

Complementary Feeding Practice by Maternal Employment Status in Eastern Ethiopia: A Comparative Cross-Sectional Study

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Research

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Abstract

Background: Appropriate complementary feeding practice during the first two years of age prevents life cycle health problems that cannot be averted later in life. Appropriate complementary feeding practices are associated with various factors and the practice may vary between populations. This study aimed to investigate the complementary feeding practice among mothers with children aged 6-23 months by maternal employment status in eastern Ethiopia.

Methods: A community-based comparative cross-sectional study was conducted in Gemachis district from 10 July to August 2020, eastern Ethiopia. A multi-stage sampling technique was used to sample a total of 674 mothers. Data were collected by face-to-face interview and analyzed using STATA version 14.2. Multivariable logistic regression analysis was conducted to identify factors associated with appropriate complementary feeding practice with 95 % CI or a P-value of less than 0.05.

Results: Over all only 9.9% of all mothers were practicing appropriate complementary feeding, with 5.9% among employed and 11.9% unemployed mothers. After controlling for confounders, traveling to the workplace less than two hours (AOR= 5.9; 95% CI: 1.30, 16.14), giving birth at home (AOR= 0.08; 95% CI:0.01, 0.72, and having at least one ANC visit (AOR=6.5; 95% CI: 1.40, 25.7) were significantly associated with appropriate Complementary feeding practice among employed mothers while having children aged 9–23 months (AOR = 3.2; 95% CI: 1.3, 8.5), spending 17–24 hours on child care (AOR = 4.8; 95% CI: 1.6, 14.12], working 1-8 hours per day (AOR =0.17; 95% CI: 0.44, 0.63], and having at least one ANC visit (AOR = 7.6; 95% CI: 3.6, 14.01] were significantly associated with appropriate complementary feeding practice among unemployed mothers.

Conclusion: The overall prevalence of appropriate complementary feeding practice was very low in this study area. There is a need to strengthen maternal health service utilization such as ANC and institutional delivery to improve complementary feeding practices. Further, considering adequate maternity leave and designing a subsidized alternative child care center is essential to improve the complementary feeding practice for employed mothers.

Introduction

Globally, every year, there are more than five million under five children mortality from which, 53.3% occurred in Sub-Saharan Africa (1). Most of this mortality is related to malnutrition that can be prevented through appropriate complementary feeding practices including breastfeeding and complementary feeding (2). Complementary feeding is defined as the feeding of solid, semi-solid or soft foods in addition to breastfeeding which lasts for the period of 6-23months (3). While appropriate complementary feeding is the introduction of complementary foods at 6 months with continued breastfeeding up to at least 2years and beyond, advanced feeding frequency with age and consumption of a diverse diet (4, 5). After the age of the sixth month, the energy and nutrient content of breast milk alone is not enough to meet the nutritional demand of the growing infant, therefore optimal complementary feeding helps to reduce the

child's risk of acquisition of different infectious diseases and related mortality. And also improves the child's mental and motor development which protects against obesity and other metabolic diseases later in life (6, 7).

Despite the numerous benefits of appropriate complementary feeding, only 35% of infants begin complementary feeding on time globally(8). In Asia, the median age of introducing additional food ranges was 3.8 months in China to 5.5 months in Japan (9). Likewise, according to research studies in Africa, less than half of infants start complementary feeding at the recommended age of 6 months (6, 10). In Ethiopia, the 2016 Demographic and Health Survey (DHS) report indicated that only 60% of infants aged 6–8 months got any complementary food with a median duration of exclusive breastfeeding of 3.1 months. Surprisingly, only a small increase from 4% in 2011 to 7% in 2016 of children aged 6–23 months were found having an appropriate infant and young child feeding practice (11).

Inappropriate feeding practice is related to the adverse and multi-dimensional health and developmental consequences of which causes more than two-third of under-five child mortality in which 41% of these deaths occur in Sub-Saharan Africa (6). In addition, any damage caused by nutritional deficiencies in early childhood is related to impaired cognitive development, poor educational achievement, and low economic productivity which can be averted the life cycle nutritional burden, economic productivity, and child morbidity through proper complementary feeding and child care during this critical age (3).

Studies of DHS data of 12 African countries revealed that less than half of these countries achieve the minimum acceptable diet required for appropriate complementary feeding (12). While East and Southern Africa achieved a minimum acceptable diet at 11.5% (13). In low-income countries like Ethiopia, almost a 1/5th of all under age five dies due to suboptimal child feeding that can be avoided by proper complementary feeding. The prevalence of children who are currently breastfed decreases from 85% among children age 12–17 months to 76% among children age 18–23 months and only 60% of infants aged 6–8 months were given any complementary feeding and only 7% receive appropriate complementary feeding (11).

Moreover, evidence shows that various inappropriate complementary feeding practices such as the untimely introduction of complementary feeding, improper feeding frequency, and low dietary diversity of complementary food have been shown to have negative effects on children's health as the first two years of life are critical period to promote optimal child growth and development (14). Different studies reported that age of mothers, educational status, employment status, family size, breastfeeding status, antenatal care, postnatal care, place of delivery, a distance of health centers, and maternal access of information were among the factors that are significantly associated with complementary feeding practices (6, 7, 14–17).

Although, enormous way of improvement on some child nutrition indicators, Ethiopia remains one of the high burden countries in child undernutrition which has revealed only about half of the infants are timely initiated for complementary foods (18). Hence, to improve complementary feeding during this critical period of growth and development, assessment of complementary feeding practices in relation to

maternal working status is vital. Therefore, this study focused on assessing complementary feeding practices and associated factors among employed and unemployed mothers of children aged 6 to 23 months in the rural community of Gemmachis district, West Hararghe zone, Eastern Ethiopia.

Methods

Study design and setting

A community-based comparative cross-sectional study was conducted in Gemachis district from 10 July 2020 to 20 August 2020. Gemachis district is one of the 17 districts of West Hararghe that is located in the Oromia Regional State of Ethiopia. The district had a total population of 241685, as of 2020, of which 123259 were women and 10344 were children aged 6-23 months (8). Approximately, the overall women unemployment rate in Ethiopia according to 2016EDHS was 48.8% (11).

Study participants

The study participants were mothers (employed and unemployed) who had children aged 6-23 months and who had resided in the districts at least for six months at the time of data collection. Mothers who were sick and/or not volunteered to participate were excluded from the study.

Sample size and sampling methods

The sample size was determined using a single population proportion formula by using 95%CI, 5% margin of error, and a 10% non-response rate. Based on the evidence from the previous study, the proportion of complementary feeding practice was 56.5% (14). The sample size for the first objective with single population proportion formula and a design effect of 1.5 was 624. The sample size for the second objective was calculated using Epi-info software version 7(stat Cal) with the following assumptions; 80% power of the study, 1:1 unexposed to exposed ratio, and 95% confidence interval. Based on these assumptions, the sample size for the second objective was found to be 674. Comparing the two samples, therefore, the larger sample size, 674, was considered as the final sample for this study.

The study participants were selected by using a multi-stage sampling technique. The primary sampling units were kebeles (small administrative units) found in the Gemachis district. First, from the 38 rural kebeles of the district, 14 Kebeles that account for 34% of the total kebeles were selected randomly. Then pre-survey case identification to identify households with employed and unemployed mothers of children aged 6-23months was conducted and followed by stratification of mothers by employment status (employed and unemployed). Then from each stratum, 226 employed and 448 unemployed mothers having children aged 6-23month were selected randomly and grouped based on their homogeneity. Finally, the total sample was proportionally allocated to each fourteen selected kebeles according to their number of eligible employed and unemployed mothers having children aged 6-23 months living in the kebeles. Following the proportional allocation of the sample to the selected, household codes were given

separately for employed and unemployed mothers. Using household code as a sampling frame, the study participants were finally selected using a systematic random sampling method.

Data Collection Tools and Procedures

A standard and validated tool that was adapted from the Ethiopian Demographic and Health Survey (EDHS) and World Health Organization (WHO) was used to collect the data. The tool was prepared first in English then translated into the local language (Afan Oromo). Then it was re-translated to English by language experts to keep its consistency. The questionnaire was including questions that is used to gather information on socio-demographic and economic variables, maternal and health service-related information. Household wealth index computed using a composite indicator for rural residents by considering properties like livestock ownership, selected household assets, size of agricultural land, and quantity of crop production. Principal component analysis was performed to categorize the household wealth index into lowest, middle, and highest.

The questioners were grouped and arranged so that objectives and all-important variables were addressed. Data were collected for fifteen days using interviewer-administered face-to-face interviews. There were sixty-seven questions to be answered and the interview was taken about 25-30min for one respondent to answer all questions. Two BSc nurses and four health officers were recruited for data collection. One supervisor was assigned to seven kebeles in order to supervise and collect questionnaires on daily basis and check for inconsistencies and incompetence. A three-day training was provided to data collectors and supervisors by the principal investigator before actual data collection was started.

Measurements/measures(?)

The outcome variable for this study was complementary feeding practice which was classified as appropriate or inappropriate. Appropriate complementary feeding practice defined as IYC feeding practice that fulfills the minimum dietary diversity, the minimum meal frequency, continuing breastfeeding with complementary feeding for 2 years, and timely initiation of complementary feeding at the recommended time of World Health Organization (11, 19). While the infant is cauterized having inappropriate complementary feeding practice when IYC feeding practice does not fulfill even one of the components of appropriate complementary feeding practice (19).

The predictor variables used in this study was maternal age, child age child sex, religion, marital status, family size, number of children ever born, maternal education, maternal employment, paternal education, paternal employment, wealth status, ANC visit, place of delivery, postnatal attendance, institutional delivery, initiation of breast and complementary feeding, decision-making role, the distance of health centers and distance of workplace, any illness in the last 2-week, and inadequate care child breastfeeding status. In addition, minimum meal frequency were defined as feeding of infants and young children (IYC) that fulfills at least 2-3 times complementary feeding within 24 hours for children aged to 6-8 months and 3-4 times for those aged 9 months and above (8). Finally infants was grouped as having minimum

dietary diversity when the baby fed from at least four food groups within the past 24 hours out of the following seven food groups: grain, legumes, dairy products, egg, meat, fruits, and vegetables (8).

Data Quality Control

Before the actual data collection procedure, a questionnaire was pre-tested on 5% of the sample on a similar population of the district, from the kebeles that were not part of the actual sample. Any ambiguity and unclear questions were modified before the data collection. After data collection, each questionnaire was given a unique code by the principal investigator. Finally, data clearance and double data entry checks were conducted by two individuals to minimize errors.

Data Processing and Analysis

Before analysis, the data were checked manually for completeness and consistency. The data were, then, entered into Epi data version 3.1 and exported to STATA version 14.2 for further cleaning and analysis. Frequency distribution, measures of central tendency, and dispersion used to describe the data.

Chi-square and Student t-tests were used as appropriate to check whether the differences between the two groups (employed and unemployed mothers) on the selected characteristics were statistically significant. A binary logistic regression model was fitted to investigate the association between each factor and outcome variable. All variables with a P-value of ≤ 0.25 in bivariate analysis were checked for multicollinearity, using variance inflation factor (VIF), and included in multivariable logistic regression models and adjusted for a confounding effect. Accordingly, three multivariable logistic regression models were constructed to identify factors associated with the appropriate complementary feeding practice among employed mothers, unemployed, and all mothers. Finally, an adjusted odds ratio with a 95% confidence interval or p-value of less than 0.05 was used to report factors independently associated with appropriate complementary feeding practice.

Ethical Considerations

Ethical clearance was obtained from Haramaya University, College of Health and Medical Sciences, Institutional Health Research Ethics Review Committee (IHRERC). A support letter was obtained from the School of Graduate Studies and submitted to Gemachis district Health Office and kebele administrations so that permission to access the study site was granted from each hierarchy. Study participants were adequately informed about the purpose, method, and anticipated benefit of the study by the assigned data collectors. Written/verbal informed consent was obtained from the study participants. The participants were informed as they have the right to refuse or withdraw from participating in the research without any explanation and they had the right to ask any question at any time during the data collection period. Further, the confidentiality of the study participants was strictly maintained by excluding any personal identifiers from the questionnaire and limiting data access only to individuals who were authorized by the IHRERC

Results

Socio-demographic and economic characteristics

In this study, out of 674 sampled eligible mothers of 6–23 months aged children, 660 (98%) were consented to participate and included in the analysis with a 2:1 unemployed and employed ratio. The mean age of the mothers was 30.4 years (SD \pm 6.6). The majority, 95%, of the mothers were currently married, and more than two-fifth (41.3%) were never attended formal education. 42.3% of employed mothers and 42.9% of unemployed mothers were decision-makers in the household. Less than a third, 31.1%, of employed and 44.6% of the unemployed mothers were in the poor wealth quantile (**Table 1**). The mean age of the children was 14.1 months (SD \pm 5.3) and the mean birth interval of the participants was 2.2 years (SD \pm 0.53) (**Table 2**).

Maternal health service utilization and child-related factors

From 660 mothers, only 46% and 31.5% of employed and unemployed mothers, respectively, had at least one ANC follow up and the difference was statistically significant (X^2 (df)=13.27 (1), $p=0.000$). Around three-fifths of employed mothers and 45.9% of the unemployed mothers gave birth to the current child in a health institution (X^2 (df) = 8.79 (1), $p=0.003$). The mean time spent on work was 2.1 hours (SD \pm 0.7) among employed ($t=9.6$; $p=0.00$). The mean time spent on child care was 1.7 hours (SD \pm 0.8) among employed and 2.1 hours (SD \pm 0.8), being lower among unemployed mothers. ($t=-6.3$; $p=0.00$) (**Table 2**).

Breastfeeding practice-related factors

Almost all employed and unemployed mothers had breastfed their children. However, only a fourth of unemployed mothers and slightly less than half of the employed mothers had initiated breastfeeding immediately after birth (X^2 (df) =29.0 (2); $p <.001$). Furthermore, 41.9% of employed and 59.2% of unemployed mothers had breastfed their children for two and more years and the difference was statistically significant (X^2 (df) = 17.6 (2); $p <.001$) (Error! Not a valid bookmark self-reference.).

Complementary feeding status

Based on a twenty-four-hour dietary recall, 12.2% of employed mothers and 15.5% of unemployed mothers had given food for their children four and more times per 24 hours. Comparing timely initiation of complementary feeding at 6 months, it was significantly higher (X^2 (df) = 32.7(1), $p <.001$) among unemployed mothers (54.3%) than employed mothers (45.0%) (**Table 4**).

Regarding the type of foods given to the children, almost a similar percentage (58.0%) of employed and unemployed mothers had given grain for their children, while only 3.2% of employed and less than one percent of unemployed mothers had given flesh food for their children (**Figure 1**). Nearly 70% of employed mothers and slightly over three-fourth of unemployed mothers had given only one food group

for their children (**Figure 2**). Moreover, the prevalence of appropriate complementary feeding practice was 9.8 % among all mothers, 5.9% for employed, and 11.9% for unemployed mothers (**Figure 3**).

Factors associated with appropriate complementary feeding practice among employed and unemployed mothers

Results from the multivariable model revealed that distance of maternal working area, place of delivery, ANC visit, among employed mothers and distance of health facility, ANC visit, the maternal working hour a day, child age and usual time spent for child care among unemployed mother were significantly associated with complementary feeding.

Employed mothers who traveled less than two hours for daily work were six times more likely to practice appropriate complementary feeding than those who traveled more than two hours (AOR = 5.9; 95% CI: 1.3, 16.14). Employed mothers who visited at least one ANC were about seven times more likely to practice appropriate complementary feeding compared to their counterparts who did not visit ANC (AOR=6.5; 95%, CI: 1.4, 30.7). On the other hand, giving birth at home decreased the odds of practicing appropriate complementary feeding among employed mothers by 92 % employed study participants who attend delivery at Health facility were more likely to practice appropriate complementary feeding [AOR=0.08; 95%, CI: 0.01, 0.72] (Table 5).

Regarding the associated for appropriate complementary feeding among unemployed mothers, like that of employed mothers, Having ANC visit increased the odds of practicing complementary feeding among unemployed mothers (AOR = 7.6; 95%CI: 3.6,14.01). Spending extended time on child care (17–24 hours) was also positively associated with appropriate complementary feeding (AOR = 4.8; 95% CI: 1.60,14.12). On the other hand, mothers who had children aged 6–8 months were 67% less likely to practice appropriate complementary feeding compared to those who had children aged 9–23 months (AOR=0.33; 95% CI: 0.14, 0.81) (**Table 6**).

Based on the multivariate logistic regression model, among all study participants; A family size of four to six and greater than or equal to seven, and giving birth at home were significantly associated with appropriate complementary feeding practice among all study participants.

Having a family size of four to six and greater than or equal to seven reduced the odds of practicing appropriate complementary feeding among mothers by 62 % (AOR = 0.38;95% CI: 0.20, 0.72) and 76% (AOR = 0.24; 95% CI: 0.10, 0.66), respectively, as compared to having a family member of less than or equal to three. Mothers who gave birth at home were 60% less likely to practice appropriate complementary feeding than those who gave birth at health facilities (AOR = 0.40, 95% CI: 0.22, 0.71). Moreover, mothers who traveled less than two hours to reach the health facility were two times more likely to practice appropriate complementary feeding compared to those who traveled greater than or equal to two hours (AOR = 2.3; 95% CI: 1.14, 5.20) This study also indicated that, overall, unemployed mothers were two times more likely to practice appropriate complementary feeding compared to employed mothers (AOR = 2.4; 95% CI: 1.20, 4.79)

Discussion

This study has revealed that the overall prevalence of appropriate complementary feeding practices among mothers of children aged 6-23 months old is 9.9%. The prevalence of appropriate complementary feeding practice was low among employed (5.9%) than among unemployed (11.9%) mothers. Distance of maternal working place, attending ANC, and giving birth at health facilities were important factors among employed mothers and, attending ANC, child age, maternal working time, and time spent on child care were significant factors that contribute for appropriate complementary feeding among unemployed mothers.

The overall prevalence of appropriate complementary feeding practice was very low, 9.9% in the current study area. This finding was in agreement with the finding of a study conducted in southern Ethiopia which reported a prevalence of 9.5% (20) and in Tigray, North Ethiopia which reported 10.75% prevalence (21). However, it was lower compared to the findings of the previous study conducted in northern Ghana; 14.3% (5), Karbore Uganda; 21.4% (3), the coastal area of south India; 32% (9), and Benishangul gumuze, west Ethiopia; 61.8% prevalent (6). The possible reasons for this discrepancy might be due to differences in study design, socio-demographic, maternal occupation, community feeding practice, and differences in access to health services delivery.

The prevalence of appropriate complementary feeding practice in the current study was significantly higher among unemployed mothers compared to among employed (11.9% vs 5.9%). This finding was consistent with the study finding in Lasta northern Ethiopia (14) and in line with the study conducted in South West Ethiopia (22). On the contrary, previous studies conducted in the different country including Ethiopia revealed that employed mothers were more likely to practice appropriate complementary compared to unemployed mothers (3, 23, 24). The variations may be due to differences in maternal work type and daily income, work distance, study design, child care alternatives. Our study considers continuing breastfeeding for two and more years may make difference.

The current study also revealed that employed mothers who traveled for work less than two hours were more likely to practice appropriate complementary feeding than those who traveled more than two hours.

Having at least one ANC and institutional delivery had a significant association with appropriate feeding practice. Employed mothers who had visited a health facility for ANC were more likely to practice appropriate complementary feeding compared to those who had not. The unemployed mother who visited at least one ANC were more likely to practice appropriate Complementary feeding than not visited ANC. This is in line with the study in Shashemene, Oromia Region (25). This could be due to the fact that mothers who visit health facilities are more likely to get child feeding-related advice and education from health professionals.

The findings also indicated that spending extended time on child care was positively associated with appropriate complementary feeding among unemployed mothers. Spending longer time with children may increase the chance to practice appropriate feeding by mothers or caregivers.

The results of this study revealed that overall complementary feeding was timely introduced to 49.9% of infants and young children included in this study, although the prevalence of appropriate complementary feeding was relatively low. The results were consistent with the findings from Ethiopia (26), in Manipal, Pokhara (10), and in Rapandi, Nepal (15). However, it is lower when compared to the findings of previous studies conducted in Ethiopia (20, 27) and a study conducted in coastal India (28). In addition, our finding was higher when compared to the findings from other countries like Nigeria (29). The observed difference might be due to demographic and socioeconomic factors, child feeding practices, type of maternal occupation, and health care access.

The proportion of timely introduction of complementary feeding was found to be significantly higher among unemployed mothers (54%) when compared to (45%) employed. The result was in line with the studies conducted in Addis Ababa (30) and northern Ethiopia (31).

Among children aged 6–23 months old, only 16.2% were received foods from at least four food groups or more (minimum dietary diversity). Overall minimum dietary diversity practice in the district was found to be lower than the WHO recommendation (8). This finding is in line with the study conducted in Damot sore southern Ethiopia (32) and with Dabat District, Northwest Ethiopia (17). It is lower than the study conducted in southern Ethiopia (20) and the study findings from Golina northeast Ethiopia (33). This might be due to educational, socioeconomic, and cultural differences.

The prevalence of minimum meal frequency in the study area among children age 6 – 8 months old was 91.2% (93.10% among employed, 89.55% among unemployed). Considering this age group, the proportion of minimum meal frequency was found to be higher among employed mothers when compared to unemployed. This is comparable with finding in Tanzania (34). This might be due to mothers' intention to start early complementary and to compensate before return to work and might be covid-19 pandemic related maternal stay at home which might increase child care.

The study also showed the prevalence of minimum meal frequency practice among children age 6 – 23 months old in the study area was 49.24% (50% employed, 39.8% unemployed). The result of this study was comparable with previous findings in Ethiopia (4, 35). However, the study finding was higher when compared with the study conducted in Ghana (3).

It was also found that while 41.9% of employed and 59.2% of unemployed mothers breastfed their children for two or more years, the proportion was found to be significantly higher among unemployed mothers having children age 6 – 23 months old. This might be due to the fact that working mothers spent most of their time at work which negatively influences breastfeeding frequency per day as resulting in reduced breast productions and might stop breastfeeding. On the other hand, unemployed mothers get a longer time to stay with their children and feed (36).

Strengths, the study explicitly addressed the complementary feeding practice between employed and unemployed mothers using a comparative approach. In ascertaining complementary feeding, we used the 24-h recall method to determine complementary feeding practice which is currently recommended by

WHO, and minimized the recall bias in ascertaining complementary feeding practice that could have occurred by other methods. This study has some limitations: The single 24 h recall only captures a single glance, it may not represent the usual intake of an infant if there is a day-to-day variation in the feeding pattern, which may consequently lead to an overestimation and misclassification. In addition, 24-hour dietary recall which didn't show the usual dietary practice of household members besides seasonal variation in food consumption might exist so that results regarding dietary information are limited to the specific season of the year in which the study was conducted. Furthermore, there might be a recall bias in ascertaining some variables like early initiation of complementary feeding, food group consumed, frequency of feed, and other maternal and child healthcare-related variables.

Conclusion And Recommendations

The prevalence of timely initiation of complementary feeding at six months, minimum dietary diversity, minimum feeding frequency, and extending breastfeeding for greater than or equals to two years with complementary feed were low in this study. The overall prevalence of appropriate complementary feeding practice was also very low (9.9%) and it was found that employed mothers were less likely to practice compared to unemployed mothers. Distance of maternal working area from the home, institutional delivery and at list one ANC service among employed and usual time spent for child care, at list one ANC service utilization, maternal working hours per day and child age among unemployed study participant were the independent predictors for appropriate complementary feeding practice. Improving child feeding practice, strengthening community-based health education programs, strengthening multi-sectoral nutrition intervention strategies to improve feeding practice advising and counseling mothers on appropriate complementary feeding practice during child health care services can improve the child feeding practices among mothers.

Declarations

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Availability of data and material

All the data and materials are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1: *Sociodemographic and economic characteristics of the study participants, eastern Ethiopia*

Variables	Maternal employment		X ² (df)	P-value
	Employed (n=222)	Unemployed (n=438)		
	N (%)	N (%)		
Maternal age (in years)				
15-19	18 (8.1)	14 (3.2)		
20-24	32 (14.4)	58 (13.2)		
25-29	54 (24.3)	126 (28.8)	8.6 (4)	.07
30-34	53 (23.9)	107 (24.4)		
35 and above	65 (29.3)	133 (30.4)		
Marital status				
Married	206 (92.8)	42 (96.1)		
Single	8 (3.6)	2 (0.5)	11.5 (3)	.01
Divorced	6 (2.7)	7 (1.6)		
Widowed	2 (0.9)	8 (1.8)		
Religion				
Muslim	218 (98.20)	370 (84.47)		
Orthodox	4 (1.80)	66 (15.07)	5.3 (2)	.07
Protestant	-	2(0.46)		
Maternal education				
No formal education	97 (43.7)	176 (40.2)		
Primary education	71 (32.0)	129 (29.4)	2.6 (2)	.26
Secondary and above	54 (24.3)	133 (30.4)		
Paternal education				
No formal education	111(50.0)	234 (53.4)		
Primary education	74 (33.3)	171 (39.0)	13.2 (2)	< .001
Secondary and above	37 (16.7)	33 (7.5)		
Paternal occupation				

Unemployed	7 (3.1)	15 (3.42)		
Employee	25 (11.2)	7 (1.6)		
Farmer	139 (62.6)	399 (91.1)	95.9 (6)	< .001
Merchant	37 (16.7)	12 (2.7)		
Daily labour	11 (5.0)	4 (0.9)		
Other	3 (1.35)	1 (0.2)		
Household wealth index				
Poor	69 (31.1)	196 (44.7)		
Medium	40 (18.1)	91 (20.8)	7.4 (2)	< .001
Rich	113 (50.9)	151 (34.5)		
Maternal decision making				
Yes	94 (42.3)	188 (42.9)	1.5 (1)	.22
No	128 (57.7)	250 (57.1)		
Family size (in number)				
1-3	81 (36.5)	195 (44.52)		
4-6	67 (20.2)	165 (37.7)	20.1(2)	< .001
7 and above	74 (33.3)	78 (17.81)		

Table 2: Maternal health service utilization, child care, and child-related characteristics among study participants, eastern Ethiopia

Variables	Maternal employment		χ^2 (df)	P-value
	Employed (n=222)	Unemployed (n=438)		
	N (%)	N (%)		
At least one ANC visit				
Yes	102 (45.9)	138 (31.5)	13.3 (1)	< .001
No	120 (54.1)	300 (68.5)		
Place of delivery				
Health facility	129 (58.1)	201 (45.9)	8.8 (1)	.01
Home	93 (41.9)	237 (54.1)		
Access to child feeding information source				
Yes	102 (46.0)	280 (63.9)	19.5 (1)	< .001
No	120 (54.1)	158 (36.1)		
Time spend on child care per day (in hours)				
1-8	117 (52.7)	132 (30.1)	37.5 (2)	< .001
9-16	66 (29.7)	148 (33.8)		
17-24	39 (17.6)	158 (36.1)		
Child care alternative available				
Yes	87 (39.2)	76 (17.4)	37.8 (1)	< .001
No	135 (60.8)	362 (82.6)		
Child care alternative				
Elder sister/brother	7 (8.1)	13 (17.1)		
Father	5 (5.8)	-		
Grandmother	36 (41.4)	43 (56.4)	37.7 (5)	< .001
Aunt	-	8 (10.5)		
Neighbour	17 (19.5)	12 (15.8)		
servant	22 (25.3)	-		
Sex of the child				

Male	112 (50.5)	188 (42.9)	3.4 (1)	.06
Female	110 (49.5)	250 (57.1)		
Age of the child (in moths)				
6-8	58 (26.1)	67 (15.3)		
9-11	47 (21.2)	76 (17.4)	15.3 (2)	< .001
12-23	117(52.7)	295 (67.3)		
Birth order				
First	46 (20.7)	147 (33.6)		
Second	47 (21.2)	132 (30.1)	29.1 (3)	< .001
Third	54 (24.3)	72 (16.4)		
Fourth and above	75 (33.7)	87 (19.8)		
Birth interval (in years)*				
One	28 (14.8)	48 (13.6)		
Two	129 (68.3)	246 (70.0)	2.46(2)	0.483
Three and above	32 (17.0)	58 (16.5)		

**First time mothers were excluded as they were not eligible for birth interval calculation*

Table 3: Breastfeeding practice-related factors among study participants, eastern Ethiopia

Variables	Maternal employment		χ ² (df)	P-value
	Employed (n=222)	Unemployed (n=438)		
	N (%)	N (%)		
Currently breastfeed the child				
Yes	220 (99.1)	435 (99.3)	0.1 (1)	.76
No	2 (0.9)	3 (0.7)		
The intended duration of breastfeeding				
Less than two years	126(56.76)	175(39.95)	17.59 (2)	0.000
Greater than or equal two years	93(41.89)	259(59.13)		
Do not know	3(1.35)	4(0.91)		
Breastfeeding initiated time				
Immediately after birth	100 (45.5)	109 (25.1)	29.0 (2)	< .001
One hour after birth	93 (42.3)	236 (54.2)		
24 hours or more after birth	27 (12.3)	90 (20.7)		
Breastfeeding frequency per day				
Less than 6 times	87 (39.6)	19 (4.4)	134.8 (2)	< .001
Six-nine times	89 (40.4)	251 (57.7)		
More than 9times	44 (20.0)	165 (37.9)		
Bottle feeding				
Yes	113 (50.9)	365 (83.3)	77.6 (1)	< .001
No	109 (49.1)	73 (16.7)		
Include snacks between foods				
Yes	73 (32.8)	158 (36.1)	0.7 (1)	0.41
No	149 (67.1)	280 (63.9)		
Type of food commonly given to the Child				
Porridge	120 (54.1)	261 (59.8)	2.0 (1)	0.12

Adult types	102 (45.9)	176 (40.2)		
Use of a separate container for child feeding				
Yes	165 (74.3)	306 (69.9)	1.4 (1)	0.23
No	57 (25.7)	132 (30.1)		

Table 4: Complementary feeding practice among study participants, eastern Ethiopia

Variables	Maternal employment		X ² (df)	P-value
	Employed (n=222)	Unemployed (n=438)		
	N (%)	N (%)		
Meal frequency per 24 hours				
Once	32(14.41)	85(19.41)	9.93(3)	0.019
Twice	115(51.80)	171(39.04)		
Three times	48(21.62)	114(26.03)		
Four and	27(12.16)	68(15.53)		
Meal frequency for children 6–8 months				
Once	4(6.90)	7(10.45)	0.49(1)	0.485
Two–three times	54(93.10)	60(89.55)		
Meal frequency for child 9–23months				
Less than or equal to two	106(65.24)	217(58.49)	2.17(1)	0.141
Greater than or equal to three	57(34.76)	154(41.51)		
Complementary feeding initiated time				
Before six months	104(46.85)	109(25.06)	32.72(2)	0.000
At six months	91(44.99)	236(54.25)		
After months	27(12.16)	90(20.69)		
Complementary feeding practice				
Appropriate	13(5.86)	52(11.87)	6.01(1)	0.014
Inappropriate	209(94.14)	386(88.13)		

Table 5: Factors associated with appropriate complementary feeding practice among employed mothers, eastern Ethiopia

Factor	Complementary feeding practice		COR (95% CI)	AOR (95% CI)
	Appropriate	Inappropriate		
	N (%)	N (%)		
Travel hours to work place				
<2 hours	9 (10.3)	77 (89.7)	3.8 (1.3, 12.70)*	5.9 (1.3, 16.14)*
≥ 2 hours	4 (3.0)	131 (97.0)	Ref.	Ref.
Family size				
1-3	10 (12.5)	71 (87.6)	Ref.	Ref.
4-6	2 (4.5)	65 (97.0)	0.22 (0.05, 1.03)	0.15 (0.2, 0.92)*
≥ 7	1 (1.4)	73 (98.6)	0.10 (0.01, 0.78)*	0.15 (0.2, 1.81)
Place of delivery				
Health facility	12 (10.1)	117 (90.7)	Ref.	Ref.
Home	1 (1.1)	92 (98.9)	0.11 (0.01, 0.83)*	0.08 (0.01, 0.72)*
ANC visit				
Yes	10 (9.8)	92 (90.2)	4.2 (1.13, 14.01)*	6.52(1.40,25.77)*
No	3 (2.5)	117 (97.5)	Ref.	Ref.
Bottle feeding				
Yes	12 (10.6)	101(89.4)	Ref.	Ref.
No	1(1.0)	108 (99.0)	0.08 (0.01, 0.61)*	0.12 (0.01, 1.07)
Time spent on child care				
1-8 hours	4 (3.4)	113 (96.6)	Ref.	Ref.
9-16 hours	4 (6.1)	62 (93.9)	1.8 (0.44, 7.50)	1.91 (0.35, 10.31)
17-24 hours	5 (12.8)	34 (87.2)	4.2 (1.10, 15.31)*	0.37 (0.48, 12.43)

*=P-value <0.05; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: confidence Interval; Ref = reference group

Table 6: Factors associated with appropriate complementary feeding practice among unemployed mothers, eastern Ethiopia

Factor	Complementary feeding practice		COR (95% CI)	AOR (95% CI)
	Appropriate	Inappropriate		
	N (%)	N (%)		
Family size (members)				
1-3	34 (17.4)	161 (82.6)	Ref.	Ref.
4-6	14 (8.5)	151 (91.5)	0.44 (0.23, 0.85)*	2.52 (0.62, 10.16)
≥ 7	4 (5.1)	76 (94.9)	0.40 (0.16, 0.98)*	1.1 (0.25, 4.77)
Travel hours to health facility				
<2 hours	47 (13.9)	291 (86.1)	3.1 (1.20, 7.94)*	1.14 (0.37, 3.35)
≥ 2 hours	5 (5.0)	95 (95.0)	Ref.	Ref.
Place of delivery				
Health facility	33 (16.4)	168 (83.6)	Ref.	Ref.
Home	19 (8.0)	218 (92.0)	0.44 (0.24, 0.81)*	2.0 (0.97, 4.03)
ANC visit				
Yes	37 (26.8)	101 (73.2)	7.0 (3.70, 13.20)*	7.6 (3.6, 14.01)*
No	15 (5.0)	285 (95.0)	Ref.	Ref.
Bottle feeding				
Yes	50 (13.7)	315 (86.3)	0.18 (0.42, 0.75)*	3.7 (0.72, 18.66)
No	2 (2.7)	71 (97.3)	Ref.	Ref.
Time spent on child care				
1-8 hours	5 (3.8)	127 (96.2)	Ref.	Ref.
9-16 hours	12 (8.1)	136 (91.9)	2.2 (0.77, 6.54)	2.33 (0.72, 7.52)
17-24 hours	35 (22.2)	123 (77.8)	7.2 (2.70, 15.05)*	4.8 (1.60, 14.12)*
Wealth index				
Poor	24 (12.2)	172 (87.8)	0.74 (0.4, 1.30)	0.64 (0.29, 1.50)

Medium	4 (4.4)	87 (95.6)	0.23 (0.8, 0.69)*	3.20 (0.9, 11.14)
Rich	24 (15.9)	127 (84.1)	Ref.	Ref.
Child care alternative				
Yes	50 (13.8)	334 (86.2)	5.9 (1.41, 24.90)*	4.9 (0.85, 28.34)
No	2 (2.6)	76 (97.4)	Ref.	Ref.
Child age				
6–8 months	13 (19.4)	54 (80.6)	Ref.	Ref.
9–23 months	39 (10.6)	332 (89.5)	0.48 (0.25, 0.97)*	0.33 (0.14, 0.81)*
Maternal working hours per day				
Zero	35 (21.9)	125 (78.1)	Ref.	Ref.
1–8	17 (6.1)	261 (93.9)	0.23 (0.13, 0.43)*	0.17 (0.44, 0.63)*

**=P-value <0.05; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: confidence Interval; Ref = reference group*

Table 7: Factors associated with appropriate complementary feeding among all mothers with children aged 6-23 months old, eastern Ethiopia

Factor	Complementary feeding practice		COR (95% CI)	AOR (95% CI)
	Appropriate	Inappropriate		
	N (%)	N (%)		
Family size				
1-3	44 (15.9)	232 (84.1)	Ref.	Ref.
4-6	16 (6.9)	216 (93.1)	0.39 (0.21, 0.71)*	0.38 (0.20, 0.72)*
≥ 7	5 (3.3)	147 (96.7)	0.18 (0.07, 0.46)*	0.24 (0.10, 0.66)*
Travel hours to health facility				
<2 hours	55 (12.8)	376 (87.2)	3.2 (1.60,6.41)*	2.43 (1.14, 5.20)*
≥ 2 hours	10 (4.4)	219 (95.6)	Ref.	Ref.
Place of delivery				
Health facility	45 (12.6)	285 (86.4)	Ref.	Ref.
Home	20 (6.0)	310 (94.0)	0.41(0.24, 0.71)*	0.40 (0.22, 0.73)*
ANC visit				
Yes	47 (26.8)	193 (80.4)	5.44 (3.0, 9.62)*	5.93 (3.30, 10.80)
No	18 (4.3)	402 (95.7)	Ref.	Ref.
Maternal employment				
Employed	13 (5.9)	209 (94.1)	Ref.	Ref.
Unemployed	52 (11.9)	389 (88.1)	2.17 (1.15, 4.07)*	2.40 (1.20, 4.79)*

*=*P*-value <0.05; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: confidence Interval; Ref = reference group

Figures

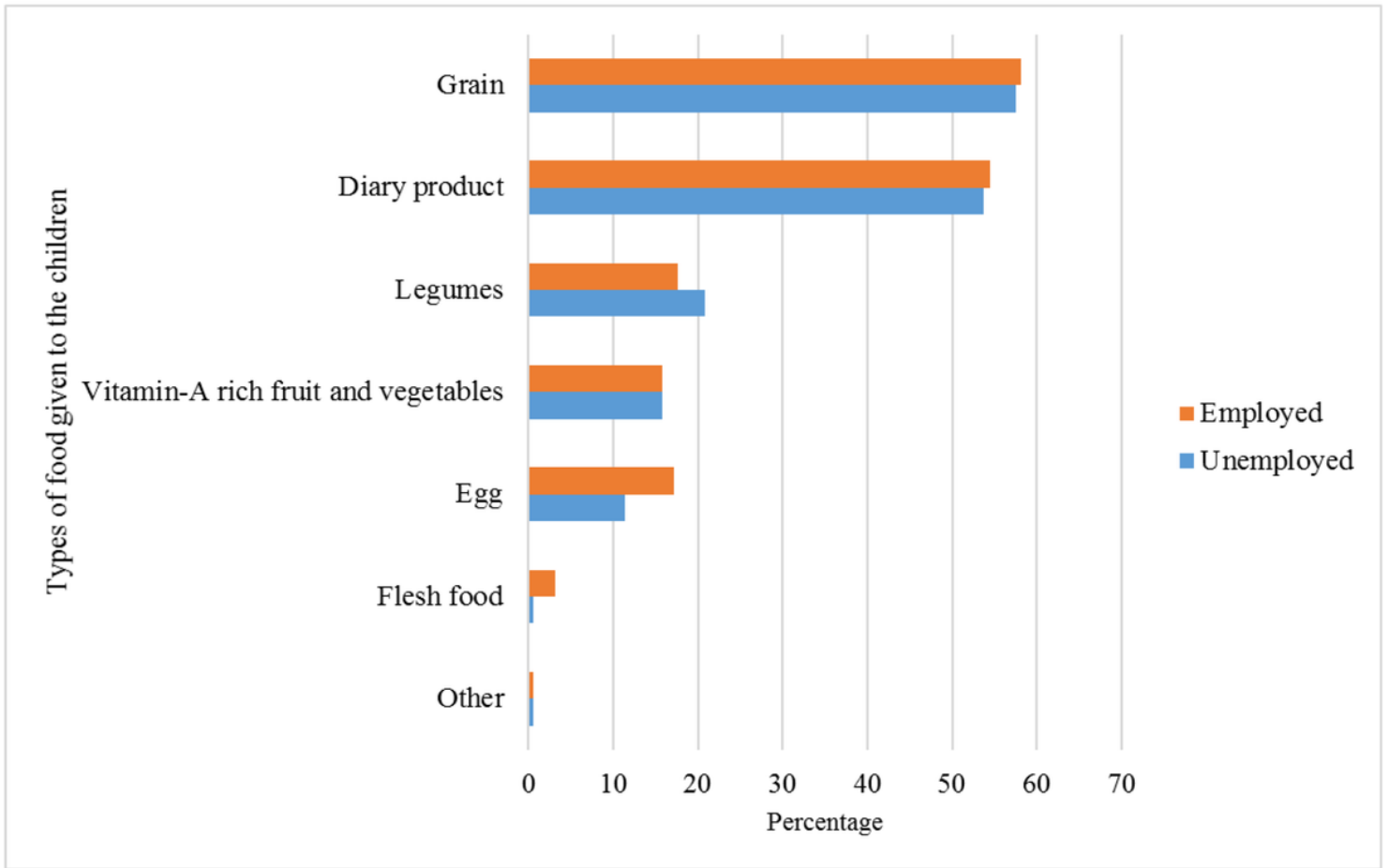


Figure 1

Types food given for the children in the last 24 hours

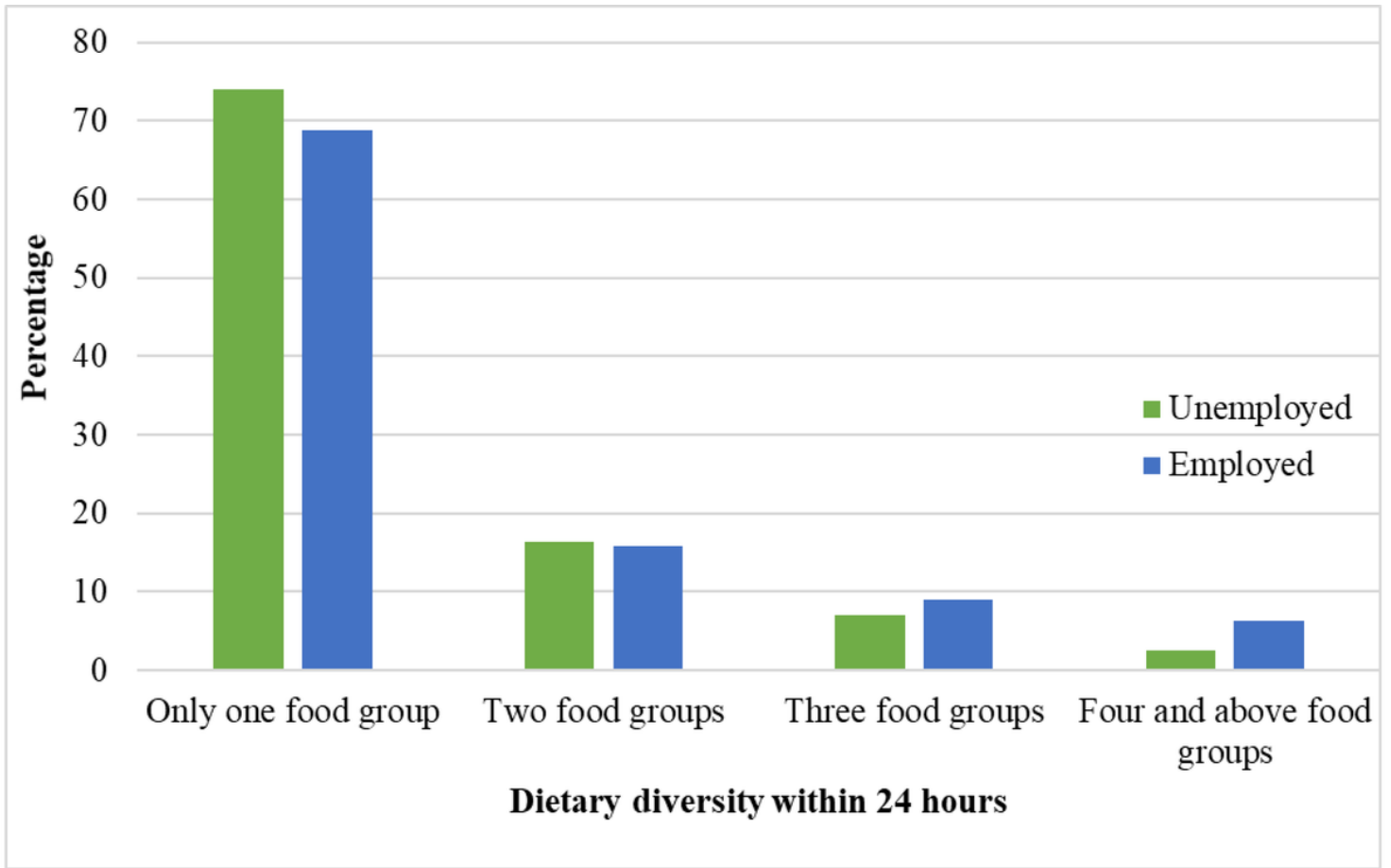


Figure 2

Percentage distribution of minimum dietary diversity among the study participants

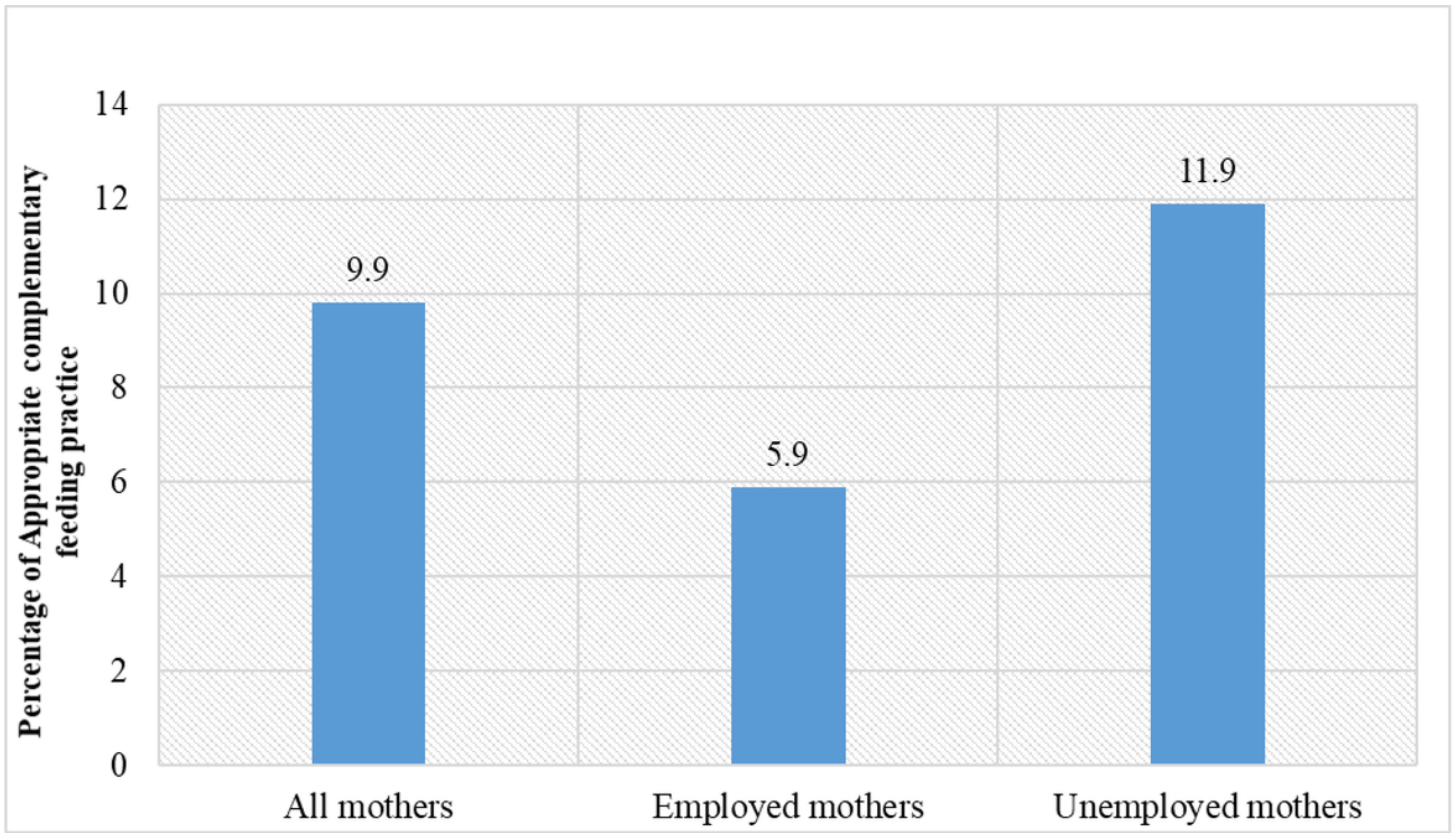


Figure 3

Appropriate complementary feeding practices among the study participants