Formula Feeding and Associated Factors among Mothers with Infants 0-6 Months Old in Mettu Town, South West Ethiopia

Abeza Mitiku (✉ abzmtk@gmail.com)

Research

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Abstract

Background

Adequate nutrition during infancy is essential for the normal development and future wellbeing of the child. Despite the fact that breast milk is optimal nutrition for infants during the first six months of life, the duration of breastfeeding has been declining and being replaced by formula feeding particularly in urban communities of developing countries including Ethiopia. However, relatively little information is available regarding formula feeding in Ethiopia; particularly in Mettu town.

Methods

Community-based cross-sectional study was conducted in Mettu town from May, 17 to July 1, 2021, among 366 mothers with infants 0-6 months old. A simple random sampling technique was employed. Pre-tested semi-structured questionnaires were used to collect data. Descriptive statistics and multivariable logistic regression were performed, and variables with a p -value <0.05 in the final model were declared statistically significant with formula feeding.

Result

The prevalence of formula feeding among the study participants was 28.4%, 95% [CI: 24.0-33.0]. In multivariable logistic regression analysis primiparity [AOR=3.3, 95% CI:(1.71-6.26)], cesarean delivery [AOR=2.6, 95% CI:(1.28-5.35)], initiation of breastfeeding after 24hrs [AOR=3.7, 95% CI:(1.24-10.05)] employed mothers [AOR=2.4, 95% CI:(1.29-4.49)] poor knowledge [AOR=2.6, 95% CI:(1.49-4.73)] and positive attitude toward formula feeding [AOR= 2.4, 95% CI: (1.27-4.84)] were significantly associated with formula feeding.

Conclusion

About one-third of mothers were formula feeding their infant. Primiparity, initiation of breast milk after 24hrs, cesarean delivery, and poor maternal knowledge and positive attitude were significantly associated with formula feeding. Hence, education on infant feeding for pregnant and lactating mothers, and supporting primipara mothers and as well as mothers who deliver by cesarean section should be implemented at health facility and community level.

1. Introduction

Infancy is a critical period in which rapid physical growth, cognitive and emotional development takes place. Adequate nutrition during infancy is essential for normal development and also fundamental for lifelong health and wellbeing (1). Breast milk is universally recommended to be the best and complete

food for infants. Thus, early initiation of breastfeeding within one hour of birth, exclusive breastfeeding of infants for the first 6 months of life and continued breastfeeding with appropriate complementary foods for two or more years is a basis for growth and development(2, 3).

Despite the fact that breastfeeding is strongly advocated, there is a shifting of exclusive breastfeeding practice towards the introduction of formula feeding particularly in industrialized countries and urban communities of developing countries including Ethiopia (4–6).

Because of the effects of globalization, urbanization, changes in the nature of women's work, increased availability of formula milk in supermarkets, and promotion of breast milk substitutes through advertising in various media, the proportion and duration of breastfeeding is declining and being replaced by formula feeding (7).

Infants on formula feeding are more vulnerable to acute respiratory infections (ARI), otitis media, allergies, gastroenteritis, diarrhea, pneumonia and sudden infant death syndrome. And also they are at higher risk of developing non-communicable disease such as diabetes mellitus, decreased cognitive development and increase risk of obesity future in their life (3, 8).

World Health Organization (WHO) developed the International Code of Marketing of BMS (Breast Milk Substitute) in 1981 to promote and support the EBF (Exclusive Breastfeeding). In addition, WHO 2016 assembly has made a national implementation of the code to guide ending the inappropriate promotion of foods for infants and young children. However, According to WHO 2020 report, only 136 (70%) of 194 WHO Member States (countries) had enacted legal measures with provisions to implement the code (9).

Since 2016, the Ethiopian government has implemented various guidelines to support breastfeeding and guide the promotion of BMS, including the "Infant Formula and Follow-up Formula Directive No. 30/2016" and the "Food Advertisement Directive 33/2016".(10, 11) However, according to studies conducted in Dire-Dawa, Jimma and Addis Ababa, Ethiopia 21.4%, 61.9%, and 46.2% of mothers were practicing formula feeding respectively (6, 12, 13).

Maternal occupation, educational status, maternal health status, delivery by cesarean section (C/S), attitude toward formula milk, advertisement, and economic factors give impact to the mothers to feed their infants with infant formula (6, 14, 15).

Parents may not know about the nutritional contents of formula milk, and the health impact of feeding their infants with formula milk. There are a few studies conducted regarding formula feeding in Ethiopia, particularly in Mettu town. Hence, this study aimed to assess factors influencing formula feeding among mothers with infants 0 up to 6 months old in Mettu town.

2. Materials And Methods

2.1 Study setting and period

The study was conducted in Mettu town and data was collected from May 17 to July 1, 2021. Mettu town is located 600 km away from Addis Ababa, the capital city of the country. The town has divided into three kebeles with an estimated total population of 49,538 and 10,321 households. The estimated number of women of the reproductive age group was 9,214. The town has one public hospital, one health center; three health posts with twelve HEW, eleven medium private clinics, six private small clinics, twelve drug vendors and three pharmacies.

2.2 Study Design and Population

A community based cross sectional study design was employed in Mettu town from May 17 to July 1, 2021. All mothers with index infants of less than 6 months old and living in Mettu town were the source population, whereas mothers with index infants less than 6 months old and full filling the inclusion criteria were study population and included in the study. Mothers who have a medical reason for the use of infant formula and those who cannot complete the interview because of severe medical /psychiatric problems were excluded in the study.

2.3 Sample Size Determination and Sampling Procedure

The required sample size was determined using single population proportion formula by taking the proportion of formula feeding as 61.9% (13), confidence of 95%, margin of error of 5%, the initial sample size was 362. By considering 5% non-response rate, the final sample size was 380.

Before data collection, a list of mothers who gave live birth within six months interval was collected from delivery books of both public and private health institutions in the town. Accordingly, we found total of 659 mothers who gave live births within six months interval in Mettu town. A sampling frame was prepared and the required numbers of mothers who will be selected from each kebele were determined based on proportion to population size allocation. Finally, study participants were selected using a computer-generated simple random sampling technique.

2.4 Data Collection Tool and Technique

Data was collected by face-to-face interview using a semi-structured and pre-tested questionnaire. The questionnaires were derived from related articles (4, 6, 12–14). The questionnaire had five parts (socio-economic and demographic characteristics, maternal health service and child characteristics, maternal knowledge of formula feeding, maternal attitude toward formula feeding, formula feeding and related characteristics)

The questionnaires were first prepared in English and translated into Afan Oromo (local language) then translated back to English by expert who had a good ability of two languages to check the consistency. Prior to data collection, the questionnaires were pre-tested on 5% (20) sample size in other town, which is not part of the actual data collection. Based on pre-test some modifications were done to the questionnaires. The internal consistency of independent variable with five-point Likert scale was checked by Cronbach's alpha.

Data was collected by six urban Health Extension Workers using pre-tested and semi-structured questionnaires through house-to-house visit of mothers with an index of infants less than six months old. Two BSc nurse were recruited as a supervisor during data collection. If the eligible mother was absent from the home at the time of data collection, a revisit was done three times, and the mother who was absent at the third visit was considered as non-respondent.

Two days training was given for data collectors and supervisors by the principal investigator on data collection tools, data collection techniques, approach to the interviews and maintaining the privacy and confidentiality of the respondents. Every day after data collection, questionnaires were reviewed and checked for completeness by the supervisors and principal investigator

2.5 Operational definition

Formula feeding

Feeding an infant less than 6 months old with formula milk using a bottle, rubber nipple, or cup as either supplement to breast milk or a complete breast milk substitute. It was measured by a “Yes” (1) and “No” (2) question. The mothers who answered “Yes” to the question were considered as a mother who fed their child with formula milk (13).

Antenatal service utilization

Having at least one visit of health facility for checkup purpose of obstetric condition during the pregnancy of the current index child (16).

Attitude toward formula feeding

Respondents were asked a set of questions contains 7 items that ranges from strongly disagree to strongly agree using five-point Likert scale. When the total score of each respondent is close to 35, it shows the most favorable attitude and when the score is close to 7, it shows the most unfavorable attitude towards formula feeding. Based on the total summation of the scales, respondents were classified as having a negative attitude toward formula feeding if they scored less than 21, neutral if they scored 21 and positive attitude score above 21(17).

Knowledge of formula feeding

was measured using yes/no dichotomous that consisted of 6 items. The answer to each question was analyzed as know and do not know. From the six items, each correct answer was coded as “1” which is (known) and each wrong answer “0” (don’t know). The maximum attainable score was six and the minimum possible score is zero. Respondent whose their knowledge scores equal to mean and above were categorized as having good knowledge whereas those score below the mean score were categorized as having poor knowledge of formula feeding(18).

Wealth index

22 items were used to assess the household assets. Factor scores were derived using Principal Components Analysis (PCA) and then the composite scores were ranked into three tertiles. The first 30% tertiles were classified as poor whereas the last 30% tertiles were classified as rich)(19).

2.6 Data Processing and Analysis

All data were checked visually, coded, and entered into Epi-data version 4.6, then exported into SPSS version 26 software packages for analysis. After categorizing and defining variables, descriptive analysis was carried out for each of the independent variables using frequencies, cross tabulation and percentages.

Before performing PCA for variables explaining household wealth index, all the necessary assumptions and prerequisites were checked. The degree of association between independent and dependent variables was assessed using AOR (Adjusted Odds Ratio with 95% confidence interval. Simple binary logistic regression analysis was performed to select candidate variables for multivariable analysis. A variable with $P\text{-value} < 0.25$ was taken as candidate for the multiple regression analysis and $p\text{-value} < 0.05$ was declared as statistically significant in the final model.

Pseudo regression was performed to check multi-collinearity between independent variables, the minimum tolerance and maximum variance inflation (VIF) factor was found to be 0.60 and 1.69 respectively. For the finally fitted multivariable logistic regression model, the adequacy of the model to predict the outcome variables was checked by Hosmer-Lemeshow goodness-of-fit and the $P\text{-value} > 0.05$.

3. Results

3.1 Socio-Economic and demographic characteristics of participants

Total of 366 mothers with an infant aged 0-6 months were participated in the study, making a response rate of 96.3%. The mean age of the respondents was 25.5 years (SD $\pm$ 4.4) which was in the range of 25 to 34 years, with a minimum age of 18 and maximum age of 39. Almost all 359 (98.1%) of mothers were married, by religion 136 (37.2%) were protestant, 286 (78.1%) were Oromo in ethnicity. Regarding educational status and occupation, 24 (6.6%) had no formal education while 144 (39.3%) were college and above, 171 (46.7%) were housewives. In terms of wealth status, one-third of them were 122 (33.4%) ranked poor (table 1).

Table 1 Table 2 Socio-demographic characteristics of the mothers with infants-age 0-6 months old, Mettu town, Southwest Ethiopia, 2021

variables (N=366)	Category	Frequency	Percent
Age of mother	15-24	176	48.1
	24-34	176	48.1
	≥35	14	3.8
Marital status	Married	359	98.1
	Single/divorced	7	1.9
Religion	Orthodox	133	36.3
	Protestant	136	37.2
	Muslim	97	26.5
Maternal education	No formal education	24	6.6
	Primary education	87	23.8
	Secondary education	111	30.3
	College and above	144	39.3
Ethnicity	Oromo	286	78.1
	Amara	43	11.7
	Other ^a	37	10.1
Maternal occupation	Housewife	171	46.7
	Merchant	65	17.8
	Government employee	87	23.7
	Private employee	12	3.3
	Other ^b	31	8.5
Wealth index	Poor	122	33.4
	Medium	124	33.8
	Rich	120	32.8

a: Tigre, Gurage and Kaffa , **b:** Student, un-employed and daily labor

3.2 Maternal health service Utilization and infant related characteristics

Regarding the obstetric experience of the participants, 211 (57.4%) of them were multi-para. Almost all 364 (99.5) were attended ANC service. However, only 58 (15.8%) of them had four and above ANC visits. Regarding infant feeding counseling during ANC, 221 (60.4%) of them were counseled on infant feeding. The majority of the study participants, 339 (92.6) gave birth at public health institutions, and 294 (80.3%) were delivered spontaneously/vaginal. The majority of them, 323 (88.3%) were received postnatal care within 24hrs of their delivery.

All of the infants were breastfed at any time and 280 (76.5%) of mothers were initiated breast within 1 hour of delivery. The mean age of the infants was 3.2 months (SD ± 1.4) with a minimum of 1 month and a maximum of 6 months (table 2).

Table 2 Maternal health service utilization and infant characteristics among mothers with infant 0-6 months old Mettu town, Southwest Ethiopia, 2021

Variable (N= 366)	Category	Frequency	Percent
Parity	Prim-Para	156	42.6
	Multi-Para	210	57.4
ANC follow up	Yes	364	99.5
	No	2	0.5
Number of visits	<4 visit	308	84.2
	≥4 visit	58	15.8
Counseling on infant feeding	Yes	221	60.4
	No	145	39.6
Place of delivery	Public health institution	339	92.6
	Private health institution	27	7.4
Mode of delivery	Normal/Vaginal	294	80.3
	C/S	72	19.7
PNC care	Yes	323	88.3
	No	43	11.7
Age of the infant	<2 months	113	30.9
	2-3 months	134	36.6
	4-6 months	119	32.5
Sex of infant	Male	178	48.6
	Female	188	51.4
Ever breastfed	Yes	366	100
	No	0	0
Timing of breast milk initiation	Within 1 hr.	280	76.5
	1-23hrs	59	16.1
	After 24 hrs.	27	7.4

ANC: Antenatal Care, PNC: Postnatal care, C/S: Cesarean section

3.3 Maternal knowledge of formula feeding

Regarding knowledge of respondents on infant formula, 298 (81.4%) of them were heard about infant formula and the most common source of information was peer/neighbors 209 (70.1%) followed by TV/radio 127 (42.6%). Among these, 129 (43.3%) of the respondents were replied infant formula increases a baby's immunity, 181 (60.1%) replied infant formula contributes to a baby's brain development. 41 (13.8%) of the respondents replied infant formula is more nutritious than breast milk, and 205 (68.8%) respondents do not know the future health impact of formula feeding. The mean score was 2.9 with SD ± 1.35 . Based on the mean knowledge score, the participants were categorized as having poor knowledge 135 (46.1%) while 158 (53.9%) good knowledge (table 3).

Table 3 maternal knowledge of formula feeding among mothers with infant 0-6-months old Mettu town, Southwest Ethiopia, 2021

Question	Response	Frequency	Percent
Have you ever heard about infant formula	Yes	298	81.4
	No	69	18.9
Source information	peer/neighbors	209	70.1
	TV/Radio	127	42.6
	family	55	18.5
	Health professional	50	16.8
Does infant formula increase your baby's immunity?	Yes	129	43.3
	No	169	56.7
Does formula feeding contribute to child brain development	Yes	181	60.7
	No	117	39.3
Does formula feeding increase the risk of diarrhea and other infection	Yes	107	35.9
	No	191	64.1
Does formula feeding increase the risk of childhood obesity	Yes	131	44
	No	167	56
Does infant formula is more nutritious than breast milk	Yes	41	13.8
	No	257	86.2
Does formula feeding affect future health status of the baby	Yes	93	31.2
	No	205	68.8

3.4 Maternal attitude toward formula feeding

Regarding the attitude of respondents toward infant formula, 107 (35.9%) disagreed on formula feeding ensures optimal health for the baby, while 143 (48%) were agreed. 238 (79.9%) of them were disagree that formula feeding is more convenient than breast milk while, 19 (6.4%) agreed. One-third of the respondents 95 (31.9%) disagreed on the idea that infant formula is advised when baby's growth is sluggish/weak while 131(44%) were agreed. 198 (66.4%) of the participants disagree on the idea that your baby is willing to feed formula milk than breast milk while 26 (8.7%) agreed. 186 (62.4%) of them disagree with the idea that formula feeding gives you more comfort than breastfeeding while 39 (13.1%) agreed.

Based on the summation of the scales, 188 (63.1%) of participants were categorized as having a negative attitude while 37 (12.4%) and 73 (24.5%) were categorized as having neutral and positive attitudes respectively (table 4).

Table 4 Maternal attitude toward formula feeding among mothers with infant 0-6 months of old Mettu town, Southwest Ethiopia, 2021

Variables	Responses		
	Disagree	Neutral	Agree
Formula feeding ensures optimal health for the baby	107(35.9%)	48(16.1%)	143(48%)
It is more convenient than breast milk	238(79.9%)	41(13.8%)	19(6.4)
It is advised when baby's growth is sluggish/weak	95(31.9%)	72(24.2)	131(44%)
Your baby is willing to feed formula milk than breast milk	198(66.4%)	74(24.8%)	26(8.7%)
It gives you more comfort than breast feeding	186(62.4%)	73(24.5%)	39(13.1%)
It makes your baby smart	107(35.9%)	144(48.3%)	47(15.8%)
Rich family feed their baby with formula milk while poor provides only breast milk	132(44.3%)	110(36.9%)	56(18.8)

3.5 Formula feeding and related characteristics

Among total study participants, 104 (28.4%) [95% CI 24.0-33.0] were formula-fed their babies. Among respondents practicing formula feeding, 99(95.2%) of them were feeding combination (both breast milk and formula) while only 5 (4.8%) were feeding their babies with only formula milk. The main reason for the initiation of infant formula was breast milk insufficiency 44 (42.3%), busy for work 36 (34.6%) and

sluggish growth of baby 24(23.1). The average age of initiating infant formula was 2.3 months $S d \pm 1.04$ which is found within 2-3 age interval.

3.6 Factors associated with formula feeding

On multivariable logistic regression analysis, prim-para mothers (AOR=3.2 95 CI: 1.71-6.27), delivery by caesarian section (AOR=2.62 95% CI: 1.28-5.35), initiation of breast milk after 24 hrs. (AOR=3.5.95 CI: 1.27-10.05), employed mothers (AOR= 2.4, 95% CI: 1.29-4.09), poor knowledge of formula feeding (AOR= 2.6 95% CI: 1.49-4.81) and positive attitude toward formula feeding (AOR=2.4 95 CI: 1.49-4.73) were significantly associated with formula feeding (table 5).

Table 5 Multivariable analysis of factors associated with formula feeding among mothers with infant 0-6-month-old Mettu town, Southwest Ethiopia, 2021

Variable	Formula feeding				P-value
	Yes (%)	No (%)	COR (95%CI)	AOR (95%CI)	
Age of mother					
15-24	34(19.3)	142(80.7)	0.31(0.104-	0.4(0.09-	0.23
25-34	64(36.4)	112(63.6)	0.98)	1.71)	0.8
35 above	6(42.9)	8(57.1)	0.762(0.25-	1.2(0.28-	
			2.29)	4.82)	
			1		
Maternal education					
No formal education	2(8.3)	22(91.7)	1		
Primary education	22((25.3)	65(74.7)	3.7(0.80-	3.5(0.65-	0.14
Secondary	30(27)	81(73)	17.12)	19.81)	0.08
College/above	50(34.7)	94(65.3)	4.2 (0.90-	4.5(0.83-	0.04
			18.38)	24.81)	
			5.8(1.32-	2.3(0.39-	
			25.90)	13.58)	
Employment status					
un employed	60(22.5)	207(77.5)	1		
employed	44(44.4)	55(55.6)	2.7(1.69-	2.4(1.29-	0.005
			4.50)	4.19) **	
Wealth status					
poor	22(18.9)	99(81.1)	1		
medium	38(30.6)	86(69.4)	1.9(1.05-	1.18(0.55-	0.06
rich	43(35.80)	77(64.2)	3.44)	2.52)	0.07
			2.4(1.33-	2(0.93-4.43)	
			4.32)		
Parity					
Primipara	55(35.3)	101(64.7)	1.8(1.02-	3.27(1.71-	>0.001
multipara	49(23.3)	161(76.7)	2.83)	6.27)**	
			1		
Frequency of ANC visit					
<4 visits	94(30.5)	214(69.5)	2.1(1.02-	2(0.84-5.33)	0.09
≥ 4 visits	10(17.2)	48(82.8)	4.34)		
			1		
Mode of delivery					
Spontaneously	62(21.1)	232(78.9)	1		
C/s	42((58.3)	30(41.7)	5.2(3.03-	2.62(1.28-	0.008
			9.04)	5.35)**	
Timing of breast milk initiation					
Within 1 hour	64(22.9)	216(77.1)	1		
1-23 hour	24(40.70)	35(59.3)	2.3(1.28-	1.5(0.74-	0.24
After 24 hrs.	16(59.3)	11(40.7)	4.17)	3.18)	0.018
			4.9(2.16-	3.5(1.74-	
			11.11)	10.0)**	
Sex of infant					
male	61(34.3)	117(65.7)	1.6(1.05-	1.5(0.87-	0.2
female	43(22.9)	145(77.1)	2.82)	2.82)	
			1		

Age of infant					
> 2 months	22(19.5)	91(80.5)	1		
2-3 months	42(31.3)	92(68.7)	1.8(1.04-3.41)	1.3(0.6-2.72)	0.46
4-6 months	40(33.6)	79(66.4)	2.2(1.14-3.82)	2(0.9-4.56)	0.051
Knowledge					
Poor	60(44.4)	75(55.6)	2(1.27-3.37)	2.6(1.27-4.74)**	0.001
Good	44(27.8)	114(72.2)	1		
Attitude					
Negative	58(30.9)	130(69.1)	1		
Neutral	13(35.1)	24(64.9)	1.4(0.57-2.57)	1.7(0.74-4.07)	0.201
Positive	33(45.2)	40(54.8)	1.8(1.06-3.22)	2.4(1.49-4.74)**	0.007

Note: ** denote statistically significant variables in multivariable logistic regression at *p-value* <0.05, COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio

4. Discussion

This study has attempted to assess the prevalence of formula feeding and associated factors among mothers with infants 0–6 months of age in Mettu town. Accordingly, the study found that 28.4% of mothers in the study area were formula feeding their babies. Primi-parity, delivery by C/S, timing of breast milk initiation, maternal employment status, maternal knowledge and attitude toward formula milk were significantly associated with formula feeding.

The prevalence of formula feeding in this study is comparable with a study conducted at Agaro town 29% (20), and Dire-Dawa 21.4% (12), whereas, it is higher compared to the study conducted at Holeta 13.5% (21) and Gonder 12.4%.(22) The prevalence of formula feeding in this study is lower compared to the study conducted in Jimma (65%) (13) and Adis Abeba 47%.(6), China 88% (23), Staten Island, New York 65% (24), Pakistan 38% (25), East Malaysia 73.7% (26), Egypt 47% (4), and Nigeria 38.3% (5) The inconsistency might be due to due to the difference in the operational definition of formula feeding among the current study, differences in socio-economic status among study participants, and study period.

Regarding predictors of formula feeding, primipara mothers were 3.2 times more likely to practice formula feeding than multipara mothers. This finding is consistent with studies conducted in Taiwan (27), Malaysia (28), and Egypt (29). The reason might be due to lack of knowledge on the benefits of breastfeeding and ignorance of the benefits of breastfeeding. In addition, postpartum primiparous mothers may face problems such as breast milk insufficiency, difficulty of motherhood, and worrying about their body image. The presence of this stress leads to insufficient breast milk secretion(30).

In this study mode of delivery was significantly associated with formula feeding, compared to those mothers who gave their birth vaginally, mothers deliver by caesarian section were 2.6 times more likely to initiate formula feeding to their babies. The finding of this study is in line with studies conducted in Dire-Dawa (12), Addis Abeba (6), Egypt (29), Western Nepal (31), Indonesia (32) and North Jordan (33). There might be delayed initiation of breast milk after C/S delivery that led to early introduction of formula feeding, which further decreases lactogenesis. In addition, maternal stress-related fear of the surgical procedure may also another factor that reduce breast milk secretion by impairing oxytocin secretion (34).

Mothers who initiated breastfeeding after 24 hours of delivery were 3.5 times more likely to initiate formula feeding compared to those who initiated breastfeeding within 1 hour of delivery. This finding is in line with a study conducted in Addis Abeba (6). The possible reason might be, as the time interval between delivery and initiation of breastfeeding increases, there is a probability for the initiation of pre-lacteal feeding which in turn leads to decreased lactogenesis and inadequate breast milk secretion.

Maternal employment status was significantly associated with formula feeding. Employed mothers were 2 times more likely to initiate formula than un-employed mothers. This finding is consistent with studies conducted in Indonesia (32), India (35), Namibia (36), North Jordan (33), and Gonder town (22). This could be due to employed mothers were more scheduled with their outside work and have no adequate time for their baby to breastfeed. In addition, the absence of private breastfeeding or pumping areas in their workplace could be a reason for formula feeding.

Contrary to this finding, study conducted in Sukoharjo, Central Java reported that working mothers had 2 times less chance of formula feeding their babies (37). The reason for this discrepancy might be due presence of a well established policy that support breast feeding at their work place and also maternal experience of pumping a breast milk and storing for their babies before going to their workplace.

In this study, maternal knowledge of formula milk was significantly associated with formula feeding. Mothers those had poor knowledge of formula milk were about three times more likely to practice formula feeding than those with good knowledge. In other word having a good knowledge of formula feeding reduce the probability of not formula feeding by 62%. The finding is similar with a study in Jimma.(13) This might be mothers with poor knowledge of formula feeding would have a probability of inadequate breastfeeding knowledge that leads them to initiate formula milk to their babies. Mother those had inadequate knowledge of infant formula were more likely shaped by effect of infant formula promotion that derived them formula feeding their babies(14).

Maternal attitude toward formula feeding is one of the predictors of formula feeding. Mothers who had a positive attitude toward formula feeding were two times more likely to initiate formula milk to their babies, compared to those who had a negative and neutral attitude toward formula feeding. In other words, having a negative attitude toward formula feeding reduces the likelihood of formula feeding by 60%. The finding is consistent with studies conducted in Jimma(13) and Sukoharjo, Central Java (37). This could be due to a women who had a positive attitude could be easily derived to initiate formula milk to their babies when they found well-packaged formula milk at pharmacies and supermarkets (26).

4.1 Limitation of the study

This study has its own limitation. First, since data were collected by the verbal report of the participants, there might be a possibility of response bias. Second, the study did not assess the qualitative perspective of formula feeding.

5. Conclusion

The current study reported that about one-third of mothers were feeding their infants with formula milk. Mode of delivery, parity, the timing of breast milk initiation, maternal employment status, maternal knowledge and attitude of formula feeding were found to be significantly associated with formula feeding. Hence, education on infant feeding for all pregnant and lactating mothers, encouraging early initiation of breastfeeding after delivery, supporting primipara mothers and as well as mothers who deliver by cesarean section should be implemented at health facility and community level.

Abbreviations

AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; CI: Confidence Interval, ANC: Antenatal Care, PNC: Postnatal Care

Declarations

Data Availability

The data set analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

AM, developed the proposal and data collection tool, collected the data, carried out the statistical analysis and drafted the manuscript. MT, RK and WA conceived the study, supervised the data collectors and reviewed the manuscript. All authors read and approved the final manuscript.

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Ethical Approval and Consent to Participate

Ethical clearance was obtained from ethical review board of Jimma University, Institute of Health Science (Reference number: IHR 42/2021) and submitted to Mettu town health office. The letter of permission was obtained from Mettu town health office. Before beginning the data collection, written consent was obtained from the study participants, after clear information was provided about the objectives of the study. The study was conducted accordance with Helsinki declaration. Participants were informed that they had full right to discontinue or refuse to participate in the study, and information obtained from them would be kept confidential.

Conflict of Interest

The authors declare that they have no competing interests regarding the publication of this article.

Author details

¹ Department of Public Health, College of Health Science, Mettu University, P.O. Box 318, Mettu, Ethiopia

² Department of Health Service Management, Faculty of Public Health, Institute of Health, Jimma University, Jimma, Ethiopia,

³ Department of Nutrition and Dietetics, Faculty of Public Health, Institute of Health, Jimma University, Jimma, , Ethiopia,

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