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Optimal Complementary Feeding Practices and Associated Factors among Mothers of Children 6-23 Months Old in Jijiga City, Somali Region of Ethiopia

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ABSTRACT

Background: Malnutrition in childhood has been linked with inappropriate and ineffective complementary feeding practices especially during the first two year of life. Complementary feeding involves the introduction of other forms of foods and or liquids from six months of age when breast milk only can no longer meet the dietary requirements of infants.

The study aimed to assess the prevalence of optimal complementary feeding practices and associated factors among mothers of children 6-23 months in Jijiga town of Somali Region of Ethiopia.

Methods: A community based cross-sectional design conducted among 227 mothers of children aged 6–23 months using multi-stage sampling technique. Data was collected using a structured questionnaire analysed using SPSS version 23. Logistic regression analysis was done to determine factors associated between optimal complementary feeding practices.

Results: The prevalence of optimal complementary feeding practice was 49.4%, however 57% of the respondents introduced complementary feeding between 6-8 months. Minimal meal frequency and minimal dietary diversity among the respondents was 52% and 45% respectively. Optimal complementary feeding practice was significantly associated with mother's level of education [AOR=3.4; 95% CI: 2.26-6.14], being employed [AOR=3.94; 95% CI: 1.08-6.57],parity [AOR=5.60; 95% CI: 2.17-8.67], Antenatal Care (ANC) attendance [AOR=7.23; 95% CI: 2.76-11.91), health facility delivery [AOR=4.20;95% CI: 1.06-7.55] and family size [AOR=3.65; 95% CI: 1.80-7.17)

Conclusion: Nutrition education and counselling being provided by health workers to mothers should focus on promoting not only timely initiation of complementary feeding but adequate in quantity, appropriate frequency and consistency using variety of foods combination to accommodate the nutritional needs of the growing child while continuing breastfeeding.

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Introduction

Adequate nutrition especially within the first 1,000 days of life is vital to a child's optimal growth, health, and development. Around the age of 6 months, an infant's need for energy and nutrients starts to exceed what is provided by breast milk, and complementary foods are necessary to meet those needs (1, 2). Malnutrition in childhood has been linked with inappropriate and ineffective complementary feeding practices especially during the first two year of life. Complementary feeding involves the introduction of other forms of foods and or liquids from six months of age when breast milk only can no longer meet the dietary requirements of infants (3). It is the transition from exclusive breastfeeding to family foods beginning from 6 months of age and continuity of breastfeeding up to two years of age. Childhood malnutrion has been identified as a significant public health issue mostly in low and middle income countries and about one-third of these malnutrition cases are attributable to inappropriate nutrition and ineffective feeding practices, which occur during the first year of life (4). Complementary feeding is recommended to be initiated timely, adequate in quantity, of appropriate frequency and consistency using a variety of foods combination to accommodate the nutritional needs of the growing child while continuing breastfeeding (1-3). If complementary foods are not introduced around the age of 6 months, or if they are given inappropriately, an infant's growth may falter (2). However, in numerous regions of the developing world, optimal supplementary feeding remains a challenge to children's healthy nutrition. Globally, most children are not being fed enough of the right foods at the right time in their development. Even before the current global food and nutrition crisis, only slightly more than two in five children under 6 months of age were exclusively breastfed, and fewer than one in three children aged 6–23 months received foods from the minimum number of food groups needed for healthy growth and development (5). Improving infant and young child feeding (IYCF) practices in children aged 0–23 months is therefore critical to improved nutrition, health, and development. The World Health Organization (WHO) recommended core indicators to ensure appropriateness and optimal combination of complementary foods for infants and young children. These indicators include early initiation of breastfeeding; exclusive breastfeeding up to 6 months of age; continued breastfeeding till the age of two years; timely introduction of solid, semi-solid or soft foods; ensuring minimum dietary diversity; minimum meal frequency; and minimum acceptable diet (3).

In realization of the importance of adequate and appropriate nutrition to child health and survival, the government of Ethiopia instituted strategies to improve the optimal complementary feeding of children aged 6–23 months which included the development of the national food and nutrition strategy and national nutrition program (6, 7). Improved nutritional status of infant and young children 0-23months is one of the key strategic objectives of the national nutrition program (6, 7). The study aimed to assess the prevalence of optimal complementary feeding practices and associated factors among mothers of children 6-23months in Jijiga town of Somali Region of Ethiopia.

Materials and Methods

The study was conducted in Jigjiga Town in the capital of Somali region in Ethiopia. Somali region is one of the nine regional states in Ethiopia located in the eastern part of the country. It consists of 20 urban and 9 peri-urban kebeles (lowest administrative unit in Ethiopia). Jigjiga town has population about 142,470 (75,972 males and 66,493 females). It has one referral hospital, one general hospital and three health centers. Ethnic groups in the city include mostly Somali (83%), Amhara (9%), and Oromo (4%) tribes, etc. It is mostly agro-pastoralist community and their major sources of income are livestock and livestock products, petty trading and merchandising, crop sales, self-employment, and governmental and private employments (8).

A community based cross-sectional study was undertaken among 227 mothers who had children aged 6-23 months in the study area in March 2021. Fisher's formula was utilized to determine the sample size as $n=Z^2pq/d^2$, where n=desired sample size, Z=standard normal deviation at 95% confidence level (CI), z=1.96, and p=0.095 (prevalence of appropriate complementary feeding practices of 9.5%) (9), q=0.905 (1-p), d=degree of accuracy desired, taken to be 0.04, 95% level of confidence and degree of accuracy at 0.05 and 15% attrition rate giving a minimum sample size of 240. A multistage sampling method was used to select the study participants. The first stage involved selection of 6 kebeles from the 20 urban kebeles (lowest administrative unit) using simple random sampling technique. In the second stage by using the household registration as sampling frame, the 240 participants were allocated for 6 kebeles based on proportion to their size. In each of the kebeles, mothers of children aged 6-23 months were selected utilizing systematic random method and those who were consent to participate in

the study were recruited. When selected households were not eligible or consent to participate, the next household from registered households was selected.

Data Collection Methods

The instrument for data collection was developed from a modified and validated structured questionnaires adopted from the Ethiopia Infant and Young Child Feeding Practices (IYCF) national guidelines, and the World Health Organisation (WHO) standard questionnaire for assessing IYCF practices (3, 10). The questionnaires consist of three basic sections: socio-demographic characteristics, utilization of maternal health services and information on feeding practices. The appropriate complementary feeding practice was assessed based on compliance with WHO recommended practices on the timeliness of the initiation of complementary feeding, minimum dietary diversity and minimum meal frequency (3). Information regarding these indicators were obtained by recall of food consumed by infants in the previous day prior to data collection.

The questionnaires were prepared in English, translated to Somali language to make sure that the questions are clear and can be understood by the respondents, and after that it was translated back to English version to maintain its consistency and pre-tested being used for interview.

Operational Definitions

• Complementary feeding refers to the provision of semi-solid and solid foods to children from 6 months-8 months of age in addition to breast milk to meet their daily nutrient requirements.

• Timely initiation of complimentary feeding is the introduction of complimentary feeding at 6 month-8 months.

• Minimum Meal Frequency (MMF) is the proportion of children aged ≥6 months who received at least the recommended minimum meal frequency appropriate for age in the last 24 hours prior the survey: at least 2 feeding times daily for infants aged 6–8 months and at least 3 times daily for infants aged 9-23months. months in the last 24 hours

• Minimum Dietary Diversity (MDD) is the proportion of children aged ≥6 months who received food from at least four out of the seven recommended food groups in the last 24 hours prior the survey. The seven foods groups used for calculating minimum dietary diversity indicator are: grains, roots and tubers; legumes and nuts; dairy products like milk; fleshy foods such as meat and fish; eggs; fruits and vegetables rich in vitamin A; other fruits and vegetables. A child who had eaten at least four out of the seven groups of foods is said to have had minimal dietary diversity based on the WHO recommended cut-off point.

• Optimal complementary feeding practice is the proportion of children 6-24 months of ages who introduced to receive complementary feeding at six-eight months and received the minimum dietary diversity and solid or semisolid meal at minimum numbers of frequency based on their age.

Data Analysis

Data entry was done using EPI -data version 3.1 and analysis was done using SPSS software version 23. Analysis was done at univariate, bivariate and multivariate levels. Univariate analysis findings were presented using frequency (n) and percentage (%) distribution tables. Association between optimal complementary feeding practices and selected sociodemographic characteristics and utilization of maternal health services by mothers were determined using both bivariate and multivariable logistic regression. A variable that shows a value<0.1 in the bivariate analyses were re-entered into multivariable logistic regression models to control for potential confounders. A p value<0.05 was considered statistically significant and the Adjusted Odds Ratios and their 95 % Confidence Intervals were reported. The outcome variable in this study was mother's optimal complementary feeding practices. This was assessed based on composite indicators comprising three of the WHO core IYCF indicators recommended by the WHO Guideline on Infants and Young Child Feeding (3). The indicators are timely initiation of complementary feeding, minimum meal frequency and minimum dietary diversity. If a child fulfilled all three criteria, it was classified as having received optimal complementary feeding.

Ethical Consideration

Ethical clearance was obtained from health research ethics review committee of Jigjiga University Health and Medical Sciences College. Informed signed consent was obtained from all participants enrolled into the study. Personal identification was not written on the questionnaire and confidentially of all information was kept.

Results

Two hundred and twenty-seven (95%) of the 240 eligible mothers of children 6-23months completed the study. As shown in Table 1, most of the respondents were aged between 25-29 years old (31.3%) followed by 30-34 years of age (26.4%) with a mean age of 29.18±5.9 years. Most of the respondents,197 (86.8%) were married and 188

Table 1: Socio-demographic of the respondents (N=227).

Variable	Frequency	Percentage
Age of mothers		
≤20 years	21	9.3
20-24 years	45	19.8
25-29 years	71	31.3
30-34 years	60	26.4
>35 years	30	13.2
Marital status of mothers		
Married	197	86.8
Divorced/Single	23	10.2
Widow	7	3.0
Religion of mothers		
Islam	193	85
Christianity	34	15
Ethnicity of mothers		
Somali	188	82.8
Amhara	27	11.9
Oromo	9	3.9
Others	3	1.3
Educational status of mothers		
No formal education	75	33
Primary education	120	53
Secondary education and above	32	14
Educational status of husbands		
Illiterate	81	35.7
Primary education	123	54.2
Secondary education and above	23	10.1
Occupation of mother		
Unemployed	177	78
Employed	50	22
Family monthly income		
≤999 ETB	68	30
1000-2999 ETB	91	40
3000-3999 ETB	45	20
≥4000 ETB	23	10
Family Size		
1-3	137	60
≥4	90	40
Parity of mothers		
Primiparous (1)	107	47
Multipara (2-4)	95	42
Grand multipara (5 or more)	25	11

(82.8%) belonged to Somali ethnicity. A total of 120 (53%) of the respondents had primary level of education participants and 75 (33%) had no formal education while 81 (36%) of their husbands had no formal education. In terms of occupational status, 177 (78%) were either unemployed or housewife while 50 (22%) had a form of employment. The family income shows that, 159 (70%) had monthly income of less than 3,000ETB (60USD). Ninety five (42%) of the respondents were multipara (have two to four deliveries) while 107 (47%) were primiparous (has had one delivery) and 182 (80%) had more than four people living in a household.

Table 2 shows that only 57 (25%) respondents used a form of contraceptive method, while 173 (76%) attended antenatal care visit at least once during their last pregnancy with 89 (39%) reporting attending four or more times. A total of 152 (67%) respondents delivered their youngest child at a health facility; while 95 (42%) reported to have attended postnatal care services at least once.

Table 3 illustrates that 34 (15%) respondents initiated the complementary feeding (provision of semi-solid and solid foods in addition to breast milk) for their children before 6 months; while 116 (51%) initiated complementary feeding between 6 and 8

Table 2: Utilization of maternal health services (N=227).

Variable	Frequency	Percentage
Contraceptive use		
Yes	57	25.
No	170	75
Attended antenatal care (ANC) services		
Yes	173	76
No	54	24
Number of ANC visits		
1	11	5
2	23	10
3	50	22
4 and above	89	39
Place of delivery		
Health institution	152	67
Home	75	33
Attended postnatal care services		
Yes	95	42
No	132	58

Table 3: Feeding practices among mothers/caregivers (N=227).

Variable	Frequency	Percentage
Initiation of complementary feeding		
Before 6 months	34	15
6-8 months	116	51
After 8 months	77	33
Minimal Dietary Diversity (MDD)		
Appropriate	102	45
Inappropriate	125	55
Minimum meal frequency		
Appropriate	118	52
Inappropriate	109	48
Complementary feeding practice	50	22
Optimal	112	49.4
Non-optimal	115	50.6

months and 77 (33%) after 8 months. Among the respondents, 102 (45%) offered four or more food groups daily before the assessment that is considered the appropriate practice (the minimum recommended diversity) to their children. A total of 118 (52%) respondents fed their children appropriately based on the recommended age (at least 2 feeding times daily for infants aged 6-8 months and at least 3 times daily for infants aged 9-23 months per day before the assessment. Only 112 (49.4%) respondents provided optimal complementary feeding practice determined from the proportion of children aged 6-24 months who were introduced to complementary feeding at 6-8 months old and received the MDD of solid or semisolid meal at minimum numbers of frequency based on their age.

Table 4 demonstrates the results of both bivariate and multivariate logistic regression analyses to assess factors associated with optimal complementary feeding practice among the mothers of children 6-23 months old. The associated factors which were significant and followed bivariate analysis re-entered into multivariate logistic regression model to control the possible potential confounders. The associated factors which were statistically significant following multivariate logistic regression were level of education, occupation, parity, number of children, attendance at ANC services and place of delivery. The level of education of the husbands and number of family members which were significant following bivariate analysis were not correlated with optimal complementary feeding practice after controlling the confounders. The analysis showed that mothers with secondary level of education and above were three times more likely to practice optimal complimentary feeding when compared to mothers without any level of education [AOR=3.4, 95% CI: 2.26, 6.14, respectively]. Occupational status which ensured ability to earn income was significantly associated

Table 4: Factors associated with optimal complementary feeding practice among respondents.

Variable	Optimal complimentary feeding practice				
	Yes (%)	No (%)	COR (95%CI)	AOR (95%CI)	P value
	112 (49.4)	115 (50.6)			
Educational status of mothers					
No formal education	29 (38.3)	46 (61.7)	1.00	1.00	1
Primary educational level	66 (55.1)	54 (44.9)	1.94 (1.21, 3.04)	1.73 (1.09, 7.94)	0.02
Secondary education and above	23 (71.9)	9 (28.1)	4.05 (0.16, 16.42)	3.4 (2.26, 6.14)	0.01
Educational status of husband					
No formal education	35 (43)	46 (57)	1.00	1.00	1
Primary educational level	81 (66)	42 (34)	2.53 (0.27, 23.0)	2.20 (1.41, 3.67)	0.12
Secondary education and above	15 (65)	8 (35)	2.46 (1.63, 9.69)	2.34 (0.17, 5.62)	0.21
Occupational status of mothers					
Unemployed	69 (39.0)	108 (61.0)	1.00	1.00	1
Employed	37 (73.0)	13 (27.0)	4.45 (1.16, 6.42)	3.94 (1.08, 6.57)	0.02
Parity of mothers					
Primi-para	39 (39.0)	68 (61.0)	1.00	1.00	1
Multipara	68 (79.0)	27 (21.0)	5.60 (1.08, 8.57)	5.6 (2.17, 8.67)	0.02
Grand multipara	14 (56)	11 (44)	2.31 (1.43,4.71)	2.72 (1.94, 6.58)	0.03
Family size					
1-3	105 (77.0)	32 (23.0)	5.8 (4.2, 9.3)	3.65 (1.8, 7.17)	0.03
≥4-	48 (53.0)	42 (47.0)	1.00	1.00	-
Attend antenatal care (ANC) services					
Yes	137 (79.0)	36 (21.0)	9.03 (1.87, 5.91)	7.23 (2.76, 11.91)	0.001
No	16 (29.0)	38 (71.0)	1.00	1.00	1
Place of delivery					
Health Institution	103 (81.0)	51 (19.0)	6.00 (2.06, 8.55)	4.20 (1.06, 7.55)	0.03
Home	19 (25.0)	56 (85.0)	1.00	1.00	1

with optimal complimentary feeding practice four times more among mothers who were employed when compared to those who were unemployed [AOR=3.94, 95%CI: 1.08, 6.57, respectively]. The parity of the mothers was significantly associated with optimal complementary feeding practice for mothers who were multipara (2-4 deliveries) and those who were grandmultipara (5 or more deliveries) that was six time and three times more to practice optimal complementary feeding when compared to those who were primiparous [AOR=5.6, 95%CI: 2.17, 8.67, respectively] and [AOR=2.7, 95%CI: 1.94, 6.58, respectively]. Mothers who attended ANC services were 7 times more likely to have optimal complimentary feeding practice when compared to those who did not attend [AOR=7.32, 95%CI: 2.76, 11.91, respectively]. However, the number of ANC visits was not significant. Mothers who delivered their last child at health facilities were 4 times more likely to have optimal complimentary feeding practice when compared to those who delivered at home [AOR=4.20, 95%CI: 1.06, 7.55, respectively]. The odd of optimal complimentary feeding practice among mothers with family size of 3 or less was four times more when compared to mothers with 4 or more family size [AOR=3.65, 95%CI: 1.80, 7.17, respectively].

Discussion

In our study, the prevalence of optimal complementary feeding practice was 49%, which is lower than the findings in studies done in Northeast Ethiopia which reported prevalence of appropriate complementary feeding practice of 57.7% and 56.5% (11, 12).

However, the finding in this study is higher than was reported in studies in Southern Ethiopia, Northwest Ethiopia, and Northern Ghana which reported prevalence of appropriate complementary feeding practice of 37.2%, 9.5% and 15.7% respectively (13-15). This suggest variation across the various region of Ethiopia with the study area, Jijiga being located in the eastern region of Ethiopia. Other studies from seven Anglophone West African countries and Kenya also reported the variation of complementary feeding practices across regions (16). Similarly, most of the areas with higher prevalence including this study are located mostly in the urban areas of the country. Another study in Ethiopia found that Mothers who lived in the predominantly urban area were 4·2 times more likely to give optimal complementary feeding to their children compared to mothers who lived in the rural areas midland agro-ecological zone (17). Mothers in urban areas have relatively better access to information about

appropriate complementary feeding practices from different mass media compared with those in the rural areas.

In this study, only 51% of the mothers initiated introduction of complementary feeding for their children at 6-8months of age which is lower than the findings in studies Northeast Ethiopia and secondary data analysis of Ethiopia demographic and health survey which reported 56.2% and 83.3% of mothers respectively initiated complementary feeding practice for their babies at 6-8months of age (18, 19). This is however higher than 34% reported in a study in southern Ethiopia (9).

The result of this study revealed that the proportion of children who consumed solid, semi-solid or soft foods at least the minimum number of times (minimum meal frequency) during the prior day of the survey was found to be 52%. This is lower than findings from studies from southern Ethiopia, secondary data analysis of Ethiopia demographic and health survey and northeast Ethiopia which reported 67.3%, 53.7%, and 69.2% respectively had at least minimum meal frequency (9, 19, 20).

This is however higher than reported in studies in Southern Ethiopia, Northern Tanzania, and sub-Saharan africa which reported prevalence of 47%, 40.3% and 41.9% respectively (14, 21, 22).

The proportion of minimum dietary diversity in our study was 45%, this is higher than was reported in other studies in Ghana 34.8%, Ethiopia 14.9%, Southeast Ethiopia 28.5%, Kenya 23.9% (15, 23-25). However, this is lower than the findings from previous studies southern Ethiopia (52.1%) and Tanzania (73.9%) (9, 21). The studies in Tanzania and southern Ethiopia were conducted in urban setting communities like our study and suggest minimum dietary diversity is higher in urban than rural areas.

The study shows that maternal education was significantly associated with optimal complementary feeding practice which increased with the level of education. This finding is similar to other studies conducted in other regions of Ethiopia, Nigeria and Congo (9, 12, 26, 27). This may be due to the fact that educated people have better access and exposure to opportunities to relevant information on nutrition including appropriate feeding practices. Education also enhances the status of mother and enable them to develop greater confidence and capacity to make decisions about their child feeding practice.

The study also found being employed was associated with optimal complementary feeding practices, this is similar to findings from other studies in other regions of Ethiopia and Uganda which found that employed mothers were more likely to provide appropriate complementary feeding practices (11, 28, 29). Improved incomes among employed could have been responsible for this since they will be able to provide the needed food groups items. In this study the practice of appropriate complementary feeding increased with income of the mothers though not statistically significant. However previous studies in other region of Ethiopia and in Tanzania and Pakistan reported increased odds of appropriate complementary feeding practices among mothers with increased income (30-33).

Utilization of maternal health services for ANC services and health facility delivery was associated with optimal complementary feeding practice. This is similar to other studies in Ethiopia and sub-Saharan africa which reported attendance at Antenatal care services, health facility delivery and use of post-natal care services as predictors of complementary feeding practices (11, 34, 35). Similarly, studies in India, Bangladesh, and Nepal found inadequate antenatal care, mode of delivery, and lack of postnatal contacts by health workers among predictors of inappropriate feeding (36-38). This could be explained as mothers who attend health facilities for various maternal health care services have better opportunity to access appropriate maternal and child feeding information which are essential to improving maternal and child health and nutrition outcomes.

This study didn't find any significant association between the numbers of ANC visits and optimal complementary feeding practices. This is unlike study in multilevel analysis of the recent demographic and health survey in sub-Saharan African countries which reported that optimal feeding practices increased with the number of ANC visit with mothers who did not attend ANC visits during pregnancy were 27% and 33% times less likely to have appropriate complementary feeding practices compared with mothers who attended 1–3 and 4 or more ANC visits, respectively (35). Likewise, utilization of post-natal care services in this study was not found to be significantly associated with optimal complementary feeding practices unlike the previous study in Northeast Ethiopia which found use of postnatal care services to be independent predictors of complementary feeding practice (11).

In the study, the parity of the mothers was associated with optimal complementary practices which increased with number of deliveries, but the age of the mothers was not found to be significant. This is however unlike finding from previous studies in Ethiopia which found no significant relationship between parity and appropriate complementary feeding practices but found age of mothers significantly associated with improved feeding practices (30,39).

Mothers with family of three or less practiced optimal complementary feeding than those with four of more family size. This is similar to finding from other studies which found family with lower family size were positively associated with optimal/ appropriate complementary feeding practices (17, 19, 30). The possible explanation is that mothers with bigger family sizes may not have adequate time to prepare and feed their children with appropriate diet beyond what is being prepared for other family members.

The study found optimal complementary feeding practice increased with the level of father's education though not statistically significant. This is unlike studies in other region of Ethiopia and Nepal which reported positive association between the father's education and appropriate complementary feeding practice (39, 40). The study didn't find any association between the age, sex of children and optimal complimentary feeding practices. However previous studies in Ethiopia and Tanzania reported that appropriate complementary feeding practice of mothers increased as the age of children increased with women with children 12months and above practice appropriate complementary feeding than women who had 6–11 months old children (21, 24, 33). A study in Nepal found male gender to be associated with timely initiation of complementary feeding (39).

A major limitation of the study is recall bias because the information provided by the mothers interviewed was collected on a single 24-hour recall basis. Also, the study was conducted in the urban areas of the Jijiga city and may not reflect the reality in the rural areas of the region. However, this is the first time such study will be conducted in Jijiga town, and the findings will help government and implementing partners to develop effective contextualized strategy to improve complementary feeding practice in the region.

Conclusion

More children had timely initiation on complementary feeding compared to those who had minimum meal frequency and minimal dietary diversity. The identified factors associated with optimal complementary feeding practices should be used to develop a contextualized social and behavioral change communication strategy targeted at mothers to improve infant child feeding practices and child nutrition outcome. Nutrition education and counselling being provided by health workers to mothers should focus on promoting not only timely initiation of complementary feeding but adequate in quantity, appropriate frequency and consistency using a variety of foods combination to accommodate the nutritional needs of the growing child while continuing breastfeeding.

Authors' Contribution

OO and HMD conceived the manuscript documentation. OO drafted and finalized the manuscript. HMD developed the study proposal, coordinated the field work, data collection and analysis. All the authors read, reviewed, and approved the final draft of the manuscript.

Conflict of Interest

None declared.

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