

TIME TO STOP EXCLUSIVE BREASTFEEDING AND ITS DETERMINANTS AMONG
EMPLOYED AND UN-EMPLOYED MOTHERS OF 6-12 MONTHS OF AGE INFANTS IN
DEBRE-TABOR TOWN, NORTH WEST ETHIOPIA



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Time to stop exclusive breastfeeding and its determinants among employed and unemployed mothers of 6-12 months' of age infants in Debretabor town, Amhara region, south Gondar zone, north west Ethiopia, community based comparative cross sectional study

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ABSTRACT

Background; Exclusive breastfeeding is feeding an infant with only breast milk for the first six months of life, excluding solids or any other fluids including infant formulas except medicines, vitamins and minerals. Early discontinuation of breastfeeding is known to be associated with avoidable childhood morbidity. Various studies have been conducted on prevalence of exclusive breast feeding and associated factors. However, the impact of maternal employment on the duration of exclusive breastfeeding and its determinants has not been addressed adequately in Ethiopia.

Objective; The aim of this study was to compare time to stop EBF and its determinants among employed and unemployed mothers of 6-12 months 'of age infants in Debretabor town, north west Ethiopia.

Method; A community based comparative cross sectional study was conducted from march 1 - 30,2019. A total of 426 mothers were recruited using simple random sampling technique. Kebeles were selected by lottery method and study participants were selected by table of random numbers Interviewer administered questionnaire was used to collect data. Data were entered to epi data version 3.1 and exported to SPSS version 23 for analysis. The Kaplan-Meier curve with log rank test was used to compare difference in cessation of exclusive breastfeeding before 6 months. Bivariate and multivariate Cox proportional hazards model were estimated to measure the strength of association

Results; A total of 426(213 employed and 213 un employed) mothers were interviewed. The median duration of exclusive breast feeding was 4 months and 6 months for children of employed& unemployed mothers respectively. Employed mothers(AHR=3.77,95%CI=(2.4,5.9)), mothers who had paid maternity leave of 4 months(AHR=7,95%CI=2.2,22.2), primipara mothers (AHR=1.5,95%CI=(1.14,2.04)) who did not have family support of EBF(AHR=3.99,95%CI=(1.9,8.3)), and mothers who had no EBF counseling during PNC(AHR=7.76,95%CI=(2.99,20.1)) were more likely to cease EBF before six months of life.

Conclusion; The median duration of exclusive breast feeding was shorter among employed mothers than un-employed mothers. Providing enabling conditions like breast feeding corners at work place, flexible work hours and breast-feeding breaks are needed to improve rate of exclusive breastfeeding among employed women.

Key words; Exclusive breast feeding, cessation of EBF before 6 months, Employment, Debretabor town

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ACRONYMS AND ABBREVIATIONS

AHR	Adjusted Hazard Ratio
ANC	Ante Natal Care
BCC	Behavioral Change Communication
CI	Confidence Interval
CHR	Crude Hazard Ratio
DDS	Dietary Diversity Score
IYCF	Infant and Young Child Feeding
EBF	Exclusive Breast Feeding
LMICs	Lower and Middle Income Countries
LR	Likelihood Ratio
PNC	Post Natal Care
SD	Standard Deviation
SDG	Sustainable Development Goal
UNICEF	United Nations Children's Fund
WHO	World Health Organization

1.INTRODUCTION

1.1. Background

Infant and young child feeding(IYCF) is critical for Child health and survival. World Health Organization(WHO) defines exclusive breastfeeding as feeding an infant with only breast milk for the first six months of life, excluding solids or any other fluids including infant formulas) except medicines, vitamins and minerals(1). It is recommended that infants should be exclusively breast fed for the first six months of life to achieve optimal growth, development and health(1).

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development during the first six months(2). It is the natural first food for babies, providing all the energy and nutrients that the infant needs for the first six months of life , up to half or more of child's nutritional needs during the second half of the first year and up to one third during the second year of life (2).Beyond survival, breastfeeding boosts children's brain development and provides protection against overweight and obesity(3) .Breast milk has nutritional, immunological, biochemical, anti-allergic, anti-infective, intellectual, developmental, psychological, psychosocial, economic and environmental benefits for the mother and her infant .Infants who are exclusively breastfed for six months experience less morbidity ,reduced risk of all-cause mortality than those who are mixed breastfed as of three or four months (4).

Despite numerous global initiatives on breast-feeding, trend data show exclusive breast-feeding rates are stagnated. Employment status and associated employment practices adversely impact on breastfeeding duration(5) .Worldwide, many women spend significant amounts of time separated from their children during the first year of life because of formal employment or education(6).

Mothers' employment has increased rapidly due to increased household income demand as a result of increased prices of food. Thus apart from household responsibilities, many women are now employed outside the home to earn income for their families(7). Income earned from maternal employment is associated with the purchase of higher-quality foods(5).However, full-time employment may limit the ability of women to breast-feed their children, considering women without maternity leave, those who work long hours outside the home, those who

perform physical labour or those without work place protections, such as breaks for breast feeding(8).

The workplace, a significant part of the breastfeeding mother 's external environment (exosystem), can be viewed as its own ecosystem. The breastfeeding mother (microsystem), with unique characteristics and behaviors, is at the center of the workplace ecosystem. Breastfeeding at work moves an intimate interpersonal relationship into a broader socio physical ecosystem. However, mothers face numerous obstacles when they combine lactation and employment, a combination that presents a challenge for them to achieve optimal breastfeeding duration(9).

In another way workplace setting support significantly influences an individual woman's ability to successfully sustain breastfeeding or lactation. A supportive work environment can help women continue breastfeeding(10).Supporting employed women to continue breastfeeding has the potential to impact such critical issues as the health of mothers and children, employee retention and productivity, and cost savings to business and society(11).

There is a consistent correlation across studies between the duration of breastfeeding and the duration of time away from work (12). Breastfeeding rates decrease as women return to work. Returning to work affects duration of EBF. Working women are less likely to breastfeed and breastfeed for a shorter amount of time compared to women who are not working (10). Professional working mothers find it difficult to exclusively breastfeed their babies .One barrier women face is the lack of breastfeeding supportive work environment(13).

Aspects of the workplace is potentially important in maintaining breastfeeding rates among working mothers. Among the most cited workplace characteristics are the availability of on-site nurseries, extended breaks, facilities to express and store milk, lactation rooms and lactation consultants or programmes(14).

1.2. Statement of problem

Early discontinuation of breastfeeding is known to be associated with avoidable childhood morbidity and mortality as well as high levels of parity and avoidable pregnancies(15). Not being exclusively breastfed during the first six months of life is the most important risk factor for childhood morbidity and mortality, including the life-long impacts of poor school performance, reduced productivity, and impaired intellectual development(16).

It is estimated that globally 11.6% of deaths of children under five years of age are attributable to sub optimal breastfeeding practices(17). Globally every year more than 10 million children under the age of five years die, mainly from one of a short list of causes which already can be prevented through successful base of exclusive breastfeeding. On average, infants younger than six months who are not breastfed are 3-4 times more likely to die than those who received any breastmilk(18). It is estimated that over 820,000 children under the age of five (the vast majority of whom are under six months of age) and 20,000 women each year die as a result of not breastfeeding and suboptimal breastfeeding practices (19).

Moreover, the failure to support women to optimally breastfeed is costing countries billions of dollars in losses to their economies. As a result economic losses lead to higher mortality in women and children, higher healthcare costs as a result of increased illnesses and disease, and lost future wages for individuals as a result of reduced cognitive capacity in children who are not breastfed in accordance with global recommendations (19). In spite of the well-recognized importance of exclusive breastfeeding, the practice is not wide spread in the developing world and increase in the global level is still very modest with much room for improvement(20). High-income countries have shorter breastfeeding duration than do low-income and middle-income countries. However, even in low-income and middle-income countries, only 37% of infants younger than 6 months are exclusively breastfed(21).

The problem of malnutrition begins early in life, primarily during the first 12 months when growth faltering takes hold due to sub-optimal infant feeding practices(22). Early nutritional deficits are also linked to long-term impairment in growth and health. Malnutrition during the first 2 years of life causes stunting, leading to the adult being several centimeters shorter than his or her potential height (23). In Ethiopia, only 58% of children under age 6 months are exclusively breastfed, and the percentage of exclusive breastfeeding declines with age from 74%

in 0-1 months to 36% in 4-5 months. The median duration of exclusive breastfeeding, the time by which half of children have stopped exclusive breastfeeding, is 3.1 months(24).

Studies show that maternal employment in the first 6 months after the birth, has been identified in a number of studies as an important factor to the continuation of EBF((25),(26),(27)). Countries that provide mothers with paid maternity leave greater than six months also report some of the world's highest exclusive breastfeeding duration and rates(28).

Many studies warn that lack of breastfeeding support in the workplace was a significant barrier for continued breastfeeding among employed women(29). Maternal employment is the most frequent barrier to exclusive breastfeeding(30). A woman's ability to breastfeed is markedly reduced when she returns to work, if breastfeeding breaks are not available, quality infant care near her workplace is inaccessible or unaffordable, and no facilities are available for pumping or storing milk(31). The longer the length of mother's working hours, the less likely the mothers breastfed their children for at least 4 months(32). Women who self-defined as a housewife or as unemployed were more likely to practice EBF than woman who had formal employment (8). Women who returned to work had a 51.8 % lower likelihood of practicing EBF than those who did not(33).

In Ethiopia, the maternity leave offered during the postpartum period could affect working mothers not to exclusively breastfeed for the first six months(34). Maternal employment affects child caring time and is reported to be the major reason for low rates of EBF and also the lower duration of breastfeeding(35). Studies indicate that significant difference (21–27%) was observed between employed and unemployed mothers on the practice of exclusive breastfeeding(36,37).

Various studies have been conducted on prevalence of exclusive breast feeding and associated factors. Even though differences in breast-feeding rates between employed and non-employed mothers have been reported little, it is unclear whether and how factors in the workplace impact on breast-feeding duration among employed mothers. Impact of maternal employment on the duration of exclusive breast feeding and its determinants has not been addressed well in Ethiopia, and there is no study on determinants of duration of EBF among employed and non employed mothers in the study area in particular. This study was aimed to compare duration of EBF among employed and non employed mothers, and its determinants.

1.3. Significance of the study

Since breast feeding practice has been recognized as a key priority of Ministry of Health and national strategy on IYCF, this study will add information on existing breast feeding practices of the mothers. It will also show how factors in the workplace impact on breast-feeding duration among employed mothers.

Having the information about the impact of maternal employment on the duration of exclusive breast feeding, will help community, government and other stakeholders to plan on activities that enhance breast feeding practice of future generation. By investigating the duration of EBF and its associated factors in comparison with women's employment status, this study will give evidence for policy makers to revise time given maternity leave and to plan on it. This study will also contribute for sustainable development goals and other child survival strategies.

Hence, this study will provide evidence for program designers, planners, policy makers, implementers and other agencies working in child nutrition programs specific to time to stop exclusive breast feeding in comparison with maternal employment status.

2. LITERATURE REVIEW

2.1. Exclusive breast feeding practice, duration and maternal perception

Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential while Poor nutrition increases the risk of illness(38).The first two years of life provide a critical window of opportunity for ensuring children's appropriate growth and development through optimal feeding(39).

Data from fifty-three WHO European Member States revealed that, exclusive breastfeeding rates declined considerably after 4 months, and were low in infants under 6 months and at 6 months of age. Breastfeeding practices within the WHO European Region, especially exclusive breastfeeding rates, are far from complying with the WHO recommendations(40).

Litration review conducted on factors that positively influence breastfeeding duration to 6 months, shows that modifiable factors that influence breastfeeding duration are: breastfeeding intention, and breastfeeding self-efficacy. The research evidence makes clear that the woman's sense of her own breastfeeding self-efficacy is crucial to her continuing to breastfeed (41). Maternal perceptions of insufficient breast milk supply, socio cultural factors such as maternal and significant others believe about infant feeding constitute strong barriers to exclusive breast feeding(30).

According to a meta-analysis on prevalence of key breastfeeding indicators in 29 sub-Saharan African countries, the overall prevalence of early initiation of breast feeding varied between a lowest of 37.84% in Central Africa to a highest in Southern Africa; the overall prevalence of exclusive breast feeding ranged between a lowest of 23.70% in Central Africa to a highest of 56.57% in Southern Africa; the overall prevalence of predominant breast feeding ranged between a lowest of in East Africa and a highest of 46.37% in West Africa(42).

Result of systematic review and meta-analysis on effectiveness of community-based peer support for mothers to improve their breastfeeding practices shows that in low and middle-income countries, compared to usual care, community-based peer support increased exclusive breastfeeding at 3 months, at 5 months and at 6 months(43). In India the median duration of exclusive breast feeding in India was 6 months(44). A study conducted in sirilanka,the median duration of exclusive breast feeding duration was 4 months , the rates of exclusive breast feeding at 4 and 6 months were 61.6% and15.5 % respectively (45). A study conducted in Xinjiang,

China indicates that the average 'exclusive breastfeeding' duration in was 1.8 months(46). In another study in China, Hong Kong, breast-feeding duration rates were 11.1%, 10.3%, 10.7% and 26.7%, for the 'within 01 week', '1–3 weeks', '4–6 weeks' and '46 weeks 'groups(47).

A study conducted in Brazil showed that, the median duration of exclusive breast feeding duration was 60 days(48). In China, Kinshasa, median duration of exclusive breast feeding is 10.9 weeks, at 6 months 2.8%of infants were exclusively breast fed(49). A study done in Kristiansand, Norway, revealed that 5% of the infants were introduced to solid food before 4 months of age, while 14% were not introduced to solid food at 5.5 months of age(50). A study conducted in Bangladesh shows that the observed mean duration of breastfeeding was 27.5 months regardless of the level of parity.

In Nigeria, Among women, 44 % who cited a family environment of positivity towards EBF practiced EBF, while only 29 % of those who perceived a negative family attitude towards EBF practiced EBF(51).

In Ethiopia, result of a study conducted in Ankesha Gugsu district, Awi zone, shows that Cessation of exclusive breast-feeding was 69.3%. From these, 57.1% happened before six months, while 37.0% and 5.9% occurred at six months and after six months of age of the infant respectively. The median time for infants to stay on exclusive breast-feeding was 6.36 months in rural and 5.13 months in urban(52).

A study conducted in Debre-markos, Ethiopia, shows that he proportion of women breastfeeding until 2 years was 13.70 per 1000 person- months(53). Another study in this area revealed 34.95% of mothers were exclusively breastfed their children as per recommended standard(54). A study in Afar revealed that, exclusive breast feeding under six months was practiced by 81.1 %of mothers of infants less than six months (55).

A study conducted in Injibara town shows, the prevalence of exclusive breastfeeding was 44% and 65% among employed and unemployed mothers respectively(36). According to a study conducted in Gondar town, the mean duration of mothers to exclusively breastfeed was 4.77 months(37).

According to a study conducted in southern Ethiopia, Gurage, the median duration of exclusive breastfeeding was six months. About 21.9% of women introduced complementary food before six months of child age(56).

study done in Gondar town revealed that poor knowledge of EBF was negatively associated among employed mothers(37). Belief of breast milk sufficiency was one of determinant factor for cessation of EBF before 6 months according to a study done in Injibara(36) town and Gurage zone(56).

2.2. Determinants of time to stop exclusive breast feeding

2.2.1. *Socio demographic and economic factors*

Studies revealed that multiparous mothers had longer intended duration of breastfeeding duration. Multiparous women were more likely to breast feed through 6 months. Multiparous mothers had a significantly lower hazard of stopping exclusive breast feeding (HR=0.66,(57). In Bangladesh, age, age at the time of marriage, religion, the level of education of the mother, the geographic region of residence and parity were important predictors of early cessation of breastfeeding(15).High paternal education level (AOR: 2.68; 95% CI: 1.11– 6.48) was one of the determinant factor(58)

A shorter duration of breastfeeding was significantly associated with younger maternal age, non-tertiary education, Irish nationality according to a study conducted in Ireland(59). Introduction of solid food before 4 months of age was associated with the infant not being exclusive breastfed the first month, receiving only formula milk at 3 months, the mother being younger, not married/cohabitant, smoking, less educated and having more economic difficulties(50).

A study conducted in Al-Hassa, revealed that maternal occupation was not observed to be a barrier to prevent mothers from breast feeding but affected the duration and frequency of breast feeding per day and the health status of babies (60). In Gurage zone, women with education status of diploma and above were more likely to cease exclusive breastfeeding before six months of child age (56)

In Ethiopia ,Awi zone, maternal and paternal occupation, place of residence and birth order of the index infant were significant predictors of cessation of exclusive breastfeeding(52). According to a study in Debre markos number of children, family income, and place of delivery were the other significant predictors of time to cessation of breastfeeding(53). A study conducted

in Gondar revealed that parity of three children and above, was positively associated with exclusive breastfeeding while wealth index of the medium level was negatively associated among employed mothers(37). According to a study done in Injibara town, Place of birth and maternal age of 18-23 were independently predictors of exclusive breastfeeding among employed mothers(36).

2.2.2. Health service, family and gynecologic related factors

A study conducted in Indonesia showed that a significant relation found between the level of partner support and practice of exclusive breast feeding/ $p=0.017$ /and respondents were dominated by their mothers (61). In Nepal, having friends who exclusively breastfed had a positive impact on the EBF practices of(62). Adequate family support for breastfeeding (OR: 2.86; 95% CI:1.25–6.53)was significantly associated with the practice of exclusive breastfeeding among working mothers(58).

In Ethiopia ,Awi zone, postnatal counseling on exclusive breast-feeding, mode of delivery were significant predictors of cessation of exclusive breast-feeding(52).In Debre markos, place of delivery was one of the significant predictors of time to cessation of breastfeeding(53). A study done in Gondar town showed that having social support was positively associated with exclusive breastfeeding (37).Religious fathers support of exclusive breastfeeding was one of independently predictors of exclusive breastfeeding among employed mothers in Injibara town(36). In Gurage zone, women who had infant feeding counseling during postnatal care were less likely to cease exclusive breastfeeding before the child was six months of age(56).

In Bangladesh, employment status, was one of determinant factors of early cessation of breastfeeding(15). According to a study conducted in Turkey, Adana, maternal employment increased the risk of lack of exclusive breastfeeding in the first six months by 12.39-fold(63).

Study in UK shows that, mothers employed part-time or self-employed were more likely to breast-feed for at least 4 months than those employed full-time. The longer a mother delayed her return to work postpartum, the more likely she was to breast-feed for at least 4 months(64). Result from three National Nutrition Surveys in Mexico shows that, maternal formal employment was negatively associated with breastfeeding in Mexican mothers with infants under 1 year. Formally employed mothers were 20 % less likely to breastfeed compared to non-

formally employed mothers and 27 % less likely to breastfeed compared to unemployed mothers(65).

According to a study conducted in Dhaka ,78% working mothers were continued exclusive breast feeding up to 3 months±15 days but at the age of 6 months±15 days only 21% babies were continued exclusive breast feeding. On the other hand, at the age of 3 months ±15days 66% and at 6 months ±15days of age 45% babies of housewife mothers were continued exclusive breast feeding(66). A study conducted in Efutu Municipal, Ghana, shows that a significant difference in exclusive breastfeeding was established between mothers in the formal (16%) and informal (84%) sectors of employment. This study showed that there was a significant difference in breastfeeding frequency between mothers in the formal (9%) and informal (91%) sectors of employment. There was also a significant difference in breastfeeding frequency among respondents that go to work with their infant (64%) and those who do not go to work with their infant (36%)(67).

A study in Pakistan reported that workplace barriers as one of the main reasons for early cessation of breastfeeding among working mothers(68).

Studies revealed that factors negatively associated with exclusive breastfeeding duration were mother's going to work and using pacifier. Factors positively associated with exclusive breastfeeding duration were whether the maternal mother breastfed her children and deciding exclusive breastfeeding before delivery(46).Reasons for weaning breast feeding were insufficient breast milk(32.7%), tiredness and fatigue (39.7%) and return to work (29.6%)(47).In Ireland, mothers whose maternity leave was between seven and 12 months 3 times more breast fed for a longer duration compared to mothers who had less than six months of maternity leave(59).

In Ethiopia, Debre- markos, Government employee mothers decreased the time of breastfeeding by 2.8 times compared to housewives(53). In another study in this area mother who had flexible time to express breast milk were 4.3 times more likely to exclusively breastfed as compared with those mother who did not. Those delivered mother who returned after 4 month of leave were 3.4 times more likely exclusively breastfed as compared to mother who returned after the 2 month. Job offers leave was also significantly associated with exclusive breastfeeding(54).

In Gondar town exclusive breastfeeding was higher among unemployed 48.0% than employed (20.9%) (37). In Injibara, employed mothers were 32% times less likely to breast feed exclusively than unemployed mothers, religious fathers support of exclusive breastfeeding were independently predictors of exclusive breastfeeding among employed mothers(36).

2.2. Conceptual framework

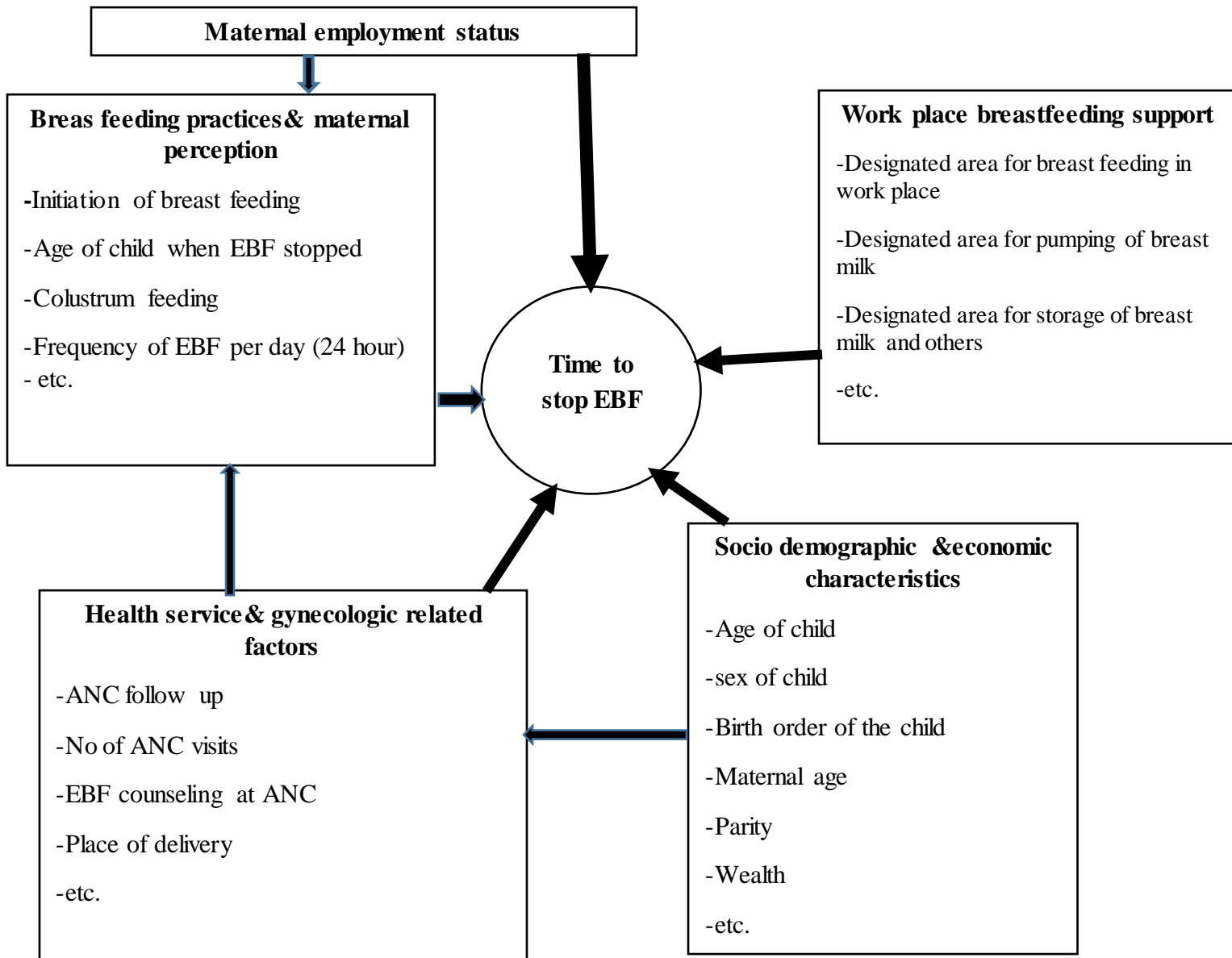


Figure 1: Conceptual framework developed by reviewing of different literatures((36),(69),(37),(56),(52)) to compare duration of exclusive breast feeding among employed and un employed mothers of 6-12 months' age infants in Debretabor town

3.OBJECTIVES

3.1. General objective

To compare time to stop EBF and its determinants among employed and unemployed mothers of 6-12 months' old infants in Debretabor town, North west Ethiopia, 2019

3.2. Specific objectives

- To compare time to stop EBF among employed and unemployed mothers of 6-12 months' old infants.
- To identify determinants of cessation of exclusive breast feeding before 6 months among employed and unemployed mothers of 6-12 months' old infants

4. METHODS AND MATERIALS

4.1. Study area and study period

4.1.1. Study area

The study was conducted in Debre tabor town. Debre Tabor town is found in South Gondar zone, Amhara Region of Ethiopia, 666 kilometers from Addis Ababa, 100 km from the capital town of Bahirdar. It has an area of 1562 hectares.

Based on the 2007 national census conducted by the Central Statistical Agency of Ethiopia (CSA), this town has a total population of 55,596, of whom 27,644 are men and 27,952 women. The climate in Debre Tabor is warm and temperate with average temperature of 14.8 °C. The town is divided into six kebeles.

4.1.2. Study period

The study was conducted from March 1 to 30 /2019

4.2. Study design

A community based comparative cross-sectional study design was employed.

4.3. Population

4.3.1. Source population

All mothers of infants aged 6-12 months in Debretabor town.

4.3.2. Study population

All randomly selected employed and unemployed mothers of 6-12 months of age infants.

4.4. Sample size determination and sampling procedure

4.4.1. Sample size determination

The sample size was calculated by Epi info statistical software version 7 using two population proportion formula. It was by calculated taking prevalence of exclusive breastfeeding among employed and un-employed mothers 44%,65% respectively from similar study which gives the largest sample size(36).With assumptions of 95% confidence level, a power of 80%, a designing effect of 2, and a 10% non-response rate, ratio of employed to unemployed 1:1; the final sample size was 426.Finally, 213 employed and 213 unemployed eligible mothers were taken.

Table1; sample size determination of employed and unemployed mothers of 6-12 months old infants Debretabor town, south Gondar zone, North west Ethiopia,2019

Variable	Confidence level	power	Prevalence		Sample Size with DE 2	Reference
			employed	unemployed		
Employment Status						
	95	80	20%	40%	401	Chekol DA,Biks GA, Gelaw YA, Melsew YA,2017
	95	80	44%	65%	426	Taddele M, Abebe L, Fentahun N,2014

4.4.2. Sampling procedure

Simple random sampling technique was used to recruit participants. First from a total of six kebeles in the town three kebeles were selected by lottery method. Survey was conducted before data collection to get list of employed and unemployed mothers in each of the selected kebeles before actual data collection. Code number was given separately for employed and unemployed mothers during survey. Then the total sample size of the study was proportionally allocated to the three selected kebeles. Proportional allocation was done for both employed and unemployed mothers. Finally, Study participants were selected randomly using table of random numbers for employed and un-employed mothers separately by using the code that was given during the survey.

4.4.3. Sampling framework

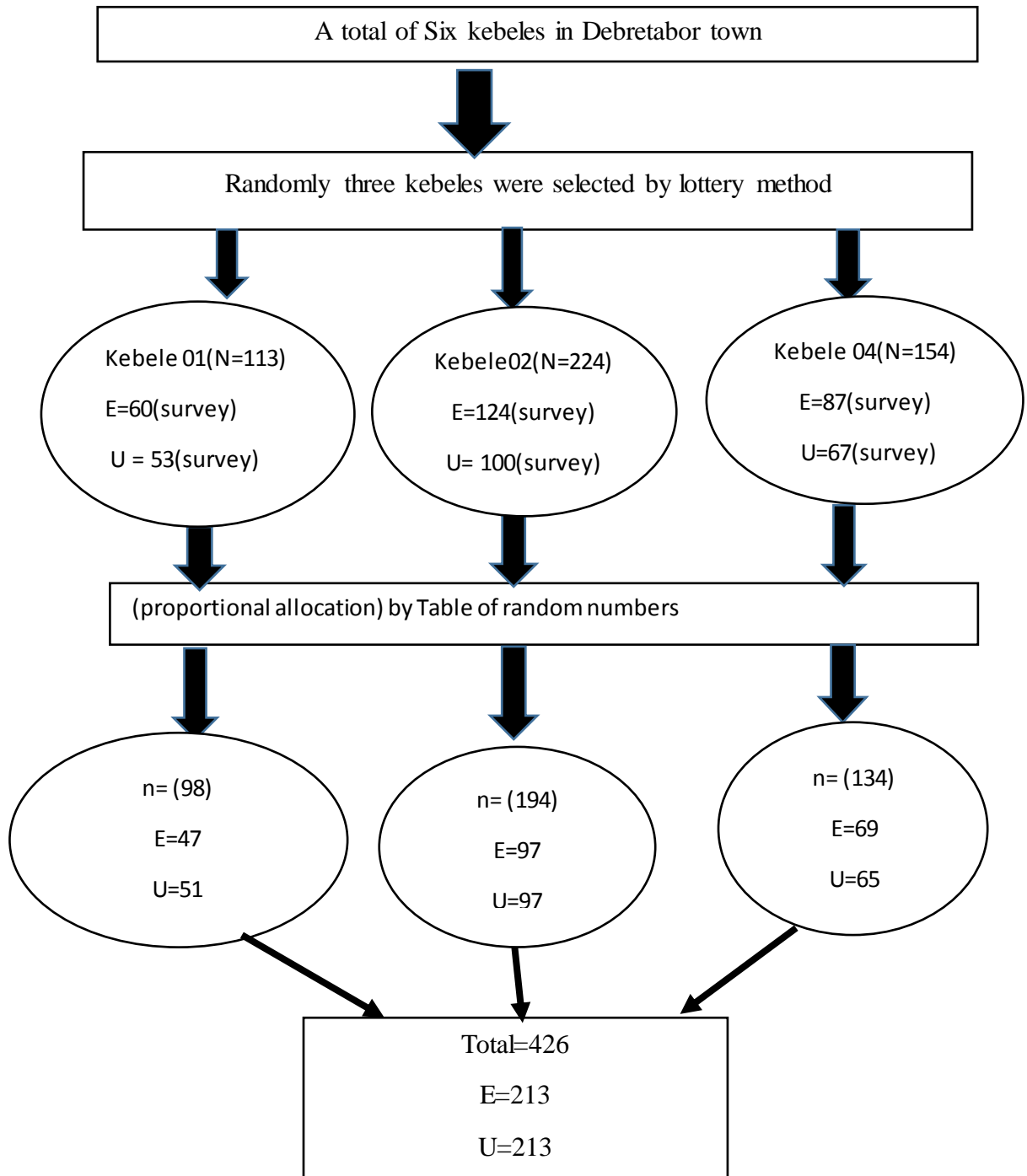


Figure 2: Diagrammatic presentation of sampling procedure to compare duration of exclusive breast feeding among employed and unemployed mothers of 6-12 months' age infants in Debretabor town, Amhara region, south Gondar zone, North west Ethiopia, 2019

4.5. Inclusion and exclusion criteria

4.5.1. Inclusion criteria

Mother of 6-12 months' of age infants who reside in the study area for at least 6 months were included in the study

4.5.2. Exclusion criteria

mothers of 6-12 months' of age infants who were not able to respond due to serious illness.

4.6. Study variables

4.6.1. Dependent variable

- ✓ Time to stop exclusive breast feeding

4.6.2. Independent variables

- ✓ Socio demographic and economic characteristics
- ✓ Breast feeding practices
- ✓ Maternal perception on EBF
- ✓ Health service related factors
- ✓ Obstetrics and gynecologic factors
- ✓ Work place breastfeeding support
- ✓ dietary diversity of mothers

4.7. Data collection procedure and instruments

Mothers of infants aged 6-12 months of age were interviewed face to face using pretested interviewer administered questionnaire. The questionnaire was developed by reviewing other related studies((36),(69),(37),(56),(52)).The questionnaire consists of the following components

4.7.1. Sociodemographic and economic characteristics

This category consists of Sex of child, age of child, maternal age, parity, marital status, ethnicity, maternal education, husband education, Occupation of the father, employment status of mother, religion and wealth index.

4.7.2. Breast feeding practices

History and initiation of breast feeding, age of child when food items other than breast milk was given, Colostrum feeding, frequency of EBF per day (24 hour) and other practices of breast feeding will be assessed.

4.7.3. Obstetrics and gynecologic factors

Under this category place of delivery, birth attendant, mode of delivery, birth order of infant, mass media encourage of EBF, family support of EBF, Husband support of EBF and Parity are included

4.7.4. perception of mothers on EBF

Maternal perception on meaning, duration & advantage of EBF

4.7.5. Health service related factors

ANC follow up, information about EBF during ANC follow up and others

4.7.6. Work place breast feeding support

This consists of assessing, presence of designated area for breast feeding, for pumping of breast milk for storage of breast milk &flexible work hour for breast feeding in work place for employed mothers and other supports

Data were collected by 4 BSc nurse trained data collectors and 2 BSc nurse Supervisors who have an experience on data collection, fluent to speak the local language/Amharic/ and familiar to the culture of the study population. Data collection was on working days for un employed mothers. Employed mothers were interviewed during weekends and before they go to their work places or at their work places for some employed mothers. Exclusive breastfeeding duration was assessed using a ‘since birth’ recall of mother (care giver). Mothers were asked “what was the age of your child in month when you first gave food items other than your breast milk including water. The status of exclusive breastfeeding

was determined based on the reported duration of exclusive breastfeeding. For exclusive breast-fed children during the time of interview, the duration of EBF was considered equal to child's age. Women who had reported exclusive breastfeeding below six months were considered as events and those who exclusively breastfeed to six months and beyond were taken as censored.

4.8. Data Quality Assurance

Training was given for one day for data collectors and supervisors. The training was mainly about the objectives of the study, techniques of interview/data collection/ and relevant ethical issues of respondents. Questionnaire was prepared in English and translated in to Amharic, local language in order to check for consistency. Questioners' were regularly checked for completeness, clarity, and consistency by the respective supervisors. Pretested questionnaire was used to collect the data. The principal investigator coordinated the overall activities of data collection through close supervision of data collectors and supervisors

4.9. Data processing and analysis

After data collection the principal investigator checked completeness of data and prepared template. The data were entered in to epi-data version 3.1 and exported to SPSS (Statistical Package for Social Sciences) version 23 for analysis. After data cleaning Principal component analysis was computed to rate household wealth using fixed and other household items for each participant. components were retained based on Eigen value and wealth index was ranked into quantile. Multicollinearity was checked for variables and VIF 1-10 was considered not collinear

Survival analysis using Kaplan-Meier was done to assess difference in duration of EBF among employed and unemployed mothers. The log rank test was used to assess presence of significant difference in survival status of EBF between employed and unemployed mothers. Also it was used to assess significant difference between different selected variables. Bivariate Cox proportional hazards model was used to identify determinants of time to stop exclusive breast feeding. Association of each covariate with duration of EBF was assessed using Bivariate Cox proportional hazards model after proportional hazard assumption was checked using log-log(st)plot. Those variables with $P < 0.25$ in bivariate Cox regression model were entered in multivariate Cox proportional hazards model to measure the effect of each variable on the hazard function, after adjusting for the effects of other variables included in the model. Multivariate Cox proportional hazards model was fitted with forward likelihood ratio (forward LR).

Variables with $P < 0.05$ in multivariate Cox regression analysis were identified as determinants of cessation of EBF before six months. Adjusted Hazard Ratio (AHR) with 95% Confidence Interval (CI) and $p < 0.05$ were used to declare level of significance.

4.10. Operational definitions and term definitions

Exclusive breast feeding: feeding an infant with only breast milk for the first six months of life, excluding solids or any other fluids including infant formulas) except medicines, vitamins and minerals(1).

Exclusive breastfeeding duration: the time interval from the start of feeding breast milk to introduction of any non breast milk foods.

Employment: any type of employment out-side home/that takes mothers outside home, and earn wages or salaries.

Unemployment: being house wife/ involved in other work inside home

Event: mothers who had reported exclusive breast feeding below six months

Censored: Those mothers who exclusively breastfed to six months and beyond

Family support: encouragement or any type of guide from family member that help mother to exclusively breast feed

Husband role: type of help obtained from husband to his wife that leads to her to exclusively breast feed

Low DDS; consumption of less than 4 food groups(70)

Medium DDS: consumption of 4-5 food groups(70)

High DDS: consumption of 6 and above food groups(70)

4.11. Ethical considerations

Before data collection, an ethical clearance was obtained from Jimma university ethical review board, and then formal letter of cooperation was written. Letter from Jimma was taken to Debretabor health office and to each of the selected kebeles. Mothers of the study participant were told about the objectives and purposes of the study and their contribution is critical to generate real and helpful information.

Oral informed consent and written consent were taken with full information including the objectives of the study, selection criteria, confidentiality and benefits of the study. Additionally, names of participants were not used in the study, questionnaire with only identification number was used and the information obtained was held confidentially. All consent and data collection procedures were conducted in a private location to protect the participants' confidentiality. Finally, data collectors informed the participants that they have the right to participate in the study as well as to interrupt/withdraw/ at any time.

4.12. Dissemination of result

The result of the study will be presented to Jimma University, Institute of Health and department of population and family health.

The result of this study will be disseminated to Amhara Regional State Health Office, South Gondar Zone /Debre tabor/ Health Administration, Woreda Health Offices and Debretabor town kebeles.

Further attempt will be made to publish it and disseminate to national and international peer reviewed scientific journals.

5.RESULT

5.1. Socio demographic characteristics of respondents

Four hundred twenty-six (426) respondents were successfully interviewed with response rate of 100%. The mean (\pm SD) age of mothers was 30.1 (\pm 0.9) years and the mean (\pm SD) age of infants was 8.4(\pm 0.8) months. Majority of the respondents, (90.8%) were Orthodox Christians followed by Muslim (7%) and protestant (1.6%). Among employed mothers, (61%) were government employed, (29.6%) were in the highest wealth quantile and (17.4%) of them were in the lowest wealth quantile. Conversely (9.9%) of un employed mothers were in the highest wealth quantile and (17.4%) were in the lowest quantile of wealth. (Table 2).

Table 2; Socio demographic characteristics of respondents, among employed and unemployed mothers of 6-12 months old infants Debretabor town, south Gondar zone, North west Ethiopia,2019

Variables		Employment status		
		Employed (n=213)n(%)	Unemployed (n=213)n(%)	Total (n=426)
Sex of child	female	115 (54)	97(45.5)	212(49.8)
	male	98(46)	116(54.5)	214(50.2)
Age of child	6-8 months	90(42.3)	96(45.1)	186(43.7)
	9-10 months	68(31.9)	70(32.9)	138(32.4)
	11-12 months	55 (25.8)	47(22.1)	102(23.9)
Birth order	first	98(46)	84(39.4)	182(42.7)
	second	62(29.1)	60(28.2)	122(28.6)
	third	36(16,9)	42(19.7)	78(18.3)
	fourth and above	17(8)	27(12.7)	44(10.3)
Maternal age	15-20	7(3.3)	7(3.3)	14(3.3)
	21-25	33(15.5)	55(25.8)	88(20.7)
	26-30	108(50.7)	86(40.4)	194(45.5)
	31-35	47(22.1)	39(18.3)	86(20.2)
	greater than 35	18(8.5)	26(12.2)	44(10.3)
parity	primipara	79(37.1)	84(39.4)	163(38.3)
	multipara	134(62.9)	129(60.6)	263(61.7)
Marital status	married	187(87.8)	202(94.8)	389(91.3)
	single	5(2.3)	1(0.5)	6(1.4)
	divorced	16(7.5)	9(4.2)	25(5.9)
	widowed	5(2.3)	1(0.5)	6(1.4)
Ethnicity	Amhara	209(98.1)	212(99.5)	421(98.8)
	Tigre	4(1.9)	1(0.5)	5(1.2)
Religion	Orthodox	193(90.6)	194(91.1)	387(90.8)

	Muslim	18(8.5)	12(5.6)	30(7)
	protestant		7(3.3)	7(1.6)
	Others	2(1)		2(0.6)
Maternal educational status	No education	16(7.5)	63(29.6)	78(18.3)
	Primary	31(14.6)	64(30)	94(22.1)
	Secondary	22(10.3)	48(22.5)	70(16.4)
	College and above	144(67.6)	38(17.8)	184(43.2)
Husband educational status	No education	5(2.3)	23(10.8)	28(6.6)
	Primary	16(7.5)	45(21.1)	63(14.8)
	Secondary	20(9.4)	47(22.1)	70(16.4)
	College and above	146(68.5)	87(40.8)	246(57.7)
Occupation	Housewife		213(100)	213(50)
	Merchant	58(27.2)		58(13.6)
	Government employee	130(61.0)		130(30.5)
	Daily laborers	17(8.0)		17(4)
	Others	8(3.8)		8(1.9)
Wealth index	Lowest quantile	37(17.4)	37(17.4)	74(17.4)
	second quantile	44(20.7)	75(35.2)	119(27.9)
	middle quantile	25(11.7)	38(17.8)	63(14.8)
	fourth quantile	44(20.7)	42(19.7)	86(20.2)
	highest quantile	63(29.6)	21(9.9)	84(19.7)

5.2. Health service and obstetrics related factors

Majority of respondents (75.8%) reported that they had four times and above ANC visits. During this visit (95.5%) of total mothers got information about exclusive breast feeding. However, (42.5%) of mothers who attended PNC were informed about EBF during PNC. Among employed mothers (78.4%) had four times & above ANC visits and (25.8%) of them were informed about EBF during PNC. Regarding unemployed mothers, (73.2%) of them had four times & above ANC visits and (59.2%) of them were informed about EBF during PNC. Majority of the respondents, (99.5%), delivered their child at health facility. From total mothers, 95.5% of them had birth attendant of health professional. (Table 3)

Table 3; Health service and obstetric related factors of employed and un employed mothers in Debretabor town, south Gondar zone, North west Ethiopia,2019

Variables		Employment status		
		Employed (n=213)n(%)	Unemployed (n=213)n(%)	total
Time of ANC follow up	once	5(2.3)	1(0.5)	6(1.4)
	twice	11(5.2)	12(5.6)	23(5.4)
	three times	30(14.1)	44(20.7)	74(17.4)
	four times and above	167(78.4)	156(73.2)	323(75.8)
Get health information about EBF at ANC	yes	201(94.5)	206(96.7)	407(95.5)
	no	12(5.6)	7(3.3)	19(4.5)
PNC services	no	158(74.2)	87(40.8)	245(57.5)
	yes	55(25.8)	126(59.2)	181(42.5)
Get health information about EBF at PNC	No	41(74.2)	51(40.8)	104(57.5)
	yes	14(25.8)	75(59.2)	77(42.5)
Place of delivery	At home	-	2(0.9)	2(0.5)
	AT health facility	213(100)	211(99.1)	424(99.5)
Birth attendant	Health professional	213(100)	211 (99.1)	424(99.5)
	Non health professional	-	2(0.9)	2(0.2)
Mode of delivery	Vaginal	200(93.9)	207 (97.2)	407(95.5)
	cesarean section	13(6.1)	6(2.8)	19(4.5)
EBF information during delivery	no	157 (73.7)	87 (40.8)	244(57.3)
	yes	56(26.3)	126(59.2)	182(42.7)

5.3. Dietary diversity of mothers

Among employed mothers, (58.2%) have dietary diversity of low/consumption of less than four food groups. However, only (1.9%) have dietary diversity of high/consumption of 6 or more food groups. On the other hand, (74.2%) of un employed mothers had dietary diversity of low and (25.8%) of them had DDS of medium (consumption of 4-5 food groups). None of unemployed mothers had dietary diversity of high(Table 4).

Table 4; Dietary diversity of employed and unemployed mother in Debre-tabor town, South Gondar zone, North west Ethiopia,2019

DDS of mothers	Employment status		
	Employed (n=213)n%	Unemployed (n=213)n %	total
low/less than four food groups/	124(58.2)	158(74.2)	282(66.2)
medium/4-5 food groups/	85(39.9)	55(25.8)	140(32.9)
high/6 and more food groups	4(1.9)		4(0.9)

5.4. Breastfeeding practice

Majority of the respondents ,410(96.2%) give breast milk to their children with in the first hour. Colostrum feeding was practiced by 390(91.2 %) of the respondents. Lack of knowledge about advantage of Colostrum was mentioned as reason of avoidance of Colostrum feeding among 27(6.3%) of the respondents. Frequency of breast feeding was nine times and greater per day among 239(56.1%) of the respondents.

Among employed mothers 192(90.1%) gave Colostrum to their child, 57(26.8%) of them breast fed their child greater than or equal to 9 times per 24 hours & 87(40.8%) of them got advice about EBF by their husbands. On the other hand, among unemployed mothers, 195(91.5%) of them gave Colostrum to their child ,130(61%) of them breast fed their child greater than or equal to 9 times per 24 hours and 61(28.6%) of them got advice about EBF by their husbands. From a total of employed mothers 57(26.8%) of them got family support to exclusively breast fed their child, while165(77.5%) of unemployed mothers got family support to exclusively breastfed their child.

Ninety-nine point five percent of the respondents thought that best food for infants in the first six months was breast milk only. Majority of the respondents,353(83.3%), thought that breast milk is sufficient for infants in the first six months (Table 5).

Table 5; Breast feeding practice and perception of mothers, in Debretabor town, south Gondar zone, North west Ethiopia,2019

Variables		Employment status		
		Employed (n=213)n%	Unemployed (n=213)n %	Total
Initiation of breast feeding	within 1 hour	203(73.2)	207(97.2)	410(96.2)
	greater than 1 hour	10(26.8)	6(2.8)	16(3.8)
Colostrum feeding	No	21(9.9)	18(8.5)	39(8.5)
	Yes	192(90.1)	195(91.5)	390(91.5)
Reason of colostrum avoidance	lack of knowledge	15(7.0)	12(5.6)	27(6.3)
	Others	6(2.8)	6(2.8)	12(2.8)
Frequency of breast feeding per day	Less than 9 times	156(73.2)	83(39)	239(56.1)
	Greater than or equal to 9 times	57(26.8)	130(61)	187(43.9)
Time to give breast milk	On maternal demand	70(32.9)	91(42.7)	161(37.8)
	When the bay cries	13(6.1)	26(12.2)	39(9.2)
	On schedule	38(17.8)	8(3.8)	46(10.8)
	Maternal demand & when baby cry	91(42.7)	88(41.3)	179(42)
	Others	1(0.5)	----	1(0.2)
family support to exclusively breast fed	No	156(73.2)	48(22.5)	204(47.9)
	Yes	57(26.8)	165(77.5)	222(52.1)
Husband role to EBF	Advice on EBF	87(40.8)	61(28.6)	149(35)
	economic support	31(14.6)	74(34.7)	114(26.8)
	Has no role	80(37.6)	63(29.6)	133(31.2)
	Do not know	15(7)	15(7)	30(7)
Religious leaders encouragement to EBF	no	206(96.7)	201(94.4)	407(95.5)
	yes	7(3.3)	12(5.6)	19(4.5)
Best food for infants in the first six months	Breast milk only	211 (99.1)	213(100)	424(99.5)
	others	2(0.9)		2(0.5)
Breast milk prevents disease	No		4 (1.9)	4(0.9)
	yes	213(100)	209(98.1)	422(99.1)
Recommended duration of exclusively breast feed	<6 months	15(7)	23(10.8)	38(8.9)
	6months	195(91.5)	180(84.5)	375(88)
	> 6 months	39(1.4)	10(4.7)	13(3.1)
Breast milk is sufficient for infants in the first six months	no	27(12.7)	44(20.7)	71(16.7)
	yes	186(87.3)	169(79.3)	355(83.3)
Breast feeding should start soon after delivery	No	1(0.5)	1(0.5)	2(0.5)
	yes	212(99.5)	212(99.5)	424(99.5)
Do you think women should not breast feed in public places	no	145(68.10)	121(56.8)	266(62.4)
	yes	68(31.9)	92(43.2)	160(37.6)

5.5. Breastfeeding support at work place

None of employed mothers had history of breast milk expression. Lack of suitable condition and not common(unknown) by the community were mentioned as reasons for avoidance of breast milk

expression by 69(32.4%) of employed mothers. Majority of employed mothers,182(85.4%) have no designated area for breast feeding in their work place. Among employed mothers 139(65.3%)of them got paid maternity leave and 152(71.4%) can't go with their child to work place. All of employed mothers have no designated area for breast milk storage in their work place. Duration of paid maternity leave was 4 months for (57.7%)& greater than 4 months for (7.5%)of employed mothers. None of employed mothers had day care services for children in their work place (table 6).

Table 6; Breast feeding support at work place of mothers in Debre tabor town, South Gondar zone, North west Ethiopia,2019.

Variables		Employed (n=213)n %
History of breast milk expression	no	213(100)
Reasons for avoidance of breast milk expression	Lack of knowledge	65(30.5)
	lack of suitable conditions	69(32.4)
	It is not common	69(32.4)
	Others	10(4.7)
designated area for breast feeding	no	182(85.4)
	yes	31(14.6)
Designated area for breastmilk pumping	no	213(100)
Designated area for breastmilk storage	no	213(100)
Breast feeding break	no	123(57.7)
	yes	90(42.5)
Sessions for breast feeding breaks per day	20-30 minutes morning and afternoon	51(23.9)
	As I want	36(16.9)
Daycare service in workplace/home	no	213(100)
	yes	
Distance of workplace from home	Less than 5 minutes	66(31)
	5-10 minutes by bus	90(42.3)
	11-20 minutes by bus	32(15)
	21-30 minutes by bus	20(9.4)
	Greater than 30 minutes by bus	5(2.3)
Paid maternity leave	no	74(34.7)
	yes	139(65.3)
Duration of paid maternity leave	4 months	123(57.7)
	>4 months	16(7.5)
Can go to work place with child	no	152(71.4)
	yes	61(28.6)
Flexible work hour	no	110(51.6)
	yes	103(48.4)
Type of flexible work hour	enter early& work one shift	60(28.2)

	Go to earlier to work and go out earlier	10(4.7)
	As I want	33(15.5)
Unpaid maternity leave	no	125 (58.7)
	yes	88(41.3)
Duration of unpaid maternity leave	1-2 months	8(9)
	3-4 months	15(18)
	5-6 months	55(62)
	Greater than 6 months	10(11)

5.6. Comparison of time to stop exclusive breast feeding among employed and unemployed mothers

From total of women 45% of them cease exclusive breast feeding before six months. Among employed mothers, 76% of them cease EBF before 6 months, while 23.5% of them cease EBF at 6 months. Conversely, 14.1% of unemployed mothers stop EBF before six months, while 85.4% of them stop EBF at 6 months (Figure 3).

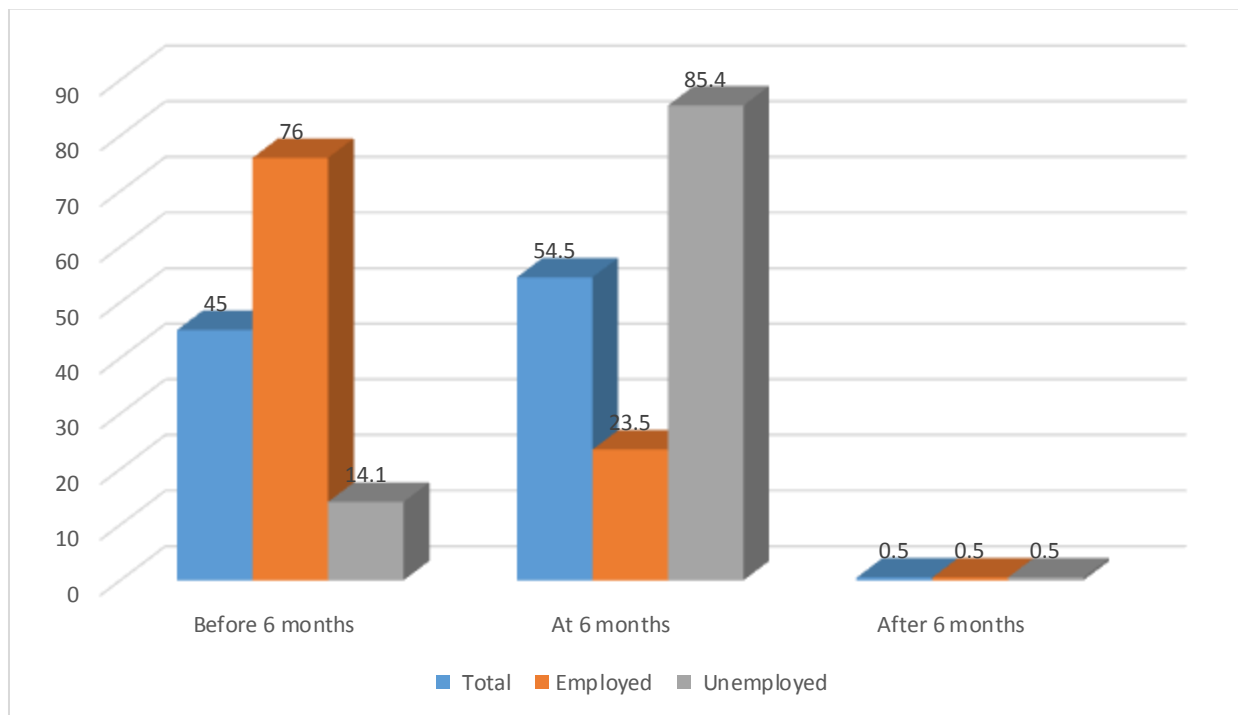


Figure 3; Percentage of cessation of EBF by the duration of time among employed and unemployed mothers in Debretabor town, South Gondar zone, North West Ethiopia, 2019

The median duration of exclusive breastfeeding for employed mothers was 4 months, while 6 months for un-employed mothers. Minimum and maximum duration of EBF was 1 and 7 months respectively for both children of employed and un-employed mothers. Median duration of EBF for all children was 6 months.

The cumulative proportion of survival probability up to 3 months on EBF was 96% for employed mothers and 100% for un-employed mothers. While it was 98% for total mothers by considering cessation of EBF before 6 months as event. The cumulative proportion of survival probability up to 4 months on EBF was 84% for employed mothers and 99% for un-employed mothers. This is the time when the cumulative survival probability started to be significantly different among employed and un-employed mothers. The cumulative survival probability up to 5 months on EBF was 44% for employed mothers and 91% for un-employed mothers. While it was 67% for total mothers. The cumulative proportion of survival probability up to six months on exclusive breast feeding for total children was 55% as illustrated by the life table (table 7). The cumulative proportion of survival probability up to six months on exclusive breast feeding was higher for children of un-employed mothers compared to children of employed mothers accounting 86% & 24% respectively. The difference was statistically significant on Log rank (Cox-Mantel) test < 0.001 (Figure 4).

Table 7; Life table for exclusive breastfeeding duration for 6-12 months' age children of employed and unemployed mothers in Debretabor Town, South Gondar zone, North west Ethiopia,2019

	EBF interval (months)	Interval start time	Number entering interval	events	Cumulative events	Remaining cases	Proportion of surviving	cumulative proportion of surviving at the end of the interval	Hazard rate
Un-Employed	0-1	0	213	0	0	213	1.00	1.00	0.00
	1-2	1	213	1	1	212	1.00	1.00	0.00
	2-3	2	212	0	1	212	1.00	1.00	0.00
	3-4	3	212	1	2	211	1.00	0.99	0.00
	4-5	4	211	18	20	193	0.91	0.91	0.09
	5-6	5	193	10	30	183	0.95	0.86	0.05
	6-7	6	183	0	30	183	1.00	0.86	0.00
employed	0-1	0	213	0	0	213	1.00	1.00	0.00
	1-2	1	213	1	1	212	1.00	1.00	0.00
	2-3	2	212	7	8	205	0.97	0.96	0.03
	3-4	3	205	26	34	179	0.87	0.84	0.14
	4-5	4	179	85	119	94	0.53	0.44	0.62
	5-6	5	94	43	162	51	0.54	0.24	0.59
	6-7	6	51	0	162	51	1.00	0.24	0.00
Total	0-1	0	426	0	0	426	1.00	1.00	0.00
	1-2	1	426	2	2	424	1.00	1.00	0.02
	2-3	2	424	7	9	417	0.98	0.98	0.07
	3-4	3	417	27	36	390	0.94	0.92	0.30
	4-5	4	390	103	139	287	0.74	0.67	0.20
	5-6	5	287	53	192	234	0.82	0.55	0.00
	6-7	6	234	0	162	234	1.00	0.55	0.00

5.7. Determinants of exclusive breast feeding

For employed mothers' duration of paid maternity leave was independent significant determinant of cessation of EBF among employed mothers. The independent significant determinant of cessation of exclusive breastfeeding before six months among unemployed mothers were family support to EBF and perceived adequacy of breast milk.

Duration of paid maternity leave significantly influences duration of EBF of employed mothers. Employed mothers who got paid maternity leave of only 4 months were 7 times more likely to cease EBF before six months than employed mothers who got paid maternity leave of greater than four months (AHR=7,95%CI=2.2-22.2). Family support to EBF was one of independent significant determinant of duration of exclusive breast feeding of unemployed mothers. Unemployed mothers who had no family support to EBF were 9 times more likely to cease EBF than unemployed mothers who had family support (AHR=9.3,95%CI=3.2-26.8). Perceived adequacy of breast milk was one of the determinant for cessation of EBF before six months among un-employed mothers. Unemployed mothers who perceived that their breast milk is not sufficient or adequate for the first 6 months were 2.6 times more likely to cease EBF before 6 months as compared to mothers who perceived their breast milk is sufficient for their child in the first 6 months (AHR=2.6, 95%CI=1.2-5.3).

Table 8; Bivariate and multivariable cox proportional hazards model predicting the hazards of cessation EBF among employed and unemployed women who have 6-12 months 'old child separately in Debretabor town, South Gondar zone, North west Ethiopia,2019

Variables						
Employed mothers¹	CHR	95%CI	P value	AHR	95%CI	P value
Duration of paid maternity leave						
4 months	7.2	2.3-22.9	0.001	7	2.2-22.2	0.001
>4 months	1					
Unemployed mothers²						
Family support to EBF						
Yes	1					
No	28	9.7-80	<0.001	9.3	3.2-26.8	<0.001
Perceived adequacy of breast milk						
Yes	1					
No	5.420	2.6-11	<0.001	2.6	1.2-5.3	0.011

¹ Model adjusted for parity, role of your husband to EBF, husband educational status, breast feeding break, duration of unpaid maternity leave. ² Model adjusted for frequency of breast feeding, EBF counseling at PNC, role of husband to EBF, and breastfeeding in public places

In bivariate cox proportional hazards model for total mother's candidates for multivariate cox regression model were the following variables as shown by table 9

Table 9; Bivariate cox proportional hazards model of cessation of EBF among women who have 6-12 months' age child in Debretabor town, North west Ethiopia,2019

variables	CHR	95%CI	P value
Employment status			
unemployed	1		
Employed	7.41	5.01-10.968	<0.001
Birth order			
first	0.499	0.353-0.705	<0.001
second	0.357	0.224-0.569	<0.001
third	0.347	0.192-0.630	0.001
Fourth and above	1		
Maternal educational status			
No education	1		
primary	0.215	0.126-0.368	<0.001
secondary	0.316	0.207-0.483	<0.001
College and above	0.363	0.231-0.571	<0.001
Husband educational status			
No education	1		
primary	0.265	0.109-0.646	0.004
secondary	0.308	0.174-0.544	<0.001
College and above	0.406	0.25-0.656	<0.001
Occupation			
Housewife	1		
Merchant	5.010	3.055-8.216	<0.001
Government employee	9.608	6.403-14.420	<0.001
Daily laborer	6.629	3.39-12.964	<0.001
Others	.896	0.122-6.567	0.94
Frequency of breast feeding			
Greater than or equal to 9 times	1		
< 9 times	16.1	8.96-28.93	<0.001
Family support to EBF			

yes			
No	25.8	14.34-46.47	<0.001
EBF counseling during PNC			
yes	1		
no	32.3	14.3-73	<0.001
EBF counseling during delivery			
yes	1		
no	23.9	11.8-48.77	<0.001
Best food for <6 months children			
Breast milk only	1		
Others	3.247	0.8-13	0.098
Recommended duration of EBF			
< 6months	1		
6 months	0.344	0.24-0.49	<0.001
> 6 months	0.122	0.03-0.5	0.004
Role of husband to EBF			
Advice on EBF			
Give economic support	0.596	0.38-.92	0.020
Has no role	1.910	1.37-2.64	<0.001
Do not know	1.041	0.57-1.89	0.896
Breast milk sufficiency in the first 6 months			
yes			
no	1.416	1.006-1.994	0.046
Religious fathers encouragement to EBF			
yes			
no	2.52	0.93-6.80	0.067
Wealth index			
Lowest quantile	0.82	0.54-1.26	0.373
Second quantile	0.60	0.40-0.89	0.013
Middle quantile	0.49	0.30-0.828	0.007
Fourth quantile	0.71	0.47-1.09	0.120
Highest quantile	1		
Parity			

Primipara	1.77	1.33-2.345	<0.001
Multipara	1		

In multivariate cox proportional hazards model for total mothers, employment status, parity of mothers, family support to exclusive breast feeding, EBF information at PNC, perception of mothers about duration of exclusive breast feeding were statically significant determinants of cessation of exclusive breast feeding before six months. The hazard of cessation of EBF among employed mothers was 3.7 times than unemployed mothers (AHR=3.77,95CI=2.39-5.9, P<0.001). This difference was statistically significant in log rank test(p value <0.001).

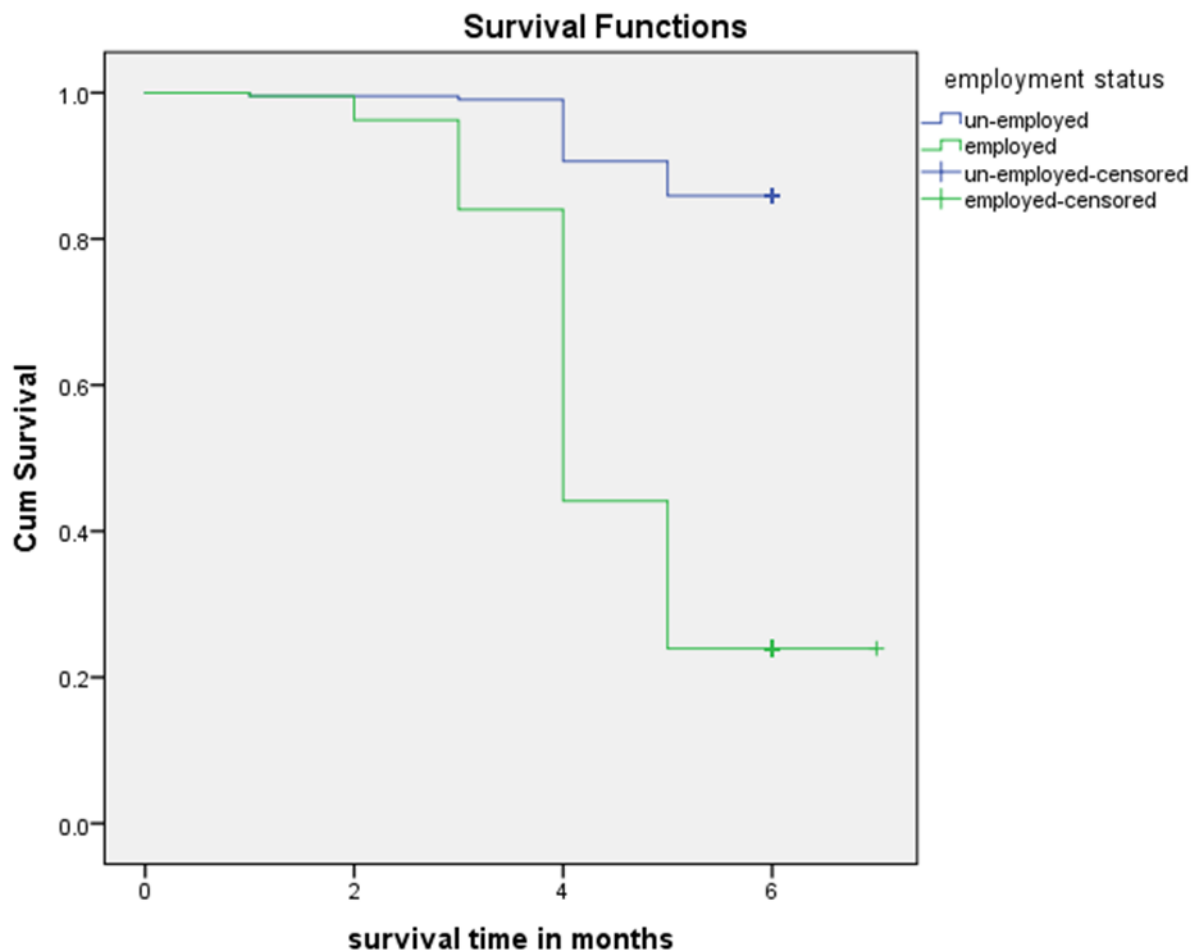


Figure 4; Kaplan-Meier cumulative survival probability functions of EBF for children of employed and unemployed mothers in Debretabor town, South Gondar zone, North West Ethiopia,2019.

The hazard of cessation of EBF before six months among mothers who thought the recommended duration of EBF as 6 months was 0.5 as compared to mothers who thought the recommended duration of EBF as <6 months (AHR=0.55,95%CI=0.37-0.8). Mothers who thought exclusive breast feeding duration as > 6months were less likely to cease EBF before six months as compared to mothers who thought recommended duration of EBF as <6 months (AHR= 0.2,95%CI=0.05-0.85, P=0.029).

Table 10; Bivariate and multivariable cox proportional hazards model predicting the hazards of cessation of EBF among women who have 6-12 months' age child in Debretabor town, South Gondar zone, North west Ethiopia,2019

variables	CHR	95%CI	P value	AHR	95%CI	P value
Employment status						
employed	7.4	5.01-10.96	<0.001	3.77	2.39-5.9	<0.001
unemployed	1					
Family support						
yes	1					
no	25.8	14.34-46.47	<0.001	3.99	1.9-8.3	<0.001
Get EBF information at PNC						
Yes	1					
No	32.3	14.3-73.0	<0.001	7.76	2.99-20.1	<0.001
Perception on recommended duration of EBF						
< 6 months	1					
6 months	0.344	0.24-0.494	<0.001	0.55	0.37-0.80	0.002
>6 months	0.12	0.029-0.51	0.004	0.20	0.05-0.85	0.029
parity						
primipara	1.77	1.33-2.35		1.52	1.14-2.04	0.005
multipara	1					

Primipara mothers were 1.5 times more likely to cease EBF before six months as compared to multipara mothers (AHR=1.5,95%CI=1.14-2.04, P=0.005) and this deference was statistically

significant in log rank test($p < 0.001$). Kaplan-Meier, the survival curve of primipara mothers were completely above survival curve of multipara mothers.

The cumulative proportion of survival probability of primipara mothers on EBF up to 6 months was 42% and 63% for multipara mothers

Mothers who had no family support to exclusively breast fed were 3.9 times more likely to cease EBF before six months as compared to mothers who had family support to EBF (AHR=3.99, 95% CI=1.9-8.3, $P < 0.001$). The survival curve of mothers who had family support to EBF was completely above the survival curve of mothers who had no family support.

The cumulative proportion of survival probability on EBF up to 6 months for mothers who had family support was 95% and for those mothers who had no family support was 12%.

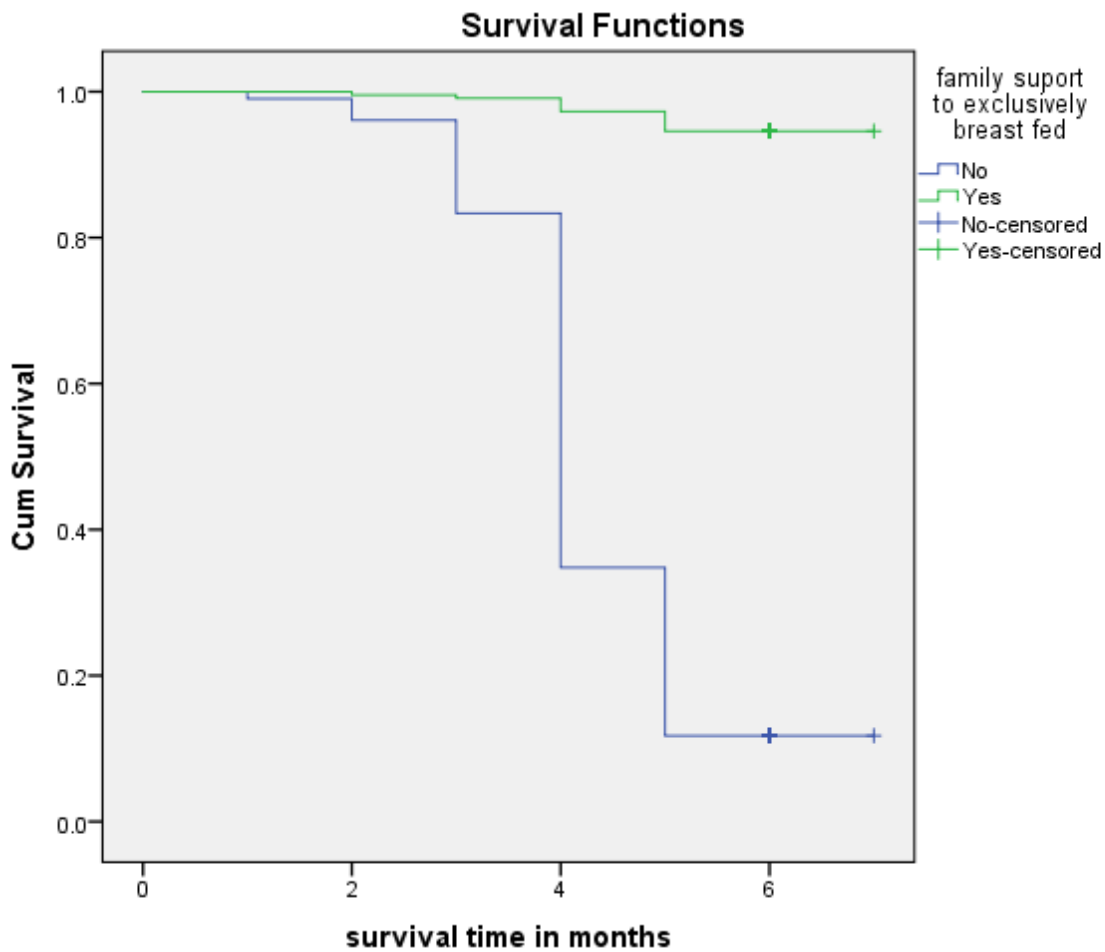


Figure 5; Kaplan-Meier cumulative survival probability functions of EBF for women who had and had not family support to EBF in Debretabor town, South Gondar zone, North West Ethiopia,2019

The hazard of cessation of EBF before six months among mothers who did not get EBF counseling at PNC was 7.7 times as compared to mothers who got EBF counseling at PNC (AHR=7.76 .95%CI=2.99-20.1, P<0.001). This difference was significant in log rank test(p<0.001).

The cumulative proportion of survival probability on EBF up to 6 months for mothers who got EBF counseling at PNC was 97% and for those mothers who did not get EBF counseling at PNC was 24%.

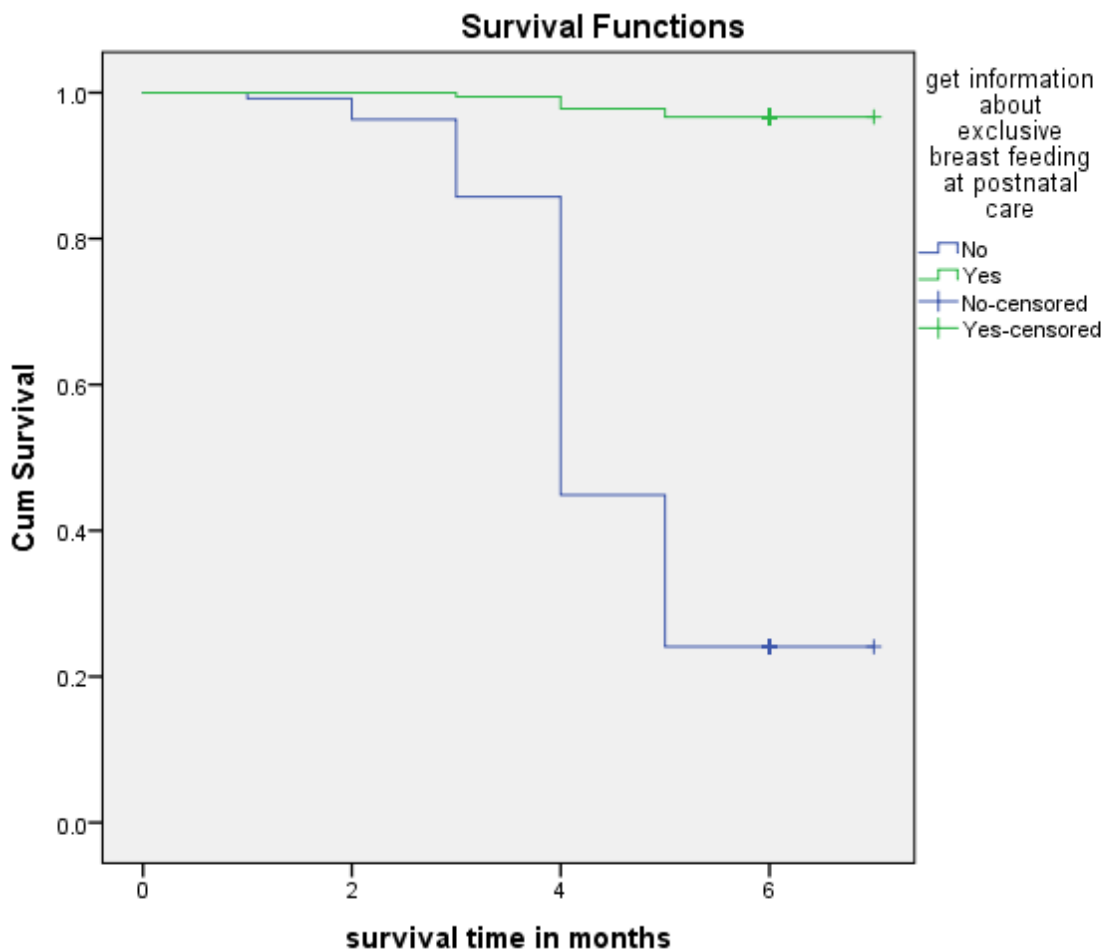


Figure 6; Kaplan-Meier cumulative survival probability functions of EBF for women who were and were not informed about exclusive breast feeding during PNC in Debre tabor town,2019

The cumulative survival probability of mothers on EBF up to six months for mothers whose perception about EBF duration of. less than six months was 3%, while it was 59% for those mothers whose perception about EBF duration is 6 months. The cumulative survival probability of mothers on EBF up to six months for mothers whose perception about EBF duration of. greater than six months was 85%. This deference is statically significant in Log rank test($p < 0.001$) and multivariate cox proportional hazards model.

6.DISCUSSION

The findings of the study revealed that, employed mothers were 3.7 times more likely to cease exclusive breast feeding before 6 months. Duration of paid maternity leave was associated factor for cessation of EBF before 6 months among employed mothers. Family support to EBF and perceived breast milk adequacy were associated factors with cessation of EBF before 6 months among unemployed mothers. For total mothers, employment status, parity, family support of EBF, counseling of EBF during PNC and maternal perception of EBF duration were the independent significant determinant factors of cessation of EBF before 6 months.

Exclusive breastfeeding for the first six months of life provides the full nutritional requirements health term infant needs (71). In this study employed women were more likely to not exclusively breastfeed for six months compared to unemployed women. This difference was comparable with studies conducted in Ethiopia, (Injibara town, Gondar town) , Saudi Arabia, and Canada (36,37,72,73) in which exclusive breastfeeding rate was higher among the unemployed women compared to employed women. Furthermore, it is very likely that employed mothers may return to work early after giving birth if necessary support to continue exclusive breastfeeding is not provided by employers. Hence separation form their babies, and additional difficulties in expressing and storing milk results in inability to maintain exclusive breastfeeding among employed women (64). On the other hand, unemployed mothers get a longer time to stay with their children (67), hence early termination of exclusive breastfeeding was observed more in employed mothers than in unemployed mothers.

Furthermore, employment rules and regulations, such as maternity leave less than 6 months (four months in Ethiopian context), compromising exclusive breastfeeding. This problem is exacerbated by lack of child care facilities and other supportive work environments (68). Thus, women who return to work often face difficulties of continuing breastfeeding (69).

According to this study, among employed mothers, duration of paid maternity leave was one of the determinants of cessation of EBF before 6 months. The hazard of cessation of EBF before 6 months for employed mothers who had paid maternity leave of 4 months only was 7 times higher than employed (working) mothers who had paid maternity leave of greater than 4 months. This result was supported by evidence from 38 low and middle income countries, in which a one-month increase in legislated duration of paid maternity leave was associated with a 5.9% increase in EBF and 2.2-month increase in breast feeding duration (75).

The median duration of exclusive breast feeding in this study was six months for all women, which was comparable with the studies conducted in Ethiopia, Gurage zone (60), Awi zone (57) and in India (70), in which the median duration of exclusive breast feeding were 6 months, 6.06 months and 6 months and months respectively. However, this finding is higher than EDHS 2016 report, in which the median duration of EBF was 3.1 months. Possible reason for this could be due to national representative data of EDHS and the fact that this study was conducted in an urban setting. Moreover, This finding is also greater than the median duration of exclusive breastfeeding in Kongo, Sri Lanka, China and Brazil(45,48,49,74). This difference could be as a result of the difference in the study settings.

The cumulative proportion of survival probability of exclusive breastfeeding for six for total children was 55%. This result was consistent with a study conducted in Ethiopia, Awi zone which reported a cumulative survival probability for EBF for six months of 53% (52). However, this finding is lower than another study conducted in Ethiopia that reported 78.1% probability of exclusive breastfeeding for 6 months (56). This difference could be due to the fact that the study participants for the study were from urban and rural settings compared to this study which was done in urban women. Hence, due to inclusion of rural mothers who usually exclusively breastfeed longer the survival probability up to six months will be greater. Furthermore, since more employed mothers are found in urban area than rural and stay long time away from their home for jobs.

Being primipara, lack of family support for EBF, not receiving information about EBF during PNC visit and maternal perception that EBF duration should be less than six months were other independent determinant factors which significantly increase the risk of terminating exclusive breast feeding before six months. In this study primipara mothers were 1.5 times more likely to stop exclusive breast feeding than multipara mothers. This result is supported by a study conducted in Gondar, in which mothers

who have three or more children were 3.5 times more likely to breastfeed exclusively than those who had one or two children. This result is also comparable with a study conducted in USA, Hershey, in which multiparous mothers had a significantly lower hazard of stopping exclusive breast feeding as compared to multiparous mothers (HR=0.66) (74). This could be due to the fact that multipara mothers are more experienced and knowledgeable on the advantage of exclusive breastfeeding (75). Ethiopian national strategy for IYCF suggested that even though breast-feeding is a natural act, it is also a learned behavior (76).

Family support in the form of encouragement was also a significant determinant of duration of exclusive breast feeding. Mothers who had family support for EBF were less likely to stop exclusive breast feeding before six months. The hazard of mothers who had no family support for EBF was 3.48 times as compared to mothers who had family support. This result was comparable with a study conducted in Indonesia, in which mothers who had good family support were 2.8 times more likely to practice exclusive breast feeding (58). Another study in Indonesia supported this result, in which respondents were dominated by their mothers decisions and there is a significant relation found between the level of partner support and practice of exclusive breast feeding (61).

Additionally, this result was also consistent with a qualitative study conducted in Nigeria, in which the rate of EBF was significantly higher among mothers from families with a positive attitude towards EBF than among mothers from families with a negative attitude. From mothers who get a family environment of positivity towards EBF 44% of them practiced EBF, while only 29 % of those who perceived a negative family attitude towards EBF practiced EBF (51). Possible reason for this could be grandfathers, grand mothers, fathers and mothers have an important role in infant feeding decisions making (77).

Post -natal counseling on EBF was also significantly associated with cessation of exclusive breast feeding in this study. The hazard of mothers who were not informed about exclusive breastfeeding in their post -natal care visits were 3.9 times more likely to cease EBF before six months as compared to mothers who were informed about EBF during post-natal care visit. This result was higher than the study conducted in Ethiopia, Awi zone, in which the hazard of cessation of exclusive breast feeding among mothers who were informed about EBF during PNC was 1.94 times as compared to mothers who were not informed (52). This deference might be due to deference in counselling services of deferent areas. This result was lower the study conducted in Ethiopia, Gurage zone, in which the

hazard of cessation of exclusive breast feeding before six months among mothers who were not informed /counseled during PNC was 5.1 times as compared to mothers who were counseled during their PNC visits(56).Possible reason for this deference could be due to study design and study participants of both urban and rural.

The hazard of cessation of exclusive breastfeeding among mothers who thought the recommended duration of EBF <6 months was higher than mothers who thought the recommended duration of exclusive breast feeding six months. This is in agreement with a study conducted in Saudi Arabia, in which lack of awareness of EBF was one of the factors limiting breast feeding(78)

7.LIMITATION OF THE STUDY

Recall bias might affect the response since way of interview were by back history and experience. to decrease the recall bias, data were collected by interviewing the mothers to give their response in reference to different types of events. Using full month recording for duration of EBF than using specific date helps respondents to easily remember the time and reduces recall bias

8.CONCLUSION

In this study significant proportion of women cease exclusive breastfeeding before six months. The median duration of exclusive breastfeeding was shorter among employed mothers than un-employed mothers. The difference was statistically significant. It is clear from this study that cessation of exclusive breast feeding was associated with duration of paid maternity leave for employed mothers. Family support and perceived adequacy of breast milk were associated with cessation of EBF before 6 months among unemployed mothers. Being primipara, lack of family support, absence of post-natal counselling, maternal perception on the recommended duration of EBF were significant determinant of the cessation of EBF before six months among both groups of mothers

9.RECOMMENDATIONS

The findings of this study had its implications for health care workers and other concerned bodies including policy makers to carry out the national strategy on IYCF. The following recommendation was made based on the study findings.

For health sectors

An inter-sectoral collaboration, particularly between health care sectors in Debretabor town and work affairs should be maintained to let those mothers who were engaged in different jobs and there should be child-care facilities, which let working mothers to care for their infants and young children. This will help continued breast-feeding as recommended by global strategy for IYCF. Employed mothers can be helped to continue exclusive breast-feeding by providing enabling conditions, such as, breast feeding corners at work place, flexible work hours and breast-feeding breaks

FMOH and policy makers;

A different approach need to be implemented for employed and unemployed mothers to promote exclusive breastfeeding. The primary focus should be given for employed mothers.

Health care workers (Debretabor town);

Should focus on the utilization of postnatal counseling on child feeding to have positive effect on the duration of exclusive breastfeeding. Public health education on exclusive breast feeding is required for family significant others, to explore cultural beliefs and practices influencing EBF and how they can be modified to promote public health interventions particularly in matters relating to EBF.

HEWS (in Debretabor town);

Should enhance, behavioral change communication to comply with the recommended exclusive breastfeeding duration and to address the misconceptions that hinder the practice of exclusive breastfeeding.

Researchers; need to conduct further studies prospectively considering knowledge related factors. From a policy planning perspective, further studies are needed to deepen understanding of the impact of maternity leave policy on breast feeding practices.

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ANNEXES

APPENDEX; English version Questionnaire

My name is _____ I am here today to collect data on duration of exclusive breast feeding and its determinants among employed and unemployed mothers of 6-12 months age infants in Debretabor town. The study is conducted by Emebet Adugnaw from Jimma University, institute of health, and department of population and family health in human nutrition from post graduate program. I kindly request you to lend me your attention to explain to you about the study and forward some questions which will take 20 to 30 minute. You have the right to decline from the study at any time and refusing to participate. The study could not bring any effect on you.

Questionnaire identification number _____

Date of interview (Date Month year) ____/____/____

Checked by supervisor

Name _____ sign _____

Date _____

English version Questionnaire

Part A: Socio-economic and demographic characteristics

NO	List of questions	Answers
1	How old is your child in months	-----
2	What is the Sex of your child	0.Male 1.female
3	What is birth order of your the child	-----
4	What is your age/maternal/	-----
6	What is your marital status	1.married 2. Single 3.divorced 4.widowed
7	What is your Ethnicity	1.Amhara 2. Tigre 3.Oromo 4.Gurage 5.others
	What is your religion	1.Orthodox 2. Muslim 3.Protestant 4.Catholic 5.others
8	What is your /Maternal /educational status	1.Illiterate 2. Read and write Grade-----
9	What is your husband educational status	1.Illiterate 2. Read and write only 3. primary school/grade 1-8/ 4. secondary school/grade 9-12/ 5. college and above
11	What is your employment status	1.employed 0.Unemployed
12	What is your occupation	1.Housewife 2. Merchant 3.Government employee 4.daily labour 5 .Other

	Does the household has any of the following properties	Yes	No		yes	no
E1	Functioning CD player	1	0	Car	1	0
	television	1	0	Bajaj	1	0
	Gas stove/cylinder	1	0	Taxi	1	0
	Electric mitad			radio		
	Refrigerator/fridge/	1	0	Own house	1	0
	Bicycle	1	0	iPad	1	0
	Motorcycle	1	0	Video camera	1	0

Animal drawn Cart	1	0	Digital camera	1	0
Sofa	1	0	Washing machine	1	0
Bed with Spring mattress	1	0	computer	1	0
Agricultural land	1	0	Watch/home/	1	0
Domestic Animals			Mobile phone		
Improved/piped/drinking water source			Non mobile telephone		

Part B: Breast feeding practices

When did you initiate / give your breast milk for the first time/ to your child	Immediately ... 000 --- -----Hours/days
Did you give the first breast milk/colostrum/ to your child?	1.yes 0.no
If no why	1 culturally forbidden 2 lack of knowledge 3 religious issue 4 other specify
Age of your child when you first gave food items other than your breast milk including water (days/ months)	-----
how many times per day and night did you breast feed your child /frequency	1.<9 times 2.9 and above times
Time to give breast milk	1.on maternal demand 2.when the baby cries 3.on schedule 4.others

Part c; health service related factors

Have you attended ANC during the pregnancy period of your youngest child	1.yes 0.no
If yes for how many times you attended	1. once 2. Twice 3. three times 4.>= four times
Do you have any information about EBF	1. yes 0. no
IF yes from where do you get this information mostly/select only one answer/	1. health professional. 2.TV/radio 3. newsletter 4. family& community
Did you get Health information about EBF at ANC?	1.Yes 0.no
Did you get Health information about EBF at PNC	1.yes 1. .no
What is the role of your husband to exclusively breast fed your child	1. advice on EBF 2. Give economic support 3. Has no role 4. Do not know

Part D; Obstetrics and gynecologic factors

Where did you delivered this child	1. At home 2. At health facility
Who was your birth attendance	1.health professional 2.non health professional
What was your mode of delivery	1.vaginal 2.cesarean section
Did you get EBF counseling at health facility during delivery	1.yes 0. no

Part E; Work place breast feeding support/

Have you ever expressed breast milk	1.yes 0.no	Distance from home to work place in minutes/hrsminutes/hour waking -----minutes /hour by car/bus
If no what is your reason	Is it allowed to go to your workplace with your child for the purpose of breast feeding	1.yes 0.no
Is there designated area for breast feeding in your work place	1.yes 0.no	For how long was Duration of paid maternity leave given to you from work place
Is there is designated area for pumping of breast milk in your work place	1.yes 0.no	Is there flexible work hour for breast feeding women?	1.yes 0.no
Is there designated area for storage of breast milk in your work place	1.yes 0.no	IF yes what type of flexibility is allowed	
Was there breast feeding breaks given to you ?	1.yes 0.no	Was unpaid maternity leave given to you other than unpaid	1.yes 0.no
If yes for how many sessions and hours per day ?		If yes for how long was duration of unpaid maternity leave	----- ---
Is there day care service in your working environment	1.yes 0.no		

Part F; Maternal perception of EBF

In your opinion what is best food for infants <6 months	1. breast milk only 2. formula milk 3. porridge 4. do not know	
Do you think that breast milk prevents mother and child from disease	1. yes 0.no	

	In your opinion for how long should a child feed breast milk only	-----	
	What do you think is meaning of EBF?	1. feed only breast milk 2. feed only cow's milk 3. feed breast milk and water 4. feed porridge	
		5.	
	Do you think that breast milk sufficient/adequate/ for the first 6 months for the infant	1. yes 0. no	
	Do you think that breast feeding should be started straight after delivery	1. yes 0. no	
	Do you think that women should not breast feed in public places?	1. yes 0. no	
	Did your religious fathers encourage EBF	1. yes 0..no	

Part G. Dietary diversity / By 24 hours' dietary recall

Please describe the foods (meals and snacks) that you ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink eaten in the morning.

Write down all food and drinks mentioned. When composite dishes are mentioned, ask for the list of ingredients. When the respondent has finished, probe for meals and snacks not mentioned.

Format for conducting dietary intake using 24-hour recall

Breakfast	Snack	Lunch	Snack	Dinner	Snack

Did you eat anything (a meal or snack) outside the home yesterday? When the respondents recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed. Format for summarized women's dietary diversity score/MDDS/

Starchy Samples	Vit A Rich Fruits/Vegetables	Other Fruits/Vegetables	Dark green leafy vegetables	Organ meat	Flesh meat	Eggs	Legumes/Nuts	Milk	WDDS
Corn, rice, barely, wheat, pasta, sugar cane, sugar beet, potato	Mango, carrot, papaya, pumpkin, spinach, watermelon, fresh, sweet potato,	Banana, orange, grapefruit, lemon, tomato, strawberry	spinach, lettuce, green beans, cabbage, green pepper, mustard	Kidney meat, liver meat, heart meat	Sheep, cow, ox meat	eggs	Peas, beans, lentils, soybeans, chickpeas,	Milk, yogurt, cheese	

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for masters of Human Nutrition (Msc) in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name of the student: Emebet_Adugnaw

Date. _____ Signature _____

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor: Dr. Meron Girma (PhD)

Date _____ Signature _____

APPROVAL OF THE SECOND ADVISOR

Name of the second advisor: Mr. Getu Gizaw (BSc, Msc)

Date _____ Signature _____