



ASRAT WOLDEYES HEALTH SCIENCE CAMPUS,

DEPARTMENT OF PUBLIC HEALTH

**PREVALENCE OF DIARRHEAL DISEASE AND ITS ASSOCIATED
FACTORS AMONG EXCLUSIVE AND NON-EXCLUSIVE BREAST
FEED CHILDRENS IN ANKOBER DISTRICT, NORTH SHOA ZONE,
AMHARA REGION, ETHIOPIA; 2023.**

BY: -

ESTIFANOS ASSEFA (B.S.C)

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Prevalence of diarrheal disease and its associated factors among exclusive and non-exclusive breast feed children's in Ankober district, north shoa zone, Amhara region, Ethiopia; 2023, comparative cross sectional study

To be approved by the Examining Board of Asrat Weldeyes Health Science Campus, Debre Berhan University

Principal Investigator's Name	Signature	Date
_____	_____	_____
Principal Advisor's Name	Signature	Date
_____	_____	_____
Co-Advisor Name	Signature	Date
_____	_____	_____
External Examiner Name:	Signature	Date
_____	_____	_____
Internal Examiner Name:	Signature	Date
_____	_____	_____

ABSTRACT

Background: - The global public health problem of diarrhea is most prevalent in developing countries including Ethiopia, especially among children under two years of age, while it kills half-million under-five children each year. However, there is limited evidences diarrheal illness and effect of exclusive breastfeeding on reducing the risk of diarrhea

Objective: - To assess prevalence of diarrheal disease and its associated factor among exclusive and non-exclusive breast fed children's in Ankober district, North shoa zone, Amhara region, Ethiopia 2023.

Methods: - A community-based comparative cross-sectional study design was employed in Ankober District from May 15 to 30, 2023. A multi-stage sampling technique was employed to select the study groups. Data was collected using face to face interview with pre-tested structured questionnaire. The collected data was entered using EpiData version 4.2 and then exported to using SPSS version 25.0 for statistical analysis. Descriptive statistics was used to summarize the data and the result reported using frequencies, means, and percentages. Bivariable and Multivariable logistic regression were carried out to identify variables having significantly associated with diarrheal diseases.

Result: - A total of 448 (mother with 206 from EBF and 206 from NEBF) participants were interviewed making the response rate 91.9%. The prevalence of diarrheal diseases among mothers with EBF and non EBF group was 11.2% and 24.8% respectively. The results of this study indicated that Educational status [AOR = 3.75, 95% CI (1.43, 9.89)], number of under 5 children [AOR = 4.88, 95% CI (1.75, 13.6)], latrine utilization [AOR = 8.09, 95%CI (1.41, were factors associated with diarrheal diseases.

Conclusion: - The prevalence of diarrhea was slightly higher in mothers with non-EBF children than in EBF children. Under poor environmental conditions, mothers with primary education and above protected their children against diarrhea better than mothers with no education in both study groups. Thus, implementing effective educational programs that emphasize environmental health and sanitation practices and encouraging female school enrollment would reduce childhood diarrheal morbidity in the region.

Key word: Diarrhea, Exclusive and non-exclusive breast feed

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Acronyms/ Abbreviation

AIDS- Acquired Immune Deficiency Syndrome

BCG- Bacille Calmette -Guerin

CSA- Central Statistical Agency

DBU- Debre Birhan University

EBF - Exclusive Breast Feed

EDHS- Ethiopia Demographic and Health Survey

ETB- Ethiopian Birr

HIV- Human Immune Virus

NEBF- Non-Exclusive Breast feed

ORS- Oral Rehydration Solution

SSA- Sub Saharan Africa

WHO- World Health Organization

1 INTRODUCTION

1.1 Background

The World Health Organization (WHO) defines diarrhea as the passing of three or more loose or liquid stools per day as a result of an abnormally high fluid content in stools or an abnormal increase in daily stool fluidity, frequency, and volume from what is thought to be normal for an individual and is brought on by bacterial, viral, protozoal, and parasitic organisms[1].

Diarrhea removes essential body fluids and vital nutrients resulting in dehydration and malnutrition as a complication. Diarrhea can last several days, depriving the body of water and electrolytes that are essential for existence[2]. Mortality is the most severe consequence of diarrheal disease, which also has long-term negative impacts in the first two years of life[3].

Diarrheal diseases account 9% of child deaths worldwide, making diarrhea the second leading cause of death among children under the age of five. From all deaths worldwide, about half of them due to diarrhea occur in just five most poor countries: namely India, Nigeria, the Democratic Republic of Congo, Pakistan, and Ethiopia[4]. According to Ethiopia Demographic and Health Surveys (EDHS) of 2016, 8% and 23% of children under age one and 6months had diarrhea respectively [55]. Studies conducted in different parts revealed that, diarrhea is one of the common causes of under-five mortality; the prevalence's is in Jabithennan District, a community based, cross-sectional study (25%)[5] And a systematic review and meta-analysis conducted based on 31 studies revealed that 27% in Afar region, 26% in Dire-Dawa, and 24% in Addis Ababa[6].

The prevention and control of diarrheal diseases requires more work due to the complexity of the causes. Exclusive breast feeding for the first 6months of life offers a protective effect against diarrheal diseases, but this behavior is not widespread in many countries. Worldwide, only 35% of infants on proper exclusively breast feeding during the first four months of life[7]. In Ethiopia, high numbers of mothers are practicing non-exclusive breast feeding. It was 41% national as it was reported in 2019 Ethiopian Demographic and Health Survey (EDHS)[8]. Infants who had not been fed exclusively face future health challenges. These problems cause a decrease in the full absorption of nutrients from breast milk; predispose them to diarrhea [56].

To avert the problem of infant mortality, World Health Organization (WHO) recommends the practice of exclusive breastfeeding (EBF) for the first six months[9]. Children are protected from infections linked to diarrhea by breastfeeding in the best possible way[11].

The Ethiopian Ministry of Health set a goal of increasing the percentage of exclusively breastfed newborns under the age of six months to 52–72% by 2019–2020 as one way to enhance child health [56]. This goal was set in order to reinforce the endeavor to reduce child mortality. Only a few studies, particularly in the study area and study population, have been done at the community level in Ethiopia regarding the prevalence of diarrheal diseases and associated factors. This study also allowed us to generate epidemiological information with which to guide the proper formulation of prevention and control programs in this area. Therefore, the goal of this study was to compare infants who exclusively and non-exclusively breastfed to determine the prevalence of diarrheal disease and associated factors.

1.2 Statement of the problem

Neonatal, infant and child mortality are ongoing public health problems throughout the world. Likewise, in developing countries, childhood mortality is almost 10 times higher than in developed nations[12]. Diarrheal disease is the common childhood illness and a leading killer of children aged under - 5 year's, which accounted for 9% of deaths worldwide in 2015, Although its occurrence was reduced from 1.2 million cases in 2000 to 526,000 in 2015 [56]. Most of the deaths from diarrhea occur among children of less than 2 year's old living in South Asia and sub-Saharan Africa [57].

Worldwide, diarrhea accounts for an estimated 3.6% of the global burden of disease, as expressed in disability-adjusted life years and it is the leading killer, despite the availability of simple effective treatments[7]. In Africa, it is estimated that children below 5 years old experience a minimum of five episodes of diarrhea a year and about 800,000 children succumb to diarrhea annually[13]. Sub-Saharan African and South Asian countries account for roughly 80% of morbidity and mortality [57].

According to 2018 WHO reports, in each year, diarrhea kills more than 525, 000 under-5 years' children [58]. Five countries accounted for 50 % of the deaths, one of which was Ethiopia[1]. Ethiopia is one of the emerging sub-Saharan-African countries contributing to the high burden of diarrheal illness and death [58]. A multiregional baseline household health status survey indicated that the two week prevalence of any diarrhea among children aged 0–23 months was reported to be 22% [1]. In the country, 24–30% of all infant deaths were due to diarrhea [14].

In the year of 2016 alone, generally, 1 in every 15 children dies before reaching their fifth birthday. Among these deaths, diarrhea kills almost fifteen thousand under-five children in Ethiopia [55]. In Ethiopia in particular, diarrheal diseases alone accounted for 23% of the causes of child mortality, which is greater than the annual deaths due to malaria, HIV/AIDS and measles all together[55][15]. According to the Ethiopian Demographic and Health Survey (EDHS) reports, the prevalence of diarrhea in 2000, 2005, 2011, and 2016 in 6 – 12Months Ethiopian children was 38.5%, 29.3%, 24.8%, and 23%, respectively [59-60] [55]. The same is true in Ankober district, North Shoa, Amhara Regional States Ethiopia in which acute diarrhea is

the common problem of children aged 6–59 months. As of the 2021/20212, annual performance report of the health office, the prevalence of diarrhea was 5% and 8.5% of children under age one and five had diarrhea respectively [61].

Globally, in children under five years of age, the higher proportion of diarrheal episodes caused by Rota-virus was 39%, versus only 20% for those caused by the other 4 different pathogens, while the percentage of diarrheal episodes without a pathogen was 34%, as indicated in the previous study[16]. Childhood wasting, unsafe water and unsafe sanitation were the leading risk factors for diarrhea, responsible for 80.4%, 72.1%, and 56.4% of diarrhea deaths in children younger than 5 years, respectively[17].

Infant and young child deaths occur mainly due to inappropriate infant feeding practices and infectious diseases[18]. Globally, in 2021 only 44% of infants 0–6 months old are exclusively breastfed. In Sub-Saharan Africa and East Africa, EBF practice was 31% and 42% respectively[19]. Ethiopian demographic health survey (EDHS) 2019 showed that EBF practice in Ethiopia was estimated to be 59% [62]. Due to non-exclusive or lack of EBF, about 1.24 million (96%) child deaths occur during the first six months of age. About 45% of neonatal infectious deaths, 30% diarrheal deaths and 10% disease burden of infants under than five years of age are attributed to suboptimal breastfeeding in developing countries[12].

Conducting a study in an evidence dearth setting is critical to explore information on diarrheal morbidity and its determinants among each study group. The study was expected to provide prominent input to program managers about the implementation of current strategies, including feeding practices (EBF), for the prevention of diarrheal diseases.

1.3 Significance of the study

This study aids in identifying any gaps in the differences between infants who are breastfed exclusively and those who are not in order to create a proper problem inventory. The morbidity and death rates among children in developing countries are significantly impacted by feeding practices and diseases associated with them[20]. Also, this work aids in understanding the fundamentals of exclusive breastfeeding status in the prevention of diarrhea. It is crucial that, while developing breastfeeding programs in Ethiopia, national and subnational authorities, as well as nutrition specialists, take into account effective intervention tactics from evidence-based studies. It also offers more proof of the effects of exclusive breastfeeding practices on diarrhea.

2. LITRATURE RIEVIEW

2.1 prevalence of diarrhea

The World Health Organization (WHO) estimated that approximately half of the 1.5 million children in this age group who died from diarrheal diseases each year were African. The youngest children are the most vulnerable, especially before their second birthday[21][22]. Many studies revealed regional variations in the prevalence of acute diarrheal diseases. As an example, in the Gaza Strip, Iraq (17.7-46.1%)[23] and Cameroon (23.8%)[22], Tanzania (32.7%), Rwanda (26.7%) [33] [24] and Ethiopia (varying from 8.5 to 54% [25][26].

The prevalence of diarrhea among children under the age of five was found to be 52% in men and 48.0% in women in the Pader District in northern Uganda, with no significant difference. The age range 0-12 months was next in line for vulnerable, followed by 13-24 months, and 37-48 months had the lowest prevalence. Children experiencing diarrhea were 65.2% more likely to have a mother or caregiver who was between the ages of 16 and 30 and 32.4% more likely to be between the ages of 15 and 24[7]. Another study conducted in Southwestern Saudi Arabia, shows that, prevalence of diarrhea among exclusive breast feed children was 41.7% and the prevalence of diarrhea among non-exclusive breast feed children was 59.4%[3].

In Ethiopia, among children under the age of 5, acute diarrheal diseases varied across the country: Debre Berhan referral hospital (31.7%)[27], Arba Minch, South Ethiopia (30.5%)[28], Bahir Dar town, northwest Ethiopia (21.6%)[20], Farta district, northwest Ethiopia (16.7%)[29], Jigjiga, East Ethiopia, 14.6%[30], and Adama town, Central Ethiopia, 14.7% [43]; the 2016 Ethiopian Demographic Health Survey report; 12%[43], WolaitaSodo, South Ethiopia (11%)[31], and Yeka sub-city, Addis Ababa, Central Ethiopia (8.5%)[26]. According to a previous research conducted in Benna Tsemay District, South Omo Zone, Southern Ethiopia, the prevalence of diarrhea among exclusive breast fed children was 16.9%, and the prevalence of diarrhea among non-exclusive breast fed children was 31.7% [40].

2.2 Factors associated with diarrheal disease

2.2.1 Socio demographic factors

A study conducted in Hadaleala District of the Afar Region[14], Jimma Geneti District, Oromia region[1], Rural Areas of North Gondar Zone, Northwest Ethiopia[32], revealed that age had significant association with occurrence of diarrheal disease.

According to multilevel data analysis in Ethiopia, sex of child were significantly associated with childhood diarrhea[33]. Another study conducted in Hadaleala District of the Afar Region also showed that there was no significant difference in the prevalence of diarrheal disease between males and females (52.9% vs. 47.1%)[14].

A study conducted in Southwestern Saudi Arabia[3], North Gondar Zone, and Northwest Ethiopia[32] revealed that maternal educational status significant association with occurrence of diarrheal disease.

According to a study done in the southwest of Saudi Arabia, Children with working mothers had a two -times higher risk of diarrhea than children with unemployed mothers[3]. A secondary data study of the most recent 2011 and 2016 Ethiopia Demographic and Health Survey (EDHS) data revealed that children whose mothers were unemployed had a 21% reduced risk of diarrhea than children whose mothers were in employment[33].

A study done in northeastern Ethiopia, shows that among children under two with mothers/caregivers aged 35 years or older were 2 times greater developing diarrhea than those with mothers/ caregivers aged 25 years or younger[34]. Another study in Pader District, northern Uganda, Children whose mothers/caretaker were aged 16–30 years and ≥ 31 years had 14 times and 12 times higher more likely to concede diarrhea than those whose caretaker were aged less than 15 years. In this study, Children whose households had 10–15 children had seven times higher more likely to develop diarrhea than children whose households had one child[7]. Similar study done in Gondar Zone, Northwest Ethiopia shows that, The occurrence of diarrhea was 1.82 times more likely to be higher among households with less than or equal to one-year children compared with households with four- to five-year children[32].

A study done in Bahir Dar, northwest Ethiopia, indicate that diarrheal disease, is nearly three times higher Among children whose household income is \leq ETB 600 compared to children whose household income is \geq ETB 2000. It may be the case that mothers/caregivers who have higher incomes may have the opportunity to buy and use detergents for hand washing and the resources to construct and use standard toilets[20]. Similar study revealed that Children's whose families monthly income earn less than or equal to 650 Birr were 1.75 times more likely to concede diarrhea than children's whose families monthly income were greater than 650 Birr[35].

2.2.2 Environmental factors

According to a study done in Jimma Geneti District, Oromia region, Ethiopia, shows that Children under five who lived in homes without a latrine nearby where they could wash their hands had a fivefold increased risk of acquiring diarrhea. When compared to households that had correctly used latrines, the likelihood that a child under the age of five would acquire diarrheal disease was roughly two times higher. This study also revealed that, under five-year-old children from households that had no hand-washing facilities adjacent to the latrines were about five times more likely to have diarrheal diseases than under-five-year-old children from households that had hand washing facilities adjacent to the latrines[1].

Another study done in Medebay Zana District, Northwest Tigray, Ethiopia, indicates that Availability of toilet facility in the households was significantly associated with childhood diarrhea. Children from households who had no toilet facility had two times higher risk of having diarrhea than children from household who had traditional or improved toilet facility and Children whose households consumed unprotected drinking water were two times more likely develop diarrhea [AOR = 1.83, 95% CI (91.1 2, 2.98)] compared to children whose households consumed protected water[36]. Similar study revealed that, risk of developing diarrhea in children whose households use protected water source had a 68% lower chance compared to children in households who use unprotected water source[7].

A study on sanitation and hygiene in relation to childhood diarrhea in Ghana shows that children who lived in households which had water closets in their dwellings recorded the lowest diarrhea prevalence rate (11.1%) whereas the highest prevalence was recorded in households which have water source outside the dwelling[37]. According to a study done in Bahir Dar, northwest Ethiopia, Children from households that had no solid waste disposal systems were more likely to develop diarrheal morbidity compared to children from households with availability of solid waste disposal systems[20].

2.2.3 Behavioral factor

According to a study done in Jimma Geneti District, Oromia region, Ethiopia, developing diarrheal disease among under-five children was about 2 times higher among households who had not utilized latrines properly when compared to households who had properly utilized them and diarrheal disease among under-five children whose mothers/caregivers practiced improper domestic solid waste disposal were about 2.7 times higher than under-five children whose mothers'/ caregivers' practiced proper domestic solid waste disposal[1].

Another study in Siyadebirena Wayu district revealed that, families who dispose infant feces outside the latrine were 11 times more likely to develop acute diarrhea compared with children whose families disposed infant feces inside the latrine and Children's mothers/ care givers with poor knowledge on the major risks of acute diarrhea were 15 times more likely to develop acute diarrhea than children whose families had good knowledge[38].

A study in Dale District, Sidama zone, Southern Ethiopia, shows that Children of mothers/caretakers who had no habit of washing their hands with soap after latrine visit had 3.1 times higher odds of developing diarrhea when compared with children whose mothers/ caretakers washed their hands[4]. Another study done in Adama District Rural Kebeles, Eastern Ethiopia Child's caregiver who did not practice hand washing during critical time had children being affected by diarrheal disease 2.2 times higher than those children whose caregivers practiced hand washing during critical time[16].

Similar study in Sheko District, south west Ethiopia, indicate that, Children's whose mother didn't practiced hand washing at critical time were 2.21 times more likely to concede diarrhea than children's whose mothers were practiced hand washing at critical time and Children's whose mothers didn't used soap for hand washing were 7.40 times more likely to concede diarrhea than children's whose mothers were used soap for hand washing. This study also revealed that, Children's whose families practiced improper refuse disposal were 3.19 times more likely to concede diarrhea than children's whose families were practiced proper refuse disposal[35].

According to a study done in Bahir Dar, northwest Ethiopia, children who did not receive rotavirus vaccine dose 2 suffered 3.96 times more from diarrheal morbidity compared to those in receipt of rotavirus vaccine dose 2. This study also revealed that, diarrheal morbidity were 2.69 times higher among under-five children who were not exclusively breastfed for 6 months[20]. Another study done in northeastern Ethiopia showed that diarrhea among children under two who were not exclusively breastfed during the first six months of life were 2 times greater than among children who had been exclusively breastfed during the first six months of life[39].

3. CONCEPTUAL FRAMEWORK

The conceptual frame work is constructed by reviewing different literatures which was expected to explain how those factors affect diarrheal morbidity, because our main concern is socio-demographic, environmental and behavioral factors as main determinants of diarrhea diseases among exclusive and non-exclusive breast feeding children. [1][20][33][35]

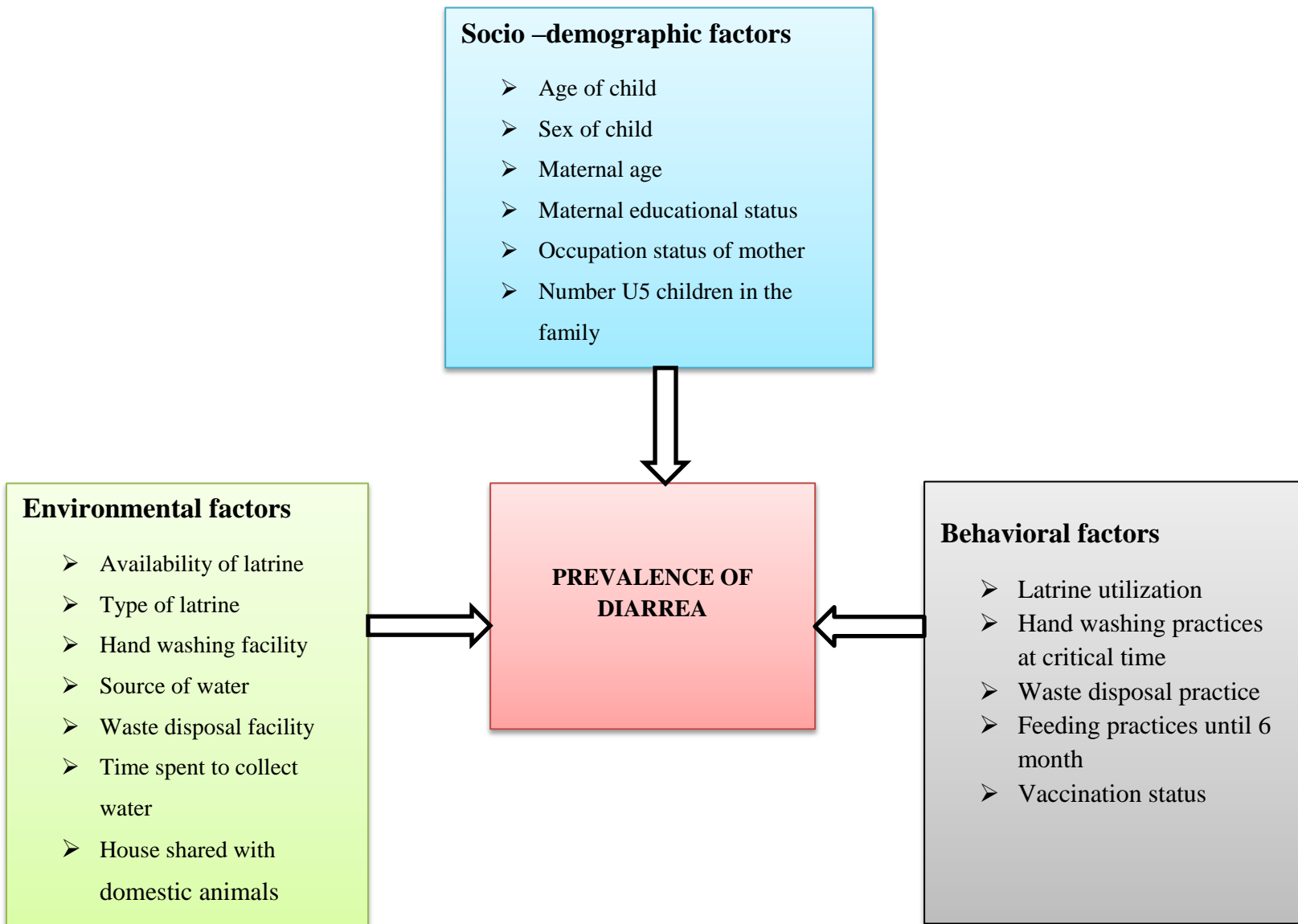


Figure 1 conceptual framework on Prevalence of diarrheal disease and associated factor among exclusive and non-exclusive breast feeding childrens in Ankober district, North shoa zone, Amhara region, Ethiopia.

4 OBJECTIVE OF THE STUDY

4.1 General Objective

- To assess prevalence of diarrheal disease and its associated factor among exclusive and non-exclusive breast feed children in Ankober district, north shoa zone, Amhara region, Ethiopia 2023.

4.2 Specific Objectives

- To determine magnitude of diarrheal disease among exclusive and non-exclusive breast feed children in Ankober district north shoa zone, Amhara region, Ethiopia 2023.
- To identify factors associated with over all among children in Ankober district north shoa zone, Amhara region, Ethiopia 2023.

5. METHODS

5.1 Study Area and period

The study was conducted January to June 5, 2023 in selected kebeles that are presented in Ankober district, North Shoa zone, Amhara region, Ethiopia. It is located 172 k.m from Addis Ababa, 339 from Bahir Dar of Amhara regional state. Ankober is one of 23 districts in the northern Shoa zone, Amhara region. According to the 2022–2023 Ankober district health bureau, this district has a total population of 96692, of whom 54,862 are men and 54,862 are women. With an area of 672.80 square kilometres, Ankober has a population density of 113.72, while 4,403 or 5.75% are urban inhabitants. A total of 22487 households were counted in this district, which results in an average of 4.19 persons per household and 17,633 housing units. The two largest ethnic groups reported in Ankober were the Amhara (92.77%) and the Argobba (7.04%); all other ethnic groups made up 0.19% of the population. There are six government health centers and five private clinics. According to Ankober district health offices; there were 3007 children in Ankober District under the age of one.

5.2 Study Design

Community based comparative cross-sectional study was conducted.

5.3 Population

5.3.1 Source of Population

All mothers who had children's and who live in Ankober district.

5.3.2 Study Population

Selected mothers with children's aged 6-12 months exclusive and non-exclusive breast feed living in selected kebeles of Ankober district, North shoa zone, Amhara region, Ethiopia.

5.4 Eligibility Criteria

5.4.1 Inclusion Criteria

- All mothers with infants aged 6-12 months exclusive and non-exclusive breast feed living in selected kebeles of Ankober district.

5.4.2 Exclusion Criteria

- Seriously ill mothers.
- Mothers of babies with cleft lip, and/or cleft palate.
- Unable to communicate due to hearing loss exclude from the study.

5.5 Sample size determination

The sample size was calculated by using two population proportion formulas. According to a previous research conducted in Benna Tsemay District, South Omo Zone, Southern Ethiopia, the prevalence of diarrhea among exclusive breast fed children was 16.9%, and the prevalence of diarrhea among non-exclusive breast fed children was 31.7% [40]. The sample by

$$n_1 = n_2 = \frac{[Z_{\alpha/2} \sqrt{p(1-p)} + Z_{\beta} \sqrt{p_1(1-p_1) + p_2(1-p_2)}]^2}{(p_2 - p_1)^2}$$

n= 140 for each group

Where $P_1 = 0.17$ (prevalence of diarrhea among EBF), $q_1 = 1 - p_1$, $P_2 = 0.32$ (prevalence of diarrhea among NON EBF), $q_2 = 1 - p_2$ and $f(\alpha, \beta) = 7.84$; when the power = 80% and $\alpha = 5\%$. the sample size for associated factors is calculated using a comparative study done at with the assumptions of 95% confidence interval, 80% power using and $\alpha = 5\%$

Table 1 Sample size calculation for the study by considering associated factors [1][15][36][3]

Outcome variable	Associated factors	CI	Power	Ratio	AOR	Outcome Among		Total sample size
						Exposed	Unexposed	
Prevalence of diarrheal diseases	Maternal employment	95%	80%	1	2.46	77	77	154
	Latrine availability	95%	80%	1	2.10	29	29	58
	Critical time Hand washing	95%	80%	1	1.00	13	13	26
	Water sources	95%	80%	1	0.86	88	88	176

The sample size for associated factors is calculated using different literature with the assumptions of 95% confidence interval, 80% power using OpenEpi version 7.2.

Finally, the calculate sample sizes by using the first objective and associated factors were compared. Then the largest sample size was taken. Therefore, the largest sample size of 140 in each group was taken, and after considering of 10% non-response rates and design effect1.5 the total sample size for each group was 224.

5.6 Sampling Procedure.

There are 3 urban and 19 rural kebeles. Sampling procedure: first, select the total number of targeted mothers with infants aged 6–12 months in each kebele. Then household surveys was conducted before data collection to identify the mothers of infants aged 6 - 12 months and their breastfeeding practices, and to provide an identity code for each eligible household in all kebeles. After determining the number of mothers with infants aged 6 -12 months who were exclusively breastfed and mothers with infants aged 6 - 12 months who were not exclusively breastfed, the total sample size was proportionally allocated by breast-feeding status in each kebele.

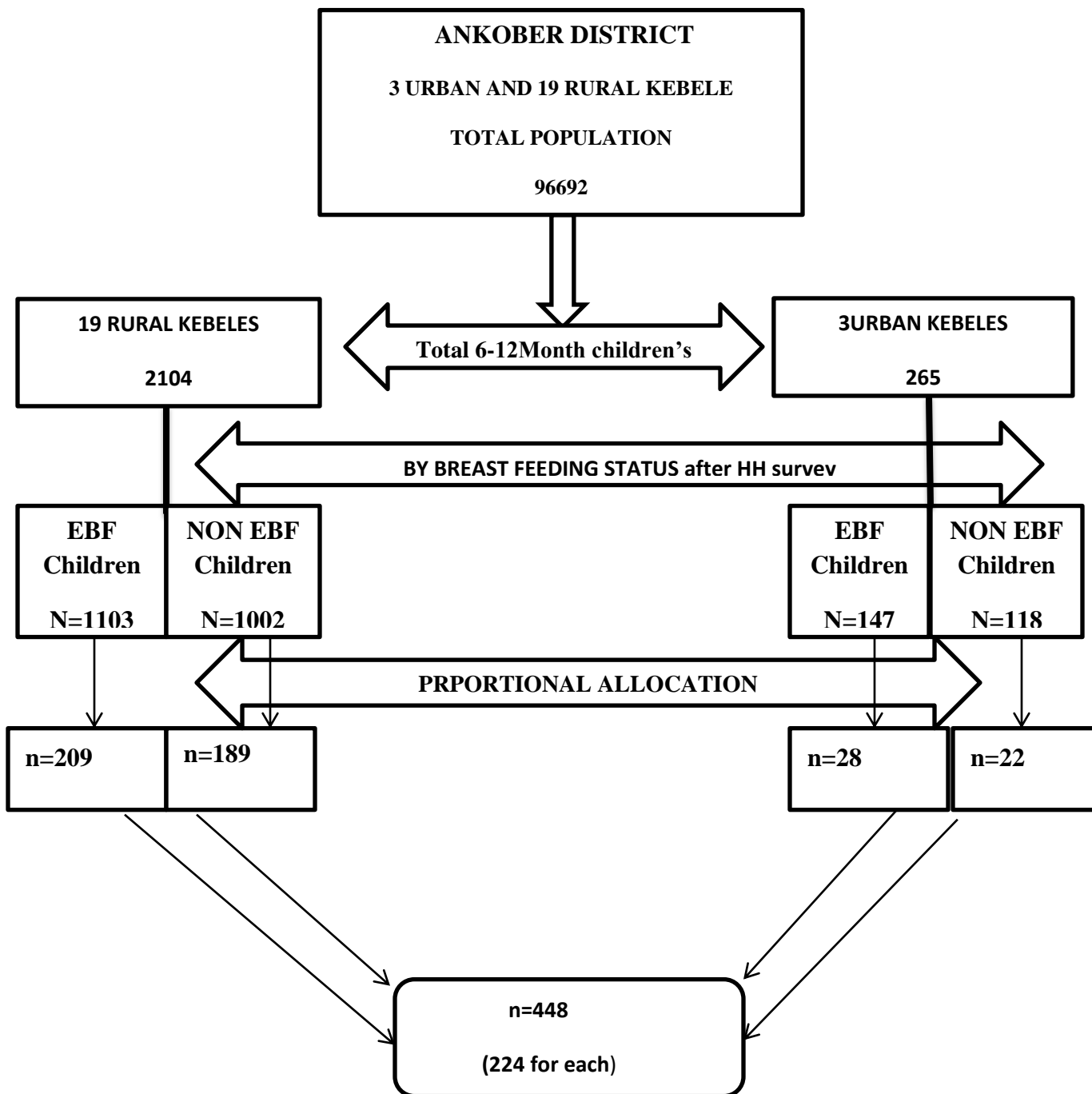


Figure 2 Diagrammatic presentation of sampling techniques of exclusive and non-exclusive breast feeding children in Ankober District ,north shoa, Amhara region, Ethiopia

5.7 Variables

5.7.1 Dependent Variables

Diarrheal disease (Yes or No)

5.7.2 INDEPENDENT VARIABLE

Socio –demographic factors

- Age of child
- Sex of child
- Maternal age
- Occupation status of mother
- Number children in the family
- Income

Environmental factors

- Availability of latrine
- Type of latrine
- Hand washing facility
- Source of water
- Time spent to collect water
- Waste disposal facility
- House shared with domestic animals

Behavioral factors

- Latrine utilization
- Hand washing practices at critical time
- Waste disposal practice
- Feeding practices until 6 month
- Vaccination status

5.8 Operational Definitions

Diarrhea is defined as a child with loose or watery stool for three or more times during a 24-hour period with in two weeks period preceding the data collection. Frequent passing of formed stool is not diarrhea, nor is the passing of loose pasty stools by breast-fed child[16].

Exclusive breastfeeding is the practice of feeding breast milk only, including expressed breast milk, to infants and excluding water, other liquids, breast milk substitutes, and solid foods. Vitamin drops, minerals, oral rehydrating solution (ORS) and medicines may be given [63].

Non-exclusive breastfeeding is giving infants other foods or fluids in addition to the breast milk other than drugs, vitamins, and minerals to Infants before the age of six months[41].

Improved sanitation facilities: It includes flush toilet, piped sewer system, septic tank, ventilated improved pit latrine (VIP), pit latrine with slab, composting toilet[42].

Unimproved sanitation facilities: It includes an flush/pour flush to elsewhere, a pit latrine without slab, bucket, hanging toilet or hanging latrine, no facilities or bush or field[42] .

Proper latrine utilization: Households with functional latrines and at least no observable feces in the compound, observable fresh feces through the squat hole, and the footpath to the latrine were uncovered with grasses[42].

Hand washing at critical time: if a mother/caregiver practiced all simple hand washings before food preparation, before child feeding, after child cleaning and after latrine visiting was considered as “all practiced” unless considered as “partially practiced”[35].

Proper refuse disposal: is a way of disposal refuses which includes burning, buried in pit or store in a container, compost, and disposed in designed site, where as disposing in open field considered as improper refuse disposal[35].

Improved water source: Drinking-water sources protected from outside contamination. This includes protected spring, protected dug well and piped water[4].

5.9 Data collection method

Data was collected by face to face interview with pre-tested structured questionnaire which were prepared after reviewing different literature[43][44].

The questionnaire consists of three parts; socio-demographic, environmental factors, behavioral factors and other related factors. Data was collected by environmental health professionals with the supervision of one public health professionals. The data collectors and supervisors were trained. The purpose of the training is to ensure that all the data collectors have the same information about the study instrument and follow the same survey administration procedures.

5.10 Data Quality Assurance

In order to assure quality of the data prior to the actual data collection, questionnaires was pretest for its clarity, understandability, and completeness. The data was cleared for inconsistencies and missing values. The tools are present with English language and translated into Amharic language. Data collectors and supervisors trained for two days on the study instrument and data collection procedure. During the actual data collection process, supervisors cross check the data collectors on the field for questionnaires consistency and completeness.

5.11 Data processing and analysis

The data was entered to Epi-data version 4.2, and then, exported to SPSS version 25.0, to accomplish further data exploration procedures; along with the required statistical data analysis methods. Descriptive statistic was done to summarize data and the result was reported using frequencies and percentages. Then bi-variable logistic regression analysis was carried out to identify candidate variables for multi-variable logistic regression analysis, where variables with P value < 0.2 was entered into multivariable logistic regression analysis. Together, multi collinearity was tested using variance inflation factor (VIF) with the 1.18 value and model of fitness was checked with to Hosmer- Lemeshow test of P-0.15. Finally, variables with P-value, \leq 0.05 in the multivariable logistic regression model was taken as statistically significant and adjusted odds ratio along with its 95% confidence interval was considered to see the association.

5.12 Ethical consideration

Ethical clearance and approval was obtained from the Ethical Review Committee Debre Berhan University, Asrat Woldeyes Health Sciences campus. Official letters obtained from department of public health to health bureaus of Ankober. After explaining the purpose and possible benefit of the study, oral permission obtained from each respondent before administering questionnaire to participants. The confidentiality maintain in each level of the response in this study. The aim and significance of the study was explained to each participant before joining to the study. The study participants inform of their rights to refuse to join, answer any question or withdraw at any particular point during data collection process.

5.13 Dissemination of the result

The findings of the study will be presented to Debre Birhan University, Asrat Woldeyes College of Health Sciences and School of Public Health as partial fulfillment of master's degree in Reproductive Health. It will be communicated to Ankober health bureau that are included in the study. The findings will be presented in different seminars, meetings and workshops as well as further effort will be made to publish the findings on national and international peer reviewed journals. Hard and soft copies will be made available in the library of Debre Berhan University, Asrat Woldeyes Health Science Campus for graduate students as well as for other researchers and readers.

6. RESULT

6.1 Socio demographic characteristics of participants

A total of 412 (206 mother with EBF and 206 non-EBF children's) participants were interviewed making the response rate 91.9 %. The majority of child age ranged from 6 - 8 months with mean age of 8.3 months and standard deviation (SD) of ± 1.59 . More than 104(50.5%) in mother with EBF and 108 (57.3%) with non-EBF children's of the respondents were aged 6 – 8months. The majority of the respondents in mother with EBF 156 (75.7%) and non-EBF children's 146 (70.9%) were married whereas 5(2.4%) from mother with EBF and 2(1.0%) from mother with non EBF feed children's were windowed. Most of the mothers in the household 102(49.5%) among mother with EBF infant and 108(52.5%) non-EBF infant) are illiterate. Most of the Mother with EBF infant 167 (81.1%) and 169 (82.0%) non-EBF infant their number of under five children were less than or equal to 1.

Table 2 Participants Characteristics in both Mother with EBF and non-EBF children's in Ankober district, North shoa, Ethiopia.

		EBF		NON-EBF		Total	
		Frequ ency	%	Frequenc y	%	Frequenc y	%
Age of child	6 – 8m	104	50.5%	118	57.3%	222	53.9%
	9 – 12m	102	49.5%	88	42.7%	190	46.1%
Sex of child	Male	95	46.1%	100	48.5%	195	47.3%
	Female	111	53.9%	106	51.5%	217	52.7%
Residences	Urban	27	13.1%	21	10.2%	48	11.7%
	Rural	179	86.9%	185	89.8%	364	88.3%
Marital	Married	156	75.7%	146	70.9%	302	73.3%
Status	Single	40	19.4%	50	24.3%	90	21.8%
	Divorced	5	2.4%	8	3.9%	13	3.2%
	Windowed	5	2.4%	2	1.0%	7	1.7%
Religion	Orthodox	132	64.1%	157	76.2%	289	70.1%
	Protestant	6	2.9%	5	2.4%	11	2.7%
	Muslim	68	33.0%	44	21.4%	112	27.2%

Maternal Age	15 – 19	4	1.9%	3	1.5%	7	1.7%
	20 – 24	53	25.7%	54	26.2%	107	26.0%
	25 – 29	79	38.3%	77	37.4%	156	37.9%
	30 – 34	61	29.6%	62	30.1%	123	29.9%
	35 and above	9	4.4%	10	4.9%	19	4.6%
Educational status	Illiterate	77	37.4%	79	38.3%	156	37.9%
	Read and write	95	46.1%	99	48.1%	194	47.1%
	Primary Education	21	10.2%	19	9.2%	40	9.7%
	Secondary Education	10	4.9%	6	2.9%	16	3.9%
	Collage and above	3	1.5%	3	1.5%	6	1.5%
	occupational status	Governmental employee	14	6.8%	16	7.8%	30
	Farmer	101	49.0%	109	52.9%	210	51.0%
	Merchant	15	7.3%	17	8.3%	32	7.8%
	Daily laborer	12	5.8%	7	3.4%	19	4.6%
	Housewife	64	31.1%	57	27.7%	121	29.4%
Monthly income	less than 2000	116	56.3%	145	70.4%	261	63.3%
	2000 – 3500	84	40.8%	59	28.6%	143	34.7%
	>3500	6	2.9%	2	1.0%	8	1.9%
Number of under five children	<=1	167	81.1%	169	82.0%	336	81.6%
	>1	39	18.9%	37	18.0%	76	18.4%

6.2. Environmental characteristics of the study participants

The majority of the respondents among mother with EBF 200 (97%) and non-EBF childrens194 (94.2%) had latrine. Among the respondents 6 mothers with EBF infant and 12 mothers' non-EBF infants had no latrine. From these households that had latrines, more than half, 142 (71.4%) among mother with EBF and 156 (80.4%) among non-EBF children's, had unimproved latrine. A total of mother with EBF 99 (49.5%) and 101 (52.5) non-EBF children's of latrines were 6 -10 meters far away from houses. With regard to the hand washing facilities among mother with EBF infant 146(70.9%) and non-EBF infant 183 (88.8%) had no hand washing facilities. The majority of the respondents in mother with EBF infant 146 (70.9%) and non-EBF infant 183 (88.8%) had no waste disposal facilities.

Table 3 An Environmental characteristic of Mother with EBF and non-EBF children's in Ankober district, North shoa, Ethiopia.

		EBF		NON-EBF		Total	
		Frequency	%	Frequency	%	Frequency	%
Houses shared with domestic animals	Yes	15	7.3%	17	8.3	32	7.8%
	No	191	92.7%	189	91.7%	380	92.2%
Latrine availability	Yes	200	97.1%	194	94.2%	394	95.6%
	No	6	2.9%	12	5.8%	18	4.4%
Types of latrine	Improved	58	29.0%	38	19.6%	96	24.4%
	Unimproved	142	71%	156	80.4%	298	75.6%
Distance of latrine from the house	<6	73	36.5%	71	36.5%	144	36.5%
	.6 -10	99	49.5%	101	52.5%	200	50.8%
	>10	28	14.0%	22	11.3%	50	12.7%
Source of drinking water	Protected	130	63.1%	124	60.2%	254	61.7%
	unprotected	76	36.9%	82	39.8%	158	38.3%
Distance to water	<=15	142	68.9%	126	61.2%	268	65%

source/round trip/	>15	64	31.1%	80	38.8%	144	35%
Presence of hand washing facilities	Yes	60	29.1%	23	11.2%	83	20.1%
	No	146	70.9%	183	88.8%	329	79.9%
If yes, observe the following items are present or not	Water only	38	73.1%	37	70.8%	75	70.8%
	Water with soap	14	26.9%	17	31.5%	31	29.2%
The site of hand washing facilities	near the latrine	19	36.5%	18	33.3%	37	34.9%
	In the Home	33	63.5%	36	66.7%	69	65.1%
waste disposal facilities	Yes	60	29.1%	23	11.2%	83	20.1%
	No	146	70.9%	183	88.8%	329	79.9%

6.3 Behavioral characteristics of the study participants

To assess the level of respondent awareness about critical junctures, respondents were asked to mention spontaneously when they think washing their hands is important. Accordingly, 143 (69.4%) from mothers with EBF and 148 (71.8%) from non-EBF children before, during, and after preparing food; 192 (93.2%) from mothers with EBF and 189 (91.7%) from mothers with non-EBF children before eating food; 141 (68.4%) from mothers with EBF and 138 (67.0%) from mothers with non-EBF children after visiting latrine; 84 (40.8%) from mothers with EBF and 71 (34.5%) from mothers with non-EBF children's buttocks after cleaning a child's buttocks after cleaning a child's buttocks were mentioned by the respondents as important wash hands time.

In 152 (73.8%) of households with mothers with EBF and non-EBF children's, 170 (87.4%) used only water to wash their hands. Accordingly, 143 (69.4%) from mother with EBF infant and 148 (71.8%) from non-EBF infant before, during, and after preparing food; 192 (93.2%) from mother with EBF infant and 189 (91.7%) from mother with non-EBF infant before eating food; 141 (68.4%) from mother with EBF infant and 138 (67.0%) from mother with non-EBF infant after visiting latrine; 84 (40.8%) from mother with EBF infant and 71 (34.5%) from mother with non-EBF infant after cleaning a child's buttocks were mentioned by the respondents as important wash hands time..

Table 4 Behavioural characteristics of mothers with EBF and non-EBF children in Ankober district, North Shoa, Ethiopia

		EBF		NON-EBF		Total	
		Frequenc y	%	Frequenc y	%	Frequenc y	%
Latrine utilization	Yes	191	92.7%	180	87.4%	371	90.0%
	No	15	7.3%	26	12.6%	41	10.0%
Methods to wash hands	Soap & water	54	26.2%	36	17.5%	90	21.8%
	Only water	152	73.8%	170	82.5%	322	78.2%
Solid waste disposal methods	Pit	21	10.2%	9	4.4%	30	7.3%
	Open field	150	72.8%	183	88.8%	333	80.8%
	Burning	28	13.6%	10	4.9%	38	9.2%
	Garbage can	7	3.4%	4	1.9%	11	2.7%
Liquid waste disposal methods	Dispose openly	155	75.2%	181	87.9%	336	81.6%
	Dispose privately	36	17.5%	18	8.7%	54	13.1%
	Dispose to road dish	15	7.3%	7	3.4%	22	13.1%
Breast feed after birth	Yes	166	79.6%	155	75.6%	319	77.6%
	No	42	20.4%	50	24.4%	92	22.4%
After how many	Within 1hr	143	87.2%	131	84.5%	274	85.9%

hours did you breast-fed								%
	After 1hr.	21	12.8%	24	15.5%	45	14.1	%
Diarrhea on feeding	Stop feeding	44	21.4%	34	16.5%	78	18.9	%
	Continue feeding	162	78.6%	172	83.5%	334	81.1	%
The Place infant when he had diarrhea	Health facility	187	90.8%	174	84.5%	361	87.6	%
	Holly water	12	5.8%	14	42.2%	26	6.3%	
	Local healer	7	3.4%	18	8.7%	25	6.1%	
Child immunization status	Yes	204	99.0%	202	98.1%	406	98.5	%
	No	2	1.0%	4	1.9%	6	1.5%	
BCG		203	99.5%	201	100%	404	99.8	%
POLIO		202	99%	198	98.5%	400	98.8	%
ROTA		202	99%	197	98%	339	98.5	
PCV		70	34.3%	71	35.3%	141	34.8	%
MEASLES		96	47.1%	86	42.8%	182	44.9	%
Way to get Information about Cause of diarrhea	Social media	15	7.3%	8	3.9%	23	5.6%	
	Health worker	198	96.1%	203	98.5%	401	97.3	%
	Community promoter	26	12.6%	15	7.3%	41	10.0	%

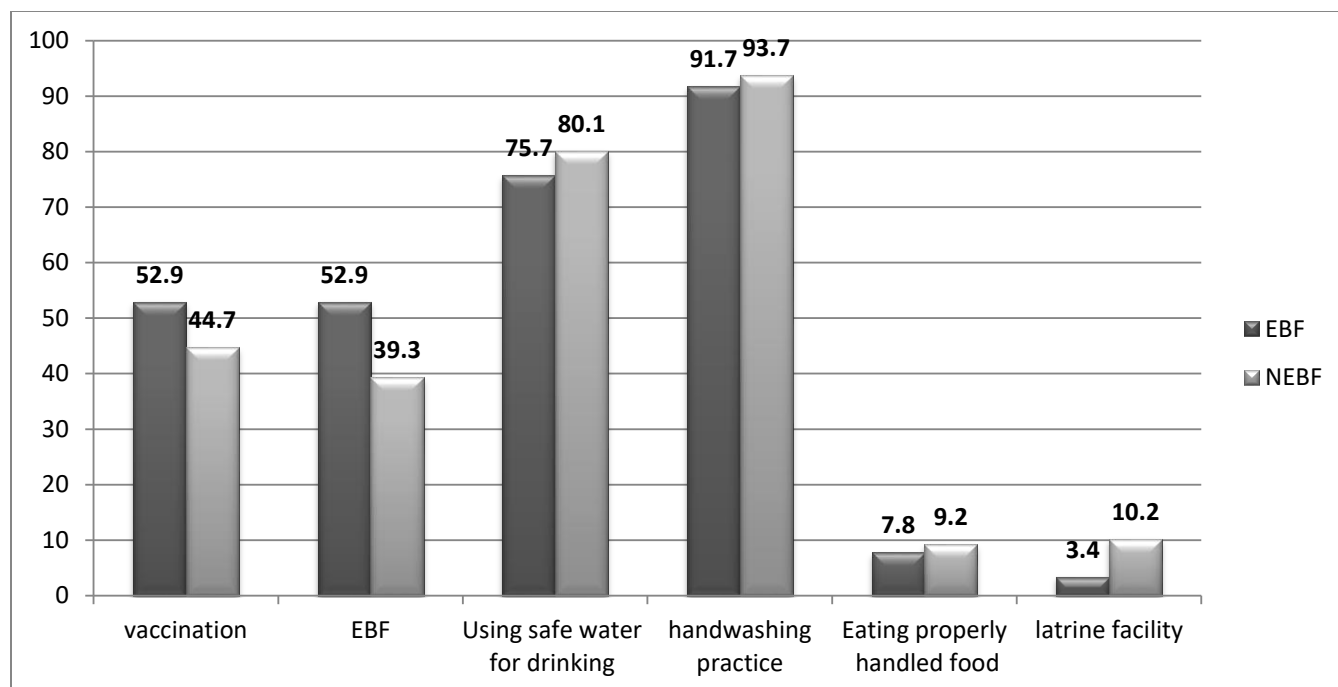


Figure 3 Response of the mother about the prevention of diarrheal diseases in in Ankober district, North shoa, Ethiopia

5.3 Prevalence of diarrhea

According to the findings of this study, 74 (17.96%) [95% CI (14.1 – 22.3)] of children had diarrhea in the past 15 days. The Prevalence of diarrhea among mothers with EBF children was 23 (11.2%), whereas in mothers with non-EBF infants, the prevalence was 51 (24.8%).

5.4 Factors Associated among exclusive and non-exclusive breast feeding children in Ankober district, north shoa zone, Amhara region, Ethiopia

Several efforts were made to identify factors associated with the prevalence of diarrhea among mothers with exclusive and non-exclusive breastfeeding children in Ankober district. A first cross-tabulation of each main covariate with the prevalence of diarrhea was done for mothers in both groups (EBF and non-EBF). Then, those that were found to be statistically associated with the outcome variable in either of the breast feeding statuses were selected to be included in the binary logistic regression model.

For listing out factors associated with the prevalence of diarrhoea among mothers with exclusively and non-exclusively breastfed infants, a binary logistic regression model was used for each group separately, and the crude odds ratios along with their 95% confidence interval were revealed. Once the binary logistic regression analysis was made, those variable that were found to be significant (p -value <0.25) further put into the multivariate logistic regression to control the confounders. Educational status and Latrine utilization were 3.75 times [AOR=3.75: 1.43, 9.89] and 8.09 times [AOR=8.09: 1.41, 46.5] more likely to diarrheal diseases than those who did not respectively. Mothers who have greater than to one under five children were almost 4.88 times [AOR=4.88: 1.75, 13.6] more likely to develop diarrheal diseases compared to those who less than or equal to one under five children.

Table 5 Bivariate and multivariate logistic regression analysis on study of Prevalence of diarrheal disease and associated factor among exclusive breast feeding children's in Ankober district, North shoa zone, Amhara region, Ethiopia

Variables	Category	Diarrhea occurrences		COR (95%CI)	AOR (95%CI)	P-value
		Yes	No			
Age of child	6 -8m	8	96	1		
	9 -12m	15	87	2.067(0.836,5.12)		
Educational status	Illiterate	16	63	4.354 (1.702 , 11.14)	3.75(1.43 , 9.89)*	0.007
	Literate	7	120	1	1	
Number of under 5 children	≤ 1	13	154	1	1	
	>1	10	29	4.09(1.64 , 10.2)	4.88 (1.75 , 13.6)*	0.002
Distance between the latrine and the living house	<6 minutes	1	7	1		
	6 – 10 minutes	5	94	3.83 (0.438 , 33.5)		
	>10 minutes	15	13	8.30 (3.08 , 27.4)		
Presence of hand washing facilities	Yes	2	49	1		
	No	21	134	3.95 (1.25 , 12.5)		
Waste disposal facilities	Yes	2	58	1		
	No	21	125	4.87 (1.105 , 21.48)		

Latrine utilization	Yes	17	174	1	8.09(1.41 ,46.5)*	0.019
	No	6	9	6.82 (2.17 , 21.5)	1	
Methods to wash hands	Soap & water	2	52	1		
	Only Water	21	131	4.12 (0.94 , 18.4)		
Breast feed after birth	Yes	16	148	1		
	No	7	35	1.85(0.70 , 4.84)		
After how many hours did you breast-fed	Within 1hr	11	132	1		
	After 1hr.	5	16	3.75 (1.15 , 12.17)		

*statistically significant at $P < 0.05$

For those groups of mothers with non-exclusively breastfed children's, Age of the child, Marital status, Educational status, Number of under-5 children, Animals living in the living house, latrine availability, types of latrine, Distance between the latrine and the living house, Sources of drinking water, Distance to the water source (round trip), Presence of hand washing facilities, Waste disposal facilities, Latrine utilization, After cleaning the child's bottom, Methods to wash hands, Breastfeed after birth, After how many hours did you breastfeed, Diarrhea on feeding shows a significant association with diarrheal diseases. Based on the findings of the multiple logistic regression analysis, Educational status, Number of under-5 children Distance to the water source (round trip), Presence of hand washing facilities, and Waste disposal facilities were positively associated with diarrheal diseases.

Table 6 Bivariate and multivariate logistic regression analysis on study of Prevalence of diarrheal disease and associated factor among non-exclusive breast feeding children's in Ankober district, North shoa zone, Amhara region, Ethiopia.

Variables	Category	Diarrhea occurrences		COR (95%CI)	AOR (95%CI)	P-value
		Yes	No			
Age of child	6 -8m	20	98	1		
	9 -12m	31	57	2.67(1.39 ,5.1)		
Marital status	Married	42	104	1	1	
	Single	5	45	0.275(0.102 , 0.74)	0.22 (0.075 , 0.65)	0.006
	Divorced	3	5	1.486(0.340,6.498)	1.99 (0.41 , 9.79)	0.394
	Windowed	1	1	2.479(0.151 , 40.5)	2.98 (0.11 , 82.0)	0.52
Educational status	Illiterate	31	49	3.35(1.74 , 6.463)	3.53 (1.71 , 8.01)*	0.001
	Literate	20	106	1	1	
Number of under 5 children	<=1	36	134	1	1	
	>1	16	21	2.92 (1.38 , 6.17)	3.41 (1.71 , 7.31)*	0.005
Animals living from the living house	Yes	7	10	2.31(0.83 ,6.42)		
	No	44	145	1		
Latrine availability	Yes	42	152	1		
	No	3	9	10.8 (2.81 , 41.9)		
Types of latrine	Improved	5	33	1		
	Unimproved	37	119	2.05 (0.75 , 5.63)		
Distance between the latrine and the living house	<6 minutes	10	61	1		
	6 – 10 minutes	24	77	1.9 (0.85 , 4.28)		
	>10 minutes	8	14	3.49 (1.17 , 10.43)		
Sources of drinking water	Protected	35	89	1		
	Unprotected	16	66	0.15 (0.32 , 1.25)		
Distance to	<=15 minutes	17	109	1		

water source/round trip/	>15 minutes	34	45	4.7 (2.41 , 9.32)		
Presence of hand washing facilities	Yes	6	48	1	1	
	No	45	107	3.36 (1.34 ,8.42)	3.14(1.01 , 9.78)*	0.048
Waste disposal facilities	Yes	2	21	1	1	
	No	49	134	3.84 (0.87 , 16.9)	4.93(1.38 , 17.7)*	0.014
Latrine utilization	Yes	39	141	1		
	No	12	14	3.01 (1.35 , 7.24)		
After cleaning of child bottom	Yes	37	101	1		
	No	14	54	3.59 (1.58 , 8.17)		
Methods to wash hands	Soap & water	3	33	1		
	Only Water	48	122	4.33 (1.26 , 14.78)		
Breast feed after birth	Yes	26	129	1		
	No	24	26	4.58(2.28 , 9.20)		
After how many hours did you breast-fed	Within 1hr	26	129	1		
	After 1hr.	24	26	4.58(2.28 , 9.20)		
Diarrhea on feeding	Stop feeding	26	129	2.55 (1.18 , 5.54)		
	Continue feeding	24	26	1		

*statistically significant at $P < 0.05$

On the other hand, to see the influence of each independent variable, including both mothers with exclusive and non-exclusive breastfeeding children, on diarrheal diseases, an ordinary binary logistic analysis was fitted. From the binary logistic regression Age of child, Educational status, Number of under-5 children, Animals living in the living house, Distance to the water source (round trip), Presence of hand washing facilities, Waste disposal facilities, Latrine utilization, Methods to wash hands, Breastfeed after birth, After how many hours did you breastfeed? Diarrhea on feeding and breast-feeding status were found to have significant associations with diarrheal diseases in both groups.

The age of children was significantly associated with the occurrence of diarrhea. Children aged 9–12 months were about 2 times more likely to develop diarrhea (AOR = 2.62 [95% CI: 1.50, 4.60]) compared to children whose age was 6–8 months. The odds of developing diarrheal diseases were 30% higher for illiterate mothers when compared to literate mothers [AOR = 3.10: 1.81, 5.32]. Mothers who have more than one child under five were almost 3.30 times [AOR = 3.30: 1.78, 6.10] more likely to develop diarrheal diseases compared to those who have less than or equal to one child under five. Waste disposal facility, latrine utilization, and method to wash hands were 5.85 times [AOR=5.85: 1.91, 17.8], 4.08 times [AOR=4.08: 1.55, 10.75], and 3.47 times [AOR=3.47: 1.11, 10.9] more likely to develop diarrheal diseases than those who did not, respectively.

Table 7 Bivariate and multivariate logistic regression analysis on study of Prevalence of diarrheal disease and associated factor among exclusive and non-exclusive feeding breast feeding children’s in Ankober district, North shoa zone, Amhara region, Ethiopia

Variables	Category	Diarrhea occurrences		COR (95%CI)	AOR (95%CI)	P-value
		Yes	No			
Breast feeding Status	EBF	23	51	1		
	NON-EBF	183	155	2.62(1.53 ,4.48)		
Age of child	6 -8	28	194	1	1	0.001
	9 -12	46	144	2.21(1.32 , 3.71)	2.62 (1.50 - 4.60)*	

Educational status	Illiterate	47	112	3.51(2.08 , 5.94)	3.10(1.81, 5.32*)	0.00
	Literate	27	226	1	1	
Number of under 5 children	<=1	48	288	1	1	
	>1	26	50	3.12(1.78, 5.48)	3.30(1.78, 6.10)*	0.00
Animals living from the living house	Yes	13	19	1		
	No	61	319	3.61(1.67 , 7.63)		
Distance to water source/round trip/	<=15 minutes	23	245	1		
	>15 minutes	51	93	5.84 (3.38, 10.11)		
Presence of hand washing facilities	Yes	8	97	1		
	No	66	241	3.32(1.54, 7.21)		
Waste disposal facilities	Yes	4	79	1	1	0.002
	No	70	259	5.34(1.89 , 15.10)	5.85 (1.91 - 17.8)	
Latrine utilization	Yes	56	315	1	1	
	No	18	23	4.40(2.23 , 8.68)	4.08(1.55, 10.75)*	0.004
Methods to wash hands	Soap & water	5	85	1	1	
	Only Water	69	253	4.64 (1.8 , 11.87)	3.47 (1.11 , 10.9)*	0.034
Breast feed after birth	Yes	42	277	1		
	No	31	61	3.35 (1.95 , 5.75)		
After how many hours did you breast-fed	Within 1hr	42	277	1		
	After 1hr.	31	61	1.83(0.81 , 4.13)		
Diarrhea on feeding	Stop feeding	28	50	3.51(2.01 , 6.12)		
	Continue feeding	46	288	1		

*statistically significant at $P < 0.05$

7. DISCUSSION

This study assesses the prevalence of diarrheal diseases and their associated factors among exclusive and non-exclusive breastfed children. The prevalence of diarrhea among mothers with EBF infants was 11.2%, whereas in mothers with non-EBF infants, the prevalence was 24.8%. This finding was lesser compared with other studies that showed 90 (13%) and 14 (56%) kamashi [15] and 50 (16.9%) and 14 (56%) Omo zones [40] of exclusive and non-exclusive breastfed infants, respectively. Similarly, this report is lower than the reports of studies conducted in Southwestern Saudi Arabia, which showed 41.7% and 59.7% [3] of exclusive and non-exclusive breastfed infants, respectively.

From the findings of this study, 74 (17.96%) of children had diarrhea in the past 15 days, which is slightly higher than the result of the 2016 Ethiopian Demographic Health Survey report of 12% [43]. But it is lower than several similar studies conducted in Ethiopia: Debre Berhan referral hospital (31.7%) [27], Arba Minch, South Ethiopia (30.5%) [28]. Similarly, this report is lower than the reports of studies conducted in Cameroon (23.8%) [22], Tanzania (32.7%), and Rwanda (26.7%) [33] [24]. This discrepancy in magnitude in the above study could be due to the population difference and the differences in socio-demographic, basic environmental and behavioral characteristics of the respondents.

Children aged between 9 and 12 months were at high risk of developing diarrhea compared with children aged 6–8 months. The increased risk might be due to the decline of maternal antibodies. In addition, crawling begins at this age, further increasing potential exposure to facially contaminated environments.

The main independent variable in this study was educational status. This study reports that the odds of developing diarrheal diseases among mothers with exclusive and non-exclusive breastfed children were 3.10 times higher among children of mothers who had not attended education (illiterate) compared with the odds of diarrheal diseases among children whose mothers had attended formal education (literate). This is in line with other studies conducted in Arbamich district, Southern Ethiopia [28], Benishangul Gumuz region [45] and Sheko District, south-west Ethiopia [35]. Similarly, findings from India also showed a relatively higher prevalence of diarrhea among children whose mothers had no education [46].

This might be due to the fact that as educational status increases, appropriate information about environmental hygiene and sanitation practices becomes more accessible, but a low level of educational status inhibits access to appropriate information about environmental hygiene and sanitation practices.

This study, diarrhea was significantly associated with the presence of one or more under-five children in the family. This is in agreement with a study done in Arba-Minch district [47]. Gondar Zone, Northwest Ethiopia, shows that The occurrence of diarrhea was 1.82 times more likely to be higher among households with less than or equal to one-year-old children compared with households with four- to five-year-old children [32]. This might be due to the mother's inability to care for a large number of children. It is possible to suggest that childbirth spacing might have a positive influence on the prevention of diarrhea.

The result of this study also revealed that mothers who did not utilized latrines were 4.08 times more likely to develop diarrheal diseases among both study groups compared to mothers who utilized latrines properly. This serves as a breeding ground for fleas and increases the risk of diarrhea than those used in open field. The result of this study was comparable with the study findings reported from West Gojjam, Ethiopia [48] and the Kawangware Slum in Nairobi County, Kenya [49].

Another factor mentioned in this study to have a significant association with diarrheal disease for both Study groups was hand washing material [AOR= 3.47(1.11, 10.9)]. This finding is in line with studies done in south-west Ethiopia [35], Jijjiga [30], and Bangladesh [50]. Hand washing with water and soap is the most effective health intervention for reducing the incidence of diarrhea in children under the age of five [51].

Children whose mothers had no hand washing facilities around latrines were 3.14 times more likely to acquire acute diarrhea compared to their counterparts. This finding is supported by those of studies conducted in Rwanda [53], Farta district [29], Geze Gofa district [24], and Kotebe sub-city [54]. This could be because the existence and use of hand washing facilities can help prevent faecal contamination, which may lead to contamination of an infant's food and, in turn, prevent infant diarrheal morbidity.

This study found a significant association with diarrheal diseases in that mothers with non-exclusively breastfed children's had no waste disposal facility at 5.85 (1.91, 17.8). This is in agreement with studies conducted in Ethiopia's Enemy District [52], Shekko District [35], and Eastern Ethiopia [47]. The simple explanation might be that inappropriate disposal of waste provides a breeding site for insects, which may carry diarrhea pathogens from the waste to water and food.

8. Conclusion

This study demonstrates a significantly higher level of diarrhea among non-EBF infants compared to EBF infants. The occurrence of diarrhea was positively associated with maternal education, age of the child, number of under-five children, presence of hand washing facilities, presence of waste disposal facilities, latrine utilization, and methods of hand washing.

9. Recommendation

To District administrative and health office

- According to this result it is better if the district administration support female's education at least to complete primary school.
- The District Health Office should encourage the community to install a hand-washing facility nearby the latrine and waste disposal facility, motivate the community to utilize the latrine properly.

To Health workers

- Health Extension Workers should facilitate and give health information to mothers on the importance of the availability of hand-washing facilities near the latrine, waste disposal facilities, and proper latrine utilization.

To Researcher

- The researchers are better to do further investigate the impact and role of exclusive breast feeding as comprehensive package on diarrhea occurrences.

10. Strength and Limitation of the study

10.1 Strength of the study

- There might also recall bias on vaccination status, but we tried to limit recall bias by checking the card.
- Probably this is the first study in its type in the area trying to explore factors that have association with diarrhea in both EBF and NEBF infants. Hopefully, it will be a base line data for other researchers who are interested for further
- Those who had diarrhea at the time of data collection were linked to the ongoing near health center for further investigation and treatment.

10.2 Limitation of the study

- Shortage of scientific literatures on the topic especially in this study group.
- Recall bias may occurred on two weeks occurrence of diarrhea and it may under estimate the magnitude.
- The study provides insufficient evidence of causality to draw conclusions from the findings, studying with a different study design would be preferable.

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12. Annex

12.2 Annex-I

Hello how are you? I am Estifanos Assefa. Currently I am a post graduate student in Reproductive Health, Debre Berhan University, Asrat Woldeyes College of Health Sciences, and School of Public Health. Now I am conducting a research on Prevalence of diarrheal disease and associated factor among exclusive breast feed children and non-exclusive breast feed children in Ankober district, North shoa zone, Amhara region, Ethiopia. I will appreciate your participation in this study. The objective of the study is to assess Prevalence of diarrheal disease and associated factor among exclusive and non-exclusive breast feed children in Ankober district, North shoa zone, Amhara region, Ethiopia. The interview will take about 30 minutes. To effectively attain the objective of the research, I am requesting your help. For your participation in the study no payment will be granted or has no any special privilege to you. All information you give will be kept confidential and won't be accessible to any third party; your name won't be registered on the question sheet so that you will not be identified for any reason. You have the right not to participate from the beginning, or you may stop participating at any time after starting the participation. However, your honest answers to these questions will help me in better understanding of triage knowledge, skill and associated factor. Will you be willing to participate?

Yes

No

If you are pleased to participate in the study please visit the next question. For any further question, please contact the principal investigator

Principal investigator name: **Estifanos Assefa**, contact phone number **0927803135**

12.2 Annex-II

The Purpose of this study has been read to me in the language I comprehend and understand. The purpose, the benefits, risks and discomforts and confidentiality of the study has been explained to me and my questions have been addressed. I understand that: If I no longer want to take part in this study, I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary. I therefore willingly agree to take part in the study.

1, Yes; continue

2, NO; skip to the next participant

Participant signature/ finger print _____

Interviewer name _____ signature _____

Date of interview _____ Time started _____ time finished _____

Supervisor name _____ signature _____

12.3 Annex III: English Version Questionnaire

Part I: Please circle the chosen option(s) or write the appropriate answer in the space provided

Part I: Socio-demographic characteristics

Q.no	Question	Response	Remark
01	Age of child	_____ months	
02	Sex of child	1. Male 2. Female	
03	Residence	1. Urban 2. rural	
04	Marital status	1. Married 2. Single 3. Divorced 4. Windowed	

05	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Other (specify)_____	
06	Maternal age	-----years	
07	What is the educational status of the mother?	1. Illiterate 2. Read and Write 3. Primary education 4. Secondary education 5. College and above	
08	What is the occupational status of the mother?	1. Governmental employee 2. Farmer 3. Merchant 4. Daily laborer 5. Housewife 6. Other (specify)_____	
09	Monthly income	_____ETB/Month	
010	Number of under five children	_____	

Part II environmental factors

Q.no	Question	Response	Remark
011	Do animals (dogs, hens, sheep etc.) live in the same house where the members of the family live? (check by observation)	1.yes 2.No	
012	Is latrine available?	1.yes 2.No	If your response is 2 go to question NO-015
013	If the family has latrine, what type of latrine?	1.improved 2. Unimproved	
014	How far is the distance between the latrine and the living house?	_____ meters	
015	If the family has no latrine, where do you dispose human waste?	1. Open field 2. Other (specify)	
016	From where do you get water for drinking?	1.protected source 2.unprotected sources 3. Other (specify)	
017	How much minutes are needed to fetch water? (round trip)	_____ minutes	
018	Do you have hand washing facilities? (observation)	1.yes 2.No	If your response is 2 go to question NO-021
019	If yes, observe the following items are present or not	1.water only 2.water with soap 3.neither water or	

		detergent	
020	The site of hand washing facilities	1.near the latrine 2.in the home 3.other places (specify)	
021	Do you have waste disposal facilities? (observation)	1.yes 2.No	

Part III Behavioral factors

Q.no	Question	Response	Remark
022	Did you utilize latrine properly	1.yes 2.No	
023	In which condition did you wash your hand?	1. Before, during and after preparing food 2. Before eating food 3. After visiting latrine. 4. . After cleaning of child bottom 5. .other (specify)	
024	What did you use to wash your hands?	1.Soap & water 2.Only water 3.other (specify)	
025	How you disposal household solid waste?	1. Pit 2. Open field 3. Burning	

		4. Garbage can 5. Other specify	
026	How you disposal household liquid waste?	1.Dispose openly 2.Dispose privately 3.Dispose to road dish 4. Other (specify)	
027	Did you breast-feed your infant after birth?	1.yes 2.No	If your response is 2 go to question NO-30
028	After how many hours did you breast-fed?	1.with in 1hr 2.After 1hr	
029	At what age did the child start supplementary feeding in addition to breast feeding?	_____ months	
030	Is the infant weaned?	1.yes 2.No	If your response is 2 go to question NO-032
031	If weaned the age of weaning	_____ months	
032	Had the baby had diarrhea in the past 15days?	1.yes 2.No	
033	What did you do with the diarrhea on feeding?	1.stopped feeding 2.continued feeding 3. Other (specify)	
034	Where did you take your infant when	1. Health facility	

	he had diarrhea?	2. Holly water 3. Local healer 4. Other (specify)	
035	Is the child immunized?	1.yes 2.No	If your response is 2 go to question NO-037
036	If yes for question number 35 which types of vaccine the child vaccinated?	1.BCG 2.POLIO 3.ROTA 4.PCV 5.MEASLES 6. Other (specify)	
037	What type of water/food is responsible to cause diarrheal diseases?	1. Any type of water/food 2.facially contaminated water/food 3.Improperly prepared and unsafe food 4.Water/food contaminated by animals waste 5. Other (specify)	
038	Where do you get the information that contaminated water/food could transmit diarrheal disease?	1.Social media 2.Health worker 3.Community health promoter 4. Other (specify)	
039	Do you know the prevention of acute	1. vaccination	

	diarrhea?	2. exclusive Breast feeding 3. Using safe water for drinking 4. hand washing practice 5. Eating properly handled food 6. latrines facility 7 other (specify)	
--	-----------	---	--

This is all what we want to ask you. Thank you for spending your time and valuable information you gave us. Do you have any question that we can address for you?

Supervisor's Name _____ Signiture _____ Date _____

THANK YOU!!!

12.1 አባራ-I

ሰላም እንዴት ነህ/ሽ? እኔ እስጢፋኖስ አሰፋ ። በአሁኑ ጊዜ በስነ ተዋልዶ ጤና፣ በደብረ ብርሃን ዩኒቨርሲቲ፣ በአስራት ወልደየስ ጤና ሳይንስ ኮሌጅ እና በህብረተሰብ ጤና ትምህርት ቤት የድህረ ምረቃ ተማሪ ነኝ። አሁን በአማራ ክልል ሰሜን ሸዋ ዞን አንኮበር ወረዳ የተቅማጥ በሽታ ስርጭት እና ተያያዥነት ባላቸው የጡት ማጥባት ህጻናት እና ልዩ ያልሆኑ የጡት ማጥባት ህጻናት ላይ ጥናት እያደረግሁ ነው። በዚህ ጥናት ውስጥ ተሳትፎዎን አደንቃለሁ። የጥናቱ ዓላማ በአማራ ክልል ሰሜን ሸዋ ዞን አንኮበር ወረዳ በልዩ ሁኔታ የጡት ማጥባት ህጻናት እና ልዩ ያልሆኑ ህጻናት የተቅማጥ በሽታ ስርጭት እና ተያያዥ ምክንያቶችን ለመገምገም ነው። ቃለ መጠይቁ 30 ደቂቃ ያህል ይወስዳል። የጥናቱን ዓላማ በብቃት ለመድረስ፣ የእርስዎን እገዛ እጠይቃለሁ። በጥናቱ ውስጥ ለሚያደርጉት ተሳትፎ ምንም አይነት ክፍያ አይሰጥዎትም ወይም ለእርስዎ ምንም ልዩ መብት አይኖረውም. ሁሉም የሚሰጡት መረጃ በሚስጥር ይጠበቃል እና ለማንኛውም ሰነድ ወገን ተደራሽ አይሆንም። በምንም ምክንያት እርስዎ እንዳይታወቁ ስምዎ በጥያቄ ወረቀቱ ላይ አይመዘገብም። ከመጀመሪያው የመሳተፍ መብት አልዎት፣ ወይም ተሳትፎውን ከጀመሩ በኋላ በማንኛውም ጊዜ መሳተፍ ማቆም ይችላሉ። ነገር ግን፣ ለእነዚህ ጥያቄዎች የሰጠሃቸው ታማኝ መልሶች ስለ መለዩ እውቀት፣ ችሎታ እና ተያያዥ ሁኔታዎችን በተሻለ እንድረዳ ይረዱኛል። ለመሳተፍ ፈቃደኛ ትሆናለህ?

አዎ

አይ

በጥናቱ ለመሳተፍ ደስተኛ ከሆኑ እባክዎ ቀጣዩን ጥያቄ ይጎብኙ። ለማንኛውም ለተጨማሪ ጥያቄ፣ እባክዎን ዋናውን መርማሪ ያነጋግሩ

የዋና መርማሪ ስም፡ እስጢፋኖስ አሰፋ
ስልክ ቁጥር 0927803135

12.2 አባሪ-II

የዚህ ጥናት ዓላማ በተረዳሁት እና በምረዳው ቋንቋ ተነበበኝ። የጥናቱ ዓላማ፣ ጥቅሞች፣ ጉዳዮች እና ምቹዎች እና በሚስጥር ተብራርተውልኛል እና ጥያቄዎች ተስተካክለዋል። ይህን ተረድቻለሁ። በዚህ ጥናት መሰረት ካልፈለግኩ ማብራሪያ ሳልሰጥ በማንኛውም ጊዜ ራሴን ማቋረጥ እችላለሁ እና በዚህ ጥናት ውስጥ መሰረተኛ በፈቃደኝነት ብቻ ነው። ስለዚህ በጥናቱ ለመሰረተኛ ፈቃደኛ ነኝ።

1, አዎ; ቀጥል

2, አይ; ወደ ቀጣዩ ተሳታፊ ይዘለሉ

የተሳታፊ ፊርማ/ የጣት ህትመት _____

የጠያቂው ስም _____ ፊርማ _____

የቃለ መጠይቁ ቀን _____ የተጀመረበት ሰዓት _____ አልቋል _____

የተቆጣጣሪ ስም _____ ፊርማ _____

12.3 አባሪ III: የአማርኛ ቅጂ መጠይቅ

ክፍል አንድ: እባክህ የተመረጠውን አማራጭ(ዎች) አክብብ ወይም ተገቢውን መልስ በተዘጋጀው ቦታ ጻፍ

ክፍል አንድ:- ማህበራዊና ስነ-ሕዝብ ባህሪያት፣ የሚመለከት መጠይቆች

ጥ.ቁ	ጥያቄዎች	ምላሽ	
01	የልጅሽ ዕድሜ ስንት ነው?	_____ ወር	
02	የልጅሽ ጾታ	1. ወንድ 2. ሴት	
03	የመኖሪያ ቦታ	1. ከተማ 2. ገጠር	
04	የጋብቻ ሁኔታ	1. ያገባ	

		<ul style="list-style-type: none"> 2. ነጠላ 3. የተፋታ 4. ባል የሞተባት 	
05	ሃይማኖት	<ul style="list-style-type: none"> 1. አርቶዶክስ 2. ፕሮቴስታንት 3. ሙስሊም 4. ካቶሊክ 5. ሌላ (ይግለጹ) _____ 	
06	የልጅ እናት ዕድሜ	_____ ዓመት	
07	የእናትየው የትምህርት ደረጃ ምን ይመስላል?	<ul style="list-style-type: none"> 1. መሃይም 2. ማንበን እና መጻፍ የሚችል 3. የመጀመሪያ ደረጃ ትምህርት 4. የሁለተኛ ደረጃ ትምህርት 5. ኮሌጅ እና ከዚያ በላይ 	
08	የእናትየው የስራ ሁኔታ?	<ul style="list-style-type: none"> 1. የመንግስት ሰራተኛ 2. ገበሬ 3. ነጋዴ 4. የቀን ሰራተኛ 5. የቤት እመቤት 6. ሌላ (ይግለጹ) _____ 	

09	የወር ገቢ	_____ ብር/ወር	
010	ከአምስት በታች የሆኑ ልጆች ቁጥር	_____	

ክፍል II የአካባቢ ሁኔታዎች

ጥ.ቁ	ጥያቄዎች	ምላሽ	
011	እንስሳት (ውሾች፣ ዶሮዎች፣ በግ ወዘተ) የሚኖሩት የቤተሰብ አባላት በሚኖሩበት ቤት ውስጥ ነው? (በመመልከት ያረጋግጡ)	1.አዎ 2.አይ	
012	መጻዳጃ ቤት አለ?	1.አዎ 2.አይ	የእርስዎ (ምላሽ 2 ከሆነ ወደ ጥያቄ ቁጥር-014 ይሂዱ)
013	ቤተሰቡ መጻዳጃ ቤት ካለው፣ ምን አይነት መጻዳጃ ቤት ነው?	1. ተሻሻለ መጻዳጃ ቤት 2. የተለምዶ መጻዳጃ ቤት	
014	ቤተሰቡ መጻዳጃ ቤት ከሌለው የሰውን ቆሻሻ የት ነው የምታስወግደው?	1. ክፍት ቦታ 2. ሌላ (ይግለጹ)	
015	በመጻዳጃ ቤት እና በመኖሪያ ቤት መካከል ያለው ርቀት ምን ያህል ነው?	_____ ሜትር	
016	ለመጠጥ ውሃ ከየት ታገኛላችሁ?	1.የተጠበቀ ምንጭ 2. ያልተጠበቁ ምንጮች 3. ሌላ (ይግለጹ)	

017	ውሃ ለመቅዳት ምን ያህል ደቂቃዎች ያስፈልጋሉ? (ደርሶ መልስ)	_____ ደቂቃ	
018	የእጅ መታጠቢያዎች አሉዎት?(በመመልከት ያረጋግጡ)	1.አዎ 2.አይ	(የእርስዎ ምላሽ 2 ከሆነ ወደ ጥያቄ ቁጥር-21 ይሂዱ)
019	አዎ ከሆነ, የሚከተሉትን እቃዎች መኖራቸውን ወይም አለመሆኑን (በመመልከት ያረጋግጡ)	1. ውሃ ብቻ 2.ውሃ በሰሙና 3. ውሃም ሆነ ሰሙና የለም	
020	የእጅ መታጠቢያዎች ቦታ	1. ሽንት ቤት አጠገብ 2. በቤት ውስጥ 3. ሌሎች ቦታዎች (ይጥቀሱ)	
021	የቆሻሻ ማስወገጃ መሳሪያዎች አሉዎት? (በመመልከት ያረጋግጡ)	1.አዎ 2.አይ	

ክፍል III የባህርይ ምክንያቶች

ጥ.ቁ	ጥያቄዎች	ምላሽ	
022	ሽንት ቤትን በአግባቡ ይጠቅማሉ(በመመልከት ያረጋግጡ)	1.አዎ 2.አይ	
023	በየትኛው ሁኔታ ነው	1. ምግብ ከማዘጋጀት በፊት,	

	እጅዎን የሚያጥቡት?	<ol style="list-style-type: none"> 1. ጊዜ እና በኋላ 2. ከመብላቱ በፊት 3. መጻፍት ቤት ከገበኝ በኋላ 4. የሕፃኑን የታችኛው ክፍል ካጸዱ በኋላ 5. ሌላ (ይግለጹ) 	
024	እጅዎን ለመታጠብ ምን ይጠቀማሉ?	<ol style="list-style-type: none"> 1. ሰሙና እና ውሃ 2. ውሃ ብቻ 3. ሌላ (ይግለጹ) 	
025	የቤት ውስጥ ቆሻሻን እንዴት እንደሚያስወግዱ?	<ol style="list-style-type: none"> 1. ጉድጓድ 2. ክፍት ሜዳ 3. መቃጠል 4. ቆሻሻ ማጠራቀሚያ 5. ሌሎች 	
026	የቤት ውስጥ ፈሳሽ እንዴት እንደሚያስወግዱ?	<ol style="list-style-type: none"> 1. በግልጽ አስወግዱ 2. በግል አስወግዱ 3. ወደ መንገድ ዲሽ 4. ሌላ (ይግለጹ) 	
027	ከወለዱ በኋላ ልጅዎን ጡት አጠቡት?	<ol style="list-style-type: none"> 1. አዎ 2. አይ 	<p>የእርስዎ</p> <p>(ምላሽ 2</p> <p>ከሆነ ወደ</p>

			ጥያቄ ቁጥር-29
028	ከስንት ሰአት በኋላ ጡት አጠቡ?	1.በሰዓታት1ሰአት ውስጥ 2.ከ1ሰአት በኋላ	
029	ህጻኑ ከጡት ማጥባት በተጨማሪ ተጨማሪ ምግብ መመገብ የጀመረው በየትኛው እድሜው ነው?	----- ወር	
030	ህጻኑ ጡት ጥሏል?	1.አዎ 2.አይ	የእርስዎ (ምላሽ 2 ከሆነ ወደ ጥያቄ ቁጥር-32 ይሂዱ)
031	ጡት የጣለው በስንተኛ ወፍ ነው?	----- ወር	
032	ህጻኑ ባለፉት 15 ቀናት ውስጥ ተቅማጥ ነበረው?	1.አዎ 2.አይ	
033	ህጻኑን የአመጋገብ ሁኔታ ከተቅማቱ ጋር ምን አረጉት?	1. መመገብ አቁሟል 2.የቀጥለ መመገብ 3. ሌላ ካለ (ይግለጹ)	
034	ልጅዎ ተቅማጥ ሲይዝ የት ወሰዱት?	1. የጤና ተቋም 2. ጸበል 3. የአካባቢ ፈዋሽ	

		4. ሌላ (ይግለጹ)	
035	ልጁ ክትባቱ ወስዷል?	1.አዎ 2.አይ	የእርስዎ (ምላሽ 2 ከሆነ ወደ ጥያቄ ቁጥር- 037ይሂዱ)
036	አዎ ከሆነ ለጥያቄ ቁጥር 35 ልጁ የተከተበው የትኛውን የክትባት አይነት ነው?	1.BCG 2.ፖሊዮ 3.ROTA 4. PCV 5.MCV 6. ሌላ (ይግለጹ)	
037	የተቅማጥ በሽታዎችን መንስኤ ምን ዓይነት ውሃ ነው?	1. ማንኛውም አይነት ውሃ 2. በሰገራ የተበከለ ውሃ 3. በእንስሳት የተበከለ ውሃ 4. ሌላ (ይግለጹ)	
038	መረጃውን ከየት አገኙት የተበከለ	1. ማህበራዊ ሚዲያ	

	<p>ውሃ/ምግብ የተቆማጥ በሽታ ሊያስተላልፍ እንደሚችል?</p>	<p>2. የጤና ሰራተኛ</p> <p>3. የማህበረሰብ ጤና አራማጅ</p> <p>4. ሌላ (ይግለጹ)</p>	
039	<p>አጣዳፊ ተቆማጥ እንዳይከሰት መከላከል የምትችለው እንዴት እንደሆነ ታውቃለህ?</p>	<p>1. ክትባት</p> <p>2. የእናት ጡት ብቻ ማጥባት</p> <p>3. ንጹህ ውሃ ለመጠጥ መጠቀም</p> <p>4. የእጅ መታጠብ ልምምድ</p> <p>5. በተገቢው መንገድ የተያዘ ምግብ መመገብ</p> <p>6. መጸዳጃ ቤት</p> <p>7. ሌላ (ይግለጹ)</p>	

ልንጠይቅህ የምንፈልገው ይህ ብቻ ነው። ጊዜህን እና ጠቃሚ መረጃዎችን ስለሰጠኸን እናመሰግናለን። ልንነግርዎ የምንችል ማንኛውም ጥያቄ አለዎት?

የተቆጣጣሪው ስም _____ ፊርማ _____ ቀን _____

አመሰግናለሁ!!!

12.4 Annex IV: Declaration

I, the undersigned, hereby declare that the work entitled “prevalence of diarrheal disease and its associated factors among exclusive and non-exclusive breast feed children’s in Ankober district, north shoa zone, Amhara region, Ethiopia; 2023” presented in this thesis work is original. It has not been presented to any other university or institution. Where, the work of other people has been used, reference has been provided. In this regard, I declare this work to be my unique work.

Name and signature of the investigators

Name

Signature

Date
