

Cross-sectional study on breastfeeding related practices in rural Ethiopia: nutritional and socio-cultural aspects

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ABSTRACT

Introduction: There is strong evidence that the prevention of malnutrition in infants and children improves with exclusive breastfeeding during the first 6 months.

Objectives: This cross-sectional community-based study of 101 women aims to describe breastfeeding related practices in two rural villages of the Oromia region of Ethiopia.

Methods: Women having a live child under 4 years of age were eligible for inclusion. Data were collected through semi-structured face-to-face interviews about maternal habits regarding breastfeeding, socio-cultural aspects and living conditions.

Results: Only 3% of women followed WHO recommendations and initiated breastfeeding <1h after birth. 35% started breastfeeding >1h after birth and 62% practiced pre-lacteal feeding. 48,6% of the mothers who initiated breastfeeding >1h after birth and 68.3% of the women who practiced pre-lacteal feeding gave birth at home and were attended by relatives while all who initiated breastfeeding <1h after birth gave birth in health centers.

Conclusions: The information generated from this study could be useful to design appropriate strategies for a nutritional education intervention program for women.

KEYWORDS

Breastfeeding, newborn, nutrition, pre-lacteal feeding.

INTRODUCTION

The World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) recommend early initiation and that infants are exclusively breastfed for the first six months of life; meaning that no other food or liquids, including water, should be provided¹. Human milk, commonly differentiated into colostrum, transition and mature milk, is the ideal food for the infant, it is essential to ensure healthy growth and is characterized by a wide variety of nutritional and bioactive components with multifunctional and anti-inflammatory properties².

However, colostrum avoidance and prelacteal feeding are common practices in developing countries, including Ethiopia, where neonatal morbidity and mortality remains a major health problem and awareness of optimal breastfeeding practices is lacking. In these areas, firmly rooted in ancient traditions, colostrum is considered dirty, dangerous and similar to pus and should be discarded because of its different color, smell and consistency in comparison to mature milk. While discarding colostrum, newborns are fed with solid food different from breastmilk before breastfeeding is established in a practice known as prelacteal feeding. It is known in Amharic as 'makamesha' and it is described as a traditional practice associated with birth in other studies conducted in Ethiopia³.

According to the last Global Multidimensional Poverty Index (MPI) 2019; an international measure of poverty which takes

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into accounts of ten different indicators divided into three dimensions of poverty: health, education and living standard; in Ethiopia, $\geq 90\%$ of children under 10 are multidimensionally poor and 93.3% of multidimensionally poor people live in rural areas⁴. Most of the people, including children, who live in these areas do not have access to a safe source of drinking water or sanitation, suffer from poor nutrition, repeated infection, and inadequate psychosocial stimulation due to lack of access to education and most of the households do not have electricity⁵.

Early initiation of breastfeeding, exclusive breastfeeding and prolonged duration of breastfeeding are associated with the pediatric post-natal health including the prevention of chronic malnutrition and stunting in children aged less than 5 years old⁶⁻⁹. According to the most recent report on pediatric nutritional status in Ethiopia available¹⁰, nearly 37% of the children aged less than 5 years are stunted, or too short for their age and 12% are severely stunted. Stunting is even more frequent in the poorest households and those where mothers have no formal education. 7% of children in Ethiopia are wasted for their height, a sign of malnutrition and 21% of children are underweight for their age¹⁰. As well as for stunting, the percentage of wasted or underweight children increases from urban to rural areas and is related to the educational level of the mother^{4,10}.

The aim of this study was to describe the knowledge about infant nutrition and breastfeeding related practices of a group of mothers in two rural villages of the Oromia region of Ethiopia.

PARTICIPANTS, ETHICS AND METHODS

Research design

This cross-sectional study carried out in two rural Ethiopian villages was approved by the Ethical Committee of the University of Valencia (Register code: 1256147) and is in line with the Declaration of Helsinki. This work has been prepared in accordance with the STROBE guidelines for observational studies.

Setting and relevant context

The study was carried out in collaboration with Comunidad Misionera de San Pablo Apostol (MCSPA) in two rural villages where MCSA works, Andode and Muke Turi. Andode is a small village of the Anger Guten Valley, located in the Oromia region, east of Wollega, in the Gidda-Kiramu district 331 km from Addis Ababa. Muke Turi is a village 78 km northeast of Addis Ababa belonging to the North Shoa region, populated mainly by the Oromo ethnic people. There are not official data about the population of Andode and Muke Turi. The only data about these two rural zones are available on MCSPA webpage (<https://mcspa.org/our-missions/>).

Sample, measurement, and data collection

All the mothers invited to participate were informed about the purpose of the study in their native language. Informed

consent documents were verbally translated to each woman from English to Amharic by a native Ethiopian translator fluent in English and participants accepted the informed consent and agree to participate before the initiation of the interview. For the women unable to write, an ink-stained fingerprint was used to indicate their agreement on the informed consent document in place of signature. All of the women invited to participate had been previously identified as possible participants by the MCSPA using the inclusion criteria that any woman having a live child under 4 years of age was eligible. All women invited to participate in the study accepted. An identification number was given to every participant in order to ensure confidentiality of data. The instrument used to collect the required data was a semi structured questionnaire, specifically created for this study, completed during a personal individual interview with the mothers. Interviews lasted more or less 30 minutes for each mother. The questionnaire was designed taking into account the existing literature on the most common practices related to breastfeeding in Ethiopia and their possible connections with the high prevalence of infant malnutrition.

The questionnaire was divided into different sections. The first section aimed to collect general information about the mothers, there were questions about their age, level of education, number of live children and delivery problems. The second section was about knowledge, attitudes, and practices toward breastfeeding. Our aim with these questions was to investigate if the mothers received antenatal care during pregnancy, if they were informed about the nutrition of the newborn and their breastfeeding behaviors in the first three days after birth. The lack of hospitals in the place where the study took place, and the scarcity of conventional health care did not allow us to collect information about the medical history of the participants. The questionnaire also included questions about supplementary feeding in order to understand at what month the child started to receive foods different from breastmilk and what kind of foods he received. The last section of the interview was focused on the household conditions: it included questions related to their house, sanitary conditions and drinking water.

Data analysis

The data were analyzed using IBM SPSS Statistic 26. One of the key questions of the interview was about the time of initiation of breastfeeding. Mothers were divided into three groups depending on the answer that they gave us. This division was done as it would reflect the reality of the mothers in the area differentiating between those that had received or not any breastfeeding education and had then put it or not into practice. This could give an idea as how the current policies along with socio-demographic characteristics were affecting breastfeeding attitudes.

- In the first group we included mothers who followed WHO recommendation initiating breastfeeding within one

hour after giving birth. This group of mothers did not practice colostrum avoidance and did not feed the newborn with foods different from human milk while discarding colostrum.

- In the second group we included mothers who started breastfeeding after at least one hour after giving birth. This group of mothers represents a group with a mixture of beliefs and practices associated to breastfeeding. They did not follow WHO recommendation about early initiation of breastfeeding, they partially or totally discarded colostrum, but they did not practice pre-lacteal feeding.
- In the third group we included mothers who fed the infants foods other than human milk before breastfeeding initiation. This group of mothers discarded colostrum and gave to the newborn solid food following an ancient ritual typical of the rural zones where the study took place.

RESULTS

Sample characteristics

In total 101 mothers who had children aged less than 4 years old participated in the study. The majority of the participants were not sure about how old they were, and, in some cases, they were also unsure about the age of their children. The approximate age of the participants ranged from 18 to 45

years. Table 1 shows a general description of the mothers in relation to breastfeeding initiation.

During the analysis of the data the sample were differentiated in three groups, related to initiation of breastfeeding. In the first group, we find just 3 of 101 (2.97%) mothers, who started breastfeeding within 1 hour after birth, as the WHO recommends. In the second group, we find 34.65% (n=35) of all the participants who initiated breastfeeding at least 1 hour after giving birth and in the third group, we find the majority of the mothers (62.38% or n=63) who gave their child foods other than human milk before starting breastfeeding. 82.18% (n=83) of the participants were still breastfeeding their children while 16.83% (n=17) of the mothers interviewed had stopped breastfeeding and there was only one woman (0.99%) among all the participants who never breastfed her child, due to nipple/breast problems.

Most of the mothers who participates in the study were multiparous; women who had more than one child were not more educated about the infant feeding, than mothers who just had one child. The average interval of years between pregnancies in multiparous mothers is lower in the first group while the highest value can be detected in the second group. However, mothers in this second group had their first pregnancy earlier in comparison with the other participants. The average of the intervals between pregnancies seems to match

Table 1. General description of the mothers in relation to breastfeeding initiation

	WHO recommendation ^a (n=3)	Later initiation of breastfeeding ^b (n=35)	Pre-lacteal feeding ^c (n=63)	p-value ^d
	Mean/n (SD/ % ^e)	Mean/n (SD/ % ^e)	Mean/n (SD/ % ^e)	
Approximate age of the mother (years)	25.33 (5.03)	27.28 (6.59)	27.35 (6.41)	0.870
Educational level				0.507
Illiterate	2 (66.7%)	30 (85.7%)	51 (81.0%)	
Able to read and write	1 (33.3%)	4 (11.4%)	12 (19.0%)	
Secondary school	0 (0.0%)	1 (2.9%)	0 (0)	
Primiparous	1 (33.3%)	8 (22.86%)	19 (30.16%)	
Multiparous	2 (66.6%)	27 (77.14%)	44 (69.84%)	
Number of children for multiparous mothers	3.50 (0.7)	3.85 (2.03)	3.89 (1.78)	0.000
Still breastfeeding	3 (100.0%)	31 (88.6%)	49 (77.8%)	0.292
Never breastfed	0 (0.0%)	0 (0.0%)	1 (100.0%)	-

^a WHO and UNICEF recommend that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life; meaning no other foods or liquids are provided, including water.

^b Delayed initiation of breastfeeding after 1 hour after birth.

^c A pre-lacteal feed is any food except mother's milk provided to a newborn before initiating breastfeeding.

^d p-value < 0.05 considered statistically significant. p-value calculated using ANOVA or Chi-squared test.

^e % by column.

the WHO and USAID recommendations even if many the women interviewed became pregnant for the first time before 18 years of age.

Most of the women interviewed were illiterate and just 16.83% (n=17) of them were able to read and write. Among them, 66.66% (n=2) of the mothers who followed WHO recommendation, 85.71% (n=30) of the women who initiated breastfeeding more than hour after giving birth and 80.95% (n=51) of the participants who gave to the infant pre-lacteal feeds, never receive any kind of education.

Living conditions

Table 2 presents the living conditions of the families who took part into the study. The overcrowding rate was calculated dividing the square meters of the house by the number of people living in it. From the data collected we estimate an average of 3.32 m² of floor area per person while WHO literatures suggest 9-10 m² of floor area per person. Quality of the household was better in the first group of mothers, where 33.3% (n=1) of the house had cement floor (rather than 3.0% (n=1) in the second group and 8.1% (n=5) in the

Table 2. Living conditions of the families who took part into the study

	WHO recommendation ^a (n=3)	Later initiation of breastfeeding ^b (n=35)	Pre-lacteal feeding ^c (n=63)	p-value ^d
	Mean/n (SD/ % ^e)	Mean/n (SD/ % ^e)	Mean/n (SD/ % ^e)	
Number of people living in the house	4.33 (1.15)	4.85 (1.98)	4.88 (1.91)	0.888
Size of the house (m²)	12.00 (0.00)	14.5 (4.55)	16.88 (5.93)	0.158
Overcrowding rate	3.20 (1.13)	2.88 (0.76)	3.90 (1.62)	0.042
Floor of the house				0.327
Soil	2 (66.7%)	32 (97.0%)	56 (90.3%)	
Cement	1 (33.3%)	1 (3.0%)	5 (8.1%)	
Mud	0 (0.0%)	0 (0.0%)	1 (1.6%)	
Toilet facility				0.720
Pit latrine	2 (66.7%)	27 (81.7%)	47 (75.8%)	
No Facilities	1 (33.3%)	6 (18.2%)	15 (24.2%)	
Animals inside the house	0 (0.0%)	11 (33.3%)	19 (30.6%)	0.487
Kind of animals				0.695
Chikens	0 (0.0%)	8 (72.7%)	11 (57.9%)	
Goats	0 (0.0%)	0 (0.0%)	1 (5.3%)	
Cats	0 (0.0%)	1 (9.1%)	1 (5.3%)	
Other	0 (0.0%)	2 (18.2%)	6 (31.6%)	
Main source of drinking water				0.653
Pipe/tap	0 (0.0%)	0 (0.0%)	0 (1.6%)	
Open well	0 (0.0%)	0 (0.0%)	1 (1.6%)	
Covered well	2 (66.7%)	14 (44.1%)	32 (50.0%)	
River	1 (33.3%)	20 (55.9%)	27 (46.8%)	

^a WHO and UNICEF recommend that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life; meaning no other foods or liquids are provided, including water.

^b Delayed initiation of breastfeeding after 1 hour after birth.

^c A pre-lacteal feed is any food except mother's milk provided to a newborn before initiating breastfeeding.

^d p-value < 0.05 considered statistically significant. p-value calculated using ANOVA or Chi-squared test.

^e % by column.

third group) and there was no case in which animals were living inside of the house. In both villages, more than 90% of the mothers who participated in the study, were living in the traditional Ethiopian thatched-roof hut typical of the rural areas called "tukul" in which any type of available wood, eucalyptus planks commonly, is used for the wall construction and for the conical shape roof support and the floor of the house is plain earth.

Ante-natal care

The information collected on health care received during pregnancy and delivery is shown in Table 3. More than half of all the participants (57.43% or n=58) received ante-natal care during pregnancy. The percentage of mothers who did not receive ante-natal was 33.3% (n=1) of women who belong to the first group, 40.0% (n=14) of women who belong to the second group and 44.4% (n=28) of women who belong to the third group.

As expected, most of the women who followed WHO recommendation received information about breastfeeding during pregnancy, while no advice was given to most mothers of the other groups. The results show that sub-optimal breastfeeding practices are associated with delivery place with the percentage of home deliveries increasing significantly from the second (48.6% or n=17) to the third group (68.3% or n=43).

Breastfeeding practices and beliefs

One-hundred percent (n=101) of the mothers who followed WHO recommendations said that colostrum is important for the infant while 48.6% (n=17) of the women who delayed breastfeeding initiation and 79.4% (n=50) of the mothers who practiced pre-lacteal feedings said that colostrum is dirty and could be dangerous for the newborn. The large percentage of mothers (70.3% or n=71) who did not receive information about infant feeding during pregnancy, learned how to feed their infants

Table 3. Health care that the women interviewed received during pregnancy and information about delivery

	WHO recommendation ^a (n=3)	Later initiation of breastfeeding ^b (n=35)	Pre-lacteal feeding ^c (n=63)	p-value ^d
	n (% ^e)	n (% ^e)	n (% ^e)	
Received antenatal care	2 (66.7%)	21 (60.0%)	35 (55.6%)	0.865
Delivery mode				0.818
Vaginal/spontaneous	3 (100.0%)	32 (91.4%)	59 (93.7%)	
Caesarean section	0 (0.0%)	3 (8.6%)	4 (6.3%)	
Delivery place				0.011
Gvn.t Hospital	0 (0.0%)	7 (20.0%)	9 (14.3%)	
Gvn.t Health Center	3 (100.0%)	11 (31.4%)	11 (17.5%)	
Own Home	0 (0.0%)	17 (48.6%)	43 (68.3%)	
Delivery attendance				0.015
Health professional	3 (100.0%)	18 (51.4%)	20 (31.7%)	
Relatives	0 (0.0%)	14 (40.0%)	42 (66.7%)	
Nobody	0 (0.0%)	3 (8.6%)	1 (1.6%)	
Changes in mother's diet during pregnancy	1 (33.3%)	3 (8.8%)	3 (4.8%)	0.146

^a WHO and UNICEF recommend that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life; meaning no other foods or liquids are provided, including water.

^b Delayed initiation of breastfeeding after 1 hour after birth.

^c A pre-lacteal feed is any food except mother's milk provided to a newborn before initiating breastfeeding.

^d p-value < 0.05 considered statistically significant. p-value calculated using ANOVA or Chi-squared test.

^e % by column.

from popular traditions handed down from mother to daughter. A substantial percentage of them (37.62% or n=38) gave foods other than human milk to the infant while discarding colostrum. In this study, just 38 (37.62%) mothers declared to feed their infants with human milk during the first three days after birth. 24.75% (n=25) of the mothers declared to leave their children fasting during the first days after birth, while they were discarding colostrum. Mothers usually start breastfeeding on day 2 after birth. The women's ideas and attitudes towards colostrum, breastmilk and breastfeeding are shown in Table 4.

The most common pre-lacteal foods that the mothers interviewed gave to their infants were butter (60.5%) raw egg yolk (21.0%) powder milk (5.3%) mix of flour and water (5.3%) or other foods (7.9%).

Data collected on the women's knowledge and practices about supplementary feeding is shown in Table 5. 98.88%

(n=88) of the 89 mothers who took part into the study and had children aged more than 6 months, said that human milk was the main food that the infants received during the first six months of life. Just 1 mother (0.8%) said that her child received infant formula instead of human milk. Among these women, 18 mothers (20.22%), added other foods to human milk. The most commonly added foods to the child's diet were infant formula, adult foods, cereals-based fluid, cow's milk, injera, and porridge. According to most participants (82.18% or n=83), supplementary feeding should start at 6 months.

According to mothers' answers, the best food to start food supplementation was injera (28.71% or n=29), followed by porridge (23.76% or n=24), shiro (14.85% or n=15), genfo (10.9% or n=11), whatever the family eats (8.9% or n=9), adult foods (6.93% or n=7) (like lentils, eggs, rice, bread.) and faffa (5.94% or n=6). Injera or Enjera is a flatbread made of teff flour, it represents the most common component

Table 4. Breastmilk: ideas and attitudes

	WHO recommendation ^a (n=3)	Later initiation of breastfeeding ^b (n=35)	Pre-lacteal feeding ^c (n=63)	p-value ^d
	n (% ^e)	n (% ^e)	n (% ^e)	
Mother's idea about colostrum				0.000
Important	3 (100.0%)	5 (14.3%)	3 (4.8%)	
Not sufficient	0 (0.0%)	3 (8.6%)	4 (6.3%)	
Dirty and dangerous	0 (0.0%)	17 (48.6%)	50 (79.4%)	
No idea	0 (0.0%)	10 (28.6%)	6 (9.5%)	
Colostrum discarding				0.000
Disagree	3 (100.0%)	7 (20.0%)	6 (9.5%)	
Agree	0 (0.0%)	24 (68.6%)	54 (85.7%)	
No idea	0 (0.0%)	4 (11.4%)	3 (4.8%)	
Info about infant feeding				0.584
about breastfeeding only	2 (66.7%)	9 (25.7%)	15 (23.8%)	
about suppl. feeding	0 (0.0%)	2 (5.7%)	1 (1.6%)	
No informations	1 (33.3%)	24 (68.6%)	46 (73.0%)	
Other	0 (0.0%)	0 (0.0%)	1 (1.6%)	

^a WHO and UNICEF recommend that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life; meaning no other foods or liquids are provided, including water.

^b Delayed initiation of breastfeeding after 1 hour after birth.

^c A pre-lacteal feed is any food except mother's milk provided to a newborn before initiating breastfeeding.

^d p-value < 0.05 considered statistically significant. p-value calculated using ANOVA or Chi-squared test.

^e % by column.

Table 5. Supplementary feeding: knowledge and practices

	WHO recommendation ^a (n=3)	Later initiation of breastfeeding ^b (n=35)	Pre-lacteal feeding ^c (n=63)	p-value ^d
	n (% ^e)	n (% ^e)	n (% ^e)	
Info about infant feeding				0.584
about breastfeeding only	2 (66.7%)	9 (25.7%)	15 (23.8%)	
about suppl. feeding	0 (0.0%)	2 (5.7%)	1 (1.6%)	
No informations	1 (33.3%)	24 (68.6%)	46 (73.0%)	
Other	0 (0.0%)	0 (0.0%)	1 (1.6%)	
Main food that the child received during the first six months after birth				0.742
Human milk	2 (66.7%)	31 (88.6%)	55 (87.3%)	
Other	1 (33.3%)	4 (11.4%)	8 (12.7%)	
Supplementary feeding started/will start at				0.786
2 months	0 (0.0%)	1 (2.9%)	0 (0.0%)	
5 months	0 (0.0%)	1 (2.9%)	1 (1.6%)	
6 months	3 (100.0%)	29 (82.9%)	51 (81.9%)	
7 months	0 (0.0%)	3 (8.6%)	9 (14.3%)	
8 months	0 (0.0%)	1 (2.9%)	0 (0.0%)	
9 months	0 (0.0%)	0 (0.0%)	2 (3.2%)	
First food the child received/will receive				0.339
Injera	0 (0.0%)	12 (34.3%)	17 (27.0%)	
Shiro	0 (0.0%)	6 (17.1%)	9 (14.3%)	
Faffa	0 (0.0%)	0 (0.0%)	6 (9.5%)	
Whatever the mother eats	0 (0.0%)	2 (5.7%)	7 (11.1%)	
Porridge	2 (66.7%)	9 (25.7%)	13 (20.6%)	
Genfo	0 (0.0%)	3 (8.6%)	8 (12.7%)	
Other	1 (33.3%)	3 (8.6%)	3 (4.8%)	

^a WHO and UNICEF recommend that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life; meaning no other foods or liquids are provided, including water.

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of any Ethiopian meal and shiro, is the most common preparation that they are used to mix with injera. The main ingredient of shiro is chickpeas flour prepared with the addition of water, oil, chopped onions and berbere, the most common Ethiopian spice. Genfo is the Amharic name for a kind of porridge that people is used to eat for breakfast and faffa is a mix of corn and soya beans flours fortified with vitamins and minerals made in Ethiopia in order to supply children suffering from malnutrition.

DISCUSSION

In the sample, 58 of the 101 (57.43%) women who participated in the study received ante-natal care with just 26 (25.74%) receiving information about breastfeeding and only 3 (2.97%) receiving information about supplementary feeding. The ante-natal care available to the participating women is limited. In Andode there is only a health post of the MCSPA staffed by a nurse. The closest health center is in Fite Bako and the nearest hospital and pharmacy are in Nekemte (70km or 3 hours away). In Muke Turi there is a very small hospital staffed by doctors and nurses, a health center and a pharmacy, however, any serious medical situation must be derived to facilities in Addis Ababa about 80km away. It must also be noted that care at any of the mentioned hospitals is not free and most of the women do not have insurance to cover the cost. If emergency or vital care is needed, the MCSPA will in that case cover the cost but the cost of regular ante-natal care must be paid by the women and their families who in most cases are not able to do so.

Due to the inadequate health care situation in which most mothers find themselves, many of the mothers interviewed never received medical assistance during pregnancy and gave birth to their children at home. This translates to around 70% of women not having received any information about the infant feeding during pregnancy, and therefore relying on popular traditions and beliefs handed down from mother to daughter regarding how to feed their infants. Optimal breastfeeding practice, including early or timely initiation of breastfeeding (EIBF) and exclusive breastfeeding (EBF), seems to be connected to the education of the mother and the level of ante-natal care received. Ante-natal care including basic information on adequate breastfeeding practices could be a great tool to improve mothers' education about infant feeding and improve rates of EIBF and EBF.

Exclusive breastfeeding in Ethiopia is significantly lower than the global recommendations¹¹. A recent meta-analysis study has provided insight into breastfeeding practices and its associated factors, which could be useful for breastfeeding improvement interventions in Ethiopia¹². Optimal care during pregnancy and after birth is important to ensure adequate breastfeeding practices. Several previous studies have shown that Ethiopian mothers who received ante-natal care and who gave birth at health institutions had better exclusive

breastfeeding practices¹³⁻¹⁷. Based on these findings, it is strongly recommended that the utilization of ante-natal care and institutional delivery be improved through health extension workers¹¹.

Early or timely initiation of breastfeeding (EIBF) refers to the feeding with human milk that start within one hour after birth and it shows great advantages, for the mother and the infant, in reference to immunological, nutritional and developmental outcomes². There is abundant evidence that shows that EIBF is connected with a low incidence of mortality among neonates^{18,19}. In 2019, neonatal mortality rate for Ethiopia was 27.6 deaths per 1,000 live births²⁰. EIBF rates in Ethiopia vary widely and have been show to range from around 40% to over 80%²¹⁻³¹. The results of this study are in agreement with previous studies in which women from rural area were less likely to initiate breastfeeding within 1 h as compared with women from urban areas^{21,28,30,31}. Mothers who give birth at health institution and/or received ante-natal care were more likely to initiate breastfeeding timely²¹⁻²⁸ as were mothers with higher educational status and household income^{22,25,29-31}.

Colostrum avoidance is a very common practice in developing countries like Ethiopia^{3,32,33}. This tradition delays the initiation and interferes with optimal breastfeeding practice and the future success of breastfeeding^{3,33-35}. The prevalence of colostrum avoidance in this study was very high at 77.23%. Furthermore, the women interviewed declared that during the first days after birth, they wet the breast with hot water and pump in order to discard colostrum. None of them could explain the reason of this practice but in most of cases the mothers stated that colostrum is dirty and could be dangerous for the newborn while a few stated that colostrum is not sufficient for the newborn because it is too similar to water.

Evidence shows that colostrum avoidance has relevant association with increased rates of malnutrition, while infant who fed on colostrum seem to be less likely to be stunted^{1,36-38}. In this study, the incidence of colostrum avoidance was higher compared to the national prevalence in Ethiopia (39.8%)³⁹ and to other studies conducted in more developed zones of the country^{32,40,41}. This difference in the incidence of colostrum avoidance might be due to the low educational level of the same exemplified by a literacy rate of only 18% with the rate decreasing from the first to the third group,

A substantial percentage of women gave food to the infant while discarding colostrum. This pre-lacteal feeding is very common in Ethiopia, where 18% of infant mortality is connected to poor breastfeeding practice⁴². An Ethiopian study reported that according to many mothers, pre-lacteal foods were useful to 'clean the neonate's throat' during the first three days after birth⁴³. This practice is widely diffused in rural areas rather than in urban areas due to the lack of knowledge of the mothers and to the high number of home deliveries. In

Ethiopia, one in four children were given prelacteal foods⁴⁴. Mothers who gave birth at home are more prone to give prelacteal foods, whereas, antenatal care, timely initiation of breastfeeding, counseling on infant feeding and an urban residence are associated with decreased prelacteal feeding practices in Ethiopia^{3,44-46}. Therefore, the government and health institutions should focus to increase maternal health service utilization and promote infant and young child feeding practices according to the guideline⁴⁴.

Pre-lacteal foods have a high microbial load for the immature immune system of the infant: after birth the gut is more permeable and vulnerable to pathogens⁴⁵. The situation is even worse if we think that mothers avoid to feed their infants with colostrum, which is essential to compensate the immunological immaturity of the newborn, and prefer to feed the neonates by hand with pre-lacteal foods. While colostrum, the perfect food that the newborn should receive after birth, is very low in fat⁴⁷ the most common pre-lacteal foods that the neonates received, like butter and egg yolk, were very high in fat and very hard to be digested by the immature intestine of the newborn.

Just 3 (2.97%) of all the mothers who participated in the study received information about supplementary feeding during pregnancy. The WHO optimal breastfeeding practice guidelines include initiation of breastfeeding within one hour after birth and exclusively breastfeeding for the first six months from which infant needs are increased and human milk may not be sufficient and supplementary feeding should start. Early supplementation, however, is discouraged for several reasons: it exposes the newborn to pathogens and increases their risk of infection⁴⁵, it raises the risk of illness including diarrhoea and pneumonia⁴⁸ and even if it is not the direct cause of death, it is a contributing cause of morbidity and mortality among children aged less than 24 months⁴⁶. On the other hand, prolonged duration of breastfeeding of more than 12 months without foods supplementation was associated with undernutrition⁴⁹.

Limitations

As with any other, this study has certain limitations that must be taken into consideration. This is the first study about breastfeeding practices conducted in these two rural zones of Ethiopia and knowledge of the area and its people was limited before the researchers' arrival. The semi-structured interview prepared before arrival had to be adapted as a considerable part of the survey could not be accurately completed due to the unforeseen limitations regarding date availability. Most of the women did not know that they were pregnant until the third/fourth month and have no official documents or records about their general health status and/or about their condition during pregnancy. The small sample size included in this study is also a limitation that was due to the short time that the research team was permitted to stay in either village,

the travel time necessary to arrive to each women's house and also to the considerable length of each interview which was necessarily conducted with complete translation.

CONCLUSIONS

Ethiopia suffers high rates of malnutrition among children and this impacts physical and mental development. There is strong evidence that the prevention of malnutrition in infants and children requires increased intake of food during pregnancy, exclusive breastfeeding during the first 6 months, appropriate supplementary feeding starting from the 6th month followed by an appropriate feeding practice until the 24th months, access to clean water, sanitation and health care. On the contrary, among the list of factors associated with stunting in literature we found use of pre-lacteal feed, mother's health status, use of ANC, optimal breastfeeding practice and age of introduction of complementary foods⁵⁰.

This study allows us to understand that mothers are not well educated about the nutrition of their infant. According to the results that we obtained, most of the mothers are illiterate and this aspect has a negative impact on their children healthy growth. Education is central for development at every level: it is a tool for improving living conditions, reducing poverty, and building a food-secure world. As expected, new mothers learn how to take care of their children from their mothers or their mothers in law. Education from health professionals during pregnancy or post-natal care still have a low rate of incidence in these rural areas. Improving this practice through mother's education is a sustainable way to improve community growth.

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