

## Recommended Infant Feeding Practices and Associated Factors among HIV Positive Mothers in Selected Health Facilities of South Ethiopia

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### ABSTRACT

**Background:** Mother-to-child transmission is the major route of HIV transmission in infants. About one third of children infected are believed to be vertically during breast-feeding. Infant feeding in the context of HIV is complex. As a result, HIV positive women are confused about infant feeding methods and mixed feeding continued to be widespread.

**Objective:** To assess magnitude of recommended infant feeding practice and its associated factors among HIV positive mothers in selected health facilities of South Ethiopia.

**Methods:** A facility based cross-sectional study was conducted in randomly selected 341 HIV infected mothers with children 6 to 24 months of age in the study. A structured and pretested questionnaire was used for data collection. Data was entered and cleaned in EpiData 3.1 and exported to SPSS version 20 for analysis. Binary and multivariate logistic regressions were done and odds ratios with 95% confidence intervals were calculated to identify associated factors.

**Results:** This study shows about 290 (85%) of mothers practiced recommended infant feeding. Significantly high number of mothers had practiced mixed feeding 51 (15%). In multivariate analysis mothers attending primary school AOR=3.9 (1.077-14.175), counseled and supported by health workers to choose recommended infant feeding practice AOR=4.44 (1.108-17.814), which was significantly associated with recommended infant feeding practice.

**Conclusion:** In this study recommended infant feeding practice was leading proportion of feeding practice among HIV positive mothers which is recommended by WHO as well as by Ethiopian ministry of health. Also, significantly high proportion of mothers had practiced mixed breast-feeding; this is an undesirable practice in infant feeding in the first 6 months of age. More extensive and comprehensive approach of infant feeding counseling should be put in place in order to increase recommended infant feeding practice by HIV positive mothers. Educating mothers, encouraging and supporting mothers to choose recommended infant feeding.

**Keywords:** Recommended infants feeding practice; EBF; HIV positive mothers; Children

## INTRODUCTION

### Background of the study

Globally, 1.17 million children aged less than 14 years were living with HIV of which 54% were on Antiretroviral Therapy (ART) in the year 2018. In the same year, 160,000 were newly infected mainly through mother to child transmission. Mother-to-Child

Transmission (MTCT) of HIV is source of infection in infants and accounts 90% of pediatrics HIV infection. It can occur at any point, in utero, at the time of delivery or during breastfeeding. In the absence of intervention, such as the use of ART, the probability that the virus pass from mother to child is 15%-45%. This rate could be reduced to below 5% with appropriate intervention. The pooled prevalence of mother to child transmission of HIV was 9.93% in Ethiopia [1].

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Breast-feeding is universal and socio-culturally acceptable method of child feeding. It is nutritionally balanced and provides immunity against diseases and thus early initiation of breast-feeding is highly advisable. However, breast milk from a woman with HIV can transmit the infection to her newborn. On the other hand, in developing countries due to the risk of death from causes other than HIV such as diarrhea and pneumonia, breast-feeding is assumed as better option despite there is no conclusive statement on this. Hence, infant feeding in the context of HIV is complex and HIV positive mothers are confused about feeding methods and mixed feeding continued to be widespread. In Ethiopia, the pooled prevalence of exclusive breastfeeding and mixed feeding practice among HIV positive mothers were 63.4% and 23.1% respectively [2].

The World Health Organization (WHO) recommends that HIV-infected women on lifelong Antiretroviral (ARVs) for the Prevention of Mother-to-Child Transmission (PMTCT option B+) exclusively breastfeed for six months and continue breastfeeding until 12 months. The recommendation further state that HIV infected mothers should receive counseling on the risks and benefits of different infant feeding options and be given guidance and support to choose the most appropriate option for their situation. Therefore there is need to determine magnitude and identify associated factors of recommended infant feeding practice among HIV positive mothers in selected zones of southern Ethiopia where such study is not well documented [3].

## MATERIALS AND METHODS

### Study area

The study was conducted in four (Kembata Tembaro, Wolaita, Hadiya and Gurage) zones of Southern Ethiopia. The four zones are geographically adjacent to each or one another, found in the northeastern part of the southern region in Ethiopia. Kembata Tembaro zone is located 306 km far from Addis Ababa in the southwest direction. At the time of the study, 610 HIV positive women were on ART of which 126 women have children less than two years old. Wolaita zone located at 325 kms to the southwest of Addis Ababa and 160 kms from Hawassa, the regional capital city. It had 1840 HIV positive women who were on ART among these 185 women had children less than two years old. Hadiya zone is located 230 kms from the national capital Addis Ababa, 210 kms from the regional capital Hawassa. A total of 1695 HIV positive woman were on ART of which 148 women had children less than two years old. Gurage zone is located 156 kms south west of Addis Ababa along Jimma road and had 205 HIV positive women who were on ART among these 145 women had children less than two years old [4].

### Study period

This study was conducted from January 01/2018 to February 28/2018.

### Study design

A facility based cross sectional study was employed.

### Source population and study population

All HIV positive mothers who had a child age 6 to 24 months in selected health facilities during the study period were the source population. HIV positive mothers having children 6 to 24 months old who visited ART and PMTCT in selected health facilities during data collection period were the study population [5].

### Inclusion and exclusion criteria

HIV positive mothers with children 6 to 24 months and visiting health facilities were included whereas mothers who were seriously ill and unable to respond were excluded.

### Sample size calculation

Sample size was determined using single population proportion formula in the following assumptions; 95% confidence interval, 5% margin of error, 10% response rate and proportion of 72% from prevalence of exclusive breast-feeding among HIV positive mothers. The final sample size was 341 participants [6].

### Sampling procedure

The health institutions with high number of HIV positive mothers attending ART and PMTCT centers were selected purposively as most of the health institutions have few study participants. Eight hospitals namely Durame, Doyogena, Shinshicho, Otona, Dubbo, Hossana, Butajira and Atat and six health centers (Hadero, Sodo, Areka, Boditi, Hossana and Wolkite) were selected. According to the total number of study participant in each health institutions, proportionate number of sample was assigned for each health institutions. The calculated sample size proportionally allocated to each health institutions based on the average number of client prior to the study period in the respective ART and PMTCT centers. Study participants were selected by simple random sampling technique. According to quick assessment done before proposal writing the total number of HIV positive mothers with infants aged 6 to 24 months in selected health facilities were 499 (90 in Kembata Tembaro zone, 166 in Wolaita zone, 123 in Hadiya zone and 120 in Gurage zone). After proportional allocation, 62 from Kembata zone (28 from Durame hospital, 10 from Doyogena hospital, 14 from Shinshicho hospital and 10 from Hadero HC), 113 from Woliata zone (34 from Otona referral hospital, 25 from Dubo hospital, 23 from Sodo HC, 14 from Areka HC and 17 from Boditi HC), 84 from Hadiya zone (55 from Nigist Eleni Hosanna hospital and 29 from Hosanna HC) and 82 from Gurage zone (30 from Atat hospital, 28 from Butajira hospital and 24 from Wolkite HC) [7].

### Variables and operational definitions

The outcome variable was recommended infant feeding practice whereas the independent variables were related to socio-demographic characteristics, maternal health service factors, maternal health (breast engorgement and nipple infection), mothers' disclosure of HIV status, knowledge of mothers on recommended feeding practice and factors related to health

workers. In this study, recommended infant feeding practice was defined as those who practiced either exclusive breast feeding or exclusive replacement feeding whereas exclusive breast feeding was giving the infant no other food or drink, not even water, apart from breast milk (including expressed breast milk), with the exception of drops or syrups consisting of vitamins, mineral supplements or prescribed medicines up to 6 months. And if an infant within one hour of birth put on mothers breast to feed it was considered as early initiation of breastfeeding whereas mixed breast feeding was breastfeeding with the addition of fluids, solid feeds and non-human milks in the first 6 months of age. Complementary feeding was defined as introduction of solid, semi-solid or soft food in addition to breast milk at 6 months of infants' age. Replacement feeding was defined as giving an infant who is not receiving any breast milk a nutritionally adequate diet until the age at which the child can be fully fed on family foods. A mother with HIV was considered as aware towards the recommended feeding options if she responded at least one correct recommended feeding option [8].

### Data collection tools and procedures

Structured questionnaires were adopted from studies done before. The questionnaire was initially prepared in English and then translated in to Amharic. The Amharic version was again translated back to English to check for consistency of meaning. Fourteen diploma nurses who had previous experience were recruited for data collection. Four bachelors in public health were recruited as supervisors [9].

### Data quality assurance

Training was given to data collectors and supervisor prior to data collection. Five percent of the questionnaires were pretested at Mudula hospital on similar population group before the actual data collection. There was close supervision by principal investigator and supervisors during data collection. The completed questionnaire was checked for completeness of information by supervisors and principal investigator. When any

gap was identified, immediate communication was made with the data collectors.

### Data processing and analysis

First, the data were checked for its completeness and inconsistencies, the presence of any missing values and variables. Data entry was done by EpiData version 3.1 and exported to SPSS version 20. Data cleaning, coding and analysis were performed using SPSS statistical software. Descriptive summaries using frequencies, proportions and cross tabulations were used to present the study results. To investigate factors affecting recommended infant feeding practice of HIV positive mothers, logistic regression was used. Significant variables observed in the bivariate analysis ( $p < 0.25$ ) were subsequently included in to the multivariate analysis. P-values less than 0.05 were considered as significant [10].

## RESULTS

### Socio-demographic characteristics of the study participants

A total of 341 HIV positive mothers aged 15-49 years with infants 6-24 months of age were included in the study making a response rate of 100%. The mean age of the mothers and their children were 29.08 (SD  $\pm$  4.74) years and 12.16 (SD  $\pm$  4.7) months respectively. More than half of mothers 234 (68.6%) were between age 25-34 years. Majority, 246 (72.1%) of mothers were residing in urban settings. More than three fourth of the study participants 287 (84.2%) were married. Regarding maternal education, 168 (49.3%) mothers had primary education. About 154 (45.2%) mothers were protestant in their religion (Table 1) [11].

**Table 1:** Socio-demographic characteristic of HIV positive mothers with 6-24 months old infants in selected health facilities in north east zones of SNNPR.

Variables	n	%
<b>Age (n=341)</b>		
15-24	52	15.2
25-34	234	68.6
35-49	55	16.1
<b>Place of residence (n=341)</b>		
Rural	95	27.9
Urban	246	72.1
<b>Marital status</b>		
Single	20	5.9

Married	287	84.2
Divorced	22	6.5
Widowed	12	3.5
<b>Education of mother (n=341)</b>		
No formal education	49	14.4
Grade 1-8	168	49.3
Grade 9-12	84	24.6
Above secondary	40	11.7
<b>Religion (n=341)</b>		
Orthodox	131	38.4
Protestant	154	45.2
Catholic	17	5
Muslim	39	11.4
<b>Occupation (n=341)</b>		
Employed	61	17.9
House wife	190	55.7
Merchant	51	15
Others	39	11.4
<b>Education of husband</b>		
No formal education	54	15.8
Grade 1-8	44	12.9
Grade 9-12	126	37
Above secondary school	117	34.3
<b>Monthly income (n=341)</b>		
<500	43	12.6
500-1000	140	41.1
>1000	158	46.3

### Obstetric history of respondents

Majority of the respondents, 322 (94.4%) received Antenatal Care (ANC) during their pregnancy period of which 218 (63.9%), 58 (17.0%), 32 (9.4%) and 14 (4.1%) had four and above, three times, twice and one ANC visits. Concerning place of delivery, 281 (82.4%) gave childbirth at public health

facilities, 37 (10.9%) at private clinic whereas the rest, 23 (6.7%) gave birth at home. The largest proportion of mothers, 323 (94.7%) and their children 332 (97.4%) took prophylaxis during pregnancy [12].

## Knowledge towards recommended feeding options

In this study, 180 (52.8%) knew that colostrum protect against diseases. More than half, 221 (64.8%) of mothers correctly identified the ideal duration of EBF as from birth to six month of life of an infant. This data showed that 159 (46.6%) mothers knew that a child should breast fed 8-10 times per day.

Majority, 272 (79.8%), of mothers knew about time to start complimentary feeding that it is at six months. Regarding to knowledge on recommend infant feeding, 319 (93.5%) mothers know exclusive breast feeding is recommended, followed by 80 (23.5%) replacement feeding (Table 2).

**Table 2:** Knowledge towards recommended infant feeding options among HIV positive mothers with 6-24 months old infants in selected health facilities in north east zones of SNNPR.

Variable	n	%
<b>Importance of yellowish milk (n=341)</b>		
Food for child	86	25.2
Protect against diseases	182	53.4
I don't know	73	21.4
<b>How long breast milk sufficient for the child (n=341)</b>		
<6 month	6	1.8
For 6 months	221	64.8
Above 6 months	114	33.4
<b>Number of times mothers breastfed their child per day (n=341)</b>		
5-7 times	59	17.3
8-10 times	159	46.6
On demand	123	36.1
<b>Time to start complementary food (n=341)</b>		
1 to 3 months	11	3.2
4 to 5 months	58	17
6 months	272	79.8
<b>Recommended infant feeding options for the first six months? (n=341)</b>		
Exclusive BF	319	93.5
Replacement feeding	80	23.5
Wet mother nursing	14	4.1
Expressed breast milk	4	1.2
Mixed feeding	37	10.9

## Awareness towards recommended feeding options

The majority 335 (98.2%) of mothers reported that they had ever heard about infant feeding of HIV positive mothers. The main source of information for mothers on infant feeding options was health workers with 286 (83.9%) followed by

neighbors 35 (10.3%), mass media 8 (2.3%) and husband with 6 (1.8%). Majority, 297 (87.1%), respondents partners were tested for HIV status. Most of respondents, 299 (87.7%) disclosed their sero-status, 225 (66%) of them disclosed to their husband.

### Feeding practice of HIV positive mothers

In this study, 316 (92.7%) had ever breast fed their children of which two third of mothers that is 213 (62.4%) breastfed their children within the first hour of delivery. Out of 316 ever breastfed mothers, 47 (15%) of them gave their infants liquids/foods before the first breast milk of which 31 (66%) who practiced pre-lacteal feeding were influenced by their parents. Mother's sickness 10 (43.5%), no enough milk 6 (26.1%) and sore nipple 4 (17.4%) were the major reasons cited by mothers for pre-lacteal feeding. More than three fourth, 276 (87.3%), mothers were ceased breastfeeding during the survey. From those who ceased breastfeeding, 203 (73.4%) of mothers ceased breastfeeding due to fear of HIV transmission.

A very few mothers, 9 (2.6%), reported ever expressed their breast milk of whom, 8 (89%) mothers gave expressed breast milk without treating with heat. Two third of mothers, 7 (77.8%), used bottle to feed expressed breast milk. Three (33.3%) of mothers used the expressed breast milk to separate from their infant while 2 (22.2%) because child was unable to suck on breast, 2 (22.2%) of mothers reported they used expressed breast milk to relieve breast engorgement and pain (Table 3) [13].

**Table 3:** Feeding practices of HIV positive mothers with 6-24 months old infants in selected health facilities in north east zones of SNNPR.

Variables	Response	Percentage of respondents
<b>Ever breast fed (341)</b>		
Yes	316	92.7
No	25	7.3
<b>Time of initiation (316)</b>		
Within one hour	213	67.4
2-3 hours	100	31.6
Days	3	1
<b>Anything given before breast milk (316)</b>		
Yes	47	15
No	269	85
<b>Still breast feeding (316)</b>		
Yes	40	12.7
No	276	87.3
<b>Ever expressed BM (341)</b>		
Yes	9	2.6
No	332	97.4
<b>Ever gave expressed (9)</b>		
Yes	9	100
No	0	0
<b>Ever replacement feed your child (341)</b>		
Yes	25	7.3
No	316	92.7

Complementary food started (341)		
Yes	323	94.7
No	18	5.3
Age complementary food started (n=323)		
<6 months	54	16.7
At 6 months	248	76.8
>6 months	21	6.5
Exclusive breastfeeding (n=341)		
Yes	265	77.7
No	76	22.3
Replacement feeding (n=341)		
Yes	25	7.3
No	316	92.7
Mixed breastfeeding (n=341)		
Yes	51	15
No	290	85

The finding of this study showed that most of respondents 265 (77.7%) exclusively breastfed their children, 51 (15%) mothers practiced mixed feeding and 25 (7.3%) mothers practiced exclusive replacement feeding. In this study the magnitude of recommended infant feeding practice is 290 (85%). Among mothers who practiced replacement feeding, most of them 15 (60%) used commercial infant formula. Majority of mothers 248 (72.7%) started complementary food at the age of 6 months.

### Counseling on infant feeding practice

Almost all, 336 (98.5%), mothers received counseling and support on different feeding options. Most mothers 335 (98.2%) were counseled on advantages of EBF. Three hundred and twenty five (95.3%) mothers received counseling on advantages of replacement feeding and 328 (96.2%) mothers received counseling on risk of mixed feeding.

### Factors affecting recommended infant feeding

In this study, 290 (85%) of mothers practiced recommended infant feeding. The bivariate logistic regression analysis revealed that recommended infant feeding practice had significant association with education of mother, being heard about infant feeding, counseling feeding options, support from health workers to choose recommended infant feeding, counseling on advantages of EBF and disadvantage of MBF and have ever heard about infant feeding practice.

Odds of recommended infant feeding were COR=3.47 (1.013-9.885) higher among mothers whose have completed primary school. Probability of practicing recommended infant feeding was five times more likely among mothers received counseling and support on different feeding options than their counterpart COR=5.2 (1.948-9.929). Mothers who were counseled on advantage of EBF were COR=5.97 (1.172-11.493) times more likely to practice recommended infant feeding. The odds of mothers who received counseling on risk of mixed feeding were about four times more likely to practice the recommended infant feeding COR=3.83 (1.201-12.222). On multivariate analysis, mother's education and receiving infant feeding counseling and support were found to be significantly associated with recommended infant feeding practice. Mothers who had educational level of primary schools were more than three times more likely to practice recommended infant feeding than who had no formal education (AOR=3.9 (1.077-9.175)). Furthermore, significant association to recommended infant feeding practice was present with mothers being counseled on feeding options and supported on infant feeding practices by health workers were more than four times more likely to practice recommended infant feeding (AOR=4.44 (1.108-13.814) (Table 4).

**Table 4:** Bivariate and multivariate logistic regression analysis showing associated factors of recommended infant feeding practice and variables of HIV positive mothers in selected health facilities of SNNP.

Variables	Recommended infant feeding		COR (95% CI)	AOR (95% CI)
	Yes N (%)	No N (%)		
<b>Education of mother</b>				
No formal education	46 (93.9%)	3 (6.1%)	1	
Grade 1-8	137 (81.5%)	31 (18.5%)	3.47 (1.013-9.885)	3.9 (1.077-11.175)
Grade 9-12	72 (85.7%)	12 (14.3%)	2.55 (0.684-9.549)	2.67 (0.662-10.833)
Above secondary	35 (87.5%)	5 (12.5%)	2.19 (0.490-9.791)	3.29 (0.688-15.804)
<b>ANC visit</b>				
No	14 (73.7%)	5 (26.3%)	1	1
Yes	276 (85.7%)	46 (14.3%)	2.14 (0.737-6.233)	0.86 (0.227-3.309)
<b>Mode of delivery</b>				
SVD	261 (84.2%)	49 (15.8%)	1	1
C/S	29 (93.5%)	2 (6.5%)	0.36 (0.085-1.590)	0.33 (0.073-1.550)
<b>Heard about infant feeding</b>				
No	3 (50%)	3 (50%)	1	1
Yes	287 (85.7%)	48 (14.3%)	5.97 (1.172-14.493)	4.01 (0.640-17.219)
<b>Disclosed HIV status</b>				
No	32 (76.2%)	10 (23.8%)	1	1
Yes	258 (86.3%)	41 (13.7%)	1.96 (0.899-4.302)	2.17 (0.852-5.542)
<b>Knowledge on EBF</b>				
No	16 (72.7%)	6 (27.3%)	1	1
Yes	274 (85.9%)	45 (14.1%)	2.28 (0.849-6.144)	1.74 (0.536-5.689)
<b>Counseling and support on different infant feeding options</b>				
No	10 (55.6%)	8 (44.4%)	1	1
Yes	280 (86.7%)	43 (13.3%)	5.2 (1.948-9.929)	4.44 (1.108-10.814)
<b>Counseling on advantage of EBF explained</b>				
No	3 (50%)	3 (50%)	1	
Yes	287 (85.7%)	48 (14.3%)	5.97 (1.172-11.493)	1.81 (0.172-19.203)
<b>Counseling on disadvantage of mixed feeding explained</b>				
No	8 (61.5%)	5 (38.5%)	1	
Yes	282 (86%)	46 (14%)	3.83 (1.201-10.222)	0.97 (0.144-6.554)



## DISCUSSION

The present study assessed the magnitude and factors associated with recommended infant feeding practice among HIV positive mothers in selected health facilities of Southern Ethiopia. It has been shown that recommended infant feeding practice is more influenced by educational status of mother, receiving counseling and support on different infant feeding options.

In this study, 85% of HIV mothers had practiced recommended infant feeding. This finding is lower than the study conducted in Tigray region Mekele city where 97.3% of the study participants had practiced recommended infant feeding. This variability might be related to the fact that their study was conducted in regional capital, Mekele city, where the access to health facility and health literacy is high unlike our own study setting, zonal level. Moreover, the Tigray region was identified as a region with the highest recommended infant feeding practice in the systematic review. On contrary, this finding was comparatively higher than the national EDHS estimate (58%) and a study done in Nigeria (74.1%). The national study includes most parts of the country including remote areas and the sampling procedure widely varies.

The proportion of mothers practicing mixed breastfeeding in this study was 15% for the first six months of age. The result was lower than studies done in India (43%) and South Africa (61%) but higher than studies done in Nigeria and Sudan where each country had 4% practice of mixed feeding. Such practice increases the risk of HIV transmission compared to exclusive breastfeeding. This study identifies, from those mothers who ever breast feed, 67.4% of mothers immediately initiated the first breast milk after delivery. This is less than a study conducted in Adama city, 85.3%. This might be related to the fact that Adama is a regional capital, moreover almost all participants in that study delivered in a health facility where health professionals immediately recommend breastfeeding after childbirth.

In this study, mothers with some form of education were more than two times more likely to practice recommended infant feeding than those with no formal education. It is known that education is the most consistent variable related with many health recommendations and healthy choices. The other variable found to influence practice of recommended infant feeding was mothers counseling on feeding options and support where the odds of practice was more than four times higher. This finding was supported by studies done in Ethiopia. This might be related to the fact that better educated mothers tend to accept health information through various sources as well accept healthy recommendations. Moreover, educated mothers are more likely to attend ANC service where they get counseling service on recommended way of infant feeding.

This study had strengths and limitations; it has collected data from hospitals and health centers from different zones that gives an opportunity to catch data from various health tiers. Since the data collectors were health professionals there may be professional bias even though a great effort was made to minimize it during the training and data collection period. There might be recall bias for questions focusing on time of

initiation of breastfeeding, pre-lacteal feeding and complementary feeding. In addition, the study participants received infant feeding counseling during follow-up and can easily answer the questions. This may overestimated the rates of recommended infant feeding practices and underestimated the rates of mixed and pre-lacteal feeding.

## CONCLUSION

In conclusion, large proportion of HIV positive mothers practiced recommended infant feeding that was somehow in line with the WHO recommendation. Regarding factors influencing the practice, maternal education and counseling on feeding options were determinants of the adherence to the recommendation. Thus, to enhance recommended infant feeding practice among HIV positive mothers, the region should advocate on media and at community level about the importance of recommended infant feeding practices as it is relatively less costly and more practical option in the context of resource constrained countries.

## ETHICAL CONSIDERATIONS

Ethical clearance was obtained from research ethical clearance of Wolaita Sodo university. Permission letters were obtained from each zone and Woreda health offices. The nature of the study was fully explained to the study participants and informed verbal and written consent was obtained from each respondent before interview. They were told that documents will be kept confidential and have the right to refuse participation totally at any time if they were not comfortable.

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