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Exclusive Breastfeeding Practice and its Associated Factors Among Mothers with Children Aged 6-23 Months in Dire Dawa, Eastern Ethiopia: A Community-based Cross-sectional Study

Assefa Desalew (MSc)[1*], Alekaw Sema (MSc)[2], Yalelet Belay (MSc)[2]

[1] Lecturer, Department of Pediatric Nursing, Faculty of Health and Medical Sciences, Haramaya University, Harar, Ethiopia
[2] Lecturer, Department of Midwifery, Faculty of Medicine and Health Sciences, Dire Dawa University, Dire Dawa, Ethiopia

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ABSTRACT

Background & aim: Exclusive breastfeeding (EBF) is an essential need for the development and survival of the neonates, particularly in low-income countries. Therefore, the purpose of this survey was to determine the prevalence of EBF practice and its associated factors among mothers with children of 6-23 months in Dire Dawa Administration, eastern Ethiopia.

Methods: This community-based cross-sectional survey was conducted on 704 participants in 15 kebeles in the Dire Dawa Administration using multistage sampling in 2018. The data were collected using a pretested interviewer-administered questionnaire. Binary logistic regression was used to identify the factors associated with EBF.

Results: The magnitude of EBF practice was 81.1% (95% CI: 78.0-83.8). In the multivariate logistic analysis, the odds of EBF practice were significantly higher among unemployed mothers (AOR: 1.93; 95% CI: 1.17-3.20), antenatal care (ANC) users (AOR: 1.69; 95% CI: 1.05-2.72), as well as the young mothers within the age ranges of 15-25 (AOR: 4.41; 95% CI: 1.90-10.20) and 26-35 (AOR: 2.16; 95% CI: 1.12-4.18) years. However, the subjects with bottle-feeding practice had lower odds (AOR: 0.55; 95% CI: 0.35-0.87), compared to those reported with EBF practice.

Conclusion: The magnitude of EBF practice was almost as high as the recommended level. The unemployment status, ANC visit, maternal age, and bottle-feeding practice were the factors associated with EBF. Therefore, employed mothers should be provided with a special room in their workplace to breastfeed their children, daycare facilities, and/or six-month maternity leave. Also, healthcare workers should give attention to the encouragement of mothers to receive ANC.

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Introduction

Exclusive breastfeeding (EBF) is a matter of concern and an unfinished agenda both in developed and developing countries. The World Health Organization (WHO) defined EBF as feeding neonates only on breast milk, directly from the breast or expressed, except for drops or syrups containing vitamins, mineral supplements, or medicine. The EBF is the most important intervention for optimal neonatal development and survival. It also has a more potential impact on the reduction of child mortality than any other preventive interventions (1, 2, 3).

Optimal breastfeeding has a crucial role in maintaining and promoting the growth, health, and survival status of the newborns. It also improves school achievement and health of mothers and their children (3, 4). International

* *Corresponding author:* Assefa Desalew, Lecturer, Department of Pediatric Nursing, Faculty of Health and Medical Sciences, Haramaya University, Harar, Ethiopia. Email: assefad100@gmail.com

organizations, such as the WHO and United Nations Children's Fund, have recommended EBF for the first 6 months of life and then with complementary foods to help neonates achieve optimal growth and development (4, 5), increase their intelligence quotient score, and boost their adult learning (6).

Although the benefit of EBF is widely promoted worldwide, only 37% of the newborns are provided with EBF in the first 6 months of life in developing countries (3, 4). The EBF is believed to reduce the neonatal mortality rate by 13% (7, 8); however, currently, early weaning and mixed feeding in the first 6 months of life result in 1.4 million deaths among the children of under 5 years of age (9). Moreover, according to the evidence, it was shown that non-EBF practices account for 55% and 53% of diarrheal and acute respiratory-related mortalities, respectively (10).

However, EBF has an essential impact on the optimal health, development, and survival of the neonates. It is also associated with a reduction of risk factors of early childhood diseases and conditions, such as respiratory tract infection, otitis media, diarrhea, stunted development, and obesity (6, 7, 11). Moreover, breastfeeding is one of the top interventions for the reduction of mortality under 5 years of age. To achieve the full effect of breastfeeding, it should continue up to the age of 2 years (11).

Different studies carried out in many settings indicated various factors. Maternal age and educational status (12-16), economic condition (14, 17, 18), antenatal and postnatal care counseling (14,16,17,19-23), maternal occupational status (11), spontaneous vaginal delivery (SVD) (24), poor feeding, inadequate support (25), and facility-based delivery (19) were considered the associated factors of EBF practice. Moreover, based on the literature, it was shown that there have been wide variations in the magnitude of EBF, for example, 29.3% and 81.1% in Addis Ababa (21) and Dubti (23), Ethiopia, respectively. Furthermore, there are inconsistencies in the factors associated with EBF in many developing countries, including Ethiopia, indicating that EBF is dependent on the local sociocultural behaviors of the community.

The advantages of EBF as the backbone of child nutrition, as well as the prevention of child morbidity and mortality, have been recognized and promoted in multiple studies. For example, the Ethiopian Ministry of Health planned to increase the magnitude of EBF for the first 6 months to 70% in 2015, as one of the important strategies for the improvement of child health (26). However, only 58% of the neonates had EBF in 2016, as indicated in the Ethiopia Demographic and Health Survey (EDHS) (27). Furthermore, the Ethiopian Ministry of Health has been struggling to reduce the burden of undernutrition through the early initiation of breastfeeding within the first hour of birth and EBF for the first 6 months, followed by adequate complementary feeding (28).

The practice of EBF has been reported with a great number of benefits for mothers and neonates. However, the level of EBF practice, particularly in developing countries, including Ethiopia, continues to be suboptimal, and the effective factors have varied according to the results of previous studies. This may be depending on sociocultural and other related conditions. Therefore, identifying the magnitude of EBF practice and its effective factors are important in designing and carrying out successful interventions in the local context. As a result, the main purpose of this survey was to determine the prevalence of EBF practice and its associated factors among mothers with the neonates of 6-23 months in Dire Dawa, eastern Ethiopia.

Materials and Methods

This community-based cross-sectional study was conducted to assess the magnitude and associated factors of EBF practice among mothers with the neonates of 6-23 months within February 1 to 30, 2018. The present study was carried out in the eastern part of Ethiopia, Dire Dawa, located 515 km from Addis Ababa the capital of Ethiopia. According to the 2007 Ethiopian demographic census, the population of Dire Dawa is 341,834. The Dire Dawa Administration has reached 100% access to primary healthcare in terms of geographic distribution. Dire Dawa has 6 hospitals, 15 health centers, and higher than 40 health posts. The administration is divided into 9 urban and 38 rural kebeles (i.e., smallest administration

units) (29).

The sample size was calculated using a single population proportion formula with a 95% CI, 5% margin of error, and 32.1% prevalence of appropriate neonatal feeding (30). Multistage sampling was employed in this study. A design effect of 2 was considered and accounted for 5% of the nonresponse. Therefore, the final sample size was estimated at 704 mothers with the newborns of 6-23 months.

In this study, simple random sampling was used to select 15 kebeles out of a total of 45 kebeles in the administration. Afterward, the list of mothers with the neonates of 6-23 months for each of the selected kebeles was obtained from the health extension workers' registry. We allocated the sample size to each of the kebeles proportional to the number of its mothers with the newborns of 6-23 months. Finally, mother-child pairs were selected from the list using simple random sampling.

The data were collected from the mothers using a structured interviewer-administered questionnaire adapted to the WHO standardized questionnaire for Infant and Young Child Feeding measurement practices (31). The questionnaire was pretested, translated into local languages (i.e., Amharic and Afan Oromo), and back to English for consistency. It contained the variables related to socioeconomic characteristics, health services, as well as maternal and neonatal health conditions. The data collectors and supervisors were trained for 2 days before fieldwork. Furthermore, timely supervision was carried out by the investigators and supervisors.

The data were cleaned, entered into EpiData software (version 3.1), and then exported and analyzed using SPSS software (version 25). Univariate analysis was utilized to describe the frequency distribution of each variable. Bivariate analysis was used to estimate the association of EBF practice with maternal and neonatal characteristics. The covariates with a p-value of 0.25 or less were retained for multivariate analysis. The Hosmer-Lemeshow goodness-of-fit was used to assess the fulfillment of necessary assumptions for the application of multiple logistic regression. A multivariable logistic regression model, using AOR with a 95% CI, was developed to incorporate both maternal and child characteristics selected in the bivariate analyses using stepwise regression. A p-value less than 0.05 was considered statistically significant.

Ethical clearance was obtained from the Institutional Health Research Ethics Review Committee of the College of Medicine and Health Sciences in Dire Dawa University (Ref. No. DDU/RTI/1851/2018). Then, a support letter was obtained from the college to the respective district administration. Afterward, a permission letter was obtained from the administration. During the data collection, each respondent was informed about the aim, benefit, and risk of the study. Subsequently, an informed, voluntary, written, and signed consent was obtained from each participant before the initiation of the data collection. To ensure confidentiality, the name and other identifiers of the mothers were not recorded on the data collection tools.

Results

Parental sociodemographic characteristics

All the mothers (n=704) participated in this study, with a response rate of 100%. In this study, 493 (70.0%) mothers were 26-35 years old, and the mean age of the participants was 28.97±4.75 years. Out of all the mothers and their partners, 41.5% (n=292) and 47.9% (n=337) of the mothers and husbands had primary education, respectively. The majority (n=649; 92.2%) of the subjects were married, and 438 (62.2%) participants were urban residents. In terms of maternal occupational status, 246 (34.9%) mothers were employed, and 517 (73.4%) participants had under 5-year children (Table 1).

Prenatal and obstetric characteristics

Almost all (n=689; 97.9%) of the neonates were delivered through a singleton birth, and 678 (96.3%) newborns were born at health facilities. Furthermore, 547 (77.7%) neonates were delivered through SVD. Many of the respondents received at list one antenatal care (ANC) visit. Moreover, 519 (73.7%) and 493 (70.0%) subjects utilized postnatal care. In addition, one-fourth (n=185; 26.3%) of the mothers reported that they had a birth interval of less than 24 months (Table 2).

Table 1. Parental sociodemographic characteristics of neonates aged 6-23 months in Dire Dawa Administration, eastern Ethiopia, in 2018 (n=704)

Variable	Frequency (n)	Percentage (%)
Residence		
Urban	438	62.2
Rural	266	37.8
Occupational status of mothers		
No	458	65.1
Yes	246	34.9
Marital status		
Married	649	92.2
Not married	55	7.8
Maternal age		
15 -25 years	156	22.2
26-35 years	493	70.0
>35 years	55	7.8
Maternal educational status		
No formal education	130	18.5
Primary	292	41.5
Secondary	148	21.0
College and higher	134	19.0
Children of under 5 years in family (n)		
Less than five	517	73.4
Higher than or equal to five	187	26.6
Husband's educational level		
No formal education	28	4.0
Primary	337	47.9
Secondary	166	23.6
College and higher	173	24.6
Husband's occupational status		
Employed	199	28.3
Farmer	95	13.5
Self-employed	263	37.4
Daily labors	147	20.9

Neonatal feeding characteristics

About half (n=354; 50.3%) of the neonates were male, and 330 (46.9%) newborns were 6-12 months, with a mean age of 13.46±5.34 months. Regarding complementary feeding, 487 (69.2%) neonates were reported with complementary feeding starting at 6 months, and 183 (26.0%) newborns had bottle-feeding. Moreover, less than half (n=324; 46.0%) of the neonates had a growth monitoring card as presented in Table 3.

Prevalence of exclusive breastfeeding

Almost four-fifth (81.1%) of the neonates were exclusively breastfed during the first 6 months of life (95% CI: 78.0-83.8) as illustrated in Figure 1. In this study, most (n=617; 87.6%) of the newborns initiated breastfeeding in the first hour of life.

Table 2. Prenatal, obstetrics, and feeding characteristics of neonates aged 6-23 months in Dire Dawa Administration, eastern Ethiopia, in 2018 (n=704)

Variable	Frequency (n)	Percentage (%)
Place of delivery		
Health facilities	678	96.3
Home	26	3.7
Mode of delivery		
Spontaneous vaginal delivery	547	77.7
Operative vaginal delivery	157	22.3
Antenatal care utilization		
Yes	519	73.7
No	185	26.3
Type of birth		
Multiple	15	2.1
Singleton	689	97.9
Postnatal care utilization		
Yes	493	70.0
No	211	30.0
Birth order		
First	267	37.9
Second	229	32.5
Third	95	13.5
Four and above	113	16.1
Birth interval		
First-time birth	317	45.0
Less than 24 months	185	26.3
Higher than 24 months	202	28.7
Neonate gender		
Male	354	50.3
Female	350	49.7
Neonate age		
6-12 months	330	46.9
13-18 months	220	31.3
19-23 months	154	21.9
Initiation time of complementary feeding		
Under 6 months	174	24.7
At 6 months	457	64.9
After 6 months	73	10.4
Bottle-feeding practice		
Yes	183	26.0
No	521	74.0
Initiation time of breastfeeding		
Within one hour	617	87.6
After one hour	87	12.4
Growth monitoring card		
Yes	324	46.0
No	380	54.0

Associated factors with exclusive breastfeeding

In the multivariate logistic analysis, unemployment status, ANC utilization, maternal age, and bottle-feeding practice were independently associated with EBF practice. The odds of EBF practice were 1.93 times higher among the unemployed mothers, compared to those reported for the employed subjects (AOR:

1.93; 95% CI: 1.17-3.20). The mothers of the neonates who received ANC were reported with the higher odds of practicing EBF as 1.7 times for the first 6 months, compared to those of their counterparts (AOR: 1.69; 95% CI: 1.05-2.72).

Table 3. Prenatal and obstetrics characteristics of neonates aged 6-23 months in Dire Dawa Administration, eastern Ethiopia, in 2018 (n=704)

Variable	Frequency (n)	Percentage (%)
Neonate gender		
Male	354	50.3
Female	350	49.7
Neonate age		
6-12 months	330	46.9
13-18 months	220	31.3
19-23 months	154	21.9
Initiation time of complementary feeding		
Under 6 months	133	18.9
At 6 months	487	69.2
After 6 months	84	11.9
Bottle-feeding practice		
Yes	183	26.0
No	521	74.0
Initiation time of breastfeeding		
Within one hour	617	87.6
After one hour	87	12.4
Growth monitoring card		
Yes	324	46.0
No	380	54.0

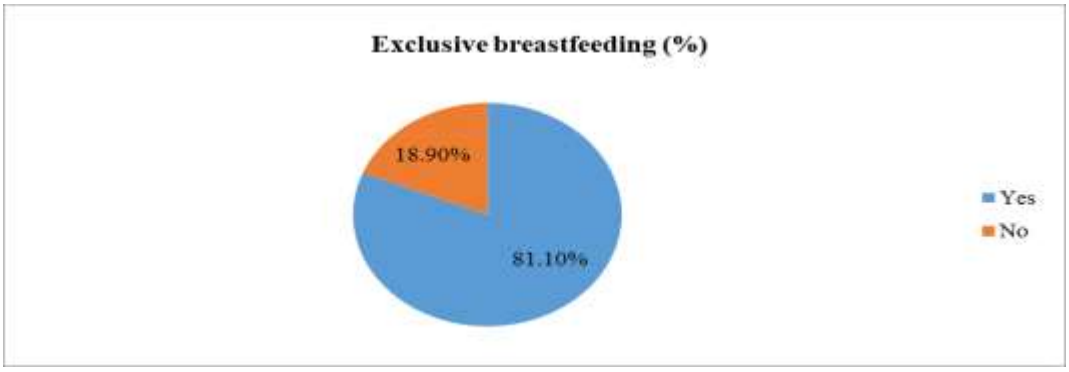

Figure 1. Proportion of exclusive breastfeeding practice among neonates of 6-23 months in Dire Dawa Administration, eastern Ethiopia, in 2018 (n=704)

Furthermore, the odds of practicing EBF was significantly higher among the younger mothers (AOR: 4.41; 95% CI: 1.90-10.20; age range: 15-25 years) in comparison to those reported for the older mothers (AOR: 2.16; 95% CI: 1.12-4.18; age range: 26-35 years). Moreover, the mothers who practiced bottle-feeding had the lower odds of EBF practice for the first 6 months than those who were reported with breastfeeding practice (AOR: 0.55; 95% CI: 0.35-0.87) (Table 4).

Table 4. Bivariate and multivariate logistic regression analyses for associated factors with exclusive breastfeeding practice among mothers with children of 6-23 months in Dire Dawa Administration, eastern part of Ethiopia, in 2018 (n=704)

Variable	Exclusive breastfeeding		COR (95% CI)	AOR (95% CI)	P-value
	Yes	No			
Maternal employment					
No	211	35	1.64 (1.08-2.50)	1.93 (1.17-3.20)	0.010*
Yes	360	98	1.00	1.00	
Marital status					
Married	525	124	1.00	1.00	
Mot married	46	9	1.21 (0.58-2.53)	0.97 (0.41-2.29)	0.942
Maternal age					
15-25 years old	136	20	3.31 (1.59- 6.89)	4.41 (1.90-10.20)	0.001*
26-35 years old	398	95	2.04 (1.11-3.74)	2.16 (1.12-4.18)	0.022*
>35 years old	37	18	1.00	1.00	
Growth monitoring follow-up					
Yes	269	55	1.00	1.00	
No	302	78	0.79 (0.54-1.16)	0.84 (0.54-1.32)	0.453
Children of under 5 years (n)					
Less than five	426	91	1.00	1.00	
Higher than or equal to 5	145	42	0.74 (0.49-1.11)	0.72 (0.45-1.13)	0.155
Place of delivery					
Health facilities	551	127	1.00	1.00	
Home	20	6	0.77 (0.30-1.95)	0.87 (0.31-2.44)	0.792
Mode of delivery					
Spontaneous vaginal delivery	434	113	1.00	1.00	
Operative vaginal delivery	137	20	1.78 (1.07-2.98)	1.70 (0.98-2.90)	0.057
Antenatal care utilization					
Yes	432	87	1.64 (1.09-2.46)	1.69 (1.05-2.72)	0.030*
No	139	46	1.00	1.00	
Initiation time of breastfeeding					
Within one hour	501	116	1.00	1.00	
More than one hour	70	17	0.95 (0.54-1.68)	0.98 (0.52-1.83)	0.946
Bottle-feeding practice					
Yes	132	51	0.48 (0.32-0.72)	0.55 (0.35-0.87)	0.010*
No	439	82	1.00	1.00	
Maternal educational status					
Primary	231	61	0.74 (0.44-1.27)	1.18 (0.63-2.20)	0.611
No formal education	110	20	1.97 (0.92-4.22)	1.85 (0.87-3.92)	0.080
Secondary	118	30	0.89 (0.47-1.71)	0.87 (0.45-1.66)	0.739
College/University and higher	112	22	1.00	1.00	

Discussion

The present study aimed to determine the prevalence and associated factors of EBF practice for the first 6 months of a neonate's life among the mothers with newborns of 6-23 months in Dire Dawa. The study design and sampling technique employed in the present study were scientific. In addition, appropriate statistical analysis were used in this study. The prevalence of EBF practice was 81.1% (95% CI: 78.0-83.8). This finding is nearly similar to other different findings in Ethiopia (i.e., 81.1%, 74%, and 74.1% in Afar, Amhara, as well as in Tigray and Hawassa, respectively) (23, 32, 33, 34).

However, the prevalence of EBF practice is higher than the findings of a national study, in which the rate of EBF practice was 58% in the EDHS in 2016. Furthermore, other reported

rates are 59.3% and 64.8% in a systematic review in Ethiopia and other studies in southern Ethiopia, respectively (19, 27, 35). The aforementioned discrepancy might be due to the recent multisectoral collaborations by the Ministry of Health, Dire Dawa Administration Health Bureau, and nongovernmental organizations regarding the improvement of child nutrition.

Moreover, the above-mentioned national survey incorporated the participants of hard-to-reach areas and residents of pastoral communities with less access to healthcare services. This might affect or limit the awareness of the benefits of EBF. However, these findings were obtained from the areas with 100% access to health services, and the majority of the subjects were urban residents, which might have resulted in the increased awareness of EBF practice. Furthermore, it might be related to study time and availability of resources in terms of EBF practice.

Maternal occupational status, ANC utilization, maternal age, and bottle-feeding practice were independently associated with EBF practice. Accordingly, the odds of EBF were 1.93 times higher among the unemployed subjects than those reported for the employed mothers. This finding is in line with the results of multiple studies in developing countries, including Ethiopia (13, 14, 20, 24, 32, 36).

Employed mothers had limited time to exclusively breastfeed their neonates. For example, in Ethiopia, mothers have maternity leave only for 4 months, which is less than the recommended time for the practice of EBF. They also lack convenient locations to breastfeed their newborns in their workplace. However, a study conducted in Bangladesh reported that employed mothers were more likely to practice EBF. The difference might be due to the variations in the establishment of neonatal lactating locations in the workplaces in Ethiopia and Bangladesh (37).

In the present study, the use of ANC counseling and demonstration of breastfeeding techniques had significant impacts on the practice of EBF. The utilization of ANC services significantly increased the practice of EBF among the participants in the current study. The odds of practicing EBF in the first 6 months among the mothers who received ANC services were 1.7 times (nearly two-fold) more likely than their counterparts. This finding is consistent with the results of several similar studies carried out in Ethiopia (14, 19, 20), Ghana (21), Nigeria (17), and sub-Saharan Africa (i.e., a systematic review) (13). This might be due to psychological support and increased perception of breastfeeding importance through early counseling and timely support for practicing appropriate EBF. In addition, the information may increase the knowledge and attitudinal changes regarding neonatal feeding practice, as well as the nutritional benefits of breast milk for the health of mothers and newborns.

Furthermore, in the present study, the odds of EBF practice were significantly higher among the younger mothers (AOR: 4.41; 95% CI: 1.90-10.20; age range: 15-25 years) than those reported for the older subjects (AOR: 2.16; 95% CI: 1.12-4.18; age range: 26-35 years). This might be due to the fact that younger women are highly eager and more willing to implement the information received from various sources about the importance of EBF practice. Young women might love their neonates more than older mothers as argued by Earsido (33, 15).

In addition, the findings of the current study indicated that the women who practiced bottle-feeding had the lower odds of EBF practice in the first 6 months, compared to those reported for their counterparts, significantly associated with EBF practice. This finding is in line with the results of studies carried out in Brazil, Pakistan, and China, in which bottle-feeding was a serious factor for discontinuing EBF (38-40). There might be the misperception of a neonate's crying as a need for bottle-feeding that reduce breast-sucking leading to the lower the production of breast milk (41).

There were some limitations in the present study. Firstly, the age of the neonates was within 6 to 23 months which was considered a long duration and might be indicative of recall bias on the mothers' side. In addition, the current study was cross-sectional which is limited to establish a cause-effect relationship between the dependent and independent variables.

Conclusion

In summary, the magnitude of EBF practice was relatively high. Unemployed status, ANC utilization, younger maternal age, and bottle-feeding practice were identified as statistically significant associated factors with EBF practice. Therefore, it is recommended that healthcare workers, health task force, and concerned bodies give due attention and work on the encouragement of pregnant women to receive ANC services, educate the community about the benefits of EBF and impact of bottle-feeding to increase the practice, and reach the WHO recommended levels. Moreover, a special breastfeeding place for working mothers, daycare facilities, and at least six-month maternity leave should be provided to improve EBF practice, as well as maternal and neonatal health.

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Conflicts of interest

Authors declared no conflicts of interest.

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