



# Feeding Practices and Associated Factors During Diarrheal Disease Among Children Aged Less Than Five Years: Evidence from the Ethiopian Demographic and Health Survey 2016

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**Purpose:** Diarrhea is a common childhood illness and one of the leading causes of death in young children globally. In Ethiopia, a significant number of deaths and hospitalizations in under-five children are related to diarrheal diseases. Inappropriate feeding during diarrhea leads to a double burden of diarrhea recurrence and malnutrition among children. However, empirical evidence is limited in Ethiopia. Thus, this study was aimed to assess feeding practices and associated factors during diarrheal disease among children aged less than five years in Ethiopia.

**Patients and Methods:** The study used the Ethiopian Demographic and Health Survey (EDHS) 2016 data. A two-stage stratified sampling technique was applied to identify 917 under five years children. Generalized linear mixed model analyses were computed, and a P value of less than 0.05 and an adjusted odds ratio (AOR) with a 95% confidence interval (CI) were used to identify statistically significant factors with feeding practices.

**Results:** The majority (92.5%) of mothers were married. Out of the participants, (54.1%) of children were male; 55.6% of them were in the age group of 6–23 months. The appropriate feeding practices for children aged less than five years who had diarrhea was 15.4% (95% CI: 13.7%-18.2%). Mothers aged 25–34 years (AOR: 0.6, 95% CI: 0.4–0.9), agricultural occupation of mothers (AOR: 2.2, 95% CI: 1.3–3.6), mothers attended four and more antenatal visit (AOR: 2.3, 95% CI: 1.3–4.32) and mothers who had a postnatal checkup within two months of birth (AOR: 1.9, 95% CI: 1.1–3.2) were factors statistically associated with child feeding practices during diarrhea.

**Conclusion:** Less than one-fifth of under-five children practiced appropriate feeding during diarrheal disease. Working in agriculture and attending antenatal care and postnatal checkup within two months were positively influencing feeding practice. Therefore, the government of Ethiopia needs to strengthen the existing maternal and child health services.

**Keywords:** feeding practices, diarrheal disease, under-five children, Ethiopia

## Introduction

Globally, in 2018, an estimated 5.3 million under the age of 5 years children were died, mostly from preventable causes and almost half of the deaths have occurred within the first month of life.<sup>1</sup> Sub-Saharan Africa (SSA) and Southern Asia were accounting over 80% of the under-five death.<sup>2</sup> In Ethiopia, 1 in 15 children died before reaching the fifth birthday.<sup>3</sup> Diarrhea is a common illness and the second leading cause of death in young children.<sup>4</sup> About 19% of under-five deaths,

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globally, and 30% of pediatric admission in developing countries are related to diarrheal disease.<sup>5-7</sup> In Africa diarrhoea among young children accounts for the biggest reason for disease and nearly 50% of deaths among young children occurs because of diarrhoea.<sup>8</sup> Ethiopia is one of the five countries with the highest diarrhoeal disease burden among children under the age of five years. Studies in Ethiopia have revealed that diarrhoeal disease accounts for approximately 8.4% to 27% of all under-five deaths. Moreover, 16% of all under-five hospitalizations and 14% of all outpatient visits were due to diarrhoeal disease.<sup>9,10</sup>

Inappropriate feeding during diarrhoea leads to a vicious cycle for the frequent occurrence of diarrhoea and malnutrition, which aggravates morbidity, mortality as well as interfere with physical growth and cognitive development.<sup>11,12</sup> Evidences advocate that optimal child feeding practices (both liquid and solid foods) during childhood illnesses like diarrhoea are among the foremost effective global strategies of integrated management of childhood illnesses and emphasize the necessity to extend fluid intake during illness while feeding is maintained and increase food intake during convalescence.<sup>13-17</sup> Continuing feeding from the early onset of diarrhoea can alleviate the consequences of the disease such as reduction of absorption and loss of nutrients, thereby the large portion of child death, due to diarrhoeal disease, can be prevented.<sup>7,18</sup>

However, children's nutritional status can be worsened during or after illness unless they do not get extra food. Children's poor appetite induced by diarrhoea can contribute to continuing the cycle of infection and stunting.<sup>19</sup> Regardless of multi-dimensional advantages of continuous feeding of children during diarrhoeal disease, some traditional beliefs, and practices such as partial food restrictions, ceasing of breast milk, giving foods in a particular composition and a specific amount, restriction of vegetables and fruits<sup>4</sup> are contributing factors for inappropriate feeding practices during common childhood illnesses in low-income and middle-income countries.<sup>20,21</sup> Moreover, poor socioeconomic status, large family size, previous experience of child illness and death; poor educational status of caregivers, low maternal and child health services utilization; low coverage, and poor quality of primary health care services were the foremost commonly mentioned factors affecting child feeding practices during and after diarrhoeal disease.<sup>22,23</sup> A study done in that of rural pastoralist communities of the Afar region, Ethiopia

showed, only 5.2% of children with diarrhoea were offered foods more than usual.<sup>23</sup> In spite of multiple site-specific studies, national-level studies would also have a paramount contribution to the achievement of the national target regarding child health, however, child feeding practices and associated factors during diarrhoeal disease is remained unstudied in Ethiopia. Thus, this study aimed to examine child feeding practices during diarrhoeal diseases and associated factors among children aged less than five years in Ethiopia using evidence from EDHS, 2016.

## Methods

### Study Settings and Data Source

The dataset for this analysis was 2016 Ethiopian Demographic and Health Survey (EDHS), conducted between January and June 2016. The data is a nationally representative household survey that has been implemented by the Central Statistical Agency (CSA) of Ethiopia with technical assistance from ICF DHS Program.<sup>24</sup> Ethiopia is divided into two administrative cities and nine geographical regions. The study involves all nine regions and two administrations cities.

### Sampling Procedures

The sampling frame used for the 2016 EDHS is the Ethiopia Population and Housing Census, which was conducted in 2007 by the CSA of Ethiopia. The census had used a complete list of 84,915 enumeration areas (EAs) created for 2007. The sampling frame contains the EAs location, type of residence, and the estimated number of residing households.

The 2016 EDHS was stratified and selected in two stages. The regions were stratified into urban and rural areas (yielded 21 sampling strata). Samples of EAs were selected independently in each stratum. At each of the lower administrative levels, implicit stratification and proportional allocation were achieved within each sampling stratum using a probability proportional to size selection. First, a total of 645 EAs were selected with probability proportional to the EAs size and with independent selection in each sampling stratum with the sample allocation given. The total residing households in the EAs were the EA size, and a household listing operation was implemented, which can be served as the sampling frame for the selection of households in the second stage. If the selected EA was large with more than 200 households segmentation was

done to minimize the task of household listing. Through the probability proportional to the segment size, only a segment was selected for the survey, and the household listing was conducted for each selected segment.

In the second stage, a fixed number of 28 households from each cluster were selected with an equal probability using a systematic selection from the newly created household listing. The survey interviewer interviewed only pre-selected households. No replacements or changes of the pre-selected households were allowed in the implementing stages to prevent bias. In this study, the 2016 Ethiopian demographic and health survey childhood datasets of the nine regions and two administrative cities were used.

All women aged 15–49 years who are the usual members of the selected households were eligible for the female survey. Children aged 0–59 months were the source population, whereas children aged 0–59 months with a history of diarrhea within two weeks before the survey were the study population. Accordingly, 917 mothers and their children aged 0–59 months with a history of diarrheal disease were included in the study, and data were extracted from the 2016 EDHS datasets. Potential independent variables were also extracted.

## Measurements of Variables

Feeding practices during diarrheal disease was the dependent variable of the study. It was measured based on the amount of liquid and food given to children during diarrheal disease. Accordingly, if a child received both liquids and foods in more than the usual amount, it was classified as “appropriate feeding practices” otherwise as “inappropriate feeding practices”.<sup>24</sup> The information on feeding practices was collected from mothers’ verbal responses. The mothers were asked about the feeding practices, treatments, and other actions taken for their child during diarrheal disease.

The explanatory variables were sociodemographic, economic, maternal, and child health services related characteristics and child-related variables.

In the EDHS, an asset-based approach was used to calculate the wealth index. The collected information was on ownership of a range of durable assets (eg car, refrigerator, and television) and housing characteristics (eg material of dwelling floor and roof and toilet facilities). Women were asked whether they had the above assets or not. These scores were derived using principal component analysis and ranked into the poorest, poorer, middle, richer, and richest categories. The wealth quintiles are expressed in terms of quintiles of individuals in the

population rather than quintiles of individuals at risk for anyone’s health or population indicator.

Media exposure was assessed as not at all, less than once in a week, and at least once a week; if they have access to all three media (newsletter reading, listen to the radio, and watching TV).

## Data Processing and Statistical Analysis

The data were extracted, cleaned, re-coded, and analyzed using STATA version 14 (Stata Corp, College Station, TX). Descriptive statistics were presented using tables and narrations. The EDHS data has hierarchical nature: women are nested within a cluster and we expect that women within the same cluster may be more similar to each other than women in another cluster. This violates the assumption of the traditional regression model which is the independence of observations and equal variance across clusters. Therefore, an advanced statistical model is needed to take into account the between cluster variability to get a reliable standard error and unbiased estimate. Besides, since the outcome variable was binary, standard logistic regression, Generalized Linear Mixed Models (GLMM) were fitted, and model comparison, as well as model fitness, were done based on the Intra-Class Correlation Coefficient (ICC), Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and Deviance values. Accordingly, the mixed-effect logistic regression model was the best-fitted model since it had the lowest deviance. Variables having a P value of less than 0.2 in the bivariable analysis were selected as candidate variables for the multivariable mixed-effect logistic regression analysis. In the final model, a P value of less than 0.05 and an adjusted odds ratio (AOR) with a 95% confidence interval (CI) were used to declare statistically significant factors with feeding practice among under-five children with diarrheal disease.

## Ethical Considerations

Ethical clearance for the 2016 EDHS was provided by the Ethiopian Health and Nutrition Research Institute (EHNRI) Review Board, the National Research Ethics Review Committee (NRERC) at the Ministry of Science and Technology, the Institutional Review Board of ICF International, and the communicable disease control (CDC). This study used secondary data sources from 2016 EDHS. Permission to use the EDHS data was obtained from the Measure DHS international program <http://www.dhsprogram.com>. This was done after being

registered and sending the concept note of this study through the website to get permission from ICF international to access and use the dataset. After obtaining permission (author letter), the dataset was downloaded from <https://dhsprogram.com/Data/terms-of-use.cfm> on Apr 09, 2020. The data is publicly available and has no personal identifiers.

## Results

### Sociodemographic and Economic Characteristics of Participants

A total of 917 mothers/caregivers with their respective under five years were included in the study. Out of the participants, more than half (52.2%) of women were aged 25–34 years; the majority of participants (92.5%) were married, and the average family size was 5.8. Of the participants, 81.2% were rural residents; approximately (15.3%) were from the Oromia region and 43.1% of participants were Muslims by religious status. Regarding educational status, about 58.2% of women have no formal education. Furthermore, 30.6% and 17.5% of participants were in the poorest and poorer wealth status, respectively, and 54.9% of them had no work (Table 1).

### Obstetrics-Related Characteristics of Participants

The majority of mothers (40.4%) had four and more antenatal care follow-up for the recent pregnancy. Out of them (54.6%) were started their first antenatal care follow-up in the second trimester of their pregnancy. In addition, 58.5% gave birth at home, and 88.7% of mothers did not seek a postnatal checkup. The majority of mothers (62.2%) had 2–5 living children; 64.4% wanted more children. (Table 2).

### Child Characteristics and Common Childhood Illnesses

More than half of the children (54.1%) were male; 55.6% of them were in the age group of 6–23 months, and 69.6% were feeding breast. Concerning symptoms, 40.5% and 54.2% had cough and fever for the last two weeks preceding the survey, respectively (Table 3).

### Health Service and Information Accessibility and Other Factors

Distance to get health facility was a big problem for more than half (53.4%) of mothers, and 62.2% had not visited the

**Table 1** Sociodemographic and Economic Characteristics of Participants in Ethiopia, 2016 (n=917)

Variables	Category	Frequency (n)	Percentage (%)
Age of mothers/care givers	15–24	255	27.8
	25–34	479	52.2
	≥35	183	20.0
Residence	Urban	172	18.8
	Rural	745	81.2
Region	Tigray	114	12.4
	Afar	89	9.7
	Amhara	108	11.8
	Oromia	140	15.3
	Somali	64	7.0
	Benishangul	65	7.1
	SNNPR	144	15.7
	Gambela	75	8.2
	Harari	43	4.7
	Addis Ababa Dire Dawa	28 47	3.0 5.1
Religion	Muslim	395	43.1
	Orthodox	305	33.3
	Others <sup>a</sup>	217	23.7
Sex of head of households	Male	742	80.9
	Female	175	19.1
Family size (mean =5.8)	Below mean	618	67.4
	Above mean	299	32.6
Current marital status of respondents	Married	852	92.5
	Not married	65	7.5
Educational status of respondents	No education	534	58.2
	Primary education	287	31.3
	Secondary education	66	7.2
	Higher education	30	3.3
Educational status of partner's (=852)	No education	353	41.4
	Primary	322	37.8
	Secondary	106	12.4
	Higher	71	8.4
Occupation of respondents	Not working	504	54.9
	Sales & service	141	15.4
	Agriculture	171	18.7
	Others <sup>b</sup>	101	11.0
Partner's occupation (n=852)	Not working	79	9.3
	Professional	168	19.7
	Agriculture	446	52.3
	Others	159	18.7

(Continued)

**Table 1** (Continued).

Variables	Category	Frequency (n)	Percentage (%)
Wealth status	Poorest	281	30.6
	Poorer	160	17.4
	Middle	149	16.3
	Richer	140	15.3
	Richest	187	20.4

**Notes:** <sup>a</sup>Others: Protestant, Catholic, traditional; <sup>b</sup>Others: skilled manual, unskilled manual, do not know.

health facility for the last 12 months before the data collection period. Nearly all (99.8%) of participants were not a member of health insurance. The majority of women (89.1%) were no participating in decision making (Table 4).

## Feeding Practices During Diarrhea Among Children Aged Less Than Five Years

Only 124 (13.5%) and 56 (6.1%) of children were offered to drink and eat more than the usual amount of liquids and foods, respectively. Appropriate feeding practice among children aged less than five years during diarrhea disease in Ethiopia was found to be 15.4% (95% CI: 13.7–18.2).

## Factors Associated with Feeding Practices During Diarrhea Among Under-Five Children

In the generalized linear mixed models analysis, mothers' age, occupation, number of antenatal care follow up and baby postnatal checkups were variables significantly associated with feeding practice during diarrhea for children aged less than five years.

Accordingly, mothers with the age group of 25–34 years were 40% less likely to feed their children appropriately compared to participants with the age group of 15–24 years (AOR: 0.6, 95% CI:0.4–0.9). Mothers with agriculture occupations were 2.2 times more likely to feed their children compared to mothers with no work (95% CI: 1.3–3.6). Mothers who had four and more antenatal visits were 2.3 times more likely to feed their children compared to those who had no antenatal care visit (95% CI: 1.3–4.3). Mothers who had a postnatal checkup within two months after birth were 1.9 (95% CI: 1.1–3.2) times more likely to give appropriate feeding compared to their counterparts (Table 5).

**Table 2** Obstetric-Related Characteristics of Mothers in Ethiopia, 2016 (n=917)

Variables	Categories	Frequency (n)	Percentage (%)
Number of ANC visit	0	261	28.5
	1–3	285	31.1
	+4	371	40.4
Time of 1st ANC visit in Month (n=656)	1st trimester	232	35.4
	2nd trimester	358	54.6
	3rd trimester	66	10.0
Current pregnancy	No	799	87.1
	Yes	118	12.9
Is current pregnancy wanted (n=118)	Then	76	64.4
	Later	28	23.7
	Not at all	14	11.9
Wanted when became pregnant	Then	694	75.7
	Later	173	18.9
	No more	50	5.4
Number of living children	1	173	18.9
	2–5	570	62.2
	6+	174	18.9
Age of the mother at the first child in years	<18	346	37.7
	18–24	505	55.1
	25+	66	7.2
The desire for more children	Wanted	591	64.4
	Undecided	32	3.5
	No more wanted	294	32.1
Place of delivery	Home	536	58.5
	Institutional	381	41.5
Postnatal checking within two months	No	813	88.7
	Yes	104	11.3
PNC service provider (n=104)	Doctor	13	12.5
	Nurse	47	45.2
	Midwife	13	12.5
	HEW	28	26.9
	<sup>a</sup> Others	3	2.9

**Note:** <sup>a</sup>Others: health officer, traditional birth attendance.

**Abbreviations:** ANC, antenatal care; PNC, postnatal care; HEW, health extension worker.

## Discussion

In this study, the overall appropriate feeding practice was 15.4% and maternal age, mother's occupation, ANC, and PNC were associated with appropriate feeding practice.

The finding showed that a significantly low percentage of children, 13.5% and 6.1%, have been given more than

**Table 3** Child Characteristics and Common Childhood Illness During Diarrhea in Ethiopia, 2016 (n=917)

Variables	Categories	Frequency (n)	Percentage (%)
Sex of the child	Male	496	54.1
	Female	421	45.9
Current age of the child in months	<6 Months	88	9.6
	6–23	510	55.6
	≥24	319	34.8
Size of the child at birth	Large	272	29.7
	Average	341	37.2
	Small	303	33.1
Child is twin	Single	908	99.0
	Multiple	9	1.0
Currently, breastfeed	Yes	638	69.6
	No	279	30.4
Had a fever in the last two weeks	No	497	54.2
	Yes	420	46.8
Had a cough in the last two weeks	No	546	59.5
	Yes	371	40.5

**Table 4** Health Service and Information Accessibility and Other Factors in Ethiopia, 2016 (n=917)

Variables	Category	Frequency (n)	Percentage (%)
Visited by fieldwork for the last 12 months	No	626	68.3
	Yes	291	31.7
Visit the health facility for the last 12 months	No	347	37.8
	Yes	570	62.2
Health insurance	No	915	99.8
	Yes	2	0.2
Smoke or other types of tobacco use	No	897	97.8
	Yes	20	2.2
Participation in decision making (=852)	No	759	89.1
	Yes	93	10.9
Exposure to mass-media on a weekly base	Not at all	586	63.9
	Less than once a week	263	28.7
	At least once a week	68	7.4
Distance to the health facility	Big problem	490	53.4
	No big problem	427	46.6

usual liquid and food during diarrheal disease, respectively. This finding is consistent with the study in Peru.<sup>12</sup> This might be explained by different factors like social and personal. For instance, a lack of knowledge about feeding practice and management during diarrhea. This is also supported that 58%, 64%, and 62% of women had no education, media exposure, and did not visited by a community health worker, correspondingly. Moreover, food taboos might contribute to poor feeding practices. The previous finding showed that some foods such as mango, orange, and banana were restricted since they are believed to cause worms and diarrhea to the growing child.<sup>25</sup>

A minimum acceptable diet is recommended for the growth and development of a healthy child. The study by Tassew AA et al from the latest Ethiopian Household Survey showed that around six percent of children aged 6–23 months took a minimum acceptable diet.<sup>26</sup> This is comparable with the current finding of feeding despite the population was to some extent different. Another important point is a significant percentage of children had a fever (54.2%) and (40.5%) cough in addition to diarrhea, which might show the severity of diarrhea or other comorbidities like pneumonia. This might cause a loss of appetite and reduce feeding during the illness.

Evidence on feeding practice among children with diarrhea, at the national level, is limited, which makes direct comparison difficult with the current finding. Two-pocket studies in Burayu Town (53.6%) and Mirab Abaya District (70.7%), Ethiopia<sup>17,27</sup> have higher feeding practice than ours. This could be explained by differences in the study population (those studies recruited less than two years) and the type of disease was any childhood illness. Besides, the current findings were from nationally representative data. Moreover, findings from DHS data in Bangladesh, India, Nepal, and Pakistan are higher than the current findings. Children's mothers in Bangladesh (21.7%) were given a high amount of fluids, and children in Nepal, Pakistan, and Saudi Arabia were offered more amount of food and liquid.<sup>28,29</sup>

The odds of appropriate feeding practice among mothers aged 25–34 years were lower compared to mothers age between 15–24 years. Possibly, even if we have not information about the age of mothers at first birth, the earlier age group might have more children which might increase the mother's activity and responsibility. A study in Burayu corroborates the above explanation that mothers who had one child exercise appropriate

**Table 5** Generalized Linear Mixed Model Analysis of Factors Associated with Feeding Practices During Diarrhea Among Children Aged Less Than Five Years in Ethiopia, 2016 (n=917)

Variables	Feeding Practices During Diarrhea		COR (95% CI)	AOR (95% CI)
	Appropriate n (%)	Inappropriate n (%)		
Age of participants				
15–24	44 (17.3)	211 (82.7)	1	1
25–34	64 (13.4)	415 (86.6)	0.8 (0.5–1.2)	0.6 (0.4–0.9) *
35 and above	33 (18.0)	150 (82.0)	1.1 (0.6–1.9)	0.9 (0.5–1.6)
Educational status				
No education	76 (14.2)	458 (85.8)	1	1
Primary	45 (15.7)	242 (84.3)	1.1 (0.7–1.8)	1.1 (0.7–1.8)
Secondary	12 (18.2)	54 (81.8)	1.4 (0.7–2.9)	1.2 (0.5–2.9)
Higher	8 (26.7)	22 (73.3)	2.4 (0.9–6.3)	2.3 (0.7–7.3)
Religion				
Muslim	55 (13.9)	340 (86.1)	1	1
Orthodox	61 (20.0)	244 (80.0)	1.6 (1.1–2.5)	1.1 (0.7–1.7)
Others <sup>a</sup>	25 (11.5)	192 (88.5)	0.8 (0.5–1.4)	0.7 (0.4–1.3)
Wealth index				
Poorest	34 (12.1)	247 (87.9)	1	1
Poorer	21 (13.1)	139 (86.9)	1.0 (0.5–1.9)	0.9 (0.5–1.7)
Middle	25 (16.8)	124 (83.2)	1.4 (0.8–2.7)	1.2 (0.6–2.2)
Richer	25 (17.9)	115 (82.1)	1.5 (0.8–2.8)	1.4 (0.7–2.6)
Richest	36 (19.3)	151 (80.7)	1.8 (1.2–3.2)	1.5 (0.6–2.6)
Occupation of respondents				
Not working	59 (11.7)	445 (90.3)	1	1
Sale & services	25 (17.7)	116 (82.3)	1.7 (0.9–3.0)	1.3 (0.8–2.4)
Agriculture	38 (22.2)	133 (77.8)	2.2 (1.3–3.5)	2.2 (1.3–3.6) *
Others <sup>b</sup>	19 (18.8)	82 (81.2)	1.8 (0.9–3.3)	1.3 (0.8–2.6)
Number of ANC visit				
0	24 (9.2)	237 (90.8)	1	1
1–3	41 (14.4)	244 (85.6)	1.7 (0.9–3.0)	1.6 (0.9–2.9)
4+	76 (20.5)	295 (79.5)	2.7 (1.6–4.6)	2.3 (1.3–4.3) *
Place of delivery				
Home	71 (13.2)	465 (86.8)	1	1
Health institution	70 (18.4)	311 (81.6)	1.5 (0.9–2.2)	1.0 (0.6–1.7)
Desire to more children				
Wanted	82 (13.9)	509 (86.1)	1	1
Undecided	5 (15.6)	27 (84.4)	1.2 (0.4–3.4)	1.2 (0.4–3.6)
No more wanted	54 (18.4)	240 (81.6)	1.4 (0.9–2.1)	1.3 (0.9–2.1)
Child age in months				
< 6 months	8 (9.0)	80 (91.0)	1	1
6–23 months	75 (14.7)	435 (85.3)	1.8 (0.8–4.0)	1.7 (0.8–3.9)
24 and above	58 (18.2)	261 (81.8)	2.4 (1.1–0.6)	2.2 (0.9–5.4)
Postnatal check within 2 months of age				
No	113 (13.9)	700 (86.1)	1	1
Yes	28 (26.9)	76 (73.1)	2.3 (1.4–3.9)	1.9 (1.1–3.2) *

(Continued)

**Table 5** (Continued).

Variables	Feeding Practices During Diarrhea		COR (95% CI)	AOR (95% CI)
	Appropriate n (%)	Inappropriate n (%)		
Currently breastfeeding				
No	51 (18.3)	228 (81.7)	1	1
Yes	90 (14.1)	548 (85.9)	0.7 (0.5–1.1)	0.8 (0.5–1.4)
Exposure to Mass Media				
Not at all	81 (13.8)	505 (86.2)	1	1
Less than once a week	47 (17.9)	216 (82.1)	1.4 (0.9–2.2)	1.0 (0.7–1.7)
At least once a week	13 (19.1)	55 (80.9)	1.6 (0.7–3.3)	0.9 (0.4–2.1)
Visited by fieldwork for the last one year				
No	83 (13.3)	543 (86.7)	1	1
Yes	58 (19.9)	233 (80.1)	1.6 (1.1–2.4)	1.3 (0.9–2.0)

**Notes:** <sup>a</sup>Others: Protestant, Catholic, traditional; <sup>b</sup>Others: skilled manual, unskilled manual, do not know. \*Statistically significant at a p-value < 0.05.

feeding practice more likely than mothers who had two children.<sup>17</sup>

The odds of appropriate feeding practice among children whose mothers worked in agriculture were higher compared with children whose mothers did not have work. Women who work in agriculture might have better access to diversified agricultural and animal products. Moreover, participating in work may expose mothers to peers and friends that can serve as a source of information related to feeding practice.<sup>17,26</sup>

The odds of appropriate feeding practice among children whose mothers had ANC and PNC follow-up were higher compared to children whose mothers did not have ANC and PNC follow-up. These services are a good point of contact to give counseling about child feeding practice in addition to maternal and child care. Mothers who had ANC and PNC follow-up may receive information, education, and counseling from health professionals about appropriate child feeding practices for normal child growth and during an illness such as diarrhea disease. A study in 15 sub-Saharan African countries showed PNC associated with increase breastfeeding.<sup>30</sup> Another study supported that mothers who got counseling about child feeding and who had more than four ANC practice appropriate feeding practice.<sup>17,27</sup>

## Strength and Limitations of the Study

The study used a large sample size at a national level, so that it may enhance its representativeness. Furthermore, the DHS surveys have a similar design, with similar

variables in a different setting. Therefore, the result may be applied to other similar settings.

The possible limitations might be the cross-sectional nature of this study, whereby it may not explain the temporal relationship between maternal characteristics and child feeding practices. Besides, the dataset does not include important variables like social norms, beliefs, and behavior, which might have a significant effect on feeding practice. Furthermore, the feeding practice was measured by using maternal verbal responses in which there might be a social desirability bias. These drawbacks will deter the implication of our findings, so further study should be carried out to explore the detailed practice by observing the normal meal frequency given to the baby at the time of illness.

## Conclusions

Generally, appropriate feeding practice during diarrheal disease among children aged less than five years was low in Ethiopia. Maternal age, working condition, ANC and PNC follow-up were increased feeding practices during diarrheal disease. Maternal and child health services (ANC and PNC) have shown a significant positive association with feeding practice. Therefore, the government shall strengthen the existing maternal and child health service.

## Data Sharing Statement

All data are available within the manuscript. Data is available on <https://dhsprogram.com/data/available-datasets.cfm>.



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## Disclosure

The authors report no competing interests in this work.

## References

- Okoro C, Ikediwu U, Mgbudem F, Uwabunkonye B, Osondu B. Estimation of levels and trends of under-five mortality in sub-saharan africa: evidence from summary of birth histories of currently married women. *Asian J Probab Stat.* 2020;17–27. doi:10.9734/ajpas/2020/v7i230176
- Danzhen Y, Hug L, Ejdemyr S, Idele P, Hogan D, Mathers C. Global, regional, and national levels and trends in under-5 mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the un inter-agency group for child mortality estimation. united nations inter-agency group for child mortality estimation (UN IGME). *Lancet.* 2015;386:2275–2286.
- Berelie Y, Yismaw L, Tesfa E, Alene M. Risk factors for under-five mortality in Ethiopia: evidence from the 2016 Ethiopian Demographic and Health Survey. *S Afr J Child Health.* 2019;13(3):137–140. doi:10.7196/SAJCH.2019.v13i3.1645
- Jelliffe DB, Jelliffe EFP, World Health O; United Nations Children's Fund. Dietary management of young children with acute diarrhoea: a manual for managers of health programmes/D. 2nd. Geneva:World Health Organization;1991.
- Troegeer C, Forouzanfar M, Rao PC, et al. Estimates of global, regional, and national morbidity, mortality, and aetiologies of diarrhoeal diseases: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet Infect Dis.* 2017;17(9):909–948. doi:10.1016/S1473-3099(17)30276-1
- Munos MK, Walker CLF, Black RE. The effect of oral rehydration solution and recommended home fluids on diarrhoea mortality. *Int J Epidemiol.* 2010;39(suppl\_1):i75–i87. doi:10.1093/ije/dyq025
- Fikadu T, Girma S. Feeding practice during diarrheal episode among children aged between 6 to 23 months in Mirab Abaya district, Gamo Gofa Zone, Southern Ethiopia. *Int J Pediatr.* 2018;2018:2374895.
- Walker CLF, Perin J, Aryee MJ, Boschi-Pinto C, Black RE. Diarrhea incidence in low-and middle-income countries in 1990 and 2010: a systematic review. *BMC Public Health.* 2012;12(1):220. doi:10.1186/1471-2458-12-220
- Regassa G, Birke W, Deboch B, Belachew T. Environmental determinants of diarrhea among under-five children in Nekemte town, western Ethiopia. *Ethiop J Health Sci.* 2008;18:2.
- Alemayehu M, Alemu T, Astatkie A. Prevalence and determinants of diarrhea among under-five children in benna tsemay district, south omo zone, southern ethiopia: a community-based cross-sectional study in pastoralist and agropastoralist context. *Adv Public Health.* 2020;2020.
- Malik IA, Azim S, Good MJ, et al. Feeding practices for young Pakistani children: usual diet and diet during diarrhoea. *J Diarrhoeal Dis Res.* 1991;9(3):213–218.
- Pantenburg B, Ochoa TJ, Ecker L, Ruiz J. Feeding of young children during diarrhea: caregivers' intended practices and perceptions. *Am J Trop Med Hyg.* 2014;91(3):555–562. doi:10.4269/ajtmh.13-0235
- Liu L, Hill K, Oza S, et al. Levels and causes of mortality under age five years. *Reprod Maternal Newborn Child Health.* 2016;71.
- Radjasegarane A, Rajagopal A, Mathiyalagen P, Vasudevan K. A cross sectional study on optimal infant and young child feeding practices with reference to WHO indicators in a rural area of Puducherry. *Int J Community Med Public Health.* 2019;6(4):1684. doi:10.18203/2394-6040.ijcmph20191405
- Seid S, Sendo E, Haso T, Amme S. Utilization of integrated management of neonatal and childhood illness (IMNCI) guidelines and associated factors among nurse at public health institutions in west arsi zone, South East Ethiopia. *Clin Mother Child Health.* 2019;16(313):2.
- Organization WH. *Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition;* 2013.
- Degefa N, Tadesse H, Aga F, Yeheyis T. Sick child feeding practice and associated factors among mothers of children less than 24 months old, in Burayu Town, Ethiopia. *Int J Pediatr.* 2019;19:2019.
- Gaffey MF, Wazny K, Bassani DG, Bhutta ZA. Dietary management of childhood diarrhea in low- and middle-income countries: a systematic review. *BMC Public Health.* 2013;13(3):S17. doi:10.1186/1471-2458-13-S3-S17
- Paintal K, Aguayo VM. Feeding practices for infants and young children during and after common illness. Evidence from South Asia. *Matern Child Nutr.* 2016;12 Suppl 1(Suppl1):39–71.
- Bhutta ZA, Das JK, Walker N, et al. Interventions to address deaths from childhood pneumonia and diarrhoea equitably: what works and at what cost? *Lancet.* 2013;381(9875):1417–1429. doi:10.1016/S0140-6736(13)60648-0
- De Onis M, Dewey KG, Borghi E, et al. The World Health Organization's global target for reducing childhood stunting by 2025: rationale and proposed actions. *Matern Child Nutr.* 2013;9:6–26. doi:10.1111/mcn.12075
- Acácio S, Mandomando I, Nhampossa T, et al. Risk factors for death among children 0–59 months of age with moderate-to-severe diarrhea in Manhiça district, southern Mozambique. *BMC Infect Dis.* 2019;19(1):322. doi:10.1186/s12879-019-3948-9
- Bezabih AM, Mohammed H, Kedir A, Haile F, Redae G, Medhanyie AA. Poor feeding practices during childhood illnesses in rural pastoralist communities of afar, North Eastern Ethiopia: a cross sectional study. *East Afr J Health Sci.* 2019;1(1):41–54.
- Central Statistical Agency (CSA) [Ethiopia] and ICF. *Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.* 2016; 2016. Available from: <https://dhsprogram.com>. Accessed February 12, 2021.
- Assefa D, Wassie E, Getahun M, Berhaneselassie M, Melaku A. Harmful traditional practices. *Carter Centre.* 2005.
- Tassew AA, Tekle DY, Belachew AB, Adhena BM. Factors affecting feeding 6–23 months age children according to minimum acceptable diet in Ethiopia: a multilevel analysis of the Ethiopian Demographic Health Survey. *PLoS One.* 2019;14(2):2. doi:10.1371/journal.pone.0203098
- Fikadu T, Girma S. Feeding practice during diarrheal episode among children aged between 6 to 23 months in Mirab Abaya district, Gamo Gofa Zone, Southern Ethiopia. *Int J Pediatr.* 2018;2018:2018. doi:10.1155/2018/2374895
- Paintal K, Aguayo VM. Feeding practices for infants and young children during and after common illness. Evidence from South Asia. *Matern Child Nutr.* 2016;12:39–71. doi:10.1111/mcn.12222
- Das SK, Nasrin D, Ahmed S, et al. Health care-seeking behavior for childhood diarrhea in Mirzapur, rural Bangladesh. *Am J Trop Med Hyg.* 2013;89(1\_Suppl):62–68. doi:10.4269/ajtmh.13-0107
- Khan SM, Speizer IS, Singh K, Angeles G, Twum-Danso NA, Barker P. Does postnatal care have a role in improving newborn feeding? A study in 15 sub-Saharan African countries. *J Glob Health.* 2017;7(2):2. doi:10.7189/jogh.07.020506

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