

ORIGINAL ARTICLE**Sub-Optimal Breastfeeding and Its Associated Factors in Rural Communities of Hula District, Southern Ethiopia: A Cross-Sectional Study**Shibru Hoche¹, Berhan Meshesha², Negash Wakgari^{3*}**OPEN ACCESS**

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ABSTRACT

BACKGROUND: Sub-optimal breast feeding contributed a significant number of infants' death. Although breast feeding is universal in Ethiopia, the practice is not optimal. Hence, this study assessed the prevalence of sub-optimal breast feeding practice and its associated factors in rural communities of Hula District, Southern Ethiopia.

METHODS: A community based cross-sectional study was conducted among 634 women with infants aged 6 to 12 months. Multistage sampling technique was employed to select study subjects. Interviewer administered structured questionnaire was used for data collection. Data were entered and analyzed by using SPSS version 20.0. Bivariate and multivariate logistic regression was used to identify predictors of delayed initiation of breastfeeding and non-exclusive breastfeeding.

RESULTS: The prevalence of suboptimal breast feeding of infants was found to be 56.9%. Nearly half (49.4%) of the mothers delayed initiation of breast feeding, and 13.4% of the infants were fed breast non-exclusively. Having formal education [AOR: 1.74; 95% CI (1.17, 2.59)], family size < 5 [AOR=1.59; 95% CI (1.03, 2.45)], having one under five child [AOR=1.88; 95% CI (1.29, 2.75)], lower number of antenatal care visits [AOR= 2.40; 95% CI (1.68, 3.43)] and lack of counseling on breastfeeding [AOR= 1.69; 95% CI (1.19, 2.41)] were negatively associated with delayed initiation of breast feeding. Similarly, not attending formal education, low birth order and lack of knowledge about exclusive breastfeeding were also negatively associated with exclusive breastfeeding practice.

CONCLUSION: In this study, sub-optimal breast feeding was found to be high. Delayed initiation and non-exclusive breastfeeding practices were major contributors to sub-optimal breast feeding.

KEYWORDS: Sub-optimal breast feeding, Hula District

INTRODUCTION

Breast feeding provides the most suitable food for the healthy growth and development of infants. It is babies' first immunization and the most effective and inexpensive life-saver (1). Breast milk is easily digestible complete food containing all the required nutrients for the first six months' life of the infants and completely satisfies an infant's nutritional and water needs (2,3). Globally, only 38% of infants aged 0 to 6 months are exclusively breast fed during the period of 2007-2014, while the global nutrition target is to increase the rate of exclusive breast feeding from 38% to 50% by 2025 (3). According to the World Health Organization recommendations of infant and young child feeding, to achieve the optimal growth, development and health, breast feeding should be early initiated within one hour after birth (2,3). Similarly, infants should exclusively breastfed for the first six months and the introduction of nutritionally adequate and safe complementary food should be started at the sixth month together with continued breast feeding up to two years and beyond (3, 4).

To improve infant and child health, optimal breast feeding is the first priority and highly cost effective preventive intervention (1-3). Every year, optimal breast feeding has the potential of preventing 1.4 million deaths of less than five-year children and reduce acute respiratory tract infections and diarrheal deaths by 50-95% (4, 5). It increases the effectiveness of immunization, reduces the need for oral rehydration by 50% and significantly increases intelligence and readiness to learn (4,5). Exclusive breast feeding is the practice of only giving infant breast milk for the first six month (6). Children who are exclusively breastfed for the first six months are 14 times more likely to survive than non-breast fed children (1). Sub-optimal breast feeding practices during the first six months is the most risk factor for the infant and child morbidity and mortality, including poor school performance, reduced productivity and impaired intellectual development (2-4,7). Annually, sub-optimum breastfeeding alone contributed to more than

800,000 child deaths (8). Moreover, non-exclusive breastfeeding alone contributed to 804,000 child deaths in 2011(3). In developing countries, only 39% of children < 6 months of age are exclusively breast fed and more than half of 20-23 month olds benefit from the practice of continued breastfeeding (2).

Although breastfeeding is universal in Ethiopia, the practice is not optimal. According to the Ethiopian demographic and health survey reports, the prevalence of exclusive breast feeding was 52%, and 27% of the newborns received prelacteal feedings like plain water, other milk and butter (10). In addition, sub-optimal breastfeeding practice contributed to 70,000 infants' death, which accounted for 24% of the total annual infant death (7, 10,11). Even though, the Federal Ministry of Health has been working to improve the optimal breast feeding practice through providing training and developing implementation guidelines, its practice remained far from global recommendation(4,12). Moreover, most of the studies conducted in different parts of Ethiopia showed that the major components of sub-optimal breast feeding-non-exclusive breast feeding, delay initiation of breast feeding and discarding colostrum are being practiced by mothers (7, 12- 20-23). In addition, providing prelacteal food and avoiding colostrums are more prevalent in Ethiopia (2, 24). However, few studies have been conducted to identify the sub-optimal breast feeding practices and associated factors in the study area. Hence, this study assessed the prevalence of sub-optimal breast feeding practices and associated factors in rural communities of Hula District, Southern Ethiopia.

MATERIALS AND METHODS

Study design, setting and population: A community based cross-sectional study was conducted among infants aged 6 to 12 months and living in Hula District from December to January, 2016. Hula District is one of the 21 districts found in Sidama Zone. It is located 97 km far from Hawassa, the capital city of Southern Nations, Nationalities and Peoples Regional State and

Sidama Zone. There were 32 kebeles in the district during the study period. The total population of the district was 167,268. Among the total population, 156,666 of them were residing in rural areas. Female population was 84,136, and 38,973 of them in reproductive age group. Infants aged between 6 to 12 months were 3,345. Infants whose mothers had serious health problems during data collection period were excluded from the study.

Sample size and sampling procedure: The sample size was calculated using single population proportion formula by considering the following assumptions: prevalence of sub-optimal breast feeding (p)=75% from the previous study conducted in Southwest Ethiopia (19), 95% confidence level ($z=1.96$), 5% margin of error ($d=0.05$), and design effect ($D=2$). Accordingly, $n=D(z^2p(1-p)/d^2) = 2(1.96^2*0.75*0.25)/0.05^2$. Hence, the final sample size with 10% non-response rate becomes 634. Multi-stage sampling technique was used to identify the study units. In primary sampling stage, among the total of 32 kebeles in Hula District, 12 of were randomly selected by using simple random sampling technique. In the secondary stage, households with 6 to 12 month infants were identified by conducting census in the selected kebeles using health promoters. There were a total of 1,399 infants aged 6 to 12 months in the selected kebeles during the study period. Then, the total sample was allocated proportionally to each kebele based on the number of 6 to 12 month infants. Study subjects were drawn from the sampling frame by using systematic random sampling technique. If there were two infants in one household, one infant was selected randomly. A feeding behavior that did not meet recommended standards including delayed initiation of breast feeding, discarding colostrum and non-exclusive breast feedings are considered as sub-optimal breastfeeding practice.

Data collection tools and procedures: Interviewer administered structured questionnaire was adapted from Ethiopian demographic and health survey (9) and other relevant literatures was used for modifications to fit the study context

(8-11, 19-37). The questionnaire was prepared in English and then translated into a local language, Sidamegna, and back to English. Furthermore, the instrument was pre-tested on 32 respondents in a randomly selected kebeles which were not selected for the study. Findings from the pre-test were used to modify the data collection tool. Eight nurses and two BSc health workers from the district health office were used as data collectors and supervisors. Both the data collectors and supervisors were given a two days' training before the actual data collection. Before the actual data collection, a preliminary survey was conducted using health promoters from each kebele to identify households with infants 6 to 12 months. Data on socio-demographic characteristics, maternal health care and breast feeding status of the last child, knowledge on breastfeeding and cultural beliefs regarding infant feeding practice were collected. To assess the prevalence of suboptimal breastfeeding practice, dietary recall method was used.

Data management and analysis: Data was entered and analyzed using the statistical Package for Social Sciences (SPSS), version 20. Univariate analysis was done using frequencies and percentages. Data were presented in the form of texts, tables and graphs. Bivariate logistic regression was used to identify candidate variables for multivariate logistic regression analysis. Multivariate logistic analysis was used to control possible confounders and identify independent predictors of delayed initiation of breastfeeding after one hour of delivery and nonexclusive breast feeding practices. Those variables with p value less than or equal to 0.25 on bivariate analysis were included in multivariate logistic regression model. Significance level of 95% and p value less than or equal to 0.05 were used to decide the significance of association.

The quality of the data was assured by properly designing and pre-testing the questionnaire. Proper categorization, coding and skipping patterns of questions were used. Training was given for data collectors and supervisors before the actual data collection. After data

collection, data from each household were reviewed and checked for completeness, accuracy, clarity and consistency. This was done by the principal investigator and the supervisors daily immediately after the data were collected. Necessary feedbacks were offered to the data collectors in the next morning. Data cleanup and cross checking were done before analysis.

Ethical considerations: Ethical approval was obtained from the Institutional Review Board of the College of Medicine and Health Sciences, Hawassa University. Written permission was obtained from Hula District Administration Office and Hula District Health Office. Each respondent was informed that the study would provide necessary information for policy makers and other concerned bodies. Written informed consent was obtained from each study subject prior to the data collection process. Any participant who was not willing to participate in the study was not forced to participate. Respondents were also informed that all the data obtained from them would be kept confidential by using codes instead of any personal identifiers and that it would be used only for the purpose of the study. During the data collection process, the data collectors informed each study participant about the purpose and anticipated benefits of the research. Study participants were also informed that they had full right to refuse, withdraw or completely reject the study.

RESULTS

Socio-demographic characteristics of mothers with infants aged 6 to 12 months: A total of 634 mothers of children aged 6 to 12 months were included in the study making a response rate of 100%. Mothers' mean age was 26.6 years (SD \pm 5.8) and ranged from 15 to 45 years. The mean age of infants was 9.7 months (SD \pm 2.1) and ranged from 6 to 12 months. Nearly half (49.2%) of the respondents were in the age group of 25-34 years. Most (97.2%) of the study participants were Sidama in ethnicity. Regarding marital status of the respondents, 99.1% were in marital union. Protestant religion was the dominant

religion reported by 94%. With regard to educational status, 42.3% had no formal education, and 47.8% attended primary education (Table 1).

Table 1: Socio-demographic characteristics of respondents in Hula district, south Ethiopia, 2016.

Variables (n=634)	Frequency	%
ANC visits		
Yes	601	94.8
No	33	5.2
Number of ANC visit		
None	32	5
1-3	351	55.4
≥ 4	251	39.6
Counseling on breastfeeding (during ANC visits)		
Yes	334	52.7
No	300	47.3
Place of delivery		
Home	276	43.5
Health facility	358	56.5
Type of delivery		
Vaginal delivery	626	98.7
Cesarean section	8	1.3
Post natal care		
Yes	200	31.5
No	434	68.5
Birth order		
First-born	182	28.7
2-3	199	31.4
4 and more	253	39.9
Parity		
1-2 children	291	45.9
3-4 children	184	29.0
>4 children	159	25.1
Number of under 5 children		
1	411	64.8
≥ 2	223	35.2
Sex of the infants		
Male	354	55.8
Female	280	44.2
Age of the infants		
6-9 months	267	42.1
10-12 months	367	57.9

Characteristics of mothers with infants aged 6 to 12 months:

In this study, around ninety five percent (94.8%) of the mothers had at least one antenatal visit. Regarding the number of the Antenatal Care(ANC) visits attended, 251(39.6%) of mothers attended four times and above. Among those who attended ANC visits, 334 (52.7%) received counseling about breast feeding practice.

More than half (56.5%) of the respondents gave birth at the health facility. Most (98.7%) of the mothers delivered spontaneously, and only 1.3% of them delivered by caesarean secession. This study reported that only 200 (31.5%) of the mothers had postnatal care services. Four hundred eleven (64.8%) of the mothers had only one under five year child (Table 2).

Table 2: Maternal and child characteristics in Hula district, Southern Ethiopia, 2016.

Variables (n=634)	Frequency	%
Maternal age		
15-24	230	36.3
25-34	312	49.2
≥35	92	14.5
Religion		
Protestant	596	94
Others*	38	6
Ethnicity		
Sidama	616	97.2
Amhara	12	1.9
Others**	6	0.9
Marital status		
Currently in marital union	628	99.1
Currently not in marital union	6	0.9
Mothers education		
Illiterate	268	42.3
Primary school	303	47.8
High school and above	63	9.9
Husbands education		
Illiterate	158	24.9
Primary school	330	52.1
High school and above	145	22.9
Occupation of mother		
Housewife	607	90.7
Others***	27	4.3
Occupation of husbands		
Farmer	463	73.3
Others****	167	26.7
Family Size		
<5	353	55.7
≥5	281	44.3
Economic status		
< 500 ETB	217	34.2
500-1000 ETB	265	41.8
1000-1500 ETB	91	14.4
>1500 ETB	61	9.6
Ownership of radio		
Yes	96	15.1
No	538	84.9

Breast feeding practice: In this study, all mothers had ever breastfed and were currently breast feeding their infants. About half, 321(50.6%), of the mothers initiated breast feeding early within one hour after giving birth, and 609(96.1%) fed colostrum to their infants. Two hundred seventy two (42.9%) of the mothers reported that providing plant herbs (locally named as “ameessa”) for infants as if it is a culture and important for child health, while (28.7%) of them provided “ameessa” for their infants believing that it would prevent infants from diseases, moistens digestive system and is culturally supported. Considerable (86.6%) proportions of mothers fed breast exclusively. Most (87.7%) of the respondents started feeding complementary foods timely (around six months). In this study, only (43.1%) of the mothers fed breast optimally (Table 3).

Maternal knowledge about breast feeding practices: Most, 590(93.1%), of the study participants were found to have awareness on early initiation of breast feeding within one hour after delivery, and 619(97.6%) knew the recommended months to start complementary feeding (Table 4).

Table 4: Maternal knowledge about breast feeding in Hula district, 2016.

Characteristics (n=634)	Frequency	%
Aware about importance of early initiation of breast feeding		
Yes	590	93.1
No	46	6.9
Aware about importance of feeding colostrum.		
Yes	611	96.4
No	23	3.6
Aware about importance of exclusive breast feeding.		
Yes	610	96.2
No	24	3.8
Aware about continuity of breast feeding for 2 years and above		
Yes	601	94.8
No	33	5.2
Know when to start complementary feeding		
Yes	619	97.6
No	25	2.4

Table 3: Breastfeeding practice in Hula district, 2016.

Variables (n=634)	Frequency	%
Ever breast fed	634	100
Breast feeding initiation		
Within one hour	321	50.6
After one hour	313	49.4
Giving colostrum		
Yes	609	96.1
No	25	3.9
Pre-lactaeal feeding		
Yes	18	2.8
No	616	97.2
Currently breast feeding		
Yes	634	100
Exclusive breast feeding		
Yes	549	86.6
No	85	13.4
Timely complementary feeding		
Yes	556	87.7
No	78	12.3
Breastfeeding frequency (day and night)		
≤8	164	25.9
>8	470	74.1

Factors associated with delayed initiation of breast feeding: On bivariate logistic regression, age of mothers, women educational status, family size, number of under five year children, number of antenatal care visits, counseling on breastfeeding during antenatal care visits, discarding colostrum and having radio were found children, number of antenatal care visits, counseling on breast feeding during antenatal care visits and discarding colostrum were found to be significant predictors of delayed initiation of breastfeeding.

Mothers who had no formal education were nearly two times more likely to delay initiation of breastfeeding than those who had formal education [AOR: 1.74; 95% CI (1.17, 2.59)]. Furthermore, mothers who had family size of <5 were found to be more likely to delay initiation of breastfeeding than those with family size ≥ 5 [AOR=1.59; 95% CI (1.03, 2.45)]. Mothers who

to have statistically significant association independently with delayed initiation of breastfeeding. However, after controlling for possible confounders on multilogistic regression analysis, age of mothers, women educational status, family size, number of under five year

had one under five year child were nearly two times more likely to delay initiation of breastfeeding than those with two and more children [AOR=1.88; 95% CI (1.29, 2.75)].

Moreover, women who had attended less than four ANC visits were two times more likely to delay early initiation of breastfeeding than those who had four and more visits [AOR= 2.40; 95% CI (1.68, 3.43)]. Besides, the women who were not counseled on breastfeeding during ANC visit were more likely to delay early initiation of breastfeeding than those who were counseled [AOR= 1.69; 95% CI (1.19, 2.41)] (Table 5).

Table 5: Factors associated with delayed initiation of breastfeeding among mothers of infants aged 6 months to 1 year in Hula district, south Ethiopia, 2016.

Variables (n=634)	Delayed initiation of BF		OR (95% CI)		P-value
	Yes	No	COR(95%CI)	AOR(95%CI)	
Age of mothers					
15-24	113	117	0.62(0.38, 1.01)	0.52(0.27, 1.00)	
25-34	144	168	0.55(0.34, 0.88)	0.61(0.35, 1.05)	
≥ 35	56	36	1	1	
Mothers education					
Illiterate	148	140	1.28(1.10, 2.08)	1.74(1.17, 2.59)	<0.01
Literate	165	201	1	1	
Number of family					
<5	188	165	1.42(1.03, 1.94)	1.59(1.03, 2.45)	<0.05
≥ 5	125	156	1	1	
Number of <5 year children					
1	228	183	2.02 (1.45, 2.82)	1.88(1.29, 2.75)	<0.01
≥ 2	85	138	1	1	
Having radio					
No	277	261	1.76 (1.13, 2.76)	1.21(0.74, 1.96) *	
Yes	36	60	1	1	
Number of antenatal care					
None	15	17	1.72(0.82, 3.61)	1.30(0.59, 2.90)	
1-3	213	138	3.01 (2.15, 4.22)	2.40(1.68, 3.43)	<0.01
≥ 4	85	166	1	1	
Breast feeding counseling during antenatal care					
No	178	122	2.15(1.56, 2.95)	1.69(1.19, 2.4)	<0.01
Yes	135	199	1	1	

*= Not significant in backward stepwise logistic regression, BF= Breast Feeding

Factors associated with non exclusive breast feeding: In bivariate logistic regression analysis, mothers' education, breast feeding counseling during ANC visits, discarding colostrum, birth order and knowledge of exclusive breast feeding were independently found to have statistically significant association with non-exclusive breast feeding of infants. After controlling for confounders with multivariate logistic regression analysis, no mothers' education, no counseling on breast feeding during ANC visits, lower birth order, and having no knowledge of exclusive breast feeding were statistically significantly associated with non-exclusive breast feeding.

Women who had no formal education were nearly two times more likely to feed breast non-

exclusively than women who had formal education [AOR=1.75; 95% CI (1.01, 3.03)]. In addition, mothers who were not counseled on breast feeding during ANC visits were more likely to feed breast non-exclusively than those who were counseled [AOR=1.67; 95% CI (1.04, 2.70)]. Moreover, women who gave birth for the first time were two times more likely to feed breast non-exclusively than mothers of higher birth order [AOR=2.05; 95% CI (1.05, 3.97)]. Similarly, women who were knowledgeable about exclusive breast feeding were five times more likely to feed breast exclusively than those who were not knowledgeable [AOR=5.10; 95% CI (2.13, 12.24)] (Table 6).

Table 6: Selected characteristics associated with non-exclusive breast feeding among mothers of infants aged 6 months to 1 year in Hula district, south Ethiopia, 2016.

Variables (n=634)	Non-exclusive breast feeding		OR (95% CI)		P-value
	Yes	No	COR(95% CI)	AOR(95%CI)	
Mothers education					
Illiterate	41	227	1.32(0.83, 2.07)	1.75(1.01, 3.03)	<0.05
Literate	44	322	1	1	
Breast feeding counseling during antenatal care					
No	51	249	1.80(1.13, 2.87)	1.67(1.04, 2.70)	<0.05
Yes	34	300	1	1	
Postnatal counseling					
No	66	368	1.70(0.99, 2.93)	1.67(0.96, 2.91)*	
Yes	19	181	1	1	
Birth order					
First and second	47	247	1.51(0.91, 2.76)	2.05(1.05, 3.97)	<0.05
Third and more	38	302	1	1	
Knowledge of EBF					
No	10	14	5.09(2.18, 11.88)	5.10(2.13, 12.24)	<0.01
Yes	75	535	1	1	
Discarded colostrums					
Yes	6	19	2.11(0.82, 5.46)	1.58(0.58, 4.25)*	
No	79	530	1	1	

*= Not significant in backward stepwise logistic regression

DISCUSSION

This study assessed the prevalence of sub-optimal breastfeeding practice and its associated factors among infants during the first six months in rural communities of Hula District, Southern Ethiopia. The prevalence of sub-optimal breast feeding in this study was 56.9% (CI: 52.4-60.2). Among those who fed breast sub-optimally, (49.4%) of them, delayed initiation of breast feeding, (13.4%) fed breast non-exclusively and (3.9%) discarded colostrum. This finding is lower than the study conducted in Jimma, Arjo District (75.4%) (19). This might be due to the difference in the context (socio-cultural difference) and the implementation of the maternal and child health programs. The prevalence of sub-optimal breast feeding in the study area remains high mainly due to cultural beliefs associated with providing “amessa” to newborns and infants. “Amessa” was believed to have importance in preventing diseases, avoiding dryness of digestive system, and supporting growth of the infant.

Similarly, the prevalence of delayed initiation of breast feeding (after the first hour of birth) was found to be (49.4%) (CI: 46.8 - 52.3). This finding is consistent with the 2011 Ethiopian Demographic and Health Survey (EDHS) report (48%) (9), Jimma, Arjo District (37%) (19), Goba Woreda (47.6%) (13), Enagu, Nigeria (47%) (38) and (50%) in Africa (31). This finding is higher than the finding of the study conducted in the rural part of Ethiopia (41.1%) (14), Debre Berhan (17.5%) (18), Bishoftu (28.2%) (25) and Arbaminch Zuria (42.8%) (39). However, it is lower than the findings of the studies conducted in Nigeria (62%), (53.9%) (11,38), and Pakistan (72.7%) (39). According to EDHS reports, the prevalence of delayed initiation of breastfeeding was increased from (31%) to (48%) between 2005 and 2011(9,41). This implies that early initiation of breastfeeding did not show significant improvement despite the efforts to improve child health. The possible explanations for this difference could be difference in socio-demographic characteristics of the respondents and the place where the study was conducted.

This study showed that delayed initiation of breastfeeding was more likely among mothers who did not attend formal education than mothers who attended formal education. This finding is similar with the finding of the studies conducted in Jimma, Arjo District (19) and Nigeria (11). Moreover, another study conducted in Goba District, Southeast Ethiopia, also showed that mothers who had formal education more initiated breastfeeding within the first hours after delivery (13). This might be related to the fact that mothers who attended formal education were more informed about timely initiation of breastfeeding.

In addition, mothers who had one under five year child were more likely to delay initiation of breastfeeding than mothers who had more than two under five year children. This finding is consistent with the study done in Nigeria (11). The possible explanation for this finding is that mothers with two or more under five year children had more experience of breast feeding practice.

Moreover, mothers who attended ANC visit ≤ 3 times were found to be more delaying initiation of breastfeeding compared with mothers who had four and more ANC visits. This finding had agreement with the study conducted in Nigeria in which frequent ANC visit was associated with early initiation of breast feeding (11). However, this finding is inconsistent with the finding of a study conducted in a rural part of Ethiopia in which delayed breast feeding initiation was not affected by the number of ANC visits (14). This inconsistency could be due to the difference in the sample size and study setting.

Mothers who were not counseled about breastfeeding during ANC visits were more likely to delay initiation of breast feeding. This finding is similar with findings of studies conducted in a rural part of Ethiopia (14) and a literature review of the factors that influence breast feeding (42). This might be due to the fact that mothers did not receive breast feeding counseling at the appropriate time and were not aware of when to initiate breast feeding.

Non-exclusive breast feeding practice was found to be 13.4% (CI: 11.6-15.4) among mothers having infants aged 6 to 12 months. This finding is lower than the findings of studies conducted in

East Ethiopia (28.3%) (43), Enderta Woreda (29.8%) (16), Debre Markos (39.2%) (44), Gondar Town (47.5%) (10), EDHS, 2011 (48%) (9), Debre Berhan (49.8%) (18), Arbaminch Zuria (44.4%) (39), Bishoftu (65.9%) (25), Ethiopia (51%) (45), Nigeria (86%) (11), Mecha District (52.9%) (7), Enagu, Nigeria (65.5%) (38), Pakistan (62.9%) (40) and developing countries (61%) (46). This might be due to the higher knowledge of exclusive breast feeding practice (96.2%) in the study area. Moreover, in the study area, there is a non-governmental organization which is working on a program called 'alive and thrives' and highly promoting the optimal breastfeeding practice.

In this study, mothers who did not attend formal education fed breast more non-exclusively than those who attended formal education. This finding was supported by studies done in Ethiopia (13,45) and Nigeria (11). However, the finding was inconsistent with the finding of a study conducted in Oromia Region, Bishoftu Town, in which mothers who did not attend formal school practiced exclusive breast feeding more likely than those who attended (25). This might be due to the difference in the study participants and the study setting.

Counseling on breastfeeding during ANC visits was significantly associated with non exclusive breast feeding. Mothers who were not counseled about breastfeeding during ANC visits were more likely to feed breast non-exclusively than mothers who were counseled. This finding is in line with findings of similar studies conducted in Addis Ababa public health centers, Debre Markos, Mecha District and Debre Berhan (17,18, 7,44). The possible explanation for this finding is the lower prevalence of postnatal care service. In the study setting, only (31.5%) of the mothers had postnatal services.

Mothers with lower birth order (first born) were two times more likely to feed breast non-exclusively than mothers of higher birth order. This finding is consistent with the findings of studies conducted in Malaysia in which primiparous women were more likely not to exclusively breast feed than multiparous mothers

(47). Moreover, a literature review of the factors that influence breastfeeding showed similar finding (42). This might be related to the fact that mothers with lower birth order did not have the experience of breastfeeding as multiparous mothers.

Mothers' knowledge about exclusive breastfeeding is significantly associated with non-exclusive breastfeeding practice. Mothers who had no knowledge about exclusive breastfeeding were five times more likely to breastfed non-exclusively than their counterparts. This finding is in line with the finding of a similar study conducted in a rural community of east Ethiopia (43). Moreover, the finding of this study is consistent with the finding of a study conducted in Northwest Ethiopia, in which mothers having knowledge of complementary feeding time protected their infants from non-exclusive breastfeeding (10).

This study has some limitations. Firstly, as study was the cross-sectional study, the cause-effect relationship of different variables with delayed initiation of breast feeding and non-exclusive breast feeding could not be assessed. Secondly, maternal skills of breastfeeding practice (positioning and attachment) were not measured. Thirdly, socioeconomic status was assessed simply by asking monthly salary which would not be good to compute wealth index. Lastly, in order to generate more information from the study participants, it would have been good if qualitative data collection approaches were considered besides the quantitative one. However, recall bias was reduced through exclusion of mothers who had children above one year, and to identify study subjects, survey was conducted in the selected kebeles by using health promoters from each kebele.

Generally, this study revealed that the prevalence of sub-optimal breast feeding was high. Delayed initiation and non-exclusive breastfeeding practices were major contributors of sub-optimal breastfeeding. Very few numbers of mothers tend to introduce pre-lacteal foods and discarded colostrums. Not attending formal education, lack of breast feeding counseling,

lower number of ANC visits, having <5 family size and one under five year child were found to be predictors of delayed initiation of breast feeding. In addition, no maternal education, lower birth order, lack of breast feeding counseling during ANC visits and lack of knowledge about exclusive breastfeeding were found to be predictors of non-exclusive breast feeding practice.

Health extension workers should address the traditional and cultural belief relating to discarding colostrum, delayed initiation of breast feeding and non-exclusive breast feeding and create awareness on benefits of optimal breast feeding. Healthcare workers should counsel women about optimal breast feeding practice during ANC visits, delivery and postnatal care services. The district administration should give emphasis to increasing the formal education enrolment of women. The Federal Ministry of Health and nongovernmental organizations working on infant and young child feeding programs should focus on factors that cause delayed initiation of breast feeding and non-exclusive breast feeding practice.

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