

## 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 provided<sup>1</sup>. 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 properties<sup>2</sup>.

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 Ethiopia<sup>3</sup>.

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 areas<sup>4</sup>. 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 electricity<sup>5</sup>.

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 old<sup>6-9</sup>. According to the most recent report on pediatric nutritional status in Ethiopia available<sup>10</sup>, 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 age<sup>10</sup>. 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<sup>4,10</sup>.

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 <sup>a</sup> (n=3)	Later initiation of breastfeeding <sup>b</sup> (n=35)	Pre-lacteal feeding <sup>c</sup> (n=63)	p-value <sup>d</sup>
	Mean/n (SD/ % <sup>e</sup> )	Mean/n (SD/ % <sup>e</sup> )	Mean/n (SD/ % <sup>e</sup> )	
<b>Approximate age of the mother (years)</b>	25.33 (5.03)	27.28 (6.59)	27.35 (6.41)	0.870
<b>Educational level</b>				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)	
<b>Primiparous</b>	1 (33.3%)	8 (22.86%)	19 (30.16%)	
<b>Multiparous</b>	2 (66.6%)	27 (77.14%)	44 (69.84%)	
<b>Number of children for multiparous mothers</b>	3.50 (0.7)	3.85 (2.03)	3.89 (1.78)	0.000
<b>Still breastfeeding</b>	3 (100.0%)	31 (88.6%)	49 (77.8%)	0.292
<b>Never breastfed</b>	0 (0.0%)	0 (0.0%)	1 (100.0%)	-

<sup>a</sup> 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.

<sup>b</sup> Delayed initiation of breastfeeding after 1 hour after birth.

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

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

<sup>e</sup> % 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 m<sup>2</sup> of floor area per person while WHO literatures suggest 9-10 m<sup>2</sup> 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 <sup>a</sup> (n=3)	Later initiation of breastfeeding <sup>b</sup> (n=35)	Pre-lacteal feeding <sup>c</sup> (n=63)	p-value <sup>d</sup>
	Mean/n (SD/ % <sup>e</sup> )	Mean/n (SD/ % <sup>e</sup> )	Mean/n (SD/ % <sup>e</sup> )	
<b>Number of people living in the house</b>	4.33 (1.15)	4.85 (1.98)	4.88 (1.91)	0.888
<b>Size of the house (m<sup>2</sup>)</b>	12.00 (0.00)	14.5 (4.55)	16.88 (5.93)	0.158
<b>Overcrowding rate</b>	3.20 (1.13)	2.88 (0.76)	3.90 (1.62)	0.042
<b>Floor of the house</b>				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%)	
<b>Toilet facility</b>				0.720
Pit latrine	2 (66.7%)	27 (81.7%)	47 (75.8%)	
No Facilities	1 (33.3%)	6 (18.2%)	15 (24.2%)	
<b>Animals inside the house</b>	0 (0.0%)	11 (33.3%)	19 (30.6%)	0.487
<b>Kind of animals</b>				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%)	
<b>Main source of drinking water</b>				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%)	

<sup>a</sup> 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.

<sup>b</sup> Delayed initiation of breastfeeding after 1 hour after birth.

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

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

<sup>e</sup> % 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 <sup>a</sup> (n=3)	Later initiation of breastfeeding <sup>b</sup> (n=35)	Pre-lacteal feeding <sup>c</sup> (n=63)	p-value <sup>d</sup>
	n (% <sup>e</sup> )	n (% <sup>e</sup> )	n (% <sup>e</sup> )	
<b>Received antenatal care</b>	2 (66.7%)	21 (60.0%)	35 (55.6%)	0.865
<b>Delivery mode</b>				0.818
Vaginal/spontaneous	3 (100.0%)	32 (91.4%)	59 (93.7%)	
Caesarean section	0 (0.0%)	3 (8.6%)	4 (6.3%)	
<b>Delivery place</b>				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%)	
<b>Delivery attendance</b>				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%)	
<b>Changes in mother's diet during pregnancy</b>	1 (33.3%)	3 (8.8%)	3 (4.8%)	0.146

<sup>a</sup> 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.

<sup>b</sup> Delayed initiation of breastfeeding after 1 hour after birth.

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

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

<sup>e</sup> % 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 <sup>a</sup> (n=3)	Later initiation of breastfeeding <sup>b</sup> (n=35)	Pre-lacteal feeding <sup>c</sup> (n=63)	p-value <sup>d</sup>
	n (% <sup>e</sup> )	n (% <sup>e</sup> )	n (% <sup>e</sup> )	
<b>Mother's idea about colostrum</b>				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%)	
<b>Colostrum discarding</b>				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%)	
<b>Info about infant feeding</b>				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%)	

<sup>a</sup> 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.

<sup>b</sup> Delayed initiation of breastfeeding after 1 hour after birth.

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

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

<sup>e</sup> % by column.

**Table 5.** Supplementary feeding: knowledge and practices

	WHO recommendation <sup>a</sup> (n=3)	Later initiation of breastfeeding <sup>b</sup> (n=35)	Pre-lacteal feeding <sup>c</sup> (n=63)	p-value <sup>d</sup>
	n (% <sup>e</sup> )	n (% <sup>e</sup> )	n (% <sup>e</sup> )	
<b>Info about infant feeding</b>				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%)	
<b>Main food that the child received during the first six months after birth</b>				0.742
Human milk	2 (66.7%)	31 (88.6%)	55 (87.3%)	
Other	1 (33.3%)	4 (11.4%)	8 (12.7%)	
<b>Supplementary feeding started/will start at</b>				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%)	
<b>First food the child received/will receive</b>				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%)	

<sup>a</sup> 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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<sup>e</sup> % by column.

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 recommendations<sup>11</sup>. A recent meta-analysis study has provided insight into breastfeeding practices and its associated factors, which could be useful for breastfeeding improvement interventions in Ethiopia<sup>12</sup>. 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 practices<sup>13-17</sup>. Based on these findings, it is strongly recommended that the utilization of ante-natal care and institutional delivery be improved through health extension workers<sup>11</sup>.

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 outcomes<sup>2</sup>. There is abundant evidence that shows that EIBF is connected with a low incidence of mortality among neonates<sup>18,19</sup>. In 2019, neonatal mortality rate for Ethiopia was 27.6 deaths per 1,000 live births<sup>20</sup>. EIBF rates in Ethiopia vary widely and have been show to range from around 40% to over 80%<sup>21-31</sup>. 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<sup>21,28,30,31</sup>. Mothers who give birth at health institution and/or received ante-natal care were more likely to initiate breastfeeding timely<sup>21-28</sup> as were mothers with higher educational status and household income<sup>22,25,29-31</sup>.

Colostrum avoidance is a very common practice in developing countries like Ethiopia<sup>3,32,33</sup>. This tradition delays the initiation and interferes with optimal breastfeeding practice and the future success of breastfeeding<sup>3,33-35</sup>. 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<sup>1,36-38</sup>. In this study, the incidence of colostrum avoidance was higher compared to the national prevalence in Ethiopia (39.8%)<sup>39</sup> and to other studies conducted in more developed zones of the country<sup>32,40,41</sup>. 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 practice<sup>42</sup>. 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 birth<sup>43</sup>. 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 foods<sup>44</sup>. Mothers who gave birth at home are more prone to give pre-lacteal 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<sup>3,44-46</sup>. 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 guideline<sup>44</sup>.

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 pathogens<sup>45</sup>. 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 fat<sup>47</sup> 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 infection<sup>45</sup>, it raises the risk of illness including diarrhoea and pneumonia<sup>48</sup> 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 months<sup>46</sup>. On the other hand, prolonged duration of breastfeeding of more than 12 months without foods supplementation was associated with undernutrition<sup>49</sup>.

### 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 foods<sup>50</sup>.

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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### REFERENCES

1. World Health Organization (WHO), UNICEF. Protecting, promoting, and supporting breastfeeding in facilities providing maternity and newborn services: the revised Baby-friendly Hospital Initiative 2018. Implementation guidance. Geneva, Switzerland: World Health Organization (WHO); 2018 [cited 2022 Oct 6]; Available from: <https://www.who.int/publications/i/item/9789240001459>
2. Lutter C. Early Initiation of breastfeeding: The key to survival and beyond. Washington DC: Pan American Health Organization; 2010 [cited 2022 Oct 6]; Available from: <http://new.paho.org/hq/dm-documents/2010/Eight%20Pager%20English%20FINAL.pdf>
3. Rogers NL, Abdi J, Moore D, Nd'iangui S, Smith LJ, Carlson AJ, Carlson D. Colostrum avoidance, prelacteal feeding and late breast-feeding initiation in rural northern Ethiopia. *Public Health Nutr.* 2011;14(11):2029-36.

4. United Nations Development Programme (UNDP), Oxford Poverty and Human Development Initiative (OPHI). Global multidimensional poverty index 2019: illuminating inequalities. Oxford, UK: Oxford Poverty and Human Development Initiative (OPHI); 2019 [cited 2022 Oct 6]; Available from: <https://reliefweb.int/report/world/multidimensional-poverty-index-2019-illuminating-inequalities>
5. Central Statistical Agency (CSA) of Ethiopia, ICF International. ETHIOPIA Demographic and Health Survey 2016. Addis Ababa, Ethiopia; Rockville, Maryland, USA: ICF International; 2017 [cited 2022 Oct 6]; Available from: <https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf>
6. Dhatrik PP, Pitale S, Kasturwar N, Nayse J, Relwani N. Prevalence and epidemiological determinants of malnutrition among under-fives in an urban slum, Nagpur. *National J Community Med.* 2013;4(1):91.
7. Fikadu T, Assegid S, Dube L. Factors associated with stunting among children of age 24 to 59 months in Meskan district, Gurage zone, South Ethiopia: A case-control study. *BMC Public Health.* 2014;14(1):800.
8. Marriott BP, White A, Hadden L, Davies JC, Wallingford JC. World health organization (WHO) infant and young child feeding indicators: Associations with growth measures in 14 low-income countries. *Matern Child Nutr* 2012;8(3):354-70.
9. Muldiasman M, Kusharisupeni K, Laksminingsih E, Besral B. Can early initiation to breastfeeding prevent stunting in 6–59 months old children? *J Health Res* 2018; 32(5): 334-41.
10. Ethiopian Public Health Institute, Federal Ministry of Health of Ethiopia, ICF International. Ethiopia Mini Demographic and Health Survey 2019 Key Indicators. Addis Ababa, Ethiopia; Rockville, Maryland, USA: ICF International; 2019 [cited 2022 Oct 6]; Available from: <https://www.unicef.org/ethiopia/media/1721/file>
11. Alebel A, Tesma C, Temesgen B, Ferede A, Kibret GD. Exclusive breastfeeding practice in ethiopia and its association with antenatal care and institutional delivery: A systematic review and meta-analysis. *Internat Breastfeed J* 2018;13(1):31.
12. Habtewold TD, Sharew NT, Alemu SM. Evidence on the effect of gender of newborn, antenatal care and postnatal care on breastfeeding practices in ethiopia: A meta-analysis and meta-regression analysis of observational studies. *BMJ Open.* 2019 May 30;9(5):e023956,2018-023956.
13. Hunegnaw MT, Gezie LD, Teferra AS. Exclusive breastfeeding and associated factors among mothers in gozamin district, northwest ethiopia: A community based cross-sectional study. *Int Breastfeed J.* 2017 12:30.
14. Adugna B, Tadele H, Reta F, Berhan Y. Determinants of exclusive breastfeeding in infants less than six months of age in Hawassa, an urban setting, Ethiopia. *Int Breastfeed J.* 2017 12:45.
15. Azeze GA, Gelaw KA, Gebeyehu NA, Gesese MM, Mokannon TM. Exclusive breastfeeding practice and associated factors among mothers in Boditi town, Wolaita zone, southern Ethiopia, 2018: A community-based cross-sectional study. *Int J Pediatr.* 2019 1483024.
16. Asemahagn MA. Determinants of exclusive breastfeeding practices among mothers in Azezo district, northwest Ethiopia. *Int Breastfeed J.* 2016 11:22.
17. Tariku A, Alemu K, Gizaw Z, Muchie KF, Derso T, Abebe SM, Yitayal M, Fekadu A, Ayele TA, Alemayehu GA, Tsegaye AT, Shimeka A, Biks GA. Mothers' education and ANC visit improved exclusive breastfeeding in Dabat health and demographic surveillance system site, northwest Ethiopia. *PLoS One.* 2017 12(6): e0179056.
18. NEOVITA Study Group. Timing of initiation, patterns of breastfeeding, and infant survival: Prospective analysis of pooled data from three randomised trials. *Lancet Glob* 2016;4(4):e266-75.
19. Smith ER, Hurt L, Chowdhury R, Sinha B, Fawzi W, Edmond KM, Neovita Study Group. Delayed breastfeeding initiation and infant survival: A systematic review and meta-analysis. *PloS One.* 2017;12(7):e0180722.
20. Knoema. Etiopía - Tasa de mortalidad, neonatal (por cada 1000 nacidos vivos) [cited 2022 Oct 6]; Available from: <https://knoema.es/atlas/Etiop%C3%ADa/Tasa-de-mortalidad-neonatal-por-cada-1000-nacidos-vivos>
21. Alebel A, Dejenu G, Mullu G, Abebe N, Gualu T, Eshetie S. Timely initiation of breastfeeding and its association with birth place in Ethiopia: A systematic review and meta-analysis. *Int Breastfeed J* 2017;12(1):44.
22. John JR, Mistry SK, Kebede G, Manohar N, Arora A. Determinants of early initiation of breastfeeding in ethiopia: A population-based study using the 2016 demographic and health survey data. *BMC Pregnancy Childbirth.* 2019 19(1):69.
23. Belachew A. Timely initiation of breastfeeding and associated factors among mothers of infants age 0-6months old in Bahir Dar city, northwest, Ethiopia, 2017: A community based cross-sectional study. *Int Breastfeed J.* 2019 14:5.
24. Ayalew T, Tewabe T, Ayalew Y. Timely initiation of breastfeeding among first time mothers in bahir dar city, north west, Ethiopia, 2016. *Pediatr Res.* 2019 85(5):612-6.
25. Tariku A, Biks GA, Wassie MM, Worku AG, Yenit MK. Only half of the mothers practiced early initiation of breastfeeding in north-west Ethiopia, 2015. *BMC Res Notes.* 2017 10(1):501.
26. Bimerew A, Teshome M, Kassa GM. Prevalence of timely breastfeeding initiation and associated factors in Dembecha district, north west Ethiopia: A cross-sectional study. *Int Breastfeed J.* 2016 11:28.
27. Tewabe T. Timely initiation of breastfeeding and associated factors among mothers in Motta town, east Gojjam zone, Amhara regional state, Ethiopia, 2015: A cross-sectional study. *BMC Pregnancy Childbirth.* 2016 16(1):314.
28. Mekonen L, Seifu W, Shiferaw Z. Timely initiation of breastfeeding and associated factors among mothers of infants under 12 months in south Gondar zone, Amhara regional state, Ethiopia; 2013. *Int Breastfeed J.* 2018 13:17.
29. Habtewold TD, Mohammed SH, Endalamaw A, Mulugeta H, Dessie G, Berhe DF, Birhanu MM, Islam MA, Teferra AA, Asefa NG.

- Higher educational and economic status are key factors for the timely initiation of breastfeeding in Ethiopia: A review and meta-analysis. *Acta Paediatrica*. 2020 109(11):2208-2218
30. Liben ML, Yesuf EM. Determinants of early initiation of breastfeeding in Amibara district, northeastern Ethiopia: A community based cross-sectional study. *Int Breastfeed J*. 2016 11:7.
  31. Lakew Y, Tabar L, Haile D. Socio-medical determinants of timely breastfeeding initiation in Ethiopia: Evidence from the 2011 nationwide demographic and health survey. *Int Breastfeed J*. 2015 10:24.
  32. Weldesamuel GT, Atalay HT, Zemichael TM, Gebre HG, Abraha DG, Amare AK, Gidey EB, Alemayoh TT. Colostrum avoidance and associated factors among mothers having children less than 2 years of age in Aksum town, Tigray, Ethiopia: A cross-sectional study 2017. *BMC Res notes*. 2018;11(1):601.
  33. Gedamu H, Tsegaw A, Debebe E. The prevalence of traditional malpractice during pregnancy, child birth, and postnatal period among women of childbearing age in Meshenti town, 2016. *Int J Reprod Med*. 2018 2018:5945060.
  34. Wolde TF, Ayele AD, Takele WW. Prolactal feeding and associated factors among mothers having children less than 24 months of age, in mettu district, southwest Ethiopia: A community based cross-sectional study. *BMC Res Notes*. 2019 12(1):9.
  35. Amele EA, Demissie BW, Desta KW, Woldemariam EB. Prolactal feeding practice and its associated factors among mothers of children age less than 24 months old in southern Ethiopia. *Ital J Pediatr*. 2019 45(1):15.
  36. Meshram I, Laxmaiah A, Venkaiah K, Brahmam G. Impact of feeding and breastfeeding practices on the nutritional status of infants in a district of Andhra Pradesh, India. *Natl Med J India*. 2012;25(4):201.
  37. Teshome B, Kogi-Makau W, Getahun Z, Taye G. Magnitude and determinants of stunting in children under five years of age in food surplus region of Ethiopia: The case of West Gojam Zone. *Ethiopian Journal of Health Development*. 2009;23(2) 98-106.
  38. World Health Organization (WHO), UNICEF. Baby-Friendly Hospital Initiative. Revised, Updated and Expanded for Integrated Care. Geneva, Switzerland: World Health Organization (WHO); 2009 [cited 2022 Oct 6]; Available from: <https://apps.who.int/iris/handle/10665/43593>
  39. Ethiopian Health and Nutrition Research Institute (EHNRI). Nutritional baseline survey report for the national nutrition program of Ethiopia. Addis Ababa, Ethiopia: Ethiopian Health and Nutrition Research Institute, (EHNRI); 2010 [cited 2022 Oct 6]; Available from: <https://d-nb.info/1127680927/34>
  40. Admasu MA, Cione E. Breastfeeding knowledge, attitude, and practice and related determinants among maternal in Gondar, Ethiopia: Cross-sectional study. *IJNFS*. 2016;5(1):25-30.
  41. Tamiru D, Belachew T, Loha E, Mohammed S. Sub-optimal breastfeeding of infants during the first six months and associated factors in rural communities of Jimma Arjo Woreda, southwest Ethiopia. *BMC Public Health*. 2012;12(1):363.
  42. Hailu I, Kidane A, Kovach T, Lemma F, Sethuraman K, Sommerfelt AE, Tekla T. A Tool to Support Nutrition Advocacy in Ethiopia: Ethiopia PROFILES 2012 Estimates. Washington DC, USA; Addis Ababa, Ethiopia: Food and Nutrition Technical Assistance III Project (FANTA)/FHI 360; Federal Ministry of Health, Ethiopia; 2013 [cited 2022 Oct 6]; Available from: <https://www.fantaproject.org/sites/default/files/resources/Ethiopia-PROFILES-2012-Estimates-Sep2013.pdf>
  43. Alemayehu T, Haidar J, Habte D. Determinants of exclusive breastfeeding practices in Ethiopia. *Ethiop J Health Dev* 2009; 23(1). 2009;23(1) 12-8.
  44. Temesgen H, Negesse A, Woyraw W, Getaneh T, Yigizaw M. Prolactal feeding and associated factors in Ethiopia: Systematic review and meta-analysis. *International breastfeeding journal*. 2018;13(1):49.
  45. Tewabe T. Prolactal feeding practices among mothers in Motta town, northwest Ethiopia: A cross-sectional study. *Ethiop J Health Sci*. 2018 28(4):393-402.
  46. Bekele Y, Mengistie B, Mesfine F. Prolactal feeding practice and associated factors among mothers attending immunization clinic in Harari region public health facilities, eastern Ethiopia. *Open J Prev Med* 2014 4:529-534.
  47. Zhao P, Zhang S, Liu L, Pang X, Yang Y, Lu J, Lv J. Differences in the triacylglycerol and fatty acid compositions of human colostrum and mature milk. *J Agric Food Chem*. 2018;66(17): 4571-9.
  48. Gedefaw M, Berhe R. Determinates of childhood pneumonia and diarrhea with special emphasis to exclusive breastfeeding in north Achefer district, northwest Ethiopia: A case control study. *Open J Epidemiol* 2015;5(02):107.
  49. Caulfield LE, Huffman SL, Piwoz EG. Interventions to improve intake of complementary foods by infants 6 to 12 months of age in developing countries: Impact on growth and on the prevalence of malnutrition and potential contribution to child survival. *Food Nutr Bull* 1999;20(2):183-200.
  50. Ghosh S, Suri D, Hiko D, Fentahun N, Griffiths JK. Factors associated with stunting in Ethiopian children under five. Addis Ababa, Ethiopia: Save the Children; 2014 [cited 2022 Oct 6]; Available from: [https://pdf.usaid.gov/pdf\\_docs/PA00KWBP.pdf](https://pdf.usaid.gov/pdf_docs/PA00KWBP.pdf)