caries experience by age and Sex

The oral examination was given to all 380 eligible children, and they were all included in the study. The overall dental caries prevalence was 53.4% with a mean (SD) dmft score of 2.33( $\pm$ 0.704). The magnitude of high caries 52(13.7%), low caries 151(39.7%) and caries free 177(46.6%). The results showed that children with high caries were more likely to be in the 24 months to 36 months age group (73.1%) than in the 12 months to 23 months age group (26.9%). On the other hand, children who were caries free were more likely to be in the 12 months to 23 months age group (58.4%) than in the 24 months to 36 months age group (45.2%). Dental caries in children varied significantly by their age and the older children were more likely to have high caries and less likely to be caries free than the younger children. The association between dental caries and age was statistically significant ( $P < 0.001$ ).

In this study, of those, 25 males and 27 females (48.1% and 51.9%, respectively) had high caries, while 74(49.0%) males and 77(51.0%) females had low caries. In comparison with males and females, females had higher caries than males but sex of the child was not statistically significant ( $P = 0.7983$ ).

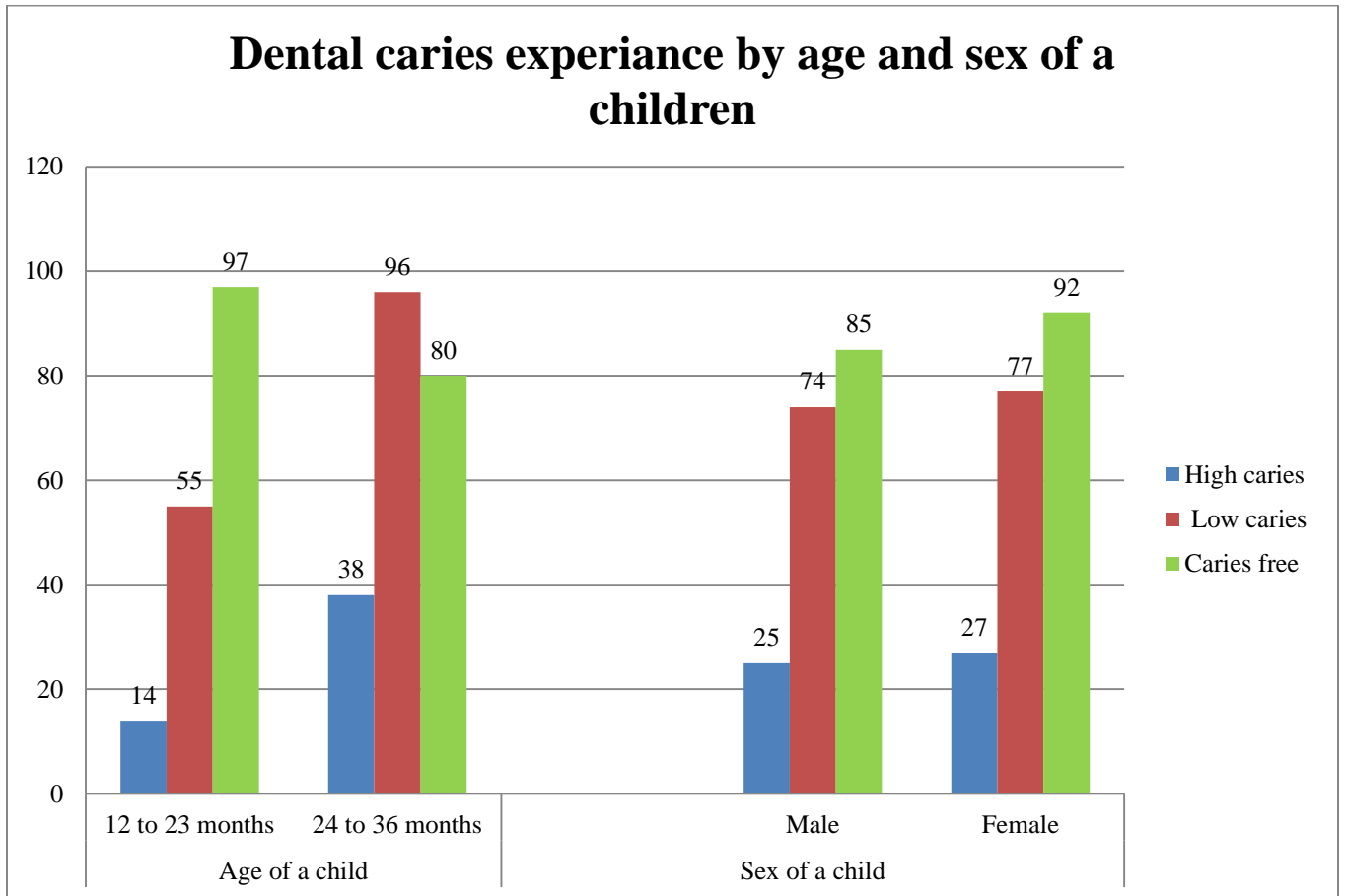


Fig. 6 Dental caries experience by age and sex among children 12 to 36 months of age in selected health facilities in Addis Ababa, Ethiopia, 2023 (n=380).

### 5.4.3 dmft score and caries

Table 5: The dmft score among 12 to 36-month-old children in Addis Ababa, Ethiopia, 2023 (n=380)

Dmft score	Frequency (%)
dmft score=0	177(46.6%)
dmft score =1 to 3	151(39.7%)
dmft≥3	52(13.7%)

### 5.4.4 Dental caries and Duration of breastfeeding

Children who breastfed for 12 – 24 months had 30.8% high caries, 37.1% low caries and 26.6% of children had no caries.

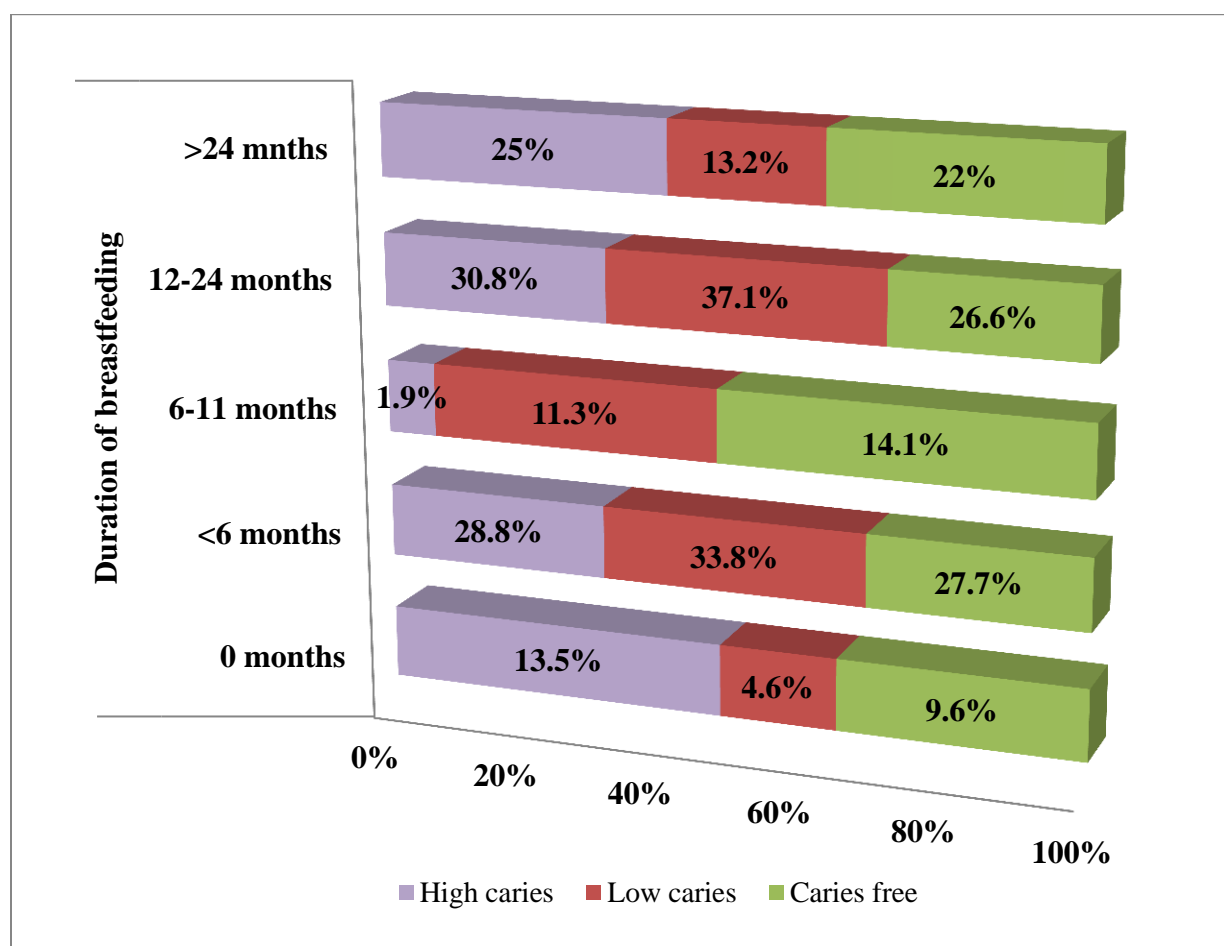


Fig.7 Magnitude of breastfeeding duration and dental caries among children aged 12 to 36 months in selected health facilities in Addis Ababa, Ethiopia, 2023 (n=380)

## 5.5 Predictive factors for dental caries

Multinomial logistic regression analysis was done to show the association of dental caries (Early Childhood Caries) with the duration of breastfeeding and other predicting factors. To select possible predicting factors to include in multinomial logistic regression, bivariate multinomial logistic regression was done. Variables that showed marginal association at  $p \leq 0.25$  in bivariate multinomial logistic regression analysis were added to the multinomial logistic regression model. Before adding to the regression analysis, the assumptions of multinomial logistic regression were followed when running the analysis. Most assumptions for multinomial logistic regression to be met were: dependent variable must be categorical with more than two levels, and the categories are mutually exclusive and exhaustive, the independent variables can be continuous, categorical or a mix of both, the observations are independent of each other, meaning that there is no correlation within groups or clusters of data, there is no multicollinearity among the independent variables, meaning that they are not highly correlated with each other, There is a linear relationship between the logit-transformed probabilities of the dependent variable and the independent variables.

To check multi-collinearity we use VIF (variance inflation factor) value. Those variables correlated with other variables are excluded from the model, and the VIF (variance inflation factor) value was less than 3, which indicates that multi-collinearity was not a problem in this regression model. Of those variables that fulfilled the inclusion criteria for the multinomial logistic regression analysis; age of children, mother educational status, household income level, duration of breastfeeding, bottle feeding, and tooth brush frequency (mother) and sugar intake frequency were statistically significant after adjusting confounding variables.

In this study, model fitting information is less than p-value 0.05 means this model is fitted  $p < 0.001$ . Both the Pearson chi-square and the deviance chi-square are non-significant ( $p = 0.282$  and  $p = 0.927$ , respectively), which suggests that the model fits well and there is no discrepancy between the observed and expected frequencies. The pseudo R-squared values for the multinomial logistic regression model were 0.303 for Cox and Snell, 0.351 for Nagelkerke, and 0.182 for McFadden.

Interpretations for high caries vs. no caries model are here below: Children who were breastfed for 6 to 11 months had a significantly lower odd of having high caries than those who were breastfed for more than 24 months (AOR = 0.08, 95% CI = 0.01, 0.71). Children who consumed table sugar two or more times a day had a significantly higher odds of having high caries than those who did not consume sugar (AOR = 3.24, 95% CI = 1.29, 8.19). Mothers who brushed their teeth two or more times a day had a significantly lower odds of having children with high caries than those who did not brush their teeth (AOR = 0.15, 95% CI = 0.03, 0.93). Children aged 12 to 23 months had a significantly lower odds of having high caries than those aged 24 to 36 months (AOR = 0.21, 95% CI = 0.10, 0.49). Mothers who had primary school education had a significantly higher odds of having children with high caries than those who had technical school education or above (AOR = 4.41, 95% CI = 1.37, 14.18). Children from households with an income of 5,000 to 6,999 birr per month had a significantly higher odds of having high caries than those from households with an income of 10,000 birr or above (AOR = 5.14, 95% CI = 1.45, 18.20).

Interpretation for low caries vs. no caries model: Children who were breastfed for 12 to 24 months had significantly higher adjusted odds (OR = 2.14, 95% CI = 1.02 to 4.50) of having low caries than children who were breastfed for more than 24 months. Children who were bottle fed had significantly lower adjusted odds (OR = 0.42, 95% CI = 0.18 to 0.97) of having low caries than children who were not bottle fed. Children who had table sugar intake frequency of two and above times a day had significantly higher adjusted odds (OR = 2.00, 95% CI = 1.03 to 3.88) of having low caries than children who did not brush their teeth. Children who were aged 12 to 23 months had significantly lower adjusted odds (OR = 0.21, 95% CI = 0.10 to 0.49) of having low caries than children who were aged 24 to 36 months. Children who had household income status of 5000 to 6999 birr had significantly higher adjusted odds (OR = 2.89, 95% CI = 1.30 to 6.42) of having low caries than children who had household income status of 10,000 and above birr.

The summary of the main findings are:

For the high caries versus no caries model, the variables that were significantly associated with high caries were: breastfeeding for 6 to 11 months (lower odds), table sugar intake frequency of two or more times a day (higher odds), tooth brushing frequency of two or more times a day (mother) (lower odds), age of 12 to 23 months (lower odds), education level of primary school

(mother) (higher odds), and household income status of 5,000 to 6,999 birr per month (higher odds).

For the low caries versus no caries model, the variables that were significantly associated with low caries were: breastfeeding for 12 to 24 months (higher odds), bottle feeding (lower odds), table sugar intake frequency of two or more times a day (higher odds), age of 12 to 23 months (lower odds), and household income status of 5,000 to 6,999 birr per month (higher odds).

Table: 6 Multinomial logistic regressions of predictive factors of dental caries among children aged 12 to 36 years in selected health facilities in Addis Ababa, Ethiopia, 2023.

Variable categories	COR	95% CI	AOR	95% CI
High caries Vs. Caries free				
Duration of breastfeeding				
0 months	1.24	( 0.42, 0.64)	1.19	(0.21, 6.82)
<6 months	0.92	(0.39, 2.16)	0.63	(0.23, 1.76)
6 to11 months	0.12	(0.02, 0.98)	0.08*	(0.01,0.71)
12 to 24 months	1.02	(0.44, 2.38)	0.72	(0.26, 1.97)
>24 months	Ref.		Ref.	
Bottle feeding				
Yes	1.19	(0.60, 2.37)	1.03	(0.33, 3.17)
No	Ref.		Ref.	
Table sugar intake frequency				
Less than two times a day	2.37	(0.84, 6.70)	0.54	(0.16, 1.82)
Two and above times a day	2.82	(0.99, 8.04)	3.24*	(1.29, 8.19)
Don't take sugar	Ref.		Ref.	
Tooth brush per day (mother)				
One times a day	2.24	(0.81, 6.22)	1.19	(0.32, 4.36)
Two times and above a day	0.32	(0.07, 1.44)	0.15*	(0.03, 0.93)
Don't brush	Ref.		Ref.	
Age in months				
12 to 23 months	0.30	(0.15,0.60)	0.21*	(0.10, 0.49)
24 to 36 months	Ref.		Ref.	
Mother education				
No formal education	0.80	(0.26, 2.44)	0.58	(0.41, 2.39)
Primary school	2.88	(1.28, 6.51)	4.41*	(1.37, 14.18)
Secondary school	2.00	(0.86, 4.60)		(0.51, 4.55)

Technical school and above	Ref.		1.53	Ref.
Household income per month				
2,000 – 4,999	4.38	(1.65, 11.64)		(0.89, 12.30)
5,000 – 6,999	5.68	(2.01, 15.96)	3.31	5.14* (1.45, 18.20)
7,000 – 9,999	1.27	(0.38, 4.22)	0.80	(0.20, 3.23)
10,000 and above	Ref.		Ref.	
Variables	COR	95%CI	AOR	95%CI
Low caries Vs. Caries free				
Duration of breastfeeding				
0 months	1.24	( 0.42, 0.64)	1.53	(0.37, 6.34)
< 6 months	0.92	(0.39, 2.16)	2.03	(0.97, 4.26)
6 – 11 months	0.12	(0.02, 0.98)	1.14	(0.46, 2.84)
12 – 24 months	1.02	(0.44, 2.38)	2.14*	(1.02, 4.50)
> 24 months	Ref.		Ref.	
Bottle feeding				
Yes	1.19	(0.60, 2.37)	0.42*	(0.18, 0.97)
No	Ref.		Ref.	
Table sugar intake frequency				
Less than two times a day	2.37	(0.84, 6.70)	1.02	(0.53, 1.95)
Two and above times a day	2.82	(0.99, 8.04)	2.00*	(1.03, 3.88)
Don't brush	Ref.		Ref.	
Tooth brush per day (mother)				
One times a day	2.24	(0.81, 6.22)	2.12	(0.89, 5.05)
Two times and above a day	0.32	(0.07, 1.44)	0.85	(0.31, 2.32)
Don't take sugar	Ref.		Ref.	
Age in months				
12 -23 months	0.30	(0.15,0.60)	0.21*	(0.10, 0.49)
24 – 36 months	Ref		Ref	
House hold income status				
2000 – 4999	4.38	(1.65, 11.64)	1.29	(0.57, 2.93)
5000 – 6999	5.68	(2.01, 15,96)	2.89*	(1.30, 6.42)
7000 – 9999	1.27	(0.38, 4.22)	0.53	(0.23,1.22)
10,000 and above	Ref.		Ref.	

\*=P≤0.05 significant and predictor for dental caries, COR: Crude odds ratio, AOR: Adjusted odds ratio

## 6. Discussion

Dental caries in children are prevalent and has been widely reported in the literature, but it is still untreated and one of the most common childhood diseases among children (90). However, figures to quantify the prevalence of such disease in Ethiopia are not available among the age group 12 to 36 months. Dental caries can start early and its consequences can affect the immediate and long-term quality of life, growth and development by interfering with comfort, nutrition, concentration, and school participation. Dental caries can be a predominantly contagious type of caries, soon after tooth eruption. We conducted a facility-based study in Addis Ababa, Ethiopia to assess the magnitude of dental caries and its association with duration of breastfeeding among young children aged (12-36) months.

The magnitude of dental caries in primary teeth in children worldwide was 46.2% (95% CI: 41.6-50.8%)(91), which is lower than our finding 53.4 % ( 95% CI: 48.3%-58.5%) with mean deft score of 2.33( $\pm$ 0.70). However, this may vary depending on the region, socio economic status, and study time. Similar review found that, the prevalence of dental caries in primary teeth in Africa was 51.9% (95% CI: 44.3-59.5%), which is closer to our study prevalence.

Our findings was significantly higher than studies conducted in Tunisia where the prevalence of dental caries among children 36 months old (53.9%) (95% CI: 38.5%-69.3%)(92), Nigeria 6 to 71 months old (21.2%) (95% CI: 16.9-25.5%)(80), India 12 to 36 months old (21%) (95% CI: 17.9-24.1)(93), Thailand 9 to 18 months old (42.5%) (95% CI: 37.9%-47.1%)(94), Uganda 6 to 36 months old (17.6%) (95% CI: 14.9%-20.3% (95) and Tanzania 6 to 36 months old (3.7%) (95% CI:2.6%-4.8%) (95). But significantly lower than studies done in Pakistan 8 to 48 months old (68.8%)(95% CI: 65.4%-71.8%)(96) and Iran 6 to 60 months old (59%) (95% CI:52.7%-65.3%)(86).The possible explanations for the variation of dental caries prevalence might be socio-economic status, dietary habits, oral hygiene practices, sample size and dental care utilization.

Breastfeeding provides several benefits for children and infants; perfect nutrition decreases the risk of infections (gastrointestinal, respiratory, and ear), infant death syndrome (SIDS), and diarrhea (27,48,68,70). The aim of this study was to examine the association between the duration of breastfeeding and dental caries in children. Children who were breastfed for 6 to 11 months had significantly lower adjusted odds (OR = 0.08, 95% CI = 0.01 to 0.71) of having high caries than children who were breastfed for more than 24 months. This was also statistically significant. On the other hand, children who were breastfed for 0 months had an AOR of 1.19, which means that they had 19% higher odds of having high caries compared to the reference group, but this was not statistically significant. This study result were consistent with some studies that breastfeeding for 6-11 months was significantly associated with lower caries OR: 0.50 (95% CI:0.36, 0.83) in other words breastfeeding for 6-11 months protects against dental caries in primary teeth (48) and breastfeeding for < 12 months decrease dental caries (38)(28). The possible similarity may be due to the same breastfeeding cut offs and way of controlling confounding factors.

The results indicated that children who were breastfed for 12 to 24 months had significantly higher adjusted odds of having low caries than children who were breastfed for more than 24 months. This finding is inconsistent with the previous studies (14) and (97), who reported that breastfeeding for less than 12 months was associated with lower caries risk in children. A possible explanation for this finding is that breastfeeding for longer durations may have a protective effect on caries by enhancing the salivary flow and buffering capacity, as well as providing antibodies and lactoferrin that inhibit the growth of cariogenic bacteria. However, it is consistent with the study who found that breastfeeding for more than 12 months was a risk factor for dental caries in children aged 0 to 71 months (28)(29). This difference could be due to different culture and social behaviors, time complementary foods start, study time interval, and shifting life styles. A possible reason for this difference is that the duration of breastfeeding may interact with other factors such as frequency of breastfeeding, nocturnal breastfeeding, oral hygiene practices different culture, social behaviors, and dietary habits that influence the caries risk.

The results further indicated that children who had table sugar intake frequency of two or more times a day had significantly higher adjusted odds of having low caries than children who did not take sugar. This finding is consistent with the previous studies ((29),(14)(97)), who reported that frequent consumption of sugary foods and drinks was a risk factor for caries in children. A possible explanation for this finding is that table sugar intake may increase the caries risk by providing a substrate for acid production by cariogenic bacteria, as well as lowering the pH and disrupting the remineralization process in the oral cavity.

Other than breastfeeding duration, our study found that factors contribute to develop dental caries among children aged 12 to 36 were consumption of sugar, bottle feeding mother educational status, age of the child, and household income level .These results suggest that dental caries among children aged 12 to 36 months is influenced by various factors related to breastfeeding practices, dietary habits, age, maternal education level, and socioeconomic status. These are studies which report factors similar with our study((70) (88)(98)).

One of the strengths of this study is that it used a large and representative sample of children aged 12 to 36 months in Ethiopia, which enhances the generalizability and applicability of the results. Strength is that it used a validated questionnaire and a standardized clinical examination to collect data on the predictor and outcome variables, which increases the accuracy and reliability of the results. A third strength is that it used a multivariable logistic regression analysis to adjust for potential confounding variables and estimate the adjusted odds ratios and confidence intervals for each predictor variable, which improves the validity and precision of the results.

Limitation of this study is that it used a cross-sectional design that cannot establish causal relationships between the predictor and outcome variables. Another limitation is that it relied on self-reported data that may be subject to recall bias and social desirability bias. A third limitation is that it did not measure or control for some potential confounders or effect modifiers such as fluoride exposure, dental plaque, enamel defects, and genetic factors that may affect the caries risk.

This study contributes to the existing knowledge on the risk factors for caries in children by providing evidence that the duration of breastfeeding, bottle feeding, table sugar intake frequency, age, and household income status are associated with caries status in children aged 12 to 36 months in Addis Ababa, Ethiopia. This study also has practical implications for caries prevention and management by suggesting that health care providers should assess the caries risk of children based on these factors and provide appropriate interventions such as oral health education and care, and dietary counseling. Based on these findings, some policy recommendations are to promote exclusive breastfeeding for the first six months of life, and continue as recommended with oral health care, bottle feeding, limit the frequency and amount of table sugar intake, encourage regular tooth brushing with fluoride toothpaste, and improve the socioeconomic status of families with children. Future research could further explore the causal mechanisms and interactions between these factors and caries risk by using longitudinal or experimental designs, objective measurements, and multilevel analyses.

## **7. Conclusion and Recommendation**

### **7.1 Conclusion**

The aim of this study was to determine the magnitude of dental caries and its association with duration of breastfeeding and dental caries among children aged 12 to 36 months in Addis Ababa, Ethiopia. The main findings of this study were the prevalence of dental caries among this age group was 53.4% and the duration of breastfeeding; bottle feeding, table sugar intake frequency, age, and household income status were significant predictors of caries status in this population, after adjusting for other variables. These findings suggest that caries prevention and management strategies for children in Ethiopia should consider these factors and provide individualized and comprehensive care based on the Caries Care International system. This study also identified some limitations and directions for future research, such as using a longitudinal or experimental design, measuring or controlling for potential confounders or effect modifiers, and exploring the causal mechanisms and interactions between these factors and caries risk. This study contributes to the existing knowledge on the risk factors for caries in children and has practical implications for improving the oral health and quality of life of children in Addis Ababa, Ethiopia.

## **7.2 Recommendations**

Based on the findings and limitations of this study, some recommendations are here;

Health care providers should assess the caries risk of children based on these factors and provide appropriate interventions such as oral health education, dietary counseling, and fluoride application. Health care providers should also promote exclusive breastfeeding for the first six months of life, continue breastfeeding as recommended, avoid bottle feeding, limit the frequency and amount of table sugar intake, encourage regular tooth brushing with fluoride toothpaste, and improve the socioeconomic status of families with children.

Policy makers should also advocate for the integration of oral health into primary health care and maternal and child health programs by developing guidelines, protocols, standards, and indicators.

Therefore, future research should use a longitudinal design, a larger sample size, and more comprehensive measures of confounding factors to confirm the causal relationship between breastfeeding duration and dental caries in children.

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## **ANNEX-I: Informed Consent and/or Ascent Form (English version)**

**Addis Ababa University, School of public health**

### **Information Sheet**

Good morning? / Good afternoon? My name is-----I am member of the research team from Addis Ababa University. I am going to ask you few questions about your child feeding practices and oral health conditions including yours. The information we get from you help as to recommend to the concerned body about the improvement of feeding practices to prevent childhood caries from causing developmental and others risks on children. You were selected to participate in this study just by chance. The following are some general information about the study.

**Title of the Study:** Breastfeeding Duration and Dental Caries among young children in Addis Ababa city, Ethiopia.

**Background of the study:** Dental caries which is also described as early childhood caries (ECC) among young children is a global public health concern worldwide. Childhood caries continues to be a major problem in developing countries, and it has a negative impact on a child's development. Breastfeeding duration is one of the controversial risk factor for development of early childhood caries.

**Objective of the study:** to assess the magnitude of dental caries and association of duration of breastfeeding and dental caries among young children aged (1 - 3 years) in Addis Ababa, Ethiopia, September, 2021 to November, 2021.

**Benefit of the study:** There is no direct short term benefit for participants. However, it may use the policy makers to evaluate the service and help them to improve it.

**Risk of the study:** This study has no risk for participants. Right of the participants: your participation is voluntary base and you are not obligated to answer any question you do not wish to answer. This interview takes about 15-20 minutes. If you feel discomfort with the interview, please feel free to drop it any time you want.

**Confidentiality:** The participants name not written in the form and never used in connection With any information you tell us. All information given by you kept strictly confidential.

**Informed Consent Form**

Based on the understanding of the above information, are you willing to participate in this study?

- 1. I agree to participate
- 2. I do not agree to participate

If yes, I will continue and If no I will skip to next participant after writing the reasons of refusal

\_\_\_\_\_

**Data collector:**

Name \_\_\_\_\_

Signature \_\_\_\_\_

Questionnaires ID number \_\_\_\_\_

Date of data collected \_\_\_\_\_

**Date of interview-----Time started-----Time completed-----**

**Result of data collected**

- 1. Completed
- 2. Not completed
- 3. Partially completed
- 4. Refused

**Checked by Supervisor**

**Name -----signature-----date-----**

**Name of PI:** Marta Yemane

Address: Tell: +251940729327/+251946712490

Email: [martino.jo2008@gmail.com](mailto:martino.jo2008@gmail.com) /[marta.yemane@aau.edu.et](mailto:marta.yemane@aau.edu.et)

Signature-----

## ANNEX II: English Version Questionnaires

Date of data collection: // /DD/MM/YY

Name of the facility: \_\_\_\_\_

Name of the data collector: \_\_\_\_\_ Signature \_\_\_\_\_

Name of the supervisor: \_\_\_\_\_ Signature \_\_\_\_\_

Code: \_\_\_\_\_ Address: \_\_\_\_\_

PART One : Socio demographic characteristics			
A. Child			
No	Questions	Options of Answers	Skip
101	Age of the child	_____ months	
102	Sex	Male <input type="checkbox"/> Female <input type="checkbox"/>	
B. Mother / care giver			
103	What is your current marital status?	<ol style="list-style-type: none"> <li>1. Currently married</li> <li>2. Single/never married</li> <li>3. Divorced /Separated</li> <li>4. Widowed</li> </ol>	
104	What is your educational status? (Mother)?	<ol style="list-style-type: none"> <li>1. No formal education</li> <li>2. Primary school</li> <li>3. Secondary</li> <li>4. Technical school and above</li> </ol>	
105	What is your educational status? (Husband)?	<ol style="list-style-type: none"> <li>1. No formal education</li> <li>2. Primary school</li> <li>3. Secondary</li> <li>4. Technical school and above</li> </ol>	
106	What is your occupation?(Mother)	<ol style="list-style-type: none"> <li>1. Unemployed</li> <li>2. Formal employed</li> <li>3. Non-formal employed</li> </ol>	
107	What is your husband's occupation?	<ol style="list-style-type: none"> <li>1. Unemployed</li> <li>2. Formal employed</li> <li>3. Non-formal employed</li> </ol>	
108	What is the monthly household income?	<ol style="list-style-type: none"> <li>1. 2000 birr to 4999 birr</li> <li>2. 5000 birr to 6999 birr</li> <li>3. 7000 birr to 9999 birr</li> </ol>	

		4. 10000 birr and above	
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**Part Two: Questionnaires on Duration of breast feeding and other control factors**

<b>Feeding practices</b>			
No	Questions	Options of Answers	Skip
109	What kind of nourishment dose a baby receives from the moment he or she is born?	<ol style="list-style-type: none"> <li>1. Breastfeeding with complimentary foods</li> <li>2. bottle feeding with complimentary foods</li> <li>3. both (breastfeeding plus bottle feeding) with complementary</li> </ol>	
110	How long do you just offer your baby breast milk and no water or other liquids? (Exclusive breast feeding)?	<ol style="list-style-type: none"> <li>1. &lt; 6 months</li> <li>2. For 6 months</li> <li>3. Never breastfeeding</li> </ol>	
111	Did your child sleep with a breast in his or her mouth at night?	<ol style="list-style-type: none"> <li>1. No</li> <li>2. Yes</li> </ol>	
112	How many times you wake up at night to breast feed your child?	<ol style="list-style-type: none"> <li>1. Below 3 times</li> <li>2. Above 3 times</li> <li>3. Am not wake up</li> <li>4. Not breastfeed</li> </ol>	
113	What type of methods do you use to give your breastfeeding?	<ol style="list-style-type: none"> <li>1. On demand</li> <li>2. By program</li> <li>3. Both type</li> <li>4. Not breast feed</li> </ol>	
114	At what age do you stop breast feed your child?	<ol style="list-style-type: none"> <li>1. &lt; 6months</li> <li>2. 6month -11 months</li> <li>3. 12 months to 24 months</li> <li>4. &gt; 24 months</li> </ol>	
115	At what age solid food other than breast or other liquids by bottle?	<ol style="list-style-type: none"> <li>1. &lt;6 months</li> <li>2. At 6 months</li> <li>3. After 6 months pass</li> </ol>	
116	What do you give to your baby other than milk with bottle? (Content of bottle feeding )	<ol style="list-style-type: none"> <li>1. Formula milk</li> <li>2. Milk with sugar</li> <li>3. Milk without sugar</li> <li>4. Drinks other than milk</li> <li>5. Not bottle feeding</li> </ol>	
117	Did your child sleep with a bottle in his or her mouth at night?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	
118	Is your child use pacifier?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	
119	How many sweet meals dose your children consume per day?	<ol style="list-style-type: none"> <li>1. 1 to 2 meals/day</li> <li>2. 3 or more meals per day</li> <li>3. I don't know</li> </ol>	

120	What type of snacks your baby/child consume?	<ol style="list-style-type: none"> <li>1. Fast foods</li> <li>2. Candy</li> <li>3. Potato chips</li> <li>4. Soft drinks</li> <li>5. Flavored juice</li> <li>6. Biscuits</li> <li>7. Don't take any sweet</li> </ol>	
121	How many sugars dose your child/ consume in day?	<ol style="list-style-type: none"> <li>1. Below Two per day</li> <li>2. Above two per day</li> <li>3. Did not consume sugar</li> </ol>	

### Part 3: Part three: Questionnaires on oral Hygiene

Questionnaires on oral Hygiene			
No	Questions for a child	Options of Answers	Skip
122	Did your child start cleaning tooth?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	
123	When did your child first begin brushing his or her teeth?	<ol style="list-style-type: none"> <li>1. Below 12 month</li> <li>2. Above 12 month</li> <li>3. Not start yet</li> </ol>	
124	What do you use for cleaning his/her teeth?	<ol style="list-style-type: none"> <li>1. Fluoride tooth paste</li> <li>2. Clean cloth</li> <li>3. Non clean their tooth</li> </ol>	
125	How many times a day does your child brush his or her teeth?	<ol style="list-style-type: none"> <li>1. Once daily</li> <li>2. Twice daily</li> <li>3. Non clean their tooth</li> </ol>	
126	Do you help when your child brushing up his/her teeth?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	
Questions for care giver /mother			
127	How often do you brash your teeth?	<ol style="list-style-type: none"> <li>1. One times a day</li> <li>2. Two times and above a day</li> <li>3. Never brash</li> </ol>	
128	Did you visit oral clinic last year /this year for tooth ache?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	

Part 4 physical examination			
129	Is dental caries present?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	
130	Stages of dental caries	<ol style="list-style-type: none"> <li>1. High caries</li> <li>2. Low caries</li> <li>3. No caries</li> </ol>	
131	How many teeth are decayed?	<ol style="list-style-type: none"> <li>1. No decay</li> <li>2. One</li> <li>3. Above one</li> </ol>	

132	How many teeth are missing?	1. No decay 2. One 3. Above one	
133	How many teeth are filling or extracted?	1. No decay 2. One 3. Above one	

Thank you for your participation

# አማርኛ መጠይቅ

## I. የመረጃ ፎርም

**የጥናቱ ርዕስ:-** የእናት ጡት እና ጥርስ መበስበስ በህፃናት ላይ (Breastfeeding Duration and Dental Carries among young children in Addis Ababa city, Ethiopia)

**መግቢያ:-** ጥርስ መበስበስ አለማቀፍ የማህበረሰብ አሳሳቢ የህፃናት ችግር ነው። ይህ የጥርስ መስብሰብ በተለያዩ መንገዶች ይከሰታል ። ከመንገዶች አንዱ ለረጅም ጊዜ ጡት ማጥባት ነው ተብሎ ይገመታል።

**የጥናቱ አለማ:-** የጥርስ መበስበስ መጠን ለመለካት እና በእናት ጡት እና በጥርስ መበስበስ መሀከል ያለው ግንኙነት ለማጥናት ነው ።

**የጥናቱ ጥቅም :-** ጥናቱ ለተሳታፊዎች ፈጣንና ቀጥተኛ ጥቅም ባይኖረውም የጥርስ መበስበስ በህፃናት ላይ የሚያመጣውን ቀጣይነት ያለው የእድገት አጠቃላይ የጤና ችግር ለመከላከል ያስችላል።

**በጥናቱ የሚመጣ ችግር:-** ይህ ጥናት በተሳታፊዎች ላይ ምንም ዓይነት ችግር አይኖረውም።

**የተሳታፊዎች መብት :-** ተሳትፎዎት በፍቃደኝነት ላይ የተመሰረተ ነው ። ይህ ቃለ መጠይቅ ከ 15-20 ደቂቃ ይፈጃል። በጥናቱ ነጻነት ካልተሰማዎት በማንኛውም ጊዜ ማቋረጥ ይችላሉ። በዚህ መጠይቅ ላይ ስም አያሥፈልግም።

## II. የስምምነት መጠየቂያ/ማረጋገጫ ቅፅ

ከላይ በተሰጠዎት መረጃ መሰረት በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ነዎት? (ክብ ያድርጉ)

1. አዎ

2. አይደለሁም

ፍቃደኛ ካላሆኑ ምክኒያቱን ጽፈው ወደ ሚቀጥለው ተሳታፊ እለፍ/ፊ \_\_\_\_\_

የመረጃ ሰብሳቢ

ስም \_\_\_\_\_

ፊርማ \_\_\_\_\_

የመጠይቁ ቁጥር \_\_\_\_\_

መጠይቁ የተካሄደበት ቀን \_\_\_\_\_

የመጠይቁ ውጤት

- 1. የተሟላ
- 2. ተሳታፊው አልተገኘም
- 3. አልተሰማማችም
- 4. በከፊል የተሟላ

በተቆጣጣሪዎች ተረጋግጧል: ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_

ለበለጠ መረጃ

ዋና አጥኝ: ማርታ የማካ

አድራሻ: ስልክ:- 0940729327

ኢ-ሜል:- [martino.jo2008@gmail.com](mailto:martino.jo2008@gmail.com)

ፊርማ-----



109	ልጅዎን ልክ እንደተወለደ ጀምሮ በምን መንገድ ወይም አይነት ነው የሚመግቡት ? (Type of feeding baby start from birth)	<ol style="list-style-type: none"> <li>1. የእናት ጡት እና ተጨማሪ ምግብ</li> <li>2. ጡጦ እና ተጨማሪ ምግብ</li> <li>3. የእናት ጡት፣ ጥጦ፣ ተጨማሪ ምግብ</li> </ol>	
110	ልጅዎ ለምን ያህል ወራት ጡት ብቻ ጠባ/ጠባች? (Exclusive breast feeding)?	<ol style="list-style-type: none"> <li>1. ከ 6 ወር በታች</li> <li>2. ለ 6 ወር</li> <li>3. ጡት አልጠባም/አልጠባችም</li> </ol>	
111	ልጅዎ ለሊት ጡት አፍ ውስጥ ይዞ ይተኛል ?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይ</li> </ol>	
112	ልጅዎን ጡት ለማጥባት ለሊት ስንቴ ከንቅልፎ ይነሳሉ ?	<ol style="list-style-type: none"> <li>1. ከ 3 ግዜ በታች</li> <li>2. ከ 3 ግዜ በላይ</li> <li>3. አልነሳም</li> </ol>	
113	ልጅዎ ጡት ስፈልግ ነው የሚሰጡት ወይም በፕሮግራም መሰረት ?	<ol style="list-style-type: none"> <li>1. ስፈልግ</li> <li>2. በፕሮግራም</li> <li>3. በሁለቱም መንገድ</li> </ol>	
114	በስንት እድሜ ልጅዎ ጡት አቋረጠ/አቋረጠች?	<ol style="list-style-type: none"> <li>1. 0 ( ምንም ያልጠባ)</li> <li>2. ከ 6 ወር በታች</li> <li>3. ከ6 ወር -11 ወር</li> <li>3. 12 ወር -24 ወር</li> <li>4. ከ 24 ወር በላይ</li> </ol>	
115	ለልጅዎ ምግብ (solid food other than breast or other liquids) መቼ ጀመሩለት?	<ol style="list-style-type: none"> <li>1. ከ 6 ወር በታች</li> <li>2. ልክ 6 ወር ላይ</li> <li>3. 6 ወር እንዳለፈው</li> </ol>	
116	በጥጦ ውስጥ የምግብ ይዘት	<ol style="list-style-type: none"> <li>1. ፎርሙላ ወተት</li> <li>2. ወተት በሲኪር</li> <li>3. ወተት ስኪር የሌለው</li> <li>4. ፈሳሽ ከወተት ውጭ</li> <li>5. ጥጦ አይጠባም</li> </ol>	
117	ልጅዎ ጥጦ እየጠባ/ች አፋ/ፏ ውስጥ ይዞ/ይዛ ሌልት ትተኛለች / ይተኛል?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይ</li> <li>3. ጡጦ አይጠባም/አትጠባም</li> </ol>	
118	ለልጅዎ ፓስፋየር (የእንጀራ ጡት) ይጠቀማሉ ?	<ol style="list-style-type: none"> <li>1. አዎ</li> <li>2. አይ</li> </ol>	
119	ልጅሽ ምን ያህል መክሰስ በቀን ይበላል?	<ol style="list-style-type: none"> <li>1. ከአንድ እስከ ሁለት ግዜ</li> <li>2. ሶስት ና ከዛ በላይ</li> <li>3. አልሰጣትም/አልሰጠውም</li> </ol>	

120	ምን አይነት መክሰስ ይመጣል?	8. ፋስት ፋድሰ 9. ከሬሜላ/ ጣፋጭ 10. ችብስ 11. ለስላሳ መጠጦች 12. ጣፋጭ ጁሶች 13. ብስኩት 14. አይመጣም	
121	ልጅዎ ጣፋጭ ወይም ስኳር ያለው ምግብ በቀን ምን ያህል ይመጣል ?	1. 2 ና ከዛ በታች በቀን 2. ከ 2 በላይ በቀን 3. አይመጣም ( ጣፋጭ ነገር አልሰጠውም)	

## Principal Investigator

### CURRICULUM VITAE

#### **PERSONAL DATA**

Name: Marta Yamane Tesfay  
Date of birth: 1990  
Place of birth: Alitena/Irob  
Nationality: Ethiopian  
Marital status: Single  
Current Address: Addis Ababa, Ethiopia  
Religion: Catholic Christian  
Contact Address: +251940729327/+251985547470  
Email: [martino.jo2008@gmail.com](mailto:martino.jo2008@gmail.com) / [marta.yemane@aau.edu.et](mailto:marta.yemane@aau.edu.et)

#### **Education Back Ground**

2019/2020 to 2020/2021: MPH Nutrition in Addis Ababa University  
2011: BSC in public health officer from Harramaya University  
2003-2007: Tsinseta lemariam secondary school  
1995-2002: St. Lucy elementary school

#### **Language**

<b>Language</b>	<b>Speaking</b>	<b>Writing</b>	<b>Reading</b>	<b>Listening</b>
Irob	Excellent			Excellent
Tigrigna	Excellent	Excellent	Excellent	Excellent
Amharic	Excellent	Excellent	Excellent	Excellent
Afar	Good			Excellent
English	Excellent	Excellent	Excellent	Excellent

#### **Additional Training**

- Scientific Writing and Communication training given by Addis Ababa University school of Public Health collaborate with NORHED Project PI from October 26-30, 2020.
- PACE/Personal Advancement and Carrier Enhancement / Life skill training organized by CARE Ethiopia in Bahirdar from 29 January to 01 February 2019.
- Poultry Sensitization Workshop organized by CARE Ethiopia in Woldiya on January 27/2019.
- Female Leadership Training organized by ORDA in Bahirdar from January 22 to January 25/2019.
- Disability inclusive training held in Kombolcha by ORDA from September 3 to September 5 /2018
- Perma garden production Training held in Mehal Meda by CARE Ethiopia CCU from July 23 to July 26/2018.
- IYCF-NSA training held in Dessie given by CARE Ethiopia from May 17 to May 20, 2018.

- Poultry TOT given by SNV Ethiopia Held in Woldiya from May 5 to 7,2018
- Updated VESA manual training given by CARE in kombolcha from 26 March to 31 March 2018.
- Gender mainstreaming training given by ORDA (Organization for rehabilitation and development in Amhara) from September 07 to September 09, 2017.
- **SAA (social analysis and action )** training given by ORDA(Organization for rehabilitation and development in Amhara) from August 28 to September 01 ,2017
- Basic computer skill training (Excel, Ms word ,power point ,data base, SPSS) from June 10 to July 25,2015.
- First aid &its practice training given by Red cross Ethiopia Bahirdar branch from October 22 to 23, 2013.
- PMTCT training held in Mizan Teferi prepared by Intra Health International from October 15 to 20, 2012.
- National comprehensive HIV care /ART training organized by SNNPR state health bureau in collaboration with Hawassa University College of medicine and health science and WHO country for Ethiopia from August 29 to September 21,2011 held in Hawassa , Ethiopia.
- HMIS, STI & Reproductive Health training prepared by Bench maji zone health bureau from June 23 to 25, 2011.

### **Social skill and Competence**

- Strong interpersonal and communication skill
- ongoing personality
- Facilitation skill

### **Organizational skill and competence**

- Leadership ability
- Computer skills ( Micro soft :word, power point, ms excel, outlook )
- Training skill
- Data collection skill

### **Work Experience**

- ❖ Currently, MPH candidate in Addis Ababa university school of public health.
- ❖ Two years' experience as Gender and Nutrition officer in ORDA(Organization for rehabilitation and development in Amhara ) L4R /GRAD II Project starting from August 28, 2017 to May 17/2019 in Mehal Meda ,North Shewa Project .
- ❖ Two (2) years' experience by public health officer in bench maji zone shey bench woreda health center from April 9, 2011 to May 2, 2013.

### **References**

- ❖ Ato Tale Hilemariam Menz Gera woreda GRAD2 project manager (0910990340) , email:talehailemariam@ordaethiopia.org/taleh39@yahoo.com .

- ❖ Ato kefelegn lemma Menz Gera woreda GRAD2 Project Youth Employment officer (0910671635); email:kefelegnlemma@gmail.com
- ❖ **Mekbib Hilegebrile | CARE Ethiopia | Senior Nutrition Advisor**  
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