

Full Length Research Paper

Appropriate complementary feeding practice among mothers of 6-23 months old children in Kedida Gamela district, south Ethiopia: A community based cross-sectional study

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Introduction of complementary foods to infants is a common practice. However, according to recommended infant and young child feeding protocol the timing of introduction, frequency of feeding and the quality of diet are not appropriate. Thus, the aim of this study is to determine the magnitude and identify the predictors of appropriate complementary feeding practice among mothers of children 6-23 months of age in Kedida Gamela district, southern Ethiopia. A community based cross sectional study was conducted among mothers of children aged 6-23 months on March 2017. A total of 777 randomly selected mothers/caregivers paired with their children aged 6-23 months were interviewed by trained nurses. Data were entered, cleaned and analyzed by using SPSS version 20. Descriptive analyses were done for main variables. Exposures with p-value less than 0.25 on bivariate analysis were taken for multivariate analysis. Statistical significance was declared at $p < 0.05$ and adjusted odds ratio (AOR) with 95% confidence interval (CI) was reported. The proportion of appropriate complementary feeding was 21% in the study area. Maternal age 18-24 years [AOR=4.01, 95% CI (1.78, 9.04)], mothers with children 6-11 months of age [AOR=2.88, 95% CI (1.68, 4.94)] and 12-23 months of age [AOR=2.67, 95% CI (1.61, 4.45)], mothers who attended postnatal care follow up [AOR=2.14, 95% CI (1.14, 4.02)], and living in a food secure household [AOR=2.23, 95% CI (1.30, 3.82)] were the factors associated with appropriate complementary feeding practice. Mothers in the age range of 18-24 years, mothers having children of 6-11 months and 12-23 months of age, attending postnatal care follow up and living in a food secure household were the predictors of appropriate complementary feeding practice. Mothers should be encouraged to attend postnatal care follow up and income generating activity should be made to assure household food security status to prevent economical vulnerability of households.

Key words: Complementary feeding, children, 6-23 months.

INTRODUCTION

Appropriate infant and young child feeding (IYCF) is important for the survival, optimal growth and

development of children (UNICEF, 1990). Globally, malnutrition has been responsible for 60% of the 10.9 million deaths annually among children under-five, of which one third is associated with inappropriate feeding practice during infancy. Majority of these under five child deaths occur in the first year of life, even if a great impact of intervention can be seen among them (WHO, 2003). Feeding appropriate, adequate and safe complementary foods starting from the age of 6 months leads to better health and growth outcomes (UNICEF, 2012). It has the potential to prevent 6% of all under-five deaths especially in the developing world (Jones et al., 2003).

Infants are particularly vulnerable to malnutrition and infection during the transition period from exclusive breast feeding to complementary feeding (Federal Ministry of Health FHDE, 2004). Rates of malnutrition increase through the age of 4 to 12 months, the age where infants start complementary foods in addition to breast milk (Bhandari et al., 2003). Complementary feeding practices are far from acceptable rate. Even though introduction of complementary foods is a common practice, the exact timing of introduction, the frequency of feeding and the quality of diet are not appropriate according to recommended infant and young child feeding protocol (UNICEF, 2012).

In a study conducted in northwest Ethiopia, 56.4% of the mothers introduced complementary foods at six months and the minimum dietary diversity was 8.5% (Gessese et al., 2014). Another study in northern Ethiopia reported that 10.5% of the mothers/caregivers appropriately practiced complementary feeding (Aemro et al., 2013). A secondary analysis of Ethiopian Demographic and Health Survey (EDHS) found that children with adequate dietary diversity were only 10.8% (Mekbib et al., 2014). In a study conducted in Tanzania, the minimum dietary diversity and the minimum meal frequency were 38.6 and 38.2% respectively (Victor et al., 2014). The minimum dietary diversity was 71, 42, 34 and 15% in Sri Lanka, Bangladesh, Nepal and India respectively (Senarath et al., 2012).

A study conducted in India showed that maternal and paternal education was significantly associated with the knowledge of correct timing of complementary feeding (Aggarwal et al., 2008). A qualitative study in Argentina showed that food insecurity, maternal employment, family pressure and financial worries affected child feeding practices (Lindsay et al., 2012). Another study in rural Bangladesh reported that better household food security status was associated with better infant feeding practice (Saha et al., 2008).

Even though appropriate infant and young child feeding practice remains poor in Ethiopia, the predictors vary from locality to locality. Therefore, this study aimed to

assess the level of appropriate complementary feeding practice and identify its predictors among mothers of 6-23 months old children in Kedida Gamela district, south Ethiopia.

METHODS

Study design and setting

A community based cross sectional study was conducted among mothers of children aged 6-23 months on March 2017. Kedida Gamela is one of the districts in southern Ethiopia. The district is administrative structured into 18 kebeles (lower administrative units) and had a projected total population of 110,971 in 2017. The estimated number of infants and young children aged 6-23 months in the district is 3,895 (Kedida Gamela woreda health office, 2015). Agriculture is the main source of livelihood in the district and kocho (prepared from false banana), kita (mainly prepared from maize) are common foods consumed along with cooked cabbage. Cereals, and roots and tubers are also common foods in the area.

Population and sampling

Selected mothers/caregivers paired with children aged 6-23 months were the study population. A sample size of 733 was calculated with the following assumptions: 95% confidence level, 5% margin of error, an expected prevalence of 40.5% (Gessese et al., 2014), design effect of 2 and non-response rate of 5%. From the 18 kebeles, 6 kebeles were selected randomly and the total sample size was proportionally allocated to each kebele. List of households with children 6-23 months of age was developed and the study participants were selected using simple random sampling. In the case where two or more eligible children were found in the same household, one child was selected randomly.

Variables

Outcome variable

Appropriate complementary feeding is when the mother/caregiver responds correctly for all the three indicators of complementary feeding practice which are: timely introduction of complementary feeding, minimum dietary diversity & minimum meal frequency.

Exposure variables

Socio-demographic and household food security status related variables: Maternal age, marital status, education, occupation and income, paternal education, occupation and household food security status.

Obstetric and health seeking behavior related factors: Parity, antenatal care (ANC) follow up, place of delivery, postnatal care attendance and participation on health development army health sessions, listen to radio programs.

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Child characteristics: Age and sex.

Operational definitions

Appropriate complementary feeding: This is when the mother/caregiver responds correctly for all the three indicators of complementary feeding practice which are; timely introduction of complementary feeding, minimum dietary diversity and minimum meal frequency.

Inappropriate complementary feeding: Among the three indicators (timely introduction, minimum dietary diversity and minimum meal frequency), if at least one indicator was not fulfilled.

Data collection

Diploma holder nurses collected the data and they were trained for two days about the aim of the study and the procedures to be followed. Questions on dietary diversity and meal frequency were adopted from WHO standardized questionnaire for infant and young child feeding (IYCF) practices. Household food insecurity access scale (HFIAS) questions were used to assess the food security status of households. All questionnaires were translated from English to local language and pre-tested on 5% of the calculated sample size in a kebele which is not included in the actual study.

Operational definitions

Appropriate complementary feeding: This is when the mother/caregiver responds correctly for all the three indicators of complementary feeding practice which are; timely introduction of complementary feeding, minimum dietary diversity and minimum meal frequency.

Timely introduction of solid, semi-solid or soft foods: Proportion of infants 6–8 months of age who started complementary foods (solid, semi-solid or soft foods) at sixth months of age (WHO, 2008).

Minimum dietary diversity: Proportion of children 6–23 months of age who received foods from four or more food groups of the seven food groups during the previous day (WHO, 2008).

Minimum meal frequency: Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid or soft foods the minimum number of times or more in the previous day (WHO, 2008).

Statistical analysis

Data were entered, cleaned and analyzed by using SPSS version 20. Descriptive analyses were done for main variables. Binary logistic analysis was done to selected exposure variables with crude association to the outcome variable. Exposures with p-value less than 0.25 were taken for multivariate analysis. Finally, multivariate regression analysis was done to control for confounders and identify predictors. Statistical significance was declared at a $p < 0.05$ and adjusted odds ratio (AOR) with 95% confidence interval (CI) was reported.

Ethics consideration

The study proposal got ethical approval from Wolaita Sodo

University ethical review committee. The committee justified for verbal informed consent since uneducated or less educated caretakers would face difficulty in reading and comprehending the consent form. Thus informed verbal consent was obtained from the study participants.

RESULTS

Socio-demographic and household food security status related characteristics

In this study the response rate was 94.3%. The mean age of the mothers was 27 ± 5 years. Majority of the mothers 721(98.4%) were married, 550 (75%) were protestant, 689(94%) were housewives and 273(37.2%) can read and write. Husbands of 440(60%) mothers were farmers and 244 (33.3%) husbands can read and write. Four hundred and forty eight (61.1%) of the families earn less than 1000 ETB. Majority 521(71%) of the mothers were from food secure households as presented in Table 1.

Obstetric and health service related variables

More than half 425(58%) of the mothers had parity of 2-4, more than two third (69.7%) of the mothers gave birth at health center and almost all mothers 729(99.5%) had ANC follow up. Five hundred and ninety six (81.5%) mothers followed postnatal care (PNC), 651(88.8%) has attended health development army meetings regularly, 377(51.4%) follow radio programs sometimes as presented in Table 2.

Child characteristics and feeding practices

Half of the children 367(50.1%) were females, 199 (27.1%) of the children were under age group of 6-11 months and the mean age of children was 14 ± 5 months. All of the mothers 733(100%) ever breastfed their children and 91(87.5%) weaned breastfeeding after 12 months of age. More than two third 509(69.4%) of the children were introduced to complementary food at 6 months of age, 552(75.3%) used cup with spoon to feed their children and Six hundred twenty seven (87.8%) of the mothers included snacks between meals for their children as seen in Table 2.

Among 92 breastfed infants aged 6-8 months, 91(98.9%) had two or more meals daily. From 518 breastfed children in the age group of 9-23 months, 307(59.3%) had three or more meals daily. Out of 104 non-breastfed children between 6-23 months of age, 16(15.4%) had four or more meals daily. In this study, 414(56.5%) of the children met minimum meal frequency and 345(47.1%) met minimum dietary diversity as shown in Table 3.

Table 1. Socio-demographic characteristics of mothers and fathers, and household food security status of the study participants in Kedida Gamela district, Southern Ethiopia, 2017.

Variable (n=733)	Frequency	Percent	
Maternal age	18-24	189	25.8
	25-32	438	59.8
	>32	106	14.5
Maternal marital status	Married	721	98.1
	Divorced	2	0.3
	Widowed	10	1.4
Maternal occupation	House wife	679	92.6
	Daily laborer/merchant	39	5.3
	Employee	15	2
Maternal education	Illiterate	206	28.1
	Can Read and write	273	37.2
	Attended 1-6 grades	135	18.4
	Attended 7-12 grades	109	14.9
	College and above	10	1.4
Paternal occupation	Farmer	440	60
	Merchant	140	19.1
	Employee	60	8.2
	Daily laborer	81	11.2
Paternal educational status	Illiterate	76	10.4
	Read and write	244	33.3
	Six complete	189	25.8
	7-12 complete	188	25.6
	College/university	24	3.3
Household monthly income	< = 999	448	61.1
	1000-1999 ETB	211	28.8
	2000-2999 ETB	50	6.8
	3000-3999 ETB	15	2.0
	> = 4000	9	1.2
Household food security status	Food secure	521	71.1
	Food insecure	218	28.9

Proportion and factors associated with complementary feeding practices

The proportion of appropriate complementary feeding practices was 21%. Mothers in the age group of 18-24 years were 4 times more likely to give appropriate complementary feeding to their children than older mothers [AOR=4.01, 95% CI (1.78, 9.04)]. Mothers who had children of 6-11 months old were 2.9 times more likely to give appropriate complementary feeding compared with mothers of children with age of 18-23 months old [AOR=2.88, 95% CI (1.68, 4.94)]. Similarly, mothers who had children of 12-17 months old were 2.7

times more likely to give appropriate complementary feeding to their children as compared to those mothers who had children in the age group of 18-23 months [AOR=2.67, 95% CI (1.61, 4.45)]. On the other hand, mothers with postnatal care follow-up were twice more likely to feed their children complementary feeding appropriately than their counterparts [AOR=2.14, 95% CI (1.14, 4.02)].

Mothers from food secured households were 2.23 times more likely to give appropriate complementary feeding to their children than mothers from food insecure households [AOR=2.23, 95% CI (1.30, 3.82)] as presented in Table 4.

Table 2. Obstetric, health service related and child feeding practice related characteristics in Kedida Gamela district, Southern Ethiopia, 2017.

Variable (n=733)		Frequency	Percent
Parity	1	83	11.3
	2-4	425	58
	5-6	182	24.8
	7 and above	43	5.9
Place of delivery	Hospital	203	27.7
	Health center	511	69.7
	Health post	7	1
	Home	12	1.6
ANC follow-up	Yes	729	99.5
	No	4	0.5
PNC follow-up	Yes	596	81.5
	No	135	18.5
Attend HAD meeting	Yes	651	88.8
	No	82	11.2
Follow Radio programs	Always	145	19.8
	Sometimes	377	51.4
	Never	211	28.8
Sex of the children	Male	366	49.9
	Female	367	50.1
Age of the children	6-11 months	199	27.1
	12-17 months	276	37.7
	18-23 months	258	35.2
Breast feeding practice	Ever breastfed	733	100
	Still breastfed	629	85.8
Age at which the child stopped breast feeding	< months	2	1.9
	6-12 months	11	10.6
	>12 months	91	87.5
Complementary feeding practice	Not started	19	2.6
	Before 6 months	7	1
	At 6 months	509	69.4
	After 6 months	198	27
Use separate container to feed the child	Yes	667	93.4
	No	47	6.6
Type of container used	Bottle	70	9.5
	Cup with spoon	552	75.3
	Other	92	12.6
Include snacks between meals	Yes	627	87.8
	No	87	12.2
Frequency of complementary feeding for breast fed children	Age 6-8 months (2 times)	91/92	98.9
	Age 9-23 months (3 times)	307/518	59.3
Frequency of complementary feeding for breast fed children	Age 6-23 months (4 times)	16/104	15.4

Table 3. Type of food group given to children aged 6-23 months in Kedida Gamela district, Southern Ethiopia, 2017.

Food group	Age of child in months					
	6-11 months (n=180)		12-17 months (n=276)		18-23 months (n=258)	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Grain, root and nut	100	0	96.4	3.6	94.6	5.4
Legume and nut	65	35	65.6	34.4	65.5	34.5
Dairy product	61.1	38.9	65.5	34.4	61.6	38.4
Flesh food	3.3	96.7	4	96	3.9	96.1
Egg	38.3	61.7	4.4	95.6	23.4	76.6
Vitamin A rich fruit and vegetable	60	40	70.6	29.4	64.3	35.7
Other fruit and vegetable	28.9	71.1	42.4	57.6	29	71

Table 4. Factors associated with appropriate complementary feeding practice in Kedida Gamela district, South Ethiopia, 2017.

Variable	Appropriate N (%)	Inappropriate N (%)	COR(95% CI)	AOR(95%CI)	
Maternal age	18-24	72(38.1)	117(61.9)	5.31(2.67,10.59)	4.01(1.78,9.04)**
	25-32	72(16.4)	366(83.6)	1.69(0.87,3.33)	1.47(0.71,3.06)
	>32	11(10.4)	95(89.6)	1.00	1.00
Maternal occupation	House wife	140(20.7)	539(79.3)	1.00	1.00
	Daily laborer/merchant	7(18)	32(82)	0.84(0.36,1.95)	0.75(0.29,1.93)
	Employee	8(53.4)	7(46.7)	4.40(1.57,12.34)	2.07(0.50,8.54)
Monthly income	≤999	72(16.1)	376(83.9)	0.24(0.06,0.91)	0.72(0.11,4.57)
	1000-1999	58(27.5)	153(72.5)	0.47(0.12,1.83)	1.04(0.16,6.56)
	2000-2999	18(36)	32(64)	0.70(0.17,2.96)	0.95(0.142,6.44)
	3000-3999	3(20)	12(80)	0.31(0.05,1.94)	0.59(0.07,5.11)
	≥4000	4(44.5)	5(55.5)	1.00	1.00
Family size	2-3	31(37.4)	52(62.6)	3.09(1.75,5.45)	0.55(0.21,1.43)
	4-6	87(20.7)	334(79.3)	1.35(0.88,2.06)	0.66(0.07,5.99)
	7 and above	37(16.2)	192(83.8)	1.00	1.00
Parity	1	31(37.4)	52(62.6)	1.73(0.76,3.92)	1.07(0.09,13.14)
	2-4	88(20.7)	337(79.3)	0.76(0.37,1.57)	0.69(0.07,7.02)
	5-6	25(13.8)	157(86.2)	0.46(0.21,1.04)	0.44(0.18,1.06)
	7 and above	11(25.6)	32(74.4)	1.00	1.00
Child age in months	6-11	54(27.2)	145(72.8)	2.94(1.79,4.83)	2.88(1.68,4.94)**
	12-17	72(26)	204(74)	2.78(1.74-4.46)	2.67(1.61,4.45)**
	18-23	29(11.2)	229(88.8)	1.00	1.00
Postnatal care follow up	Yes	140(23.5)	456(76.5)	2.49(1.41,4.41)	2.14(1.14,4.02)**
	No	15(11)	122(89)	1.00	1.00
Attend HAD meetings	Yes	145(22.3)	506(77.7)	2.06(1.04,4.10)	2.04(0.93,4.46)
	No	10(12.2)	72(87.8)	1.00	1.00
Follow radio programs	Always	50(34.5)	95(65.5)	2.39(1.47,3.91)	1.43(0.79,2.59)
	Sometimes	67(17.8)	310(82.2)	0.98(0.63,1.53)	0.84(0.52,1.36)
	Never	38(18)	173(82)	1.00	1.00
HH food security status	Food secure	134(25.8)	387(74.2)	3.15(1.93,5.15)	2.23(1.30,3.82)**
	Food insecure	21(9.9)	191(90.1)	1.00	1.00

DISCUSSION

In this study, the overall proportion of appropriate complementary feeding was 21%, which is comparable with other studies in Sri Lanka, Bangladesh, Nepal and Tanzania (Victor et al., 2014; Senarath et al., 2012). However, it was higher than findings from Ghana (14.3%) and northern Ethiopia (10.7%). This difference might be due to the difference in the socioeconomic variations among the communities.

Unlike many other study findings, mothers within the age group of 18-24 years were 4 times more likely to feed their children appropriately than mothers who were older than 32 years. The possible explanation might be in the study area younger mothers usually have better educational status than their counterparts. Moreover, younger mother may have better postnatal follow-up.

Children within the age group of 6-11 months were about 2.9 times more likely to be appropriately fed as compared to children in the age group 18-23 months. Similarly, children within the age group of 12-17 months were 2.7 times more likely to be appropriately fed as compared to children in the age group 18-23 months. This finding is in congruous with other findings in Zambia, Nepal, Tanzania, Ghana and Ethiopia (Mekbib et al., 2014; Victor et al., 2014; Senarath et al., 2012; Aemro et al., 2013). This might be because in the study area when children grow older they join their family diet.

Mothers who attended postnatal care service were 2.14 times more likely to practice appropriate complementary feeding than their counterparts. Similar finding was reported in Sri Lanka, India, Tanzania and elsewhere in Ethiopia (Gessese et al., 2014; Mekbib et al., 2014; Senarath et al., 2012). This might be due to the guidance and counseling service that mothers received from health workers during their postnatal visits which may also include advice about best complementary feeding practices and child care.

Mothers from food secured households were 2.23 times more likely to give appropriate complementary feeding to their children than those mothers who were from food insecure households. This result was consistent with findings in Argentina and rural Bangladesh (Lindsay et al., 2012; Saha et al., 2008) where food secured households had better infant and young children feeding practices. This might be due to the high probability of a food secured households to ensure dietary diversity and meal frequency.

LIMITATIONS OF THE STUDY

Information on income status of the study participants may not be reliable since measuring the exact amount of income is difficult for those who are not employed in monthly basis. The dietary data does not take account of the quality and amount of food provided.

Conclusion

A lower proportion of mothers practiced appropriate complementary feeding in Kedida Gamela district. Appropriate complementary feeding was associated with maternal age of 18-24 years, children within the age group of 6-11 months, attending postnatal care service and household food security status. Mothers should be encouraged to attend postnatal care services and maternal health services outlets should be used to transmit child feeding information. Income generating activities should be commenced to ensure household food security status for the economically disadvantaged households.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Aemro M, Mesele M, Birhanu Z, Atenafu A (2013). Dietary diversity and meal frequency practices among infant and young children aged 6–23 months in Ethiopia: a secondary analysis of Ethiopian demographic and health survey 2011. *Journal of nutrition and metabolism* 2013.
- Aggarwal A, Verma S, Faridi MMA (2008). Complementary feeding-reasons for inappropriateness in timing, quantity and consistency. *The Indian Journal of Pediatrics* 75(1):49.
- Bhandari N, Bahl R, Mazumdar S, Martines J, Black RE, Bhan MK, other members of the Infant Feeding Study Group (2003). Effect of community-based promotion of exclusive breast feeding on diarrhoeal illness and growth: a cluster randomised controlled trial. *The Lancet* 361:1418-23.
- Black RE, Morris SS, Bryce J (2003). Where and why are 10 million children dying every year?. *The Lancet* 361(9376):2226-2234..
- Federal Ministry of Health (FHDE) (2004). National Strategy for Infant and Young Child Feeding. Ethiopia.
- Gessese D, Bolka H, Alemu AA, Tegabu D (2014). The practice of complementary feeding and associated factors among mothers of children 6-23 months of age in Enemay district, Northwest Ethiopia. *Nutrition and Food Science* 44(3):230-240.
- Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, Bellagio Child Survival Study Group (2003). How many child deaths can we prevent this year?. *The Lancet* 362(9377):65-71.
- Lindsay AC, Ferarro M, Franchello A, La Barrera RD, Machado MMT, Pfeiffer ME, Peterson KE (2012). Child feeding practices and household food insecurity among low-income mothers in Buenos Aires, Argentina. *Ciencia and saude coletiva* 17:661-669.
- Mekbib E, Shumey A, Ferede S, Haile F (2014). Magnitude and factors associated with appropriate complementary feeding among mothers having children 6–23 months-of-age in northern Ethiopia; a community-based cross-sectional study. *Journal of Food and Nutrition Sciences* 2(2):36.
- Saha KK, Frongillo EA, Alam DS, Arifeen SE, Persson LA, Rasmussen KM (2008). Household food security is associated with infant feeding practices in rural Bangladesh. *The Journal of nutrition* 138(7):1383-1390.
- Senarath U, Agho KE, Akram DES, Godakandage SS, Hazir T, Jayawickrama H, Joshi N, Kabir I, Khanam M, Patel A, Pusdekar Y (2012). Comparisons of complementary feeding indicators and associated factors in children aged 6–23 months across five South Asian countries. *Maternal & child nutrition* 8:89-106.
- UNICEF (2012). Infant and young child feeding nutrition section

program. New York.
Unicef (1990). Strategy for improved nutrition of children and women in developing countries. Unicef.
Victor R, Baines SK, Agho KE, Dibley MJ (2014). Factors associated with inappropriate complementary feeding practices among children aged 6–23 months in Tanzania. *Maternal and child nutrition* 10(4):545-561.

World Health Organization (WHO) (2003). Global strategy for infant and young child feeding GenevaSwitzerland.