

## Determinants of age appropriate breastfeeding practices among 6 – 23 months old children from rural and urban communities of Tigray, Northern Ethiopia

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### Abstract

**Background:** Numerous studies have reported the determinants of low levels of initiation of breastfeeding within an hour after birth, exclusive breastfeeding for the first six months or continue breastfeeding practices for two years and beyond. However, few have examined the composite age appropriate breastfeeding practices of women from resource limited settings.

**Objective:** The aim of this study was to assess infant and young child feeding practices and their determinants in rural and urban communities of Tigray region of Ethiopia.

**Methods:** A cross-sectional study was conducted in randomly selected households from all districts of Tigray, Ethiopia from June through July 2019. A structured questionnaire on practices of infant and young child feeding practices was used to collect information from 5321 mothers of 6-23 months old children. Bivariate and multivariable analyses were conducted. Variables having p value less than 0.20 at bivariate analysis were fitted to multivariable binary logistic regression model and 95% Confidence interval with p-value<0.05 was used to assess the strength of association.

**Results:** Breastfeeding was almost universal. About 98.8% of the mothers practiced ever breastfeeding, 96.5% provided colostrum and 85% of the mothers initiated breastfeeding within one hour of birth. Almost all of the mothers (98.0%) avoid prelacteal feeding, 96.5% reported that they exclusively breastfed their infants and 75.2% of the mothers practiced continued breastfeeding until two years. The prevalence of age appropriate breastfeeding was 53.9%. Mothers who were educated were more likely (AOR= 1.35) to practice age appropriate breastfeeding as compared to mothers with no education. Mothers who were single were less likely (AOR=0.58) to practice age appropriate breastfeeding compared to married and mothers who provided prelacteal feeds were less likely (AOR=0.14) to practice age appropriate breastfeeding. Mothers who were from food secure households were less likely (AOR=0.69) to practice age appropriate breastfeeding as compared to mothers from food insecure households. Mother whose children had fever in the last two weeks of the survey were less likely (AOR=0.81) to practice age appropriate breastfeeding. Children aged 12-23 months were less likely (AOR=0.72) to receive age appropriate breastfeeding compared to younger children. Mothers who gave colostrum as first food for their infants were more likely (AOR=3.74) to practice age appropriate breastfeeding.

**Conclusion:** Age appropriate breastfeeding practices was relatively better. A significant number of mothers practiced timely initiation of breastfeeding within an hour of birth, exclusive breastfeeding for the first six months and continue breastfeeding until 24 months or more. Sustaining and strengthening the high-performing breastfeeding ecosystem is recommended to guarantee the continuation of the age appropriate breastfeeding practices as well as their performance during and after the armed conflict and siege imposed on Tigray, Ethiopia.

**Key words:** determinants, age appropriate, children, breastfeeding practices, Tigray, Ethiopia.

## Introduction

The first two years of life provide a critical window of opportunity to ensure survival, growth and development through age appropriate breastfeeding and complementary feeding practices (1). The beneficial effects of age appropriate breastfeeding practices depend on its initiation, exclusivity and duration (2-4). Improving breastfeeding can save more than 3500 lives of children every day, more than any other intervention in preventive medicine (5). Globally, over one million newborn infants could be saved each year by early initiation of breastfeeding. In developing countries alone, early initiation could save as many as 1.45 million lives each year by reducing deaths mainly due to diarrheal disorders and lower respiratory tract infections in children (6). A recent meta-analysis (7) reported that the initiation of breastfeeding within 24 hours of birth

was significantly associated with reduction in “all-cause neonatal mortality”, “low birth weight related neonatal mortality” and “infection related neonatal mortality” among all live births (3, 7). Immediate care of the newborn which includes early initiation within one hour of birth and exclusive breastfeeding is a major area of intervention for newborn survival during the prenatal period (8). Early initiation of breastfeeding can also reduce mortality due to neonatal infections (sepsis, pneumonia, tetanus, and diarrhea) (9) which contribute 36% in neonatal deaths from all causes (10). The importance of breastfeeding initiation in reducing risk of neonatal mortality is also highlighted in studies from Ghana, India and Nepal (9, 11, 12). Low risk infants from Ghana were at twice the risk of neonatal death if they were not breastfed within the first 24 hours after birth. Similarly, late

initiation of breastfeeding was associated with a 78% increased risk for mortality in India (13). About 22% of neonatal deaths could be saved if all infants started breastfeeding within the first hour of birth and 16% if breastfeeding started from day one and overall late initiation (after day 1) was associated with a 2.4-fold increase in risk of death (3). Early initiation of breastfeeding and exclusive breastfeeding for the first 6 months of life prevent around 20% newborn deaths and 13% under-five deaths (14). Evidences showed that high rates of exclusive breastfeeding during the first 6 months of life and continued breastfeeding with complementary feeding can potentially prevent 13% and 6% respectively of under-5 deaths each year (15, 16). Moreover, exclusive breast-feeding and age appropriate complementary feeding practices are universally accepted as essential elements for the satisfactory growth and development of infants as well

as for the prevention of childhood illness and deaths as reported in several studies (17-19).

Despite the strong evidence supporting immediate and long term health benefits of breastfeeding practices, the prevalence of optimal breastfeeding practices has remained low and largely unchanged for many years in Tigray. The rates of breastfeeding practices are well below the universal standard though breastfeeding is almost universal among the mothers from Tigray. Initiation of breastfeeding was late for significant proportion of the children. Moreover, the adherence to exclusive breastfeeding for the first six months of life was suboptimal or quite low. According to the Ethiopian Demographic and Health Survey of 2016, the median duration of exclusive breastfeeding was 3.8 months in Tigray compared to the 4.5 months in Ethiopia; 37% of the children were not breastfed within the first hour of birth in

Tigray compared to 27% in Ethiopia and 24% of Ethiopian children continue breastfeeding until their second birthdays(20).

In this study, it is hypothesized that additional information is required to provide more evidence to support and improve optimum breastfeeding practices, determine the remaining gaps to meeting the country targets and ensure optimal growth and development among 6 – 23 months old children at the local level. Thus, the study was conducted to measure the age

appropriate breastfeeding practices and to identify determinants influencing the poor breastfeeding practices in Tigray, Ethiopia. The findings of this study will help policy makers to identify and implement intervention programs capable of enhancing the age appropriate breastfeeding practices in Tigray, Ethiopia. We report here our findings on the levels of age appropriate breastfeeding practices among 6 – 23 months old children from representative samples of rural and urban children from Tigray, Ethiopia.

## Methods

### Study design and setting

A cross-sectional survey was conducted in all the 52 districts of Tigray, Ethiopia. The Tigray regional state of Ethiopia is home for 6.2 million people with an estimated area of 54,593 square kilometers. Most (73%) of the population live in rural areas, while 27% are

urban dwellers. In terms of religion, 95.5% of its population is Orthodox Christians and 4.1% and 0.4% are Muslims and Catholics, respectively. Regarding ethnic composition, 96.6% are Tigray, 2.6% Amhara, 0.7% Erob and 0.1% Kunama. Based on a report from

the Tigray Regional Health Bureau, the region has 40 hospitals, 230 health centers and 741 health posts(21).

### **Data source and study participants**

The findings of this study were derived from the data extracted from the survey conducted on malnutrition among under-five children. The survey was carried out from June to July 2019 in Tigray, Ethiopia that aimed to determine the prevalence of malnutrition among 6-59 months old children in the region(22). All rural and urban communities of Tigray were included in the survey. Sample size of the survey was determined by using a single population proportion formula. Moreover, a stratified two stage sampling technique was employed to select the 11,004 households with 6–59 month old children. In this study, a sub sample of 5321 children aged 6 -23 months are considered and the subgroup of children aged 24 - 59 months was excluded from the analysis.

### **Study variables**

#### **Dependent variables**

To assess child feeding practices, we used core indicators of breastfeeding practices. According to the recent definitions and measurement methods of WHO and UNICEF (23), the breastfeeding indicators were defined and adopted as follows:

- Early initiation of breastfeeding was defined as the proportion of children born in the last 24 months who were put to the breast within the first hour of birth.
- Exclusive breastfeeding was defined as the proportion of children 6-23 months of age who were reported to be fed breast milk during the first six months of age.
- Continued breastfeeding until 2 years was defined as the proportion of children 12-23 months of age who

were fed breast milk during the previous day

- Age-appropriate breastfeeding: we defined age appropriate breastfeeding as the early initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first 6 months of life, and continued breastfeeding for up to 2 years or beyond among 6-23 months old children.
- Similarly, the WHO tool for assessing national practices, policies and programs was used for rating infant and young child feeding practices as follows (24). According to the tool, 0 – 29% of early initiation of breastfeeding is rated as “Poor”, 30 – 49% as “Fair”, 50 – 89% as “Good” and 90 – 100% as “Very good”. With regard to exclusive breastfeeding 0 – 11% is rated as “Poor”, 12 – 49% as “Fair”,

50 – 89% as “Good” and 90 – 100% as “Very good”. Similarly, the Median duration of breastfeeding from 0 – 17 months is rated as “Poor”, 18 – 20 months as “Fair”, 21 – 22 months as “Good”, 23 – 24 months or beyond as “Very good”. Timely introduction of complementary foods is also rated as “Poor” if it’s 0 – 59%, “Fair” if it’s 60 – 79%, Good if it’s 80 – 94%, and Very good if it’s 95 – 100%. Timely introduction of complementary foods is also rated as “Poor”, “Fair”, “Good” and Very good if it’s 0 – 59%, 60 – 79%, 80 – 94%, and 95 – 100%, respectively.

### **Independent variables**

The independent variables selected were residence, child sex, child age, common childhood illnesses, marital status, age of mother, maternal education, father education, household food security status,

ANC follow-up, avoidance of prelacteal feeds, provision of colostrum, and nutritional status of child.

### **Statistical analysis**

The data analysis was conducted using STATA software version 16. Frequencies and percentages were calculated for categorical variables. The association between selected variables and age appropriate breastfeeding practices was examined by performing both bivariate and multivariate analyses to identify key determinants of age appropriate breastfeeding practices. Binary logistic regression model was used to identify the predictors of all outcome variables. The  $p$ -value  $<0.25$  in the bivariate was used for inclusion in the multivariable binary logistic

regression model. Odds ratio and 95% confidence interval were used to assess the strength of the association between the independent variables and outcome variables.

### **Ethical considerations**

Approval from the Intuitional Review Board (IRB) of the College of Health Sciences of Mekelle University was obtained to conduct the research study (Reference number: IRB1365/2019). The data collectors collected the information after obtaining verbal consent from the study participants. Confidentiality of individual client information was recorded anonymously and confidentiality was assured throughout the study period.

### **Results**

## Characteristics of children and mothers

A total of 5321 children were included for analysis. The mean age of mothers was 28.3 years (SD:  $\pm$  6.5 years), with the majority being aged between 25 and 35 years. Majority (86.2%) of mothers were married.

More than one third (35.5%) of the mothers had no formal education. Majority of the mothers (88.8%) had ANC follow up during their last pregnancy. About 7% of households were severely food insecure while 23.1% of households were moderately food insecure (Table 1).

Table 1: Household and maternal characteristics of the study participants in Tigray, Ethiopia, 2019 (n=5,321).

	Variables	Number	Percent
Residence	Rural	4143	77.9
	Urban	1178	22.1
Household size	$\leq 5$	4014	75.4
	6-12	1307	24.6
Mather's age	<25 Years	1593	29.9
	25-29 Years	1666	31.3
	30-35 Years	1379	25.9
	36+ Years	683	12.8
Marital status	Married	4586	86.2
	Single	97	1.8
	Other (divorced/separated/widowed)	638	12.0
Mother education	No formal education	1891	35.5
	Primary education	1797	33.8
	Secondary or higher	1633	30.7
ANC visits	No	596	11.2
	Yes	4725	88.8
Iron and folic acid supplementation	No	3401	63.9
	Yes	1920	36.1
Father education	No formal education	1651	32.5
	Primary education	1603	31.6
	Secondary or higher	1820	35.9
Food insecurity level of households	Food secure	3092	58.1
	Mild food insecurity	643	12.1
	Moderate food insecurity	1243	23.4
	Severe food insecurity	343	6.5

### Nutritional and health status of the children

The gender proportion of the surveyed children was almost equal (51.3% females and 48.7% males). The mean age of children was 14.1 months (SD:  $\pm$  5 months). Majority of the children received the biannual

supplementation of vitamin A. About 18% of the children had fever, 15.1% had cough or pneumonia and 13.3% had diarrhea within two weeks prior to the date of data collection. About 10% of the children were wasted, 17.4% underweight and 34.6% stunted (Table 2).

**Table 2:** Nutritional and health status of the study children aged 6-23 months in Tigray, 2019(n=5321).

Variables	N	%	
Child sex	Male	2592	48.7
	Female	2729	51.3
Child age	6–11 months	1799	33.8
	12–23 months	3522	66.2
Nutrition status	Stunted	1824	34.6
	Underweight	922	17.4
	Wasting	509	9.6
Received vitamin A	No	787	14.8
	Yes	4168	78.3
	Not sure	366	6.9
Had cough/pneumonia in the last 2 weeks	No	4518	84.9
	Yes	803	15.1
Had fever in the last 2 weeks	No	4369	82.1
	Yes	952	17.9
Had diarrhea in the last 2 weeks	No	4615	86.7
	Yes	706	13.3

### Breastfeeding practices among mothers

Majority of mothers (84.9%) initiated breastfeeding within one hour of birth, and exclusive breastfeeding were almost universal in the study communities are respectively rated as Good and Very good

based on the WHO tool for assessing national practices, policies and programs. Colostrum was given as the first meal to 5076 (96.5%) of babies and about 2% of the babies had received a prelacteal feeds and 80.1% of the mothers initiate the provision

of complementary foods at exactly six months of age of the child, which is rated as “Good” based on the WHO tool. Of the total, 75.2% of mothers continued breastfeeding

up to two years of age. Age appropriate breastfeeding was practiced among 53.9% mothers (Table 3).

**Table 3:** Breastfeeding practices among 6-23 months old children in Tigray, Ethiopia, 2019 (n=5,321).

Variables		n	%
Ever breastfeeding	No	61	1.2
	Yes	5260	98.8
Early initiation breastfeeding within 1 hr	No	782	15.1
	Yes`	4398	84.9
Provision of colostrum	No	141	2.7
	Yes	5076	96.5
	Don't know	43	0.8
Avoidance of prelacteal feeds	No	82	1.5
	Yes	5213	98.0
	Don't know	26	0.5
Excusive breastfeeding	No	185	3.5
	Yes	5136	96.5
Continued breastfeeding	No	873	24.8
	Yes	2649	75.2
Age appropriate breastfeeding practices	No	2455	46.1
	Yes	2866	53.9
Reason for non-exclusive breastfeeding	Lack of awareness	41	22.2
	Mother gets back to work	32	17.3
	Start infant formula	38	20.5
	Maternal death	5	2.7
	Illness such as HIV	10	5.4
	Other	69	37.3

### Factors affecting age appropriate breastfeeding practices

Mothers who were educated were more likely (AOR= 1.35; 95% CI: 1.169-1.555) to practice age appropriate breastfeeding as compared to mothers with no education. Single mothers were less likely (AOR= 0.58; 95% CI: 0.354-0.933) to practice age appropriate breastfeeding compared to married mothers..Children aged 12-23 months were less likely (AOR=0.72; 95%CI: 0.638-0.820) to practice age appropriate breastfeeding. Mothers from secure households were less likely

(AOR=0.69; 95% CI: 0.615-0.780) to practice age appropriate breastfeeding and mothers who provided prelacteal feeds were less likely (AOR=0.14; 95% CI: 0.067-0.303) to practice age appropriate breastfeeding. Mothers who gave colostrum as first food to their infants were more likely (AOR=3.74; 95% CI: 2.626-5.315) to practice age appropriate breastfeeding..Mother whose children had fever in the last two weeks of the survey were less likely (AOR=0.81; 95% CI: 0.689-0.955) to practice age appropriate breastfeeding (Table 4).

**Table 4:** Factors associated with age appropriate breastfeeding in Tigray, Ethiopia, 2019 (n=5,321).

Variables		COR (95%CI)	P-value	AOR (95%CI)	P-value
Residence	Urban(Ref.)	1			
	Rural	0.99 (0.869-1.126)	0.868		
Child sex	Male(Ref.)	1			
	Female	0.94 (0.845-1.049)	0.274		
Child age	6-11 months	1		1	
	11-23 months	0.71 (0.632-0.795)	<0.001	0.72 (0.638-0.820)	<0.001
Maternal age	< 25 Years(Ref.)	1		1	
	25-29 Years	1.11 (0.969-1.277)	0.131	1.14 (0.984-1.318)	0.082
	30-35 Years	1.04 (0.898-1.19)	0.618	1.07 (0.917-1.257)	0.378
	36+ Years	0.79 (0.662-0.948)	0.011	0.96 (0.782-1.171)	0.669
Marital status	Married(Ref.)	1		1	
	Single	0.59 (0.390-0.883)	0.010	0.58 (0.354-0.933)	0.025
	Other(divorce/separated/widow)	0.88 (0.749-1.044)	0.146	0.80 (0.655-0.973)	0.026
Maternal education	No formal education(Ref.)	1		1	
	Primary or higher	1.38 (1.234-1.546)	<0.001	1.35 (1.169-1.555)	<0.001
Father education	No formal education(Ref.)	1		1	
	Primary or higher	1.25 (1.109-1.403)	<0.001	1.10 (0.958-1.267)	0.175
Regular ANC	No(Ref.)	1			
	Yes	0.94 (0.793-1.117)	0.486		
Prelacteal feeds	Not provided	1		1	
	Provided	0.09 (0.043-0.186)	<0.001	0.14 (0.067-0.303)	<0.001
Colostrum	No	1		1	

	Yes	4.99 (3.630-6.855)	<0.001	3.74 (2.626-5.315)	<0.001
Cough/pneumonia in the last 2 weeks	No (Ref.)	1			
	Yes	1.02 (0.873-1.180)	0.848		
Fever in the last 2 weeks	No (Ref.)	1		1	
	Yes	0.88 (0.765-1.013)	0.076	0.81 (0.689-0.956)	0.012
Diarrhea in the last 2 weeks	No (Ref.)	1		1	
	Yes (Ref.)	1.12 (0.952-1.310)	0.175	1.18 (0.982-1.421)	0.076
Household food security status	Food insecure	1		1	
	Food secure	0.76 (0.685-0.852)	<0.001	0.69 (0.615-0.780)	<0.001
Nutrition Status	Normal	1		1	
	Stunted	0.85 (0.757-0.951)	0.005	0.96 (0.850-1.09)	0.542
	Underweight	0.99 (0.861-1.144)	0.915		
	Wasting	0.97 (0.809-1.167)	0.756		

## Discussion

The present study was conducted to assess the levels and determinants of age appropriate breastfeeding practices among 6 - 23 months of age children from the rural and urban communities of Tigray, Ethiopia. Breastfeeding was initiated within the first hour of childbirth by 84.9% of the mothers. The prevalence of exclusive breastfeeding as reported by the mothers of 6-23 months old children was 96.5%. About 75.2% of the mothers continued breastfeeding for up two years of age and 53.9% of the mothers practiced age appropriate breastfeeding practices. The determinants of age appropriate breastfeeding practices have been rarely investigated in the nutrition literature. However, in the present study, child age, maternal education, marital status, , colostrum, , avoidance of prelacteal feeds, food security and childhood illnesses were found to be significant predictors of

age appropriate breastfeeding practices among 6 – 23 months old children from rural and urban communities of Tigray, Ethiopia.

This study reported a prevalence of 85% breastfeeding initiation within the first hour of childbirth. This finding is comparable to the study conducted in North Jordan (86.6%), Nekemte town in Oromiya, Ethiopia (88.5%), Wollega, west Ethiopia (83.1%), and Sri Lanka (83.3%) [24-27] and much higher than the studies conducted in Axum, Ethiopia (41.6%), Arbaminch, south Ethiopia (72.2%), Gondar, Ethiopia (48.7%), Gaba, Ethiopia (52.4%), Nigeria (45%), Sindh Pakistan (50%) and Turkey (35.2%) [28-34]. The reason for the high rate of timely initiation of breastfeeding in this study might be associated with the increased uptake of ANC and institutional delivery

services in Tigray, Emekonthiopia where health extension workers and midwives have provided the necessary counseling, encouragement and enabling environment to the mothers for timely initiation of breastfeeding. The provision of community activation through women's groups, in addition to general nutrition information, improved exclusive breastfeeding in the first 3 months of life by 16% in Indonesia(25). Timely initiation of breastfeeding should be encouraged because studies have shown that the risk of neonatal mortality could be significantly reduced by 16% if the mothers started breastfeeding at day one and 22% when breastfeeding is commenced within the first hour of birth(26)

In the present study the prevalence of exclusive breastfeeding was 96.5%, which was higher than the study conducted in Axum, Ethiopia (40.9%) and Sindh Pakistan (37%)(27-32). The possible reason for the higher rate of exclusive breastfeeding might be the improved uptake of the maternal and child health services provided free of charge. The improved uptake of the maternal and child health services namely ANC, PNC, immunization, and institutional delivery services would have a beneficial effect on counseling about EBF. For

instance, counseling during follow up are reported to increase exclusive breastfeeding in children under 6 months by 66%(33). Another implication of the high proportion of exclusivity among mothers in the present study compared to an old study from Axum, Tigray (27) might be due to the time passed (about five years) since the Axum study was done. Moreover, breastfeeding is almost universal in Tigray and hence following exclusive breastfeeding might be viewed as the default choice and a normal behavior for most of the mothers in Tigray and therefore, women from the study communities with a tradition of breastfeeding should be encouraged and supported to maintain their cultural breastfeeding practices. Exclusive breastfeeding should be encouraged as it is a cost-effective source of nutrition that is essential in reducing child morbidity and mortality. Scaling up of exclusive and continued breastfeeding to up to 90% could prevent 823,000 deaths globally in under-five children annually(34) and failure to breastfeeding is associated with reduced cognition and economic losses of approximately \$302 billion annually(33).

Similarly, the result of this study revealed that 75% of the mothers practiced continued

breastfeeding which is much higher than the study conducted in Italy (12%) (35), Australia (7.5%)(36) and Vietnam (20.9%)(33). The possible reason for the higher rate in continued breastfeeding in the present study could be due to the lower socio-economic status of the households in Tigray, Ethiopia. Mothers in poorer households would delay feeding their babies with complementary foods but instead resort to continued breastfeeding. Moreover, mothers from a relatively higher income country would have a higher labor force participation and hence greater means to purchase baby formula and less time to breastfeed and hence would stop breastfeeding their babies earlier. The improved uptake of ANC services in Tigray might also explain the relatively higher rate of continued breastfeeding in the present study. ANC counseling programs are reported to improve continued breastfeeding in children aged 12–23 months by 15%(33).

The level of education of mothers was significantly associated with age appropriate breastfeeding. In line with the present study findings, level of maternal education was strongly associated with breastfeeding practices in Dabat, Ethiopia(37), in Amhara, Ethiopia(38), in

Kashan City of Iran(39), in Rupandehi, Nepal (40) and in Australia (41). The association between higher maternal education and breastfeeding practices could be due to the ability of literate mothers to read health education materials on infant and young child feeding practices, know the benefits of the practice of child feeding, adopt positive feeding practices, have higher decision-making capacity on matters related to child feeding and easily comprehend and translate information into practice(42).

The other factor that influenced the mothers' decision to optimal breast-feeding was prelacteal feeding in the present study. Mothers who provided prelacteal feeds to their children have been shown to delay breastfeeding initiation. In agreement with the present study, prelacteal feeding increased the likelihood of early interruption of exclusive breastfeeding in Asian and African countries(43). Similarly, mothers who gave prelacteal feeds to infants within three days of life were 70 % times less likely to initiate breastfeeding within one hour afterbirth (44) and infants who were not provided prelacteal feeds had higher likelihood of breastfeeding initiation within one hour of birth in Nepal(45), India(46)[and Honduras(47)]. Though the

provision of prelacteal feeds is very low in the present study, prelacteal feeding should be discouraged as it increases risk of cessation of exclusive breastfeeding (47), diarrheal and respiratory illnesses, and mortality(48). The findings highlight the importance of discouraging prelacteal feeding might eventually lead to lactation failure and weakens the suckling stimulus of babies.

Mothers with children who had fever in the last two weeks of the survey were less likely to practice age appropriate breastfeeding. In line with our findings, children who had no history of illness 2 weeks before the survey were nearly three times more likely to get minimum acceptable diet than children with a history of illness(38). Studies reported that mothers breastfed their sick children less frequently (49, 50) and others ceased to breastfeed when their children were sick(49, 51). The possible reasons for reducing or ceasing breastfeeding while children were sick are the belief that infants could not digest breast milk when they are sick, the perception that children were anorexic/had no appetite and/or refused to be fed (50)and/or the belief that breast milk had become harmful to the child owing to harmful traditional practices (50, 52).

Child's age was also associated with age appropriate breastfeeding practice. Children aged 6-11 months had a 70% greater odds of being age-inappropriately breastfed, whereas children 12–24 months had lower odds of being age appropriately breastfed compared with children aged 6–11 months. This finding is similar with the previous study(53), indicating that young children had lower odds of age-inappropriate breastfeeding.

A limitation of this study was the failure to include children younger than 6 months as the study population of the study. Therefore, we were unable to estimate the prevalence of exclusive breastfeeding from 0-5 month old children but from 6-23 months old children which obviously might have introduced recall bias. However, the analyses were restricted to the most recent younger children and experienced data collectors in similar nutrition surveys were recruited and conducted all interviews by asking probing questions to reduce recall bias and gather exact information. Thus, estimation of the rate of age appropriate breastfeeding practices and its determinants from 0 – 23 months old children warranted future studies. Another limitation is that breastfeeding practices were self-reported

and may therefore have been susceptible to social desirability bias and misreporting possibly resulting in over or underestimation of actual feeding practices. Strength of the study was the socio-economically diverse, large sample size and relatively representative of the population drawn from all the 52 districts of Tigray, Ethiopia.

## Conclusion

This study revealed that the proportion of mothers who practiced timely initiation of breastfeeding within one hour of birth, exclusive breast feeding for the first six months, continued breastfeeding until 24 months or more and age appropriate

breastfeeding was high. Child age, maternal education, marital status, prelacteal feeding, colostrum, food security and childhood illnesses were the predictors of age appropriate breastfeeding among mothers of 6-23 months old children from Tigray, Ethiopia. Most of the factors associated with the practice of age appropriate breastfeeding are potentially modifiable. Thus, sustaining and strengthening the high-performing breastfeeding ecosystem is recommended to guarantee the continuation of the age appropriate breastfeeding practices as well as their performance during and after the armed conflict and siege imposed on Tigray, Ethiopia.

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