

Determinants of Exclusive Breast Feeding Practice among HIV Positive Mothers in North East Ethiopia: A mixed method study

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Abstract

Background: Exclusive breast feeding (EBF) of Human Immune Virus (HIV) exposed infants for the first six months is strongly recommended and vital for protecting them against common childhood illnesses including diarrhea and pneumonia. Despite its benefit, EBF practice is low in developing countries including Ethiopia. There is a paucity of evidence for factors associated with EBF among HIV positive mothers.

Objectives: To assess exclusive breast feeding practice and its associated factors among HIV positive mothers attending Prevention of mother to child transmission and Anti-retroviral therapy clinics in public Health facilities of Debre Birhan town Amhara National Regional State, Ethiopia from February 01, 2020 to Apr 30, 2020

Methods: Facility based convergent mixed methods design was used to conduct the study in public Health facilities of Debre Birhan town. Structured interviewer-administered questionnaires were used to collect data from 432 participants selected by systematic random sampling technique. Epi info version 7 and SPSS version 20 were used for data entry and analysis respectively. Descriptive and inferential statistics were computed during the analysis. Two focus group discussions and 25 in-depth interviews and observational checklist were held to collect data on barriers for exclusive breast feeding practice and thematic analysis was used to identify important insights on the study topic. Bivariate and multivariate logistic regression were conducted to select candidate variable and determine adjusted effect of independent variables respectively using p-value less than 0.05. The output from multivariate logistic regression were reported with 95% confidence interval.

Results: The prevalence of exclusive breast feeding, mixed feeding and exclusive formula feeding practice were 89.8%, 6.9% and 3.2% respectively. Having information about EBF (No=0.02, 95% CI; 0.01, 0.12), time taking from home to workplace (less than 30 min=4.96, 95% CI; 1.17, 20.95), disclosing HIV status (No= 0.09, 95% CI; 0.02, 0.37), place of residence (urban=5.37, 95% CI; 1.12, 25.77), living with mother/mother in-law (No=6.03, 95% CI; 1.26, 28.86), knowledge about EBF (poor knowledge=0.06, 95% CI; 0.01, 0.34) were main factors for exclusive breast feeding practice. Poor counseling, non-disclosure of HIV status and pressure from mother/mother in-law were the commonly raised reasons by FGD and IDI participants for non-exclusive breast feeding practice.

Conclusions: Majority of HIV positive mothers were practicing exclusive breast feeding for the first six month. Strengthening information dissemination, providing quality health services and empowering mothers through integrated interventions help to promote exclusive breast feeding practice among mothers living with HIV.

Background

Exclusive breastfeeding (EBF), is defined as providing an infant only breast milk (including milk expressed or from a wet nurse) from birth up to 6 months of age, without giving other liquids or solids,

not even water, with the exception of Oral Rehydration Solution (ORS), or drops/syrups of vitamins, minerals or medicines (1). All required nutrients essential for healthy growth and development of infants are included in breast milk (2). EBF is highly helpful to the health of the child in the early stage and later adult life because breast milk has vital nutrient that is critical to protect newborns and infants against many infectious diseases such as pneumonia, meningitis, neonatal sepsis, otitis media and allergies, and malnutrition as well as it also help to have better visual acuity, speech and cognitive development (3-7). Breast feeding, particularly early initiation of breast feeding and EBF are key for child survival as recommended by World Health Organization (WHO) (8). Additionally, regardless of the Human Immune Virus (HIV) status, WHO highly recommended to practice EBF for the first six month and continued till two years with appropriate complementary food (9). In order to accomplish optimum growth, development and wellbeing the National Nutrition Programme (NNP) of Ethiopia recommend that infants should be exclusively breastfed for the first six months of life, which means that infants should receive only breast milk except prescribed medications, vitamins, and minerals (10).

Infant feeding among HIV positive mothers continues to be a global public health problem in spite of improvements in biomedical research (11). The emergent of HIV/AIDS pandemic and the understanding that HIV positive mothers can pass on the virus to their child via breast milk hastened as becoming a public health dilemma in nations with significantly higher new HIV infection and breastfeeding is a norm like Ethiopia (12).

Worldwide, nearly 1.5 million children die each year among children without breast feeding associated with diarrheal disease and malnutrition, even though close to 300, 000 infants become infected with HIV during breast feeding (13). This highlights to outweigh the burden of infant death in the absence of breast feeding especially in resource limiting setting where diarrheal disease and malnutrition are highly prevalent associated with HIV infection to the risk of transmission of HIV via breast milk (14, 15).

The WHO guidelines recommends the importance of avoiding mixed feeding to reduce the risk of HIV transmission and to avoid diarrhea and malnutrition, although difficulties have been reported in some resource-poor settings (9), and where some mothers have been reported to prefer exclusive formula feeding regardless of the promotion of exclusive breastfeeding (16). Despite its recognized importance, exclusive breastfeeding is not widely practiced in the developing world (17). EBF has been recognized as the best chance of the infant to receive the nutrients and antibodies needed to survive (14, 15).

Evidence shows almost all HIV positive women in sub-Saharan Africa including Ethiopia choose EBF but due to little information and lack of practical support, the majority end up with mixed feeding resulting in high rates of postnatal HIV transmission (14, 18).

Despite few studies conducted in Ethiopia related to exclusive breast feeding practice among HIV positive mothers in previous studies (19-23), still there is a gap in exploring cultural influences using qualitative approach in those studies. Therefore, the overall aim of this study was to determine practices of exclusive breast feeding and its associated factors among HIV positive mothers in Debre Birhan town.

Methods

Study area and Setting

The study was conducted in Debre Birhan Town, the capital city of North Showa Administrative Zone of Amhara National Regional State, which is located 130 km north east from Addis Ababa. According to Central Statistics Agency 2013 report, there were an estimated of 87,204 population in Debre Birhan town, of them 47,354 (54.3%) were females. Evidence from North Shoa Zone Health Department 2018/19 report showed, an estimated of 102 HIV positive children with less than fifteen years of age in Debre Birhan Town (24). There is one Referral public and one private primary hospitals, three health centers in which PMTCT and ART services are given.

Study design and Study Period

Facility based mixed method design (convergent parallel) was carried out; it is a type of methods in which qualitative and quantitative data are collected in parallel, analyzed independently, and then combined in a single study (25). Since in the previous studies cultural factors and the society's belief towards exclusive breast feeding was not well addressed through qualitative approach, it provides good opportunity to capture the lived experiences and real life events of the study participants. The aim of bringing together both qualitative and quantitative data is to have a more comprehensive understanding of a problem that helps to design strategies to overcome the practical challenges. Study was conducted from February 01, 2020 to April 30, 2020

Source and Study Population

All HIV positive mothers in the reproductive age group that have been following their ART or PMTCT in Debre Birhan town can be considered as source population.

All HIV positive mothers who have a child or children less than 18 months and who will attend in ART and PMTCT clinics in the public health institution during data collection period were considered as study population.

Sample Size determination and procedure

The sample size for quantitative study was determined by using two methods. First, for answering the first objective (determining practice of EBF), the sample size were calculated using a single population proportion formula, supposing a confidence level of 95%, marginal error 5%, and by taking 77.3 % proportion from previous study conducted in Debre Markos (19). By adding a 10% non-response rate: Lastly, the expected sample size were= **297**. For the second objective (identifying factors for EBF), we selected main determinants of EBF, previously identified in other studies in Ethiopia, then we calculated for each variable using Epi-info "STATCALC" and compare the largest sample size which was 393 from knowledge about EBF. Again we compare from sample size calculated for practice (297) and sample size for factors and took the largest sample size which was sample calculated for factors (393). By added

10% non-response rate the total sample size given us **432**. Number of groups for FGD were two and number of participants for IDI were 25. But it was depend on the point of redundancy or saturation point.

The calculated sample size were proportionally allocated to the selected health institutions found in Debre Birhan town based on the average number of client prior to the study period in the respective PMTCT centers. Then to select study subjects from each PMTCT unit, systematic sampling technique was employed by referring client's registration book during data collection period. There were nearly similar PMTCT cases flow in all three Health Centers (2 cases per day) and triple of HC in Debre Birhan Referral Hospital (6 cases per day). The total estimated clients who visited each health centers and hospital for three months were one hundred twenty and three hundred sixty respectively. Therefore, we took sample proportionally from each HF. The first sample was randomly selected and then every two clients were taken consecutively until the desired sample size have been achieved.

For qualitative phase, purposive sampling was used. In-depth interview were conducted to collect qualitative data from those who were not participate in the quantitative study. There were two FGD group with 10 members in each group that incorporated Health Extension Workers (HEWs) as one group and Woreda HIV/AIDS officer and Health Centers and Hospital Health Professionals who were work in ART and PMTCT clinics. The interviewer for qualitative study was the principal investigator. Both the moderator and assistant were 2 public health experts who had master in public and had more than three years' experience in qualitative data collection and supervision.

Inclusion and Exclusion Criteria

All HIV positive mothers who had children aged less than 18 months old and those visited PMTCT and ART clinics of Public health institution of Debre Birhan town during the study period were included. For FGD also, those health care workers who had more than 3 years' experience related to PMTCT services and at least worked for one year in Debre Birhan twon Health facilities. And those who can express their feeling well and volunteered were included in FGD discussion.

However, those HIV positive mothers who were critically sick, had hearing impairment and who lived in Debre Birhan town for less than six months of period were excluded from the study.

Study variables

The outcome variable was exclusive breast feeding practice. It is defined as providing an infant only breast milk (including milk expressed or from a wet nurse) from birth up to 6 months of age, without giving other liquids or solids, not even water, with the exception of Oral Rehydration Solution (ORS), or drops/syrups of vitamins, minerals or medicines (1). Accordingly, it was coded as 1 for those who practiced EBF and 0 otherwise.

Independent variables were selected based on previous literatures (20-23, 26-32). These are socio-economic and socio-economic factors such as maternal age, religion, and educational status, place of residence, distance of workplace, economic dependency and maternal occupation. As well as other

factors like previous information and maternal knowledge about EBF, disclosure of HIV status, antenatal care follow up, counseling of infant feeding and living arrangement were included.

Operational Definition

Exclusive Breastfeeding-Giving infant breast milk only and prescribed medicine, vitamin/mineral drops, syrup, but no water, other liquids, or food to the infants for the first six months of life.

Mixed Feeding-Giving the baby some breast feeds, and some artificial feeds, either milk or cereal or other foods.

HIV Exposed Infants -Refers to an infants born from HIV infected mothers.

Exclusive Replacement-Feeding-Giving an infant who is not receiving any breast milk only a nutritionally adequate diet until the age at which the child can be fully feed on family food.

Good knowledge-If the respondent score was above or equal to the mean for knowledge assessment questions about exclusive breast feeding practice it was considered as good knowledge.

Poor knowledge- If the respondent score was below to the mean for knowledge assessment questions about exclusive breast feeding practice it was considered as poor knowledge.

Economically dependent: if the mother was dependent on her husband for the household expenditure in the past year.

Economically independent: if the mother was not dependent on their husband for the household expenditure in the past year.

Data collection method, tools and quality assurance

The instrument were adapted from different previous literatures (19-22, 26, 31, 33). After modified to local setting and it contain five parts, which are socio-economic factors, infant feeding counseling, beliefs and cultures, maternal and child health and maternal knowledge.

Quantitative data were collected using structured interviewer administered questionnaire. The tools were pre-tested in Chacha health center that provided approximately similar societies as facilities in Debre Birhan town. The data collectors were two degree holder midwives and they got intensive training for two days; about overall objective of the study, data collection tools, methods and ethical concerns related to the study prior to data collection period. There were also one supervisor who had master of Public health with proven supervision experience related to facility data collection. Each day, the supervisor was available with data collector to each health facility to attentively supervise and support them. At the end the day he checked for completeness and consistency of data. Similarly principal investigator also randomly checked for the activities of data collector and supervisors in each day.

For qualitative data, the principal investigator himself collected it with the help of two public health experts for audio record and taking field notes and moderators. The questions were open ended and prepared to explore their feeling, beliefs and current cultural practices related to EBF. Observational checklists for assessment of quality of counseling also used.

Data processing and analysis

The collected data were checked manually for its completeness, coded and entered into Epi-info version 7, then exported to SPSS version 20.0 for further analysis. Descriptive and inferential statistics have been computed. Bivariate logistic regression to select candidate explanatory variable and multivariate logistic regression analysis were done to determine whether or not association among independent and dependent variable using p value less than 0.05 as cut point. Variables that had significant association in bivariate logistic regression were entered into a multivariate logistic regression model to adjust for the effects of cofounders on the outcome variable. Odds ratio with their 95% confidence intervals were computed to identify the presence and strength of association. Statistical significance declared at P-value < 0.05.

The qualitative data were analyzed manually and thematic analysis technique have been done using the following steps. Firstly data from audio recorder were transcribed. Secondly the data were read several times (immersion) and classified and categorized in to similarly labeled data (cluster). Thirdly similar cluster were refined and relabeled in to code (coding). Then the data were double coded to confirm inter-coder consistency. After that the coded data organized in to themes and then the theme were revised and refined by check data if there are numerous illogicalities with-in a theme. Lastly the themes was explained and named. The main finding from qualitative study were mixed with quantitative result and finally, interpretations were drawn by triangulating both qualitative and quantitative results.

Results

Socio-demographic characteristics of respondents

A total of 432 respondents were involved with 100% response rate. Their mean age was 28.38 years with a standard deviation ± 4.61 years. More than one fourth (29.2%) and half (50.7%) of the participants were less than 25 years old and had attended primary school respectively. Majority of the participants were Amhara (83.6%) by ethnicity and orthodox (83.8%) by religion. One hundred twenty (27.8%) of the respondents were economically dependent. Regarding occupational status, 140 (32.4%) and 159 (36.8%) of the participants were daily laborer and housewife respectively (**Table 1**).

*** Table 1***

Frequency distribution of selected explanatory variables

Majority (88.2%), (89.4%) and (85%) of the respondents had antenatal care follow-up, heard about exclusive breast feeding and disclosed their HIV status either to their husband, mother, or any close

friends respectively. Almost two-third (64.6%) of the participants had good knowledge about exclusive breast feeding (**Table 2**).

Table 2

Practice of EBF

Majority (89.8%) of HIV positive mothers were practicing exclusive breast feeding. Only 14 (3.2%) of the participants were feeding their child exclusive formula feeding. their reasons were fear of HIV virus transmission or had doubt on transmission even with ART (**Figure 1**). Exclusive breast feeding practice among HIV positive mothers who had previous information about EBF was 94.7%, while it was 54.7% among mothers who had not previous information. Huge difference in EBF practice was seen between mothers who walked short and long distance from home to workplace. For instance, among mothers who walked less than 30 minutes it was 96.8%, however, it was 80.2% among mothers who walked more than 30 minutes. About 97.3% of HIV positive mothers who attended primary school practiced EBF. But, only 42% of HIV positive mothers who had no formal education practiced EBF.

Figure 1

Determinants of exclusive breast feeding

We found that having information/awareness about EBF, time to go/distance from home to work place, disclosing HIV status, place of residence, living with mother/mother in law, knowledge on EBF, maternal education, and ANC follow up had statistically significant association with EBF among HIV positive mothers. More specifically, compared to mothers who had previous awareness about EBF, mother who had no information were 98% less likely to practice EBF. (aOR=0.02, 95% CI; 0.01, 0.12).

Time taken to go from home to work place also had significant association with EBF practice. In fact, the result showed the odd of EBF practice among HIV positive mothers who traveled from home to their work place in less than 30 minute were about 5 times (aOR=4.96, 95% CI; 1.17, 20.95) higher as compared to mother who traveled more than 30 minutes and above.

Another factor that had significant association with EBF practice was disclosing of HIV status. Compared to mothers who disclosed their HIV status, EBF practice among mothers who are not disclosed their HIV status were lower by 91% (aOR=0.09, 95% CI; 0.02, 0.37)..

Place of residence had significant association with EBF practice. In fact, the finding shows, the odd of EBF practice among HIV positive mothers living in urban setting were 5.3 times (aOR=5.37, 95% CI; 1.12, 25.77) higher as compared to their counterparts.

The finding from the current study showed, living with mother/mother in-law had significant association with practice of EBF among HIV positive mothers. Compared to HIV positive mothers living either with

their mother or mother in law, the odd of EBF practice were 6 times (aOR=6.03, 95% CI; 1.26, 28.86) higher among HIV positive mothers who were living alone.

Knowledge related to EBF also had significant association with EBF practice. In fact, the present study shows EBF practice among HIV positive mothers who had poor knowledge regarding EBF were lower by 94% (aOR=0.06, 95% CI; 0.01, 0.34) as compared to mother who had good knowledge.

Maternal educational level had significant association with EBF practice among HIV positive mothers. Compared to HIV positive mothers who were attended secondary school and above, EBF practice among HIV positive mothers who had no formal education were lower by 93% (aOR=0.07, 95% CI; 0.01, 0.48).

ANC follow up had significant association with EBF. The finding from the present study showed EBF practice among HIV positive mothers who had no ANC follow up were lower by 90% (aOR=0.10, 95% CI; 0.02, 0.55) as compared to mothers who had ANC follow up (**Table 3**).

*** Table 3***

Qualitative findings

Socio-demographic characteristics of the participants

A total of eighteen female and twenty seven male participants were involved in the qualitative study. Twenty five respondents whose age ranges from 28 to 40 years and who were not participated in quantitative study were involved for the in-depth interview. About fifteen of the IDI participants had no formal education, the rest eight and two participants were attended primary and secondary schools respectively. While, seven of them were from the rural residents, eighteen were living in urban area.

Thematic areas identified during the analysis

Different concepts about EBF practice were raised both from IDI and FGD participants. After familiarized and coded it, themes were formed. Then those themes were reviewed for its accuracy as the concepts of their original meaning. Finally those themes were defined, named and written as the followings.

Habit of EBF

Participants in FGD reported that breast feeding are practicing both by HIV positive and HIV negative mothers but better among HIV positive mothers in the town. A 29 years old woreda HIV officer explained:

"I stayed for more than 3 years in this town and I understood two different points from what I am looking and report I found from health facilities. The first is, among the general population or both among HIV positive and HIV negative mothers, the practice is nearly similar. What I said this is, even if the practice seemed a little increased among some group of the population like rural setting related to expansion of education and health facilities, as well as media exposure as compared to previous years, still I have seen mothers living in urban setting ignoring breast feeding for fear of disfigurement in their physical shape,

modernization and considering formula feeding as an indicator of rich family and breast milk for the poor. However, among HIV positive mothers I believed it is better as compared to HIV negative mothers” [FGD 1].

Awareness about EBF

The participants stated that majority of the mothers in the town practice exclusive breast feeding. However, few mothers may not strictly feed as recommended. This might be either related to illness, or work related challenges and awareness problems.

“I shared my friends’ idea. With few exception most of the mothers feed their baby exclusively. Since it is town mothers got information from health professionals in their ANC follow up or delivery or they may exposed for media directly or indirectly. Not only that, most of them attended a minimum of primary school. But those who lived in rural area may not have media exposure as urban residents” [FGD 2].

Poor counseling

The FGD participants described that HIV positive mothers are highly sensitive to make their child safe or free and they apply what health professionals’ advice. Despite majority mothers accept HCWs advice and feed exclusively, still some mothers completely avoid breast feeding. The main reason could be due to poor counseling during their ANC, they may become confused about HIV virus transmission to their child and prefer to use exclusive formula feeding or giving other food and cow milk instead.

“I know one mother not want to breast feed her child exclusively due to fear of HIV transmission. Even if I counseled her several times about risk and benefit of both option, she can’t believe it and choice feeding formula feeding or even cow milk with known risks like diarrheal disease and malnutrition”. [FGD 2]

Non-disclosure of HIV status

The society’s perception can substantially affect HIV positive mothers to apply mixed feeding especially in rural area. The societies are highly interconnected socially. Particularly, mothers who are not disclosed their HIV status commonly practice mixed feeding. This could be by two main reasons; one by fearing social discrimination and stigma and the second is due to fearing of divorce and its consequence such as lack of social support and family disintegration. A 39 year Woreda HIV officer explained:

I see this idea by two point of view. The first is, if they believe they their husband can’t accept this truth, divorcing is inevitable and very complicated economic and social crisis they will face, they may choice keeping it as secret and praying to God or Allah to be free of their child with mixed feeding. The other point is, if they believed their husband infected them, disclosing may not reach to this level, they can economically survive by themselves, shoulder social discrimination and prioritized their baby, they decided to disclose their HIV status. Whatever it is, I believed disclosing for their husband or mother or their close friend can hugely support them to practice EBF as I looked from my experience”.

Pressure from mother/mother-in-law

Mothers participated in-depth interview reported that the pressure from mother in-law and other members of family including the husband can highly affect in the choice of infant feeding either during the starting or persistent of EBF. A 23 years old mother explained: *"I had antenatal care follow up and the health professionals were counseled me about feeding. However, both my husband and my mother in-law were not volunteered to feed only my breast. They told me that not for mother who delivered for the first time, breast milk is not enough for mothers who had many children also and I decided to give water and other fluid"* [IDI 1].

Discussion

Using facility based mixed method approach, exclusive breast feeding practice and its associated factors among HIV positive mothers were assessed. Majority of the respondents (89.8%) were practiced exclusive breast feeding, while 6.9% and 3.2% of the respondents were practiced mixed and exclusive formula feeding respectively. This finding was also supported by FGD participants. They expressed compared to HIV negative mothers, EBF practice are seriously seen and practiced by most of HIV positive mothers. Few mothers (3.2%) had fed formula feeding exclusively. The reason they explained was fear not to transmit HIV virus to their child.

Several socio-demographic and socio-economic factors that constrain or increases the practice of EBF are identified. In line with previous study in Kenya (34), Nepal (35) and Tunisia (36), the current study shows that maternal educational level had influence on exclusive breast feeding practice with better practice among mothers who attended secondary school and above. This might be due to better level of knowledge and media exposure status as compared to non-educated mothers.

Disclosing HIV status had positive influence on EBF practice as supported by previous study South Africa (37). Previous study also reported that disclosing HIV status increased assistance from families and close friends, this in turn have influence in their adherence to EBF practices as stated elsewhere (37). For example, reduced workload, dietary provision, good adherence to ART, and exclusive breastfeeding reassurance were certain of the explanations for disclosure (38, 39). Evidence showed because of husband's awareness and contribution in decision making and assistance regarding infant feeding option, exclusive breast feeding practice can be highly affected by disclosure of mothers HIV status (40). Beyond financial and other support, disclosing HIV status believed to have psychological freedom during preparation and feeding of formula feeding (20). The qualitative finding from FGD participants supported this result. After they confirmed non-disclosing HIV status is one of the barrier for poor adherence in EBF, they stated it is because of fearing the adverse consequences such as divorces, economic vulnerability, social discrimination and related mental and social problems. Previous studies also showed, disclosing HIV status sometimes have bad consequence in the marital relationship (37, 41, 42). As a result mothers prefer keeping at a secret even if they face challenges in EBF and obliged to change in to mixed infant feeding.

Consistent with previous studies in Uganda (43) and Cameron (44), knowledge about exclusive breast feeding found to have influence on exclusive breast feeding among HIV positive mothers. This might be due to mothers with better knowledge might increase their confidence and believed to help to have timely decision about their child feeding option related to their understanding about the benefits of EBF their child and themselves.

Similar with previous studies in Oromia region (21), Southern Ethiopia (45), and in selected institution in Ethiopia (46), ANC follow up observed to have positive influence in EBF practice in the current study. This could be they could have been counseled about EBF during their pregnancy follow up. Previous studies in Ethiopia confirmed that counseling ANC follow-up could significantly increase the practice of EBF (23, 26, 47), because of the information given on infant feeding option help mothers to decide based on sufficient evidence they get from the health professionals.

Our finding showed that mother/grandmother or mother in-law had negative influence on the practice of EBF as supported by previous study (48). The plausible reason could be, if the mother living alone the decision could be relied on her and her husband. However, when her or husband mother/grandmother living with them, the decision could be not as easy as they decided. The pressure from those family members are highly dominant since they passed over several years with deep rooted culture and perception (48). From the IDI participants similar finding were seen. They reported that due to the direct pressure from husband and indirect pressure from their mother in-law (through husband), their decision might be changed even if they counseled and informed by health professionals to practice EBF. Their main reason to push to mix feeding is by the assumption of breast milk alone is not sufficient enough for their child. They sometimes give guarantee by explain their previous experience, their children are still healthy and this is because of mixed feeding.

Limitation Of The Study

The study has few strengths. First, the study used mixed approach, made the finding to be more comprehensive and complete understanding of the factors. Second, the sample size was also large and believed to be representative. However, it should be seen with the following limitations. Since it is facility based study, might not represent the community population. Second, since it was self-reported, the result might be affected by recall bias. And lastly, due to its cross-sectional nature, causal inference might not be possible.

Conclusions

Majority of HIV positive mothers were practiced EBF for the first six months. HIV positive mothers not living with their mother/mother in-law, living near to their workplace and urban setting were high likely to breast feed exclusively. Whereas, mothers who had no formal education and no previous information about EBF, as well as not had ANC follow up, had poor knowledge about EBF, and those not disclosed their HIV status were less likely to practice exclusive breast feeding.

Especial attention should be given for mothers living in rural area. Strengthening service uptake of ANC, empowering women educationally, designing regulations of deploying or facilitating working opportunities near to their home for breast feeding mothers, health education and information dissemination about EBF using media and leaflets both at facility and other potential sites where mothers are accessible are needed. Individual and couple counseling during ANC follow up also helpful both the mothers and their husband to have sufficient knowledge, to increase confidence for HIV status disclosure, and to reduce families' pressure and related mixed feeding.

Abbreviations

AIDS: Acquired Immune Deficiency Virus, ANC: Antenatal care, aOR: Adjusted Odd Ratio, CI: Confidence Interval, COR: Crude Odd Ratio, EBF: Exclusive Breast Feeding, FGD: Focus Group Discussion, HCWs: Health Care workers, HEW: Health Extension Worker, HIV: Human Immune deficiency Virus, IDI: In-depth Interview, PMTCT: Prevention of Mother to Child Transmission, WHO: World Health Organization

Declarations

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Availability of data and materials

The minimal data up on which the analysis was based can be obtained from the corresponding author up on reasonable request.

Authors' contributions

YG and BZ contributed in the conceived and design of the study, reviewing literatures, data analyses, interpretation, drafting and development of the manuscript. AM and AH contributed in the design of the study, interpretation, development of the manuscript and critical review of final manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Ethical clearance for the study was provided by the Ethical Review Committee (ERC) of College Health Science, Debre Birhan University. Then, a letter of permission to conduct the study was obtained from

Debre Birhan Health office and Debre Birhan Referral Hospital. In depth explanations about the process, study objectives and benefits were given to the study participants. Data was collected after obtaining verbal informed consent from the participants; confidentiality was maintained throughout the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1: Socio-demographic characteristics of HIV positive mothers visited PMTCT clinics in public health facilities of Debre Birhan town from February 01 to April 30, 2020 (n=432)

Variables	Categories	Frequency	Percent
Child age	<6 month	103	23.8
	6-11 month	185	42.8
	12-18 month	144	33.3
Child sex	Male	213	49.3
	Female	219	50.7
Ethnicity	Amhara	361	83.6
	Oromo	54	12.5
	Tigre	17	3.9
Religion	Orthodox	362	83.8
	Muslim	53	12.3
	Protestant	17	3.9
Maternal age	<=25 years	126	29.2
	25-34	288	66.6
	>=35 years	18	4.2
Economic dependency	Dependent	120	27.8
	Independent	312	72.2
Educational status	No formal education	50	11.6
	Primary school	219	50.7
	Secondary school and above	163	37.7
Occupational status	Daily laborer	140	32.4
	Housewife	159	36.8
	Governmental and private employee	133	30.8
Place of residence	Urban	302	69.9
	Rural	130	30.1

Table 2: Frequency distribution of some explanatory variables among HIV positive mothers visiting PMTCT clinics in public health facilities of Debre Birhan town from February 01, 2020 to April 30, 2020 (n=432)

Variables	Categories	Frequency	Percent
ANC follow up	No	51	11.8
	Yes	381	88.2
Heard about EBF	No	46	10.6
	Yes	386	89.4
Disclosed HIV status	No	65	15.0
	Yes	367	85.0
Time taking to go from home to work place	<=30 minute	250	57.9
	>=30 minute	182	42.1
Living with mother/mother in-law	No	233	53.9
	Yes	199	46.1
Knowledge about EBF	Poor knowledge	153	35.4
	Good knowledge	279	64.6

Table 3: Determinants of exclusive breast feeding practice among HIV positive mothers attending PMTCT clinics in public health facilities in Debre Birhan town from February to April, 2020 (n=432).

Variables	EFB	COR [95% CI]	AOR [95% CI]
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	Yes (Freq. / %)	No (Freq. / %)		
Economical dependency				
Dependent	105 (87.5%)	15 (12.5%)	0.30 (0.16- 0.57) ^{***}	0.64 (0.12, 3.23)
Independent (ref)	281 (90.1%)	31 (9.9%)		
Previous information on EBF				
No	29 (54.7%)	24 (45.3%)	0.02 (0.01- 0.06) ^{***}	0.02 (0.01, 0.12) ^{***}
Yes (ref)	359 (94.7%)	20 (5.3%)		
Time taking home to workplace				
<30minute	242 (96.8%)	8 (3.2%)	7.45 (3.37- 16.48) ^{***}	4.96 (1.17, 20.95) *
>=30minute (ref)	146 (80.2%)	36 (19.8%)		
Disclosed HIV status				
No	24 (36.9%)	41 (63.1%)	0.09 (0.05- 0.19) ^{***}	0.09 (0.02, 0.37) ^{**}
Yes (ref)	20 (5.4%)	347 (94.6%)		
Place of residence				
Urban	276 (91.4%)	26 (8.6%)	2.40 (1.91- 5.23) ^{**}	5.37 (1.12, 25.77) *
Rural (ref)	112 (86.2%)	18 (13.8%)		
Living with mother/mother in law				
No	224 (96.1%)	9 (3.9%)	5.31 (2.48- 11.35) ^{***}	6.03 (1.26, 28.86) *
Yes (ref)	164 (82.4%)	35 (17.6%)		
Knowledge about EBF				
Poor Knowledge	123 (80.4%)	30 (19.6%)	0.21 (0.11- 0.42) ^{***}	0.06 (0.01, 0.34) ^{**}

Good Knowledge (ref)	265 (95.0%)	14 (5.0%)		
Maternal educational status				
No formal education	21 (42.0%)	29 (58.0%)	0.04 (0.02- 0.10)***	0.07 (0.01, 0.48) **
Primary school	213 (97.3%)	6 (2.7%)	2.07 (0.72-5.95)	1.29 (0.27, 6.18)
Secondary school and above (ref)	154 (94.5%)	9 (5.5%)		
Maternal occupation				
Daily laborer	102 (72.9%)	38 (27.1%)	0.02 (0.00- 0.15)***	0.08 (0.01, 1.39)
Housewife	154 (96.9%)	5 (3.1%)	0.23 (0.03-2.02)	0.70 (0.04, 11.41)
Government and private employee (ref)	132 (99.2%)	1 (0.8%)		
ANC follow up				
No	37 (72.5%)	14 (27.5%)	0.22 (0.11- 0.46)***	0.10 (0.02, 0.55) **
Yes (ref)	351 (92.1%)	30 (7.9%)		

Notes: *** p<0.001, ** p<0.01, * p<0.05, ref: reference

Figures



Figure 1

Infant and child feeding practice among HIV positive mothers attending PMTCT clinics in public health facilities in Debre Birhan town, from February to April, 2020 (n=432)