

Appropriate complementary feeding practice was relatively low and associated with mother's education, family income, and mother's age: a community based cross-sectional study in Northern Ethiopia

Abstract

Background: Introduction of complementary foods that is not timely is inappropriate feeding practice as it carries many risks, which contributes to persistent child malnutrition, mortality and other complications. This study was aimed to determine appropriate complementary feeding practice and associated factors among mothers of children aged 6-23months in East Gojam, Debre Markos district.

Methods: A cross-sectional, community based study was conducted on 606 women of eligible children existing in ten randomly selected rural and urban kebeles (kebele is the smallest administrative unit in Ethiopia). Data were collected using a pre-tested structured questionnaire in their own respective homes. Data were analyzed by SPSS version 21. A multivariable logistic regression was used to identify the predictors of appropriate complementary feeding practice.

Results: Level of appropriate complementary feeding practice was 15%, 95% CI (12.2, 18.0). Literate mothers [AOR= 3.1, 95% CI (1.8, 5.3)], low income [AOR=3.3, 95% CI (1.54, 7.16)] and Mother's age<20 [AOR=2.1, 95% CI (1.64, 6.21)] were independently associated with appropriate complementary feeding practice.

Conclusion: Appropriate complementary feeding practice in Debre Markos district was very low. Thus, infant and young child feeding practices targeted efforts should be made by all concerned bodies to improve the health and nutritional conditions of this age group.

Volume 6 Issue 2 - 2017

Belete Y,¹ Awraris W,² Muleta M³¹College of Medicine and Health Sciences, Debre Markos University, Ethiopia²College of Natural and Computational Sciences, Debre Markos University, Ethiopia³College of Health and Medical Sciences, Debre Markos University, Ethiopia

Correspondence: Belete Yimer, College of Medicine and Health Sciences, Debre Markos University, PO Box 269, Debre Markos, Ethiopia, Tel +251587711646, sEmail byimer04@gmail.com

Received: March 29, 2016 | **Published:** February 15, 2017

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; EDHS, Ethiopian health and demographic survey; WHO, world health organization conflict of interests; IYCF, infant and young child feeding; FMOH, federal ministry of health; MDG, millennium development goal; TBA, traditional birth attendant

Background

In the world 60% of the infant and young child deaths occur due to malnutrition where two-thirds of these deaths attributed to sub-optimal child feeding practices and infectious disease.¹⁻⁵ Forty-one percent of these deaths occur in sub-Saharan Africa and 34% in South Asia. Apart from contributing to childhood disease burden, early under nutrition has long lasting effects on physical as well as cognitive growth into adulthood. In addition to its direct relation to the first Millennium Development Goal (MDG 1), namely, eradicating extreme poverty and hunger, reducing under nutrition is also a key factor underpinning several other MDGs. As WHO definition optimal infant feeding practices is initiation of breastfeeding within 1 hour of birth; exclusive breastfeeding for the first 6 months of life; introduction complementary food from locally available food that are rich in both macronutrients and micronutrients and hygienically prepared around 6 months; increased breastfeeding during illness and recovery and on-

demand and frequent breast feeding should continue for up to 2 years of age to ensure that infants receive all the benefits of breastfeeding.²⁻⁶

Complementary feeding is the process of starting semi solid or solid food when breast milk alone or infant formula alone is no longer sufficient to meet the nutritional requirements of an infant and when other foods and liquids along with breast milk or a breast milk substitute are needed. The age range for complementary feeding is generally 6-23 months. Complementary feeding should be timely, meaning that all infants should start receiving foods in addition to breast milk from 6 months onwards. It should be adequate, in amounts, frequency, consistency and using a variety of foods to cover the nutritional needs of the growing child while maintaining breast feeding foods should be prepared and given in a safe manner, to minimize the risk of contamination with pathogens. And they should be given in a way that is appropriate, for the age of the child and applying responsive feeding following the principles of psycho-social care. The indicators for the minimum frequency of feeding complementary foods are based on whether the child is being breastfed or not who recommends that infants start receiving complementary foods at 6 months of age in addition to breast milk, initially 2-3 times a day between 6-8 months, increasing to 3-4 times daily between 9-11 months and 12-24 months with additional nutritious snacks offered 1-2 times per day, as

desired.⁷ Adequate nutrition during infancy and early childhood is fundamental to the development of each child's full human potential. It is well recognized that the period from birth to two years of age is a "critical window" for the promotion of optimal growth, health and behavioral development. Longitudinal studies have consistently shown that this is the peak age for growth faltering, deficiencies of certain micronutrients, and common childhood illnesses such as diarrhea. After a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier.⁸ Infants' right to adequate food needs to be improved, as only about one-third of the world's infants begin breastfeeding within one hour and are exclusively breastfed for the first six months.⁶ According to the Lancet⁹ on the third series papers about maternal and child under-nutrition, a review on studies focused on complementary feeding strategies, concluded that appropriately designed interventions can have a positive effect on feeding practices. Access to safe water used for preparing and serving the food for the child and for drinking as well as good sanitation and hygiene are important for appropriate complementary feeding and has been shown to have an impact on reducing child mortality.⁹ Thus there is a need for a clear-cut program to provide a basic service and support for pregnant and lactating women and health workers support breast feeding, because breast milk is the only appropriate food for newborn infants and the most nutritious food for babies.^{6,10}

The Ethiopian Health care development program consider child health as a major priority. To meet all of these goals, the FMOH is implementing a strategy aimed at improving child feeding practices by giving emphasis to key messages on optimal IYCF practices which is recommended by the WHO. Despite of all these the prevalence of appropriate complementary feeding practices in different part of Ethiopia are lower than international recommendation.¹¹ While economic and contextual factors are strong determinants of child nutritional status, immediate causes such as feeding practices are associated with nutritional outcomes, particularly stunting, independent of socio-economic determinants.¹² Those malnourished children who survive are more frequently sick and suffer the lifelong consequences of impaired development.¹³

In 2011, EDHS result shows that 29% of children under age five are underweight (have low weight-for-age), and 9% are severely underweight.¹¹ The proportion of underweight children generally increases with each age cohort the proportion of underweight children is highest in the age groups 24-35 months (34%) and lowest among those under six months (10%). This may be explained by the fact that foods for weaning are typically introduced to children in the older age group, thus increasing their exposure to infections and susceptibility to illness. This tendency, coupled with inappropriate or inadequate feeding practices, may contribute to faltering nutritional status among children in these age groups.¹¹

Too early or too late introduction of complementary foods is not appropriate feeding practice as it carries many risks which contributes to persistent child malnutrition.¹²⁻¹⁴ It is reported that too early introduction of complementary foods stress the immature gut, kidneys and immune system, increased allergies and morbidity due to diarrhea. It also pre-disposes the infants to reduced protective benefits of the breast milk.¹⁵ In addition the micronutrients in complementary foods are not absorbed as well as those in breast milk, thus increasing the chances of slow growth pattern among infants. The risks of microbial contamination as a result of poor hygiene that results to gastrointestinal infections are higher with complementary foods. These all cause the children particularly vulnerable to growth retardation, micronutrients deficiencies and common childhood illnesses.¹⁶

Poor feeding practices are, therefore, a major threat to social and economic development as they are among most serious obstacles to attaining and maintaining health of this important age group.¹⁷ Inappropriate feeding practices are often a greater determinant of inadequate intakes than the availability of foods in the households, while the appropriate complementary feeding practice has been shown to prevent up to 6% of child deaths.¹² In developed countries perception that infants at work may hinder mothers' job performance; lack of privacy for breastfeeding and insurance regulations and others are some barriers to breastfeeding and factors of early introduction of complementary food.^{18,19}

According to 2011 the Ethiopian Demographic Health Survey report, 50.6% of newborns were put on breast within 1 hour of birth and about 80% of infants 2 months old are exclusive breastfed.¹⁴⁻¹⁷

However, this proportion rapidly drops to 38% at the age of 6 months and complementary feeding starts too early in about 14% of infants. The survey also indicated that among breastfed children age 6-23 months, 4% receive foods from at least four food groups, while 48% are fed the minimum number of times or more. In total, 4% of breastfed children are given foods from four or more groups and also are fed at least the minimum number of times per day. Overall, the study found inappropriate or lack of knowledge on proper feeding practices in all livelihood zones.¹⁴⁻¹⁷ Although a number of factors have been suggested as important for success of preventing child from malnutrition and mortality, impact of inappropriate complementary feeding practice appears as a common threat. The impacts of inappropriate complementary feeding practice are great in developing countries where access to basic needs and health services are not adequately available. Optimal infant and young child feeding practices rank among the most effective interventions to improve child health. Although complementary feeding is one of the components of Essential Nutrition Action in Ethiopia, a wide range of harmful infant feeding practices are documented even after the implementation of infant and young child feeding guide line. Children in this area have problems of malnutrition and micronutrient deficiencies. Therefore; for successful interventions of improving IYCF practice, identifying complementary feeding practice and associated factors in the study area is likely to be specific. However, few studies were documented about appropriate complementary feeding practice in the study area. That's why the researchers are motivated to assess appropriate complementary feeding and associated factors among mothers of children aged 6-23 months.

Methods and materials

Study setting, design and period

A cross-sectional, community-based study was conducted in Debre Markos district, Amhara regional state Northeast Ethiopia from March 10/2014 to March 29/2014 among mothers of children aged 6-23 months. The district is one of districts in East Gojam zone and its population is divided into rural and urban dwellers. Debre Markos is its capital city; it is located 285 kms from Bahir Dar (the capital city of Amhara Regional State) and 300 kms from Addis-Ababa (the capital city of Ethiopia). The potential health service coverage in the district is 93%.

Study population, sample size and sampling

Mothers having children aged 6-23 months in the randomly selected kebeles of the district were the study population. Mothers were identified from the report of health extension workers in the

kebeles. A sample size of 634 women was calculated using a single population proportion formula with a 95% confidence level, 5% margin of error, and 51% estimated level of appropriate complementary feeding practice children aged 6-23months in the study area¹¹ and by considering a non-response rate of 10%. This study was based on the random sample of ten kebeles of the forty-seven kebeles existing in the district. The total kebeles in the district were initially stratified into rural and urban (7 urban and 40 rural) areas. Then, ten (two from urban and eight from rural) were selected randomly based on Probability Proportional to Size (PPS) sampling technique and then the determined sample size was distributed proportional to total mothers of each stratum. After that, simple random sampling was used to select the required number of mother's eligible children.

Data collection methods and procedures

Data was collected by four grade twelve complete female data collectors and supervised by one BSc nurse and principal investigator who were able to speak and write local languages. Data was collected using a pre-tested structured questionnaire adapted from related studies. The adapted questionnaire was modified, contextualized to the local situation and the research objectives. Information on socio-demographic and infant and young child feeding variables of the identified eligible respondents' was assessed using a structured face-to-face interview administered questionnaire in their own respective homes. Appropriate complementary feeding for this study is when the Mother initiates complementary feeding practices at the age of 6-8months with continuous of breast feeding.²⁰

Statistical analysis

Data was double entered and cleaned in EPI data software version

3.1. The entered data was exported and analyzed with SPSS version 21. Descriptive tests like proportions mean and standard deviation was used to describe the data. Bivariate and multivariate logistic regression analyses with an odds ratio along with the 95% confidence interval were used to ascertain the association between covariates and appropriate complementary feeding practices of mothers. Hosmer-Lomeshow goodness-of-fit is used to test model fitness. Only covariates that have (P<0.2) at the bivariate level were included in the multivariate logistic regression to control for all possible confounders. For all statistical tests P-value ≤ 0.05 was considered for level of statistical significance.

Ethical considerations

Officially written ethical approval letter was obtained prior to the study. A formal letter of permission and supports was taken and submitted to concerned bodies. Then, informed consent was obtained, privacy and confidentiality was maintained for the participants. The purposes, the data collection procedures, the risks, and the benefits of the research were explained to the eligible respondents before obtaining their informed consent.

Results

Socio-demographic characteristics of study participants

A total of 606 study participants were interviewed with 95.6% response rate. The median (±SD) age of mothers was 22.0(±1.8) years. The majority of participants were Amhara (67.2%) and Orthodox (66.5%) (Table 1).

Table 1 Characteristics of mother who had children aged 6-23months in Debre Markos

Variable	Category	No	%
Mother' age	<20years	28	4.6
	20-24years	92	15.2
	25-29years	187	30.9
	30-34years	153	25.2
	>35	146	24.1
Income	Very low income	164	27.1
	Low income	154	25.4
	Middle income	137	22.6
	High income	151	24.9
	Housewife	80	13.2
Occupation	Go/NGO	2	0.3
	Student	1	0.2
	Merchant	354	58.4
	Daily laborer	18	3
	Farmer	151	24.9

Table continued...

Variable	Category	No	%
Parity	1 child	23	85.7
	2-4 children	266	85.8
	>5 children	226	85
Family size	2-Jan	14	2.3
	4-Mar	104	17.2
	>5	488	80.5
Income source	Job salary	7	1.2
	Own business	94	15.5
	Husband	455	75.1
	Remittance	28	4.6
	Family/relative support	22	3.6

Appropriate complementary feeding practice and associated factors

Among 606 interviewed mothers, about half, 350 (57.8%) of them reported they received information about appropriate complementary feeding practice and only 15% (95% CI (12.2, 18.0)) were practiced appropriate complementary feeding (Table 2). In the bivariate analysis;

literate women were three times more likely to practice appropriate complementary feeding practice than those illiterate women. Whereas women with very low family income were three times less likely to practice appropriate complementary feeding practice than those women with high family income and mother's age <20 were 1.2 times less likely to practice appropriate complementary feeding practice than those mothers aged 35 & above (Table 3).

Table 2 Appropriate complementary feeding practice of the mother of children aged 6-23 months in Debre Markos, Ethiopia March 2014

Variable	Category	No	%
Appropriate Complementary feeding information	Received	350	57.8
	Not received	256	42.2
Source of information	Health facility	483	79.7
	TBA	57	9.4
	Family	52	8.6
Appropriate Complementary feeding practice	Friends	14	2.3
	No	515	85
	Yes	91	15
Reason for starting before 6 months	Unsatisfactory growth	290	47.8
	Breast milk insufficient	215	35.4
	Poor quality breast milk	91	15.1
	Common usage	10	1.6
Fed the child during the last 24 hours	Twice	37	6.1
	Three times	205	33.8
	Four times	310	51.2
	More than four times	54	8.9

Table continued..

Variable	Category	No	%
Child was given fluid using	Bottle	153	25.2
	Spoon	93	15.3
	Glass	294	48.5
	By Hands	59	9.7
	Others	7	1.2
	Purchased	409	67.5
Source of food in the family	Own production	117	19.3
	Food aid	66	10.9
	Shared production	5	0.8
	Others	9	1.5
Main staple food in the family	Rice	459	75.7
	Wheat	67	11.1
	Sorghum	76	12.5
	Animal product	2	0.3
	Others	2	0.3

Table 3 Factors associated with appropriate complementary feeding of mothers of children aged 6-23months in Debre Markos, Ethiopia, March 2014

Variable	Category	Appropriate complementary feeding practice		COR 95% CI	AOR 95% CI
		Yes	No		
Educational	Illiterate	71(19.8%)	288(80.2%)	1	1
Status	Literate	227(91.9%)	20(8.1%)	2.798(1.65, 4.74)*	3.35(1.93,5.82)*
Family income	Very low income	32(19.5%)	132(80.5%)	2.808(1.388,5.68)*	3.071(1.43,6.61)*
	Low income	30(19.5%)	124(81.2%)	2.802(1.375,5.71)*	3.325(1.54,7.16)*
	Middle income	120(87.6%)	17(12.4%)	1.641(0.75,3.57)	1.616(0.72,3.61)
	High income	139(92.1%)	12(7.9%)	1	1
Family size	1,2	2(14.3%)	12(85.7%)	0.979(0.22,4.47)	1.373(0.27,6.9)
	3,4	18(17.3%)	86(82.7%)	1.229(0.69,2.17)	1.397(0.67,2.93)
	5 or more	71(14.5%)	417(85.5%)	1	1
Parity	1	7(23.3%)	23(76.7%)	1.72(0.69,4.27)	1.068(0.30,3.76)
	2,4	44(14.2%)	266(85.8%)	0.935(0.59,1.49)	0.807(0.47,1.37)
	5 or more	40(15%)	226(85%)	1	1
	< 20	2(28.6%)	26(71.4%)	1.20(0.23,1.6)*	2.1(1.64,6.21)*

Table continued...

Variable	Category	Appropriate complementary feeding practice		COR 95% CI	AOR 95% CI
		Yes	No		
Mother's age	20-24	18(19.6%)	74(80.4%)	0.497(0.2,1.2)	1.124(0.52,2.43)
	25-29	156(83.4%)	31(16.6%)	0.252(0.09,0.68)*	0.997(0.51,1.93)
	30-34	14(9.2%)	139(90.8%)	0.397(0.15,1.02)	0.539(0.25,1.15)
	35 and above	20(13.7%)	126(86.3%)		

Discussion

The study showed a low level of appropriate complementary feeding practice. Educational status, appropriate mother's age family income remained the main significant factors associated with complementary feeding practice. The level of appropriate complementary feeding practice in this study was higher than finding of the Tigray region which is 10.75%.²¹ The level of appropriate complementary feeding practice in this study also much lower than findings from other different countries, i.e., 23% in Bangladesh^{22,23} and 87.3% in India.²⁴ The probable reason for the above difference in rates could be variation in information disseminations on child feeding practice, age at first birth, empowering women and household income generation schemes. This finding evidenced that, those illiterate mothers were three times less likely to practice appropriate complementary feeding compared to literate mothers. This was in line with the other studies.^{21,23,24} This may be due to education improving mothers knowledge and ability on decision making about their own children health and nutritional needs. The study also revealed that very low income class mothers were about three less likely to start complementary feeding at the appropriate age than those mother who belongs to high family income. This was in line to other studies.^{24,25} Compared to mother's age 35 and above, mother's age <20 were less likely practiced appropriate complementary feeding. This was in line with other study.²¹ The practices of early marriage, which was a case in the study area, limit the education and the women to begin childbearing at teenage whom bio psychosocially immature which in turn trigger the occurrence of inappropriate IYCF practices.

Contrary to other studies, family size and parity was found to have no significant association with appropriate complimentary feeding practice in our study. The finding of a lack of association could reflect effect modification on the basis of settings or cultural contexts. Major strengths of this study were the community based approach and random selection of the study households or kebeles. This may made generalization possible to the study communities as an attempt was made to identify randomized households and women from the study communities. The study couldn't establish firm causal links though association was observed due to its cross - sectional design. As study was based on the women's self-reported feeding practice, there was the cultural unacceptability and fear of disclosing the issue and this may have resulted in under reporting.

Conclusion

Appropriate complementary feeding practice among mothers who have children aged 6-23months in Debre Markos district was relatively low. Mother's education, family income, and mother's age was significantly associated with appropriate complementary

feeding practice. So the district health office and other concerned bodies should put effort towards IYCF, postponing age at first birth, empowering women and household income improving projects. Health professionals who are involved in maternal and child health should provide nutrition education giving emphasis towards appropriate complementary feeding practice. Information on promoting of appropriate complementary feeding practice should also participate relevant actor and decision-makers.

Authors' contribution

All authors, Belete Yimer, Awraris Wolde, and Muleta Mekonnen, conceptualized the research question, monitored and managed fieldwork, analyzed and interpreted the findings, and written the paper.

Acknowledgments

The authors are grateful to the women who sacrificed their time. The authors also thank the HEWs working in the selected kebeles of the district for their necessary support and the data collectors for their responsible data collection. The authors got enabling cooperation from Debre Markos District Administration, District Health Office, and the Administrations of the Selected Kebeles during the fieldwork.

Conflicts of interest

The authors did not receive payments, funding, or salary from any organization in relation to the work and publication of this paper in the past five years and there will also be no financial support to be received in the future. There is not any organization affected positively or negatively by the publication of this paper. There are not any competing interests related with patents of the content of the paper. The authors also declare that there are not any other financial or nonfinancial competing interests.

References

1. Maryland, Disha AD, Rawat R, et al. Infant And Young Child Feeding (IYCF) Practices In Ethiopia And Zambia And Their Association With Child Nutrition: Analysis Of Demographic And Health Survey Data. *African journal of food agriculture, nutrition and development*. 2012;12(2).
2. UNICEF and WHO. *Global Strategy for Infant and Young Child Feeding*. Geneva, Switzerland; 2003. 30p.
3. WHO. *World Health Organization complementary feeding practice fact sheet*. 2014.
4. UNICEF. Statistics on Breastfeeding in Ethiopia. *Basic Indicators on Nutrition, Health, HIV/AIDS, Education, Demographic Indicators, Economic Indicators, Women, Child Protection*. 2009.

5. Quinn V, Guyon A, Claudine M. Successfully Scaling Up Exclusive Breastfeeding: Lessons Learned from Madagascar by the Child Health and Nutrition Research Initiative. *CHNRI*. 2014;4(7).
6. Bernadette Daelmans, Jose Martines, Randa Saade. Special Issue Base World Health Organization Expert Consultation on Complementary Feeding. *Food and Nutrition Bulletin*. 2003;24(1):3–141.
7. Alive Thrive. 2014. Org. <http://aliveandthrive.org/technical-focus/complementary-feeding/#sthash.IJxnqxXD.dpuf>
8. Martorell R, Kettel Khan L, Schroeder DG. Reversibility of stunting: Epidemiological findings in children from developing countries. *Eur j clinnutr*. 1994;48:45–57.
9. Bhutta ZA, Ahmed T, Black RE, et al. What works? Interventions for maternal and child undernutrition and survival. *Maternal and child under nutrition*. 2008;339:417–440.
10. Pelto GH, Levitt E, Thairu T. Improving feeding practices: Current patterns, common constraints, and the design of interventions. *Division of Nutritional Sciences*. 2003;24(1):45–82.
11. Central Statistical Authority, ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Ethiopia and Calverton; 2012.
12. WHO UNICEF. Strengthening action to improve feeding of infants and young children 6-23months of age in nutrition and child health programmes. *WHO*. 2008. 74p.
13. Food and Nutrition Technical Assistance Project (FANTA). *Working Group on Infant and Young Child Feeding Indicators*. Calverton, Maryland, USA: ORC Macro; 2006.
14. WHO. Infant and young child feeding (IYCF) Model. *Model Chapter for textbooks for medical students and allied health professionals*. 2009:99.
15. WHO, UNICEF, AEDUSAID. *Africa's Health 2010, Learning from Large Scale Community-based Programsto Improve Breastfeeding Practices*. Department of Nutrition for Health and Development, Geneva Switzerland; 2011.
16. WHO Geneva. World Health Organization. www.who.int/child_adolescent_health/new_publications-health/gc/who_cfh_cah_02.3.pdf global forum for child health research: a foundation for improving child health genevajun. 2011.
17. Obeng S. *Ethnicity and Infant Mortality in Sub-Saharan Africa: the Case of Ghana*. Population Studies Center, University of Western Ontario, Canada; 2002;16(10).
18. Girma W, Genebo T. *Determinants of Nutritional Status of Women and Children in Ethiopia*. 2002.
19. Foo LL, Quek SJ, Lim MT, et al. Breast feeding prevalence and practices among Singaporean Chinese, Malay and Indian mothers. *Health Promotion International*. 2005;20(3):229–237.
20. Indicators for assessing infant and young child feeding practices part 1definitions conclusions of a consensus meeting held 6–8 November 2007 in Washington, DC, USA; *WHO*. 2007. 26p.
21. Mekbib M, Shumey A, Ferede S, et al. Magnitude and factors associated with appropriate complementary feeding among Mothers having children 6-23months-of-age in northern Ethiopia. *Journal of Food and Nutrition Sciences*. 2014;2(2):36–42.
22. Kabir I, Khanam M, Kingsley EA, et al. Determinants of inappropriate complementary feedingpractices in infant and young children in Bangladesh. *Journal of Nutritional Health*. 2007;8(1):11–27.
23. Hazir T, Senarath U, Agho K, et al. Determinants of inappropriate timing of introducing solid, semi-solid or soft food to infants in Pakistan: Secondary data analysis of Demographic and Health Survey 2006–2007. *Matern Child Nutr*. 2012;1:78–88.
24. Rao S1, Swathi PM, Unnikrishnan B1, et al. Study of complementary feeding practices among Mothers of children aged six months to two years – a study from coastal south India. *Australasian medical journal AMJ*. 2011;4(5):252–257.
25. Kumar RK, Houstren R, Harvey H. *Nepal nutrition assessment and gap analysis final report*. 2009.