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Utilization of Bottle Feeding Practices and Associated Factors among Mothers Who Have Infant Less than 12 Months of Age in Agaro Twon, Jimma Zone South West Ethiopia, 2018

Sheka Shemsi Seid*, Elsa Muluneh, Ismael Ahmed Sinbirro, Tolasa Takele Moga, Tura Koshe Haso and Shamsedin Amme Ibro

School of Nursing and Midwifery, Faculty of Health Science, Institute of Health, Jimma University, Ethiopia

*Corresponding author: Sheka Shemsi Seid, Lecturer at School of Nursing and Midwifery, Jimma University, Ethiopia, Tel: +251-917-513-841; E-mail: shekaaa2006@gmail.com

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Abstract

Background: Breast milk substitutes are used commonly worldwide with bottle feeding which should be avoided due to its impact on optimal breastfeeding and appropriate complementary feeding. Moreover, feeding bottles are associated with diarrheal disease morbidity and mortality as it is difficult to keep it clean especially in developing countries where sanitation is poor.

Objectives: To assess the utilization of bottle feeding practices and associated factors among mothers who have infant (from birth-12 months of age) in Agaroo town, Jimma zone Oromia region south west Ethiopia, 2018.

Methodology: A community based cross sectional study was conducted from March 15 to 30, 2018 in Agaroo town. A systematic sampling method was applied to select 222 respondents among mothers who have infant (from birth-12 months of age). Data was collected through face to face interview using pretested questionnaire. Data analysis was done by using SPSS and to identify associated factor chi-square was used. The data was presented by graph and tables.

Result: From the total of 222 mothers participated in the study the prevalence of bottle feeding was 207 (93.2%). Mothers return to work 104 (46.8) was the main reasons for initiation of bottle feeding reported by the mothers who started bottle feeding practice. The percentage was high among mothers with educational background of illiterate 92 (41.4%) governmental employer 10 (4.8%) and whose monthly family income was 1000-1499 birr 100 (45%). There was significant association between bottle feeding practices and Mothers' education status, occupational status, place of delivery and family monthly income.

Conclusions: The utilizations of bottle feeding was high at the study area. Educational status, monthly family income, employments was associated with utilization of bottle feeding. The provision of formal and information education to the mothers, increasing family monthly income, the number months for maternal leave and institutional delivery could reduce the bottle feeding utilizations among mothers.

Keywords: Bottle feeding practice; Associated factors

Introduction

Appropriate evidence-based feeding practices are essential for achieving and sustaining proper nutrition and health [1]. Optimal infant and young child feeding practices as suggested by the World Health Organization include early initiation of breast feeding within first hour of birth; exclusive breastfeeding till 6 months of age; introduction of complementary feeding at 6 months while continuing breastfeeding up to 2 years or beyond and ensuring proper use of breast-milk substitutes. However, breast milk substitutes are used commonly worldwide with bottle feeding which should be avoided due to its impact on optimal breastfeeding and proper complementary feeding. Moreover, feeding bottles are linked with diarrheal disease morbidity and mortality as it is challenging to keep it clean especially in developing countries where sanitation is poor [2].

The bottle is used not only used to give milk but all other types of fluids e.g. water, tea, juice etc. The semisolid cereals are also diluted as a drink to be given through the bottle. The adverse effects of bottle-feeding are well known. They are more profound in the under developed world due to economic resources, lack of clean water, unhygienic surroundings and illiteracy amongst mothers. The prevalence of unsuitable and/or low-quality bottles and teats further aggravate the situation in developing countries. The hazards of bottle-

feeding include over dilution of milk with resultant malnutrition. There is increased susceptibility to diarrhea and other Gastrointestinal Tract (GIT) infections, ear infections, allergic tendency and dental caries. Recently a detailed comprehensive report, using data both from developed and developing countries highlighted the increased relative risk of infant mortality amongst formula fed versus breast-fed infants [3-7].

According to the 2016 Ethiopian Demographic and Health Survey (EDHS), only 58% of infants less than 6 months were exclusively breastfed. Even higher prevalence of bottle feeding (38%) was reported in some areas of the country such as Oromia region [8-11].

Lack of appropriate breast feeding and complementary feeding practices leads to child malnutrition, many countries worldwide are experiencing a sharp increase in the prevalence of malnutrition and suffer from the double burden of both types of malnutrition [12]. In 2012 about 99 million children under 5 years of age were underweight and 162 million stunted. At the same time, about 44 million children under 5 were overweight or obese. In the same year 67 percent of all underweight children lived in Asia and 29% in Africa [11-13].

There is no recent study conducted in Agaroo town that explored the significance of the major factors that are assumed to initiate or stimulate the practice of bottle-feeding. Thus, the purpose of this study was identify the factors associated with bottle feeding practice in Agaroo town in order to obtain the baseline data that will help the concerned bodies to plan and Implement feasible Intervention to alleviate the problem.

Methods and Materials

Study area and study period

Agaroo is a town and separate woreda in south-western Ethiopia located in the Jimma Zone of the Oromia Region, it sits at a latitude and longitude of 7°51'N 36°35'E, and an elevation of 1560 m above sea level. Agaroo town is located 385 Km southwest of Addis Ababa, a capital city of Ethiopia and 45 Km from Jimma zone. The town has five kebeles. In 2007/2008, the total population of the town is 40,114 of which about 51% were males, while 49% were females. In the town, there are eight clinics, two health posts, two health centers and one hospital. The study period was conducted from May 18 to 21, 2018

Study design: A community-based cross-sectional study was conducted.

Sample size determination and sampling procedure

The sample size is determined by using a single population proportion formula considering the following assumptions: expected proportion of bottle feeding practice (19.6%) from

previously study in Holeta, 95% confidence level and a margin of error of 5% [8].

$Z_{\alpha/2}$ = Confidence interval at 95% level (1.96)

d = is the degree of precision (marginal error) 5%

$$n = \frac{Z_{\alpha/2}^2 P(1-P)}{d^2}$$

Where,

n = sample size

p = proportion of home delivery = 19.6% = 0.196

d = marginal error = 5% = 0.05

$Z_{\alpha/2}$ = Z value of 95% confidence = 1.96 from the Z-table

Substitute the values in to the formula:

$$n = (1.96)^2 0.196(1-0.196) / (0.05)^2 = 242$$

Since the source population is less than 10,000, using the correction formula the final sample size is:

$$nf = \frac{n}{1 + \frac{(n)}{N}} = \frac{242}{1 + \frac{(242)}{1250}} = 202$$

Considering non response rate and add 10%

$$202 * 0.1 = 20.2$$

$$202 + 20.2 = 222$$

222 is the final sample size

Since I was selected one kebele (Birbirsawantan) from the five kebeles

$$K = N/n \rightarrow 430/202 = 2$$

Therefore, the mothers are selected every 2 interval.

Sampling Procedure

Simple random sampling technique was used to select kebeles (one kebele from the five kebeles). Then from the selected Kebele a systemic random sampling technique was conducted to select 222 mothers who have birth-12 month of age infant by using lists from health post. Mothers are selected every two interval. If more than one eligible mother was encountered in the household, a lottery method was used to determine the mothers to be interviewed. Revisit of three times was made in a case where eligible respondents are not available at the time of the survey and the next house was used.

Data Collection Tools and Procedures

Data was collected using pretested, structured interviewer-administered questionnaire. The questionnaire was administered through face to face interview by four (4) trained data collectors (college students) and the data collection was strictly supervised by one health extension worker. A two days training was given for data collectors and supervisors about

the confidentiality of the information, respondent's rights, informed consent and technique of the interview before starting the actual work. Data was collected on daily basis from morning to evening including weekends for the period of 3 days starting from May 18, 2018 G.C. The questionnaire needs 20-40 minutes to interview one study participants. Daily meeting was conducted between data collectors, supervisors and principal investigator for discussion regarding presenting difficulties and to assess the progress of data collection.

Data Quality Control

The questionnaire is adapted from previously done similar researches and translates Afaan oromo (local language) to obtain data from the study participants and to ensure understandability and clarity the contents properly. The questionnaire was back translated to English. Prior to the actual data collection activities (one week prior to data collection), the instrument were pre-tested on mothers (5% of sample size) on one of the unselected kebeles (tamsajida). Necessary changes (addition of alternative responses, removal of some repeated questions and skipping patterns) was made after pre-testing based on the information obtained from participants to make questions more understandable.

On-going supervision of the data collection activities was undertaken by one supervisor throughout the data collection period. The completeness of the questionnaire and accuracy of the information recorded was checked at the end of each day by supervisors and principal investigators. Code was given for questionnaire during data collection so that any identified errors was traced back using the codes. Completeness of the collected data were finally reviewed by principal investigator.

Data Processing and Analysis

The association between the outcome variables (bottle feeding) and independent variables was analyzed by using chi square. Frequency distributions, cross-tabulations, and graphs

were used to describe the variables of the study. Findings were presented in text, tables, and graphs.

Ethical Consideration

The study was conducted after getting Ethical clearance from the Institutional Review Board of, Faculty of Health Science, Institute of Health, in Jimma University. Official letter of cooperation was also being obtained from the health office of Agaroo town and from selected Kebeles through a formal letter. Participation in the study was asked only on the voluntary basis. Written informed consent was obtained from each participant prior to the interview to confirm willingness after explaining the objective of the study. The respondents were told that they have the right to refuse or terminate at any point of the interview. No personal identifiers of the study participants were taken hence all information obtained from the study participants were kept strictly confidential.

Results

Socio demographic characteristics

A total of 222 mothers having children less than 12 months of age included in the in the study giving a response rate of 100%.

The age of study respondent were between range of 15-49 years with majority of them 80 (36%) in age group of 30-34 years. Majority of mothers 202 (90.9%) mothers were married and only 3% of them were single. With respect to Ethnicity More than half of study participants 125 (56.3%) were Oromo followed by Amhara 46 (21.1%). almost half 110 (49.5%) study participants were Muslim. 107 (48.1%) of mothers had an estimated monthly income of <1000 birr. majority 95 (43%) of the mothers were illiterate. Around half 110 (49.5%) of mothers were house wife followed by merchant 50 (22.5) (Table 1).

Table 1 Socio demographic characteristics of the respondents, Agaro, Southwest Ethiopia, 2018.

Characteristics	Group	Bottle feeding practice		
		Yes	No	Total
Age of mother	15-19	2 (0.9%)	0	2 (0.9%)
	20-24	29 (13%)	1 (0.4%)	30 (13.5%)
	25-29	72 (32.4%)	3 (1.3%)	75 (34%)
	30-34	75 (34%)	5 (2.2%)	80 (36%)
	>35	29(13%)	6 (2.7%)	35 (16%)
Marital status	Single	7 (3%)	0	7 (3%)
	Married	192 (86.4%)	10 (4.5%)	202 (90.9%)
	Divorced	7 (3.1%)	5 (2.2%)	12 (5.4%)
	Widowed	1 (0.4%)	0	1 (0.4%)

Ethnicity	Oromo	145 (65.3%)	10 (4.5%)	155 (69.8%)
	Amhara	44 (19.8%)	3 (1.3%)	47 (21.1%)
	Other (Debub)	18 (8.1%)	2 (0.9%)	20 (9%)
Religion	Muslim	102 (45.9%)	8 (3.6%)	110 (49.5%)
	Orthodox	92 (41.4%)	3 (1.3%)	95 (43%)
	Protestant	13 (5.8%)	4 (1.8%)	17 (8%)
Educational back ground of the mother	Illiterate	90 (40.5%)	5 (2.2%)	95 (43%)
	Primary	63 (28.3%)	2 (0.9%)	65 (29.2%)
	Secondary	45 (20.2%)	5 (2.2%)	50 (23%)
	Above secondary	9 (4.0%)	3 (1.3%)	12 (5.4%)
Occupational states of mothers	House wife	107 (48.1%)	3 (1.3%)	110 (49.5%)
	Merchant	50 (22.5%)	0	50 (22.5%)
	Daily labor	25 (11.2%)	7 (3.1%)	32 (14.3%)
	Government employee	10 (4.5%)	5 (2.2%)	15 (6.7%)
	Farmer	10 (4.5%)	0	10 (4.5%)
	Student	5 (2.2%)	0	5 (2.2%)
Educational status of the husband	Illiterate	58 (26.1%)	2 (0.9%)	60 (27%)
	Primary	55 (24.7%)	5 (2.2%)	60 (27%)
	Secondary	43 (19.3%)	2 (0.9%)	45 (20.2%)
	Above secondary	31 (13.9)	6 (2.7%)	37 (16.6%)
Occupational status of husband	Merchant	78 (35.1%)	2 (0.9%)	80 (36%)
	Daily labor	50 (22.5%)	5 (2.2%)	55 (24.7%)
	Farmer	30 (13.5%)	5 (2.2%)	35 (15.7%)
	Government employee	27 (12.1%)	3 (1.3%)	30 (13.5%)
	House wife	20 (9%)	0	20 (%)
	Student	2 (0.9%)	0	2 (0.9%)
Monthly family in came (Birr)	<500	52 (23.4%)	7 (3.1%)	59 (26.5%)
	500-999	35 (15.7%)	5 (2.2%)	40 (18%)
	1000-1499	100 (45%)	3 (1.3%)	103 (46.3%)
	>1500	20 (9%)	0	20 (9%)

Obstetric condition of the respondent

From total of the study participants 192 (86.4%) and 182 (81.9%) had history of ANC and PNC follow up respectively. Of those who had history of ANC follow 187 (84.2%) respondents received advice on advantage of breast feeding during ANC follow up. The majority of the respondent 212 (95.4%) were

give birth at health institution and 10 (4.5%) were give birth at home, among those were give birth at health institution 182 (81.9%) of respondents was give birth vaginally and 40 (18%) were by caesarean section. 212 (95.4%) of the respondents was assisted by health professionals. Of total respondent 65 (29.2%) of them has four children and 85 (38.2%) were in age range of 11-20 years (**Table 2**).

Table 2 Obstetrics condition of the respondents, Agaro, Southwest Ethiopia, 2018.

Variables		No	(%)
Number of children	One	21	11.2

	Two	55	24.7
	Three	52	23.4
	Four	65	29.2
	>five	29	13
	Total	222	100
Age of youngest child	02-May	27	12.1
	06-Oct	55	24.7
	Nov-20	88	38.2
	21-24	25	11.2
	>25	5	2.2
	Total	197	88.7
ANC follow up while you are pregnant for this last child	Yes	197	88.7
	No	25	11.2
	Total	222	100
What you advised during ANC follow up	About advantage of breast feeding	187	84.2
	About hazards of bottle feeding	10	4.5
	Total	197	88.7
Where did you delivery for the last child	Health institutions	212	95.4
	Home	10	4.6
	Total	222	100
Mode of delivery for the last child	Vaginally	182	81.9
	Caesarean section	40	18.1
	Total	222	100
Assisted you during delivery last child	Health professional	212	95.4
	Traditional birth attendant	10	4.6
	Total	222	100
PNC follow up for last child	Yes	182	81.9
	No	40	18.1
	Total	222	100

Child feeding practice

The overall prevalence of bottle feeding practice in the study area was 207 (93.2%). Among mothers who bottle feed their infants, the reason to starting bottle feeding were mothers return to work, availability of formula milk, inadequate breast milk and ill of mothers which accounts 104 (46.8%), 70 (31.5%), 30 (13.5%) and 3 (1.3%) respectively. 95 (42.7%) of respondents feeds there infant >5 times per day. 90 (40.5) mothers clean bottle twice per day and 102 (45.9%) were clean the bottle by rising with water and soap two times

per day. Most of the mothers 160 (72%) were breast feed their child immediately after birth and 135 (60.8%) mothers had got information about advantage of breast feeding from health professional. 142 (63.9%) and 75 (33.7%) mothers were use cow milk and formula milk for bottle feeding respectively. From the total respondents 85 (38.2%) has two bottles to feed their infants. All mothers were gate safe water from pipe and they have toilet facility. From 207 bottle feed infants (120 (54%), 40 (18%), 5 (2.2%), 5 (2.2%)) had history of diarrhea, vomiting, respiratory infection and weight loose in past one month respectively (**Table 3**).

Table 3 Child feeding practice of the respondents, Agaro, Southwest Ethiopia, 2018.

Variables	No	(%)	
Is the child currently on bottle feeding	Yes	207	93.2
	No	15	6.8
	Total	222	100
Reason to start bottle feeding	Mother return to work	104	46.8
	Inadequate breast milk	30	13.5
	Availability of formula milk	70	31.5
	Mother ill	3	1.3
	Total	207	93.2
Did you think the breast feeding per day	Immediately after birth	160	72
	After one day	5	2.2
	When the mother feels comfortable	40	18
	Don't know	17	7.6
	total	222	100
How many times child bottle feeding per day	Two	1	0.4
	Three	41	18.4
	Four	70	31.5
	>five	95	42.7
	Total	207	93.2
How many times do you have clean the bottle per day	Every feed	50	22.5
	Two times per day	90	40.5
	Once daily	55	24.7
	Every six hours	12	5.4
	Total	207	93.2
How do you keep clean the bottle	Boiling	90	40.5
	Rising with a water and soap	102	45.9
	Only rising the water	15	6.7
	Total	207	93.2
Did you offer additional food with the bottle feeding	Yes	207	93.2
	No	15	6.7
	Total	222	100
Additional food with the bottle feeding	Yes	207	93.2
	No	15	6.7
	Total	222	100
What kind of fluid are you offering to the baby with the bottle feeding	Cow milk	142	63.9
	Formula milk	65	29.2
	Expressed breast milk		
	Total	207	93.2
	Up to 1 year	50	22.5

How long did you offer the bottle feeding	Until the baby discontinuous	157	70.7
	Total	207	93.2

Factors associated with bottle feeding practice

Chi-square analyses was done to identify factors associated with bottle feeding practice. The Chi square analyses showed that there were significant association between bottle feeding

practice with educational status of the mother $\chi^2 (8.91)=0.031$, $p<0.05$, occupational status of the mother $\chi^2 (36.0)=0.000$, $p<0.05$ and monthly family income $\chi^2 (8.40)=0.038$, $p<0.05$, but there is no significant association between bottle feeding practice with age of the mother (**Table 4**).

Table 4 Association between bottle feeding practices and Socio-demographic characteristic of the respondent, Agaro, southwest Ethiopia, 2018.

Variable	Bottle feeding practice				χ^2	p-value
	Yes		No			
	No.	(%)	No.	(%)		
Age of the mother						
15-19	2	1	0	0	7.63	0.106
20-24	29	14	1	0.5		
25-29	72	34.8	3	1.4		
30-34	75	36.2	5	2.4		
>35	29	14	6	2.9		
Educational status of the mother						
Illiterate	92	44.4	3	1.4		
Primary	60	29	5	2.4	8.91	0.031
Secondary	45	21.7	5	2.4		
Above secondary	10	4.8	2	1		
Occupational status of the mother						
House wife	107	51.7	3	1.4		
Merchant	50	24.2	0	0		
Daily labor	25	12.1	7	3.4	36	0
government employee	10	4.8	5	2.4		
Farmer	10	4.8	0	0		
Student	5	2.4	0	0		
Family income per month						
<500	52	25.1	7	3.4		
500-999	35	16.9	5	2.4	8.4	0.038
1000-1499	100	48.3	3	1.4		
>1500	20	9.7	0	0		

Chi square analyses showed that there were significant association between bottle feeding practice with place of delivery $\chi^2 (35.3)=0.000$, $p<0.05$, but there is no significant

association with bottle feeding practice and number of children, ANC follow up and PNC follow up (**Table 5**).

Table 5 Association between bottle feeding practices and obstetrics condition of the mother.

Variable	Bottle feeding practices				X ²	p-value
	Yes		No			
	No.	(%)	No.	(%)		
Number of children						
One	19	9.2	2	1	2.02	0.731
Two	50	24.2	5	2.4		
Three	50	24.2	2	1		
Four	60	29	5	2.4		
>five	28	13.5	1	0.5		
ANC follow up for last child						
Yes	185	89.4	12	5.8		
No	22	10.6	3	1.4	1.23	0.268
PNC follow up for the last child						
Yes	171	82.6	11	5.3		
No	36	17.4	4	1.9	0.815	0.367
Place of delivery						
Home	9	4.3	1	0.5		
Health institutions	198	95.7	14	6.8	35.3	0

Discussions

The prevalence of bottle feeding in this study was higher compared to other study conducted in Indian which was 18.4% [14-23]. This difference might be due to variation in socio cultural and economic aspect among study participant. The finding of this study also higher than study conducted in western Uganda which reported that the prevalence of bottle feeding was (10%) [24-26]. The difference might be due to socioeconomic difference between study participants and difference in sample size, study setting and design. Community based cross sectional study conducted in Bangladesh showed that the proportion of bottle-feeding was (37.3%) [24] which is lower than the finding of this study and Another study conducted at Holeta and shashemene town in Ethiopia reported that the prevalence of bottle feeding was 19.6% [27] and 20.9% [28] respectively which is lower than the finding of the present study the difference might be due to difference study period, study design and sample sizes.

This study found that mothers return to work 104 (46.8) was the main reasons for initiation of bottle feeding by the mothers who started bottle feeding practice while study conducted in urban Libyan reported that the major reason for initiation of bottle feeding were inadequacy of breast milk (55.9%) and breast or Nipple condition (mothers ill) (8.4%) [25]. But study conducted at Jimma revealed that insufficient breast milk as the main reason for starting bottle-feeding (70.9%) [29]. The addressed reason was different from study conducted in Holeta [27]. But the current finding was in line with the study conducted in the same town before fifteen

years [28,29]. This implies that there were no significant changes regarding bottle feeding over the years which could be due to lack of an intervention and preventive measures.

This study found that socio demographic variables like educational status of the mother, occupational status of mother, monthly family income and place of delivery were associated with bottle feeding in line with this study the other study also reported that the bottle feeding practice were higher among mothers with better educational background and relatively high monthly income [25,30] while in contrast to these study Community based cross sectional study done in Jimma south west Ethiopia showed that the of bottle-feeding practice was found to be higher among single and divorced (71.4%) [29]. This finding was also inconsistent with another study conducted near capital city of Ethiopia at town called Holeta, which showed that bottle feeding was associated with infants' age, mothers' age, number of children, Lack of previous counseling on bottle feeding, and lack of attending post natal care [27]. The observed difference could be due to the difference in study setting and composition in study population as this study was conducted at a remote town where there could be lack of awareness about the danger of bottle feeding as more governmental and nongovernmental organization working on maternal and child health are not commonly available in this remote town compared to the study conducted around the capital city of the country.

Conclusion

In conclusions, the prevalence of the bottle feeding practice in the study setting was higher compared to other similar study conducted throughout the country and the world. The addressed associated factors were mostly consistent with the other studies. Therefore, an intervention and prevention measure that could reduce the practice of bottle feeding should be taken by the concerned bodies. Furthermore it is important that further community based interventional studies be conducted on a larger scale to broaden the understanding obtained from this initial study.

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Author Contributions

Shemsi SS and Muluneh E hypothesized the study, searched literature, and trained the research assistants in data collection. He also wrote the results and discussion sections. Sinbiro IA, Haso Tk, Moga TT and Ibro SA contributed to the design of the study, advised on methods and data interpretation, and analyzed the data. They also critically revised and edited the manuscript. All the authors read and approved the final manuscript.

Disclosure

The authors declare that they have no competing interests in this work.

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