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Sick Child Feeding Practice and Associated Factors Among Mothers With Sick Children Less Than 24 Months of Age in Debre Tabor Regiopolitan City, Northwest Ethiopia.(Institutional Cross-sectional Mixed Method)

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Abstract

Background: Children's nutritional status can decline rapidly during an illness unless additional nutritional requirements associated with the illness are considered. Therefore, the aim of this study was assessing a sick child's feeding practices and related factors among mothers with sick children less than 24 months of age attending public health institutions, Northwest Ethiopia.

Methods: Institution based cross-sectional study triangulated with a phenomenology study design was conducted from March 18 to April 30, 2024, among randomly selected 415 mothers with less than 24 month aged sick children. The data were collected and cleaned, edited coded, and, entered by Epi-DATA software version 4.6 and then exported to the STATA 17. The Binary-logistic regression analyses were used to identify factors associated, and an adjusted odds ratio (AOR) with 95% confidence intervals (CIs) ,a p-value of <0.05 was declared to Statistical significance. For the qualitative data, thematic analysis was used through open-code software.

Result: The overall magnitude of good sick child feeding practices was 61.4%; 95% CI: (56.6, 66.0). Factors such as having formal education (AOR=15.8; 95% CI: 6.1,41.0), wanted pregnancy (AOR=8.0; 95%CI: 1.4,45.1), having ANC visit (AOR=7.5; 95%CI: 2.4,23.2), having PNC visits (AOR=14.4; 95% CI: 5.7,36.2) and being counseled about IYCF (AOR=4.2; 95% CI: 2.5,11.7) were significantly affecting sick child feeding practice. In the qualitative part, the most frequently reported reasons not to feed more frequently during illness were loss of appetite of the child, fear of vomiting, diarrhea and food shortage.

Conclusion; Good sick child feeding practice was low in the area and mainly associated with access with basic maternal health service such as ANC, PNC and counseling on IYCF. Therefore, strengthening these basic maternal health services would improve sick child feeding practice.

Introduction

Infant and young child feeding is a cornerstone of care for ensuring optimal child growth(1). According to WHO and UNICEF, about 2 billion cases of diarrheal disease occur worldwide each year, and 1.9 million children under the age of 5 die from diarrhea each year (10).

Adequate nutrition during infancy and early childhood is essential for each child's healthy development. IYCF is critical for development. Pregnancy and the first two years of a child's life are considered a "critical window of opportunity" to prevent growth failure. After birth, a child's ability to meet growth norms is governed by the sufficiency of dietary intake (which is dependent on infant and young child feeding and care practices and food security), as well as illness exposure (12, 13)

Only 9.3% of children in Sub-Saharan Africa receive appropriate nutrition during diarrhea episodes. Sub-regional coverage varies; Central Africa and West Africa have the highest and lowest coverage, ranging from 9.3 to 4.2%. When looking at country-specific coverage, Burkina Faso (0.4%), Rwanda (2.8%), and Nigeria (3.2%) have lower prevalence of appropriate child feeding practices during diarrheal episodes

(10, 11). In most developing countries, mothers' correct feeding practices for their sick children are poor, fair for supplemental feed, which ranges from 1 to 69.94%, and poor for breastfeeding children, which ranges from 3 to 17% (10).

According to the most recent anthropometric statistics from low-income countries, poor nutrition levels rise between the ages of 18–24 months and 3 years of age (12, 13). Contrary to the WHO recommendation to IYCF, 14% of infants 0-5 months consume plain water, 13% consume complementary foods in addition to breast milk. Notably, Nine percent of infants less than 6 months use a bottle with a nipple, a practice that is discouraged because of the risk of exposing the child to illness (14).Malnourished children, particularly those with severe acute malnutrition, have a higher risk of death from common childhood illness such as diarrhea, pneumonia, and malaria and Ethiopia is still in the list of nations with low levels of meal frequency and poor dietary diversity practices(15).The potential negative impact of under nutrition during this critical period is not limited to childhood life rather it diminishes the individual level of productivity during adulthood, negatively affecting the future social and economic development of countries and leading the vicious cycle of intergenerational malnutrition (16).

In Ethiopia, a facility based cross sectional study conducted in Burayu town Oro, shows more than half (53.6%) of the children were fed more frequently compared to what they fed when they were healthy(4).Other similar study conducted in Tembaro district, Southwest Ethiopia, reveals that About 21.3% of the children were fed more frequently compared to what they fed when they were healthy(24).Also, in Gamo zone, Southern Ethiopia, the overall magnitude of mothers’ good sick child feeding practices was determined to be 45.0%(25). In Abaya district, Gamo zone, the proportion of proper feeding practice during diarrheal episode was (70.7%)(26), in Debrebirhan town shows, the overall prevalence of ACF practice was 70.3%(27) , and in Dabat, north west Ethiopia, the overall proportion of sub-optimal feeing practice among child with illness were 27%(28).

In the globe, different literatures were documented, and good sick child feeding was attributed to different factors. The most commonly reported factors like mother's educational status, place of delivery, birth order of the index child, very close birth spacing, antenatal care (ANC) and postnatal care (PNC) service utilization, socioeconomic status, maternal employment status, access to media, family food source, inappropriate beliefs, and a lack of knowledge about child feeding practices (17,18).)

There were numerous studies across a globe including Ethiopia which assessed the prevalence of sick child feeding practice and various associated factors, most of them were done in a single approach and there was no a mixed study that have been done to assess sick child feeding practice in our study area. Therefore, this study has assessed the sick child feeding practice and explored reasons for poor sick child feeding practice among mothers with sick children age less than 24 months attending public health institutions and had a further role in the success of child malnutrition control programs.

Methods and Materials

Study design, period and area

An institutional-based cross-sectional study mixed with phenomenology design was conducted, from March 18 to April 30, 2024, to assess sick child feeding practice and its associated factors among mothers with sick children less than 24 months of age attending public health institutions in Debre Tabor Regiopolitan city, Northwest Ethiopia. It is located in the North Western Amhara Region. Approximately, it is 110km far from Bahardar city, and 667 km from Addis Ababa. In this city, there is 115,387 total population, one public comprehensive specialized hospital and 3 public health centers. The majority of the town's population receives health services from public health institutions. The study included all mothers with sick children aged less than 24 months living in Debre Tabor Regiopolitan City, and the sample Mothers with sick children aged less than 24 months who were attending selected public health institutions. During the study period children who were seriously ill and needing referrals during data collection time were excluded.

Sample Size and procedure

The sample size was determined by single population proportion formula where Zα/2 at 95% CI (1.96), marginal error (d= 0.05), and, proportion (P=54%) obtained from the previous study done in Burayu Town, Ethiopia on sick child feeding practice(4). After adding a 10% non-response rate, the final sample size was 421. For qualitative data, participants were selected purposively for in-depth interviews among mother child less than 24 month in public health institution, after analysis of the quantitative data, and then the participants were selected until information saturation was obtained. The study population were selected by using a systematic random sampling technique. From a total of One public comprehensive specialized Hospital and three public health centers include in the study. To get representative data, the sample was taken from each health facility by proportional allocation. Previous two months' data were reviewed the average number was taken to know monthly attendants of the under-two year sick children and to calculate K^{th} interval based on sample size. Therefore, a total of 789 sick children have visited the health facilities per month in previous month before data collection, which was calculated as an approximate mother with a sick child of every second mother (care giver) was interviewed (Figure 1). After the analysis of quantitative data, a purposive sampling technique was conducted and participants were selected to explore the barrier of sick child feeding practice for in-depth interviews, among the mothers attending in public health institution, those who could not be included as quantitative data interviewees.

Study variables

Dependent variable: Sick child feeding practice (Good or Poor)

Independent variables:

Socio-demographic variables:- Age of the mother, marital status, maternal occupation, maternal educational status, religion, monthly income, family size, and husband educational status, sex of the child, and age of the child.

Obstetrics and maternal health service-related factor - Provision of advice on Breastfeeding (BF) and complementary feeding during ANC, PNC, Attendance of ANC services, pregnancy type, number of antenatal visits, place of delivery, PNC services, birth attendance, parity, and birth interval.

Health information related factors: Source of information, Access to health information

Operational definitions.

Good sick child feeding practice*:* - refers to routines of feeding a child at the time of illness. Respondents were asked about the frequency of feeding and fluid intake while the child was sick as compared with when they were healthy, it is considered as good sick child feeding practice for those mothers who increase the frequency of food and fluid intake for their sick child, but those who didn't change or reduced the food and fluid intake during illness were considered as poor sick child feeding practice (29)

Sick child- refers to an infant or young child who had either of the common childhood illness like pneumonia , diarrhea, malaria, measles, malnutrition… and seeks treatment(30).

Information access on sick child feeding practice: - participants were asked whether or not they were heard about any information on sick child feeding practice, if they knew about sick child feeding practice report "yes" or if they did not know about sick child feeding practice was" no"(4).

Data collection procedure and quality control

Structured questionnaires were adapted from WHO guideline for sick child feeding practices of less than 24 months of age sick children data collection tools, and previous literature after an extensive search of relevant studies on the issue. Before the data collection; the questionnaires were submitted to experts mainly health professionals who were working in the area to test the face and content validity and to assess whether they met the study objectives. The questionnaire was prepared first in English and then changed to the local language (Amharic) for a better understanding of the data collectors and the respondents. One day of training was given to 6 data collectors on the objective of the study. Before conducting the main study, a pretest was done at two health facilities. The collected data was carefully checked for completeness and consistency on a daily basis by the principal investigator and data collectors. Regarding qualitative data, semi-structured questionnaires (interview guides) were prepared by reviewing different articles. Then in-depth interviews were conducted by maintaining their privacy and smart phone recorder to record the interview process in health facilities.

Data entry, processing and analysis

Data was coded, entered, and cleaned by Epi-Data software version 4.6.0.0 and then exported to the STATA 17 for analysis for further analysis. Descriptive statistics were used to summarize and present the information in the form of mean, percentages, tables, and graphs with 95% confidence intervals for the magnitude of sick child feeding less than two years of age. Variables logistic regression was

performed on each variable and then all variables with P-value ≤0.25 were imported into a multivariable logistic regression model to control for all possible confounders. Moreover, the goodness of model fitness was checked by the Hosmer -Lemeshow test and it was fitted. Finally, the results were reported that adjusted Odds Ratio (AOR) with 95% CI and p-value less than 0.05 were used to explain the significance associated with sick child feeding practices. For in-depth interviews, the audio records were first transcribed into themes and reread the transcripts repeatedly to understand the data. The findings were into themes and thematic content analysis using OpenCode software. After significant quotes from the respondents were identified, the themes were coded. Selected quotes and themes were presented in the result section with supported to quantitative data.

Results

Socio-demographic characteristics of mothers

A total of 415 mothers voluntarily participated in the study, making a response rate of 98.6%. All the respondents were the biological mothers of the selected children. The mean (± SD) age of the mothers are 29.8 (± 6.350 SD). Concerning with educational status, 304 (73%) of mothers and 351 (85%) of their husbands were having formal education. The occupation of more than half of the participants, that is 226 (54%) were housewives. About 393 (95%) of participants were having less than 5 living children. The average estimated monthly income of the household of 105(25%) were less than 3200 ETB per month and only 15% of them were having an estimated average monthly income of ≥ 10901 ETB)(Table 1).

Table 1
;Socio demographic characteristics of mothers who have sick children younger than 2 years attending the public health facilities in Debre Tabor town, northwest Ethiopia, 2024 (n = 415).

Variable	Category	Sick child feeding practice					
		Good		Poor		Total	
		n	%	n	%	n	%
Age	15–24	138	33	80	19	218	53
	25– 34	93	22	66	16	159	38
	≥ 35	24	6	14	3	38	9
Maternal education	No formal education	26	6	85	20	111	27
	Has formal education	229	55	75	18	304	73
Husband education	No formal education	38	9	26	6	64	15
	Has formal education	217	52	134	32	351	85
Religion	Orthodox	189	46	129	31	318	77
	Muslim	57	14	29	7	86	21
	Other	9	2	2	0	11	3
Marital status	Married	238	57	141	34	379	91
	No married	17	4	19	5	36	9
Occupation	House wife	95	23	131	32	226	54
	All worker	160	39	29	7	189	46
Estimated monthly income	≤ 3200 ETB	43	10	89	21	132	32
	3201 to 7200 ETB	15	3	32	8	47	11
	≥ 7201 ETB	197	47	39	9	236	57
Number of Children	< 5 children	243	59	150	36	393	95
	5 and above	12	3	10	2	22	5

Child-related characteristics

Out of the total sick children recorded in this study, almost half of them, which is 214 (52%) were males. The children's mean age was 12.74 (6.15 ± SD) months and when we categorize them by age, about 52 (13%) of them were < 6 months. In terms of birth order, 196 (42%) children in this study were the first child for their mother. The birth interval between the sick child and their older children were greater than two years were about 209 (50%) of the children and about 196 (46%) of the sick children were having no

older children or they were the first children for their family. In terms of exclusive breast-feeding status, about 93(22%) of mothers with sick children were initiate complimentary feeding for their children before child's six months of age. Regarding with children's bottle-feeding status, about 340(82%) of them were having a history of bottle feeding. When tried to classify children in terms of their immunization status, about 28 (7%) of children were not complete their immunization for their age (Table 2)

Table 2
Child-related characteristics of mothers who have sick children younger than 2 years attending the public health facilities in Debre Tabor Regiopolitan City, northwest Ethiopia, 2024 (n = 415).

Variable	Category	Sick child feeding practice					
		Good		Poor		Total	
		n	%	n	%	n	%
Sex	Male	128	31	86	21	214	52
	Female	127	31	74	18	201	48
Age	< 6 month	29	7	23	6	52	13
	6 to 12 months	112	27	71	17	183	44
	13 to 23 months	114	27	66	16	180	43
Birth order	First child	116	28	76	18	192	46
	Second child	72	17	31	7	103	25
	Third child	35	8	30	7	65	16
	Fourth and above	32	8	23	6	55	13
Birth interval	First child	120	29	76	18	196	47
	≤ 2 years	7	2	3	1	10	3
	> 2 years	128	19	81	31	209	50
Age at CF initiation	< 6 months	46	11	47	11	93	22
	≥ 6 months	208	50	114	27	322	78
Bottle feeding	Yes	217	52	123	30	340	82
	No	38	9	37	9	75	18
Immunization status	Complete up to age	246	59	150	36	396	95
	Not complete up to age	9	2	19	5	28	7

Obstetrics and health service-related characteristics of mothers

Regarding to pregnancy desirability, about 386(93%) of mothers with sick children in this study were wanted pregnancy. More than fourth-fifth of the study participants, i.e., 345 (83%), were having ANC visit. With regard to place of delivery, about 391 (94%) of mothers gave birth at health institutions and were assisted by health professionals. About two-third or 277 (67%) of the mothers with sick children were having PNC visit. More than three-fourth or 326 (79%) of the mothers with sick child, were having a media exposure for at least one of the medias (television, radio and reading magazine). More than two-third or 278 (67%) of the mothers with sick child were counseled or got health education about IYCFP by health care professionals(Table 3).

Table 3
; Health service-related characteristics of mothers who have sick children aged less than 2 years who attended in public health facilities in Debre tabor Regiopolitan City, Northwest Ethiopia, 2024 (n = 415).

Variable	Category	Sick child feeding practice					
		Good		Poor		Total	
		n	%	n	%	n	%
Wanted pregnancy	Yes	248	60	138	33	386	93
	No	7	2	22	5	29	7
ANC visit	Yes	238	57	107	26	345	83
	No	17	4	53	13	70	17
Place of delivery	Home	8	2	16	4	24	6
	Health facility	247	60	144	35	391	94
PNC visit	Yes	218	53	59	14	277	67
	No	37	9	101	24	138	33
Counseling on IYCF	Yes	206	50	72	17	278	67
	No	49	12	88	21	137	33
Media exposure	Yes	216	52	110	27	326	79
	No	39	9	50	12	89	21

Sick child feeding practice

The overall proportion of good sick child feeding practice is 61.4%; 95% CI: (56.6, 66.0), which means that 255 mothers provide their children with breast milk and/ or soft and complementary diet more frequently during illness than when they are healthy. On the contrary, 160 (38.6%) [95% CI: 33.9, 43.3], of the mothers were feeding their sick children with the same or at a lower frequency of fluid and food as compared with when they were healthy. Commonly reported reasons, For not to increase the frequency

of fluid and food intake for their sick children were, not willing to feed while he/she is sick, not good to feed the sick child more or food restriction during illness and shortage of food supply to feed their children were reported by 127 (79%), 6 (3.75%) and 6 (3.75%) of the mothers respectively

Factors associated with sick child feeding practice

The variable whose P-value ≤ 0.25 was a candidate variable entered into a multivariable logistic regression analysis to control the effect of confounding and identify the true relationship between variables.While these variables entered in to the multivariable logistic regression analysis revealed that, mothers' educational status, mothers' occupation, average monthly income, desirability of the pregnancy, ANC visit, PNC visit and counseling about IYCF practice were significantly associated with sick child feeding practices by mothers at a p-value of < 0.05

(Table 4). Additionally, before entering bi-variable logistic regression analysis; the model fitness was tested by using the Hosmer and Lemeshow model test that was fitted with a p-value of 0.91. Moreover, qualitative data, three main themes were categorized for the identified analysis of the qualitative data(Table 5). These were (i) the children's desire to feed during illness is reduced (ii) the level of understanding to wards feeding the sick child (iii) difficulty of affording to feed more and (iv) shortage of time to feed your child more frequently.

Table 4
; Bi variable and multi variable logistic regression result for sick child feeding practice among mothers who have sick children aged less than 2 years attending the public health facilities in Debre tabor town, northwest Ethiopia, 2024 (n = 415)

Variables	Category	Sick child feeding practice		COR (95%CI)	AOR (95%CI)	P value
		Good	Poor			
Mothers Education	No formal education	26	85	1	1	
	Has formal education	229	75	9.9 (6.0,16.6)	15.8(6.1,41.0)	**< 0.001**
Religion	Orthodox	189	129	0.33(0.07,1.5)	0.17 (0.01,3.4)	0.248
	Muslim	57	29	0.44 (0.1,2.1	0.25 (0.1,5.3)	0.372
	Other	9	2	1	1	
Marital status	Married	238	141	1.9 (0.9,3.7)	3.5 (0.8,14.2)	0.083
	No married	17	19	1	1	
Occupation	House wife	95	131	0.08(0.08,0.2)	0.08(0.03,0.2)	**< 0.001**
	All worker	160	29	1	1	
Estimated monthly income	≤ 3200 ETB	43	89	0.1(0.2,0.6)	0.03(0.01,0.07)	**< 0.001**
	3201 to 7200 ETB	15	32	0.09(0.3,0.9)	0.07(0.02,0.2)	**< 0.001**
	≥ 7201 ETB	197	39	1	1	
Age at CF initiation	< 6 months	46	47	0.55 (0.3,0.9)	1.4 (0.5,3.7)	0,525
	≥ 6 months	208	114	1	1	
Bottle feeding	Yes	217	123	1.7 (1.04,2.8)	2.9(0.97,9.1)	0.056
	No	38	37	1	1	
up to age Immunization	Completed	246	150	1.8 (0.7,4.6)	1.03(0.26,4.1)	0.173
	Not completed	9	19	1	1	
Wanted pregnancy	Yes	248	138	5.6 (2.4,13.6)	8.0(1.4,45.1)	**0.018**
	No	7	22	1	1	

Note; bold= significant variables with p < 0,05

ANC visit	Yes	238	107	6.9 (3.8,12.5)	7.5(2.4,23.2)	**0.001**
	No	17	53	1	1	
Place of delivery	Home	8	16	0.29(0.12,0.7)	1.7(0.3,9.5)	0.502
	Health facility	247	144	1	1	
PNC visit	Yes	218	59	10.1(6.3,16.2)	14.4(5.7,36.2)	**< 0.001**
	No	37	101	1	1	
Counseling on IYCF	Yes	206	72	5.1 (3.3,7.9)	4.2(2.5,11.7)	**0.019**
	No	49	88	1		
Media exposure	Yes	216	110	2.5 (1.6,4.1)	1.1(0.16,2.21)	0.115
	No	39	50	1	1	
Note; bold= significant variables with p < 0,05						

Table 5
; Characteristics of the participants interviewed for the qualitative approach in a study of sick child feeding practice among mothers who have sick children aged less than 2 years attending the public health facilities in Debre tabor Regiopolitan City, Northwest Ethiopia

Participant code	Mothers age	Educational status	Occupation	Child age	Child sex	Address
01	35	grade 7	house wife	15 months	male	Farta
02	30	grade 8	house wife	7 months	male	Farta
03	32	grade 10	house wife	14 months	male	DT town
04	25	grade 10	house wife	9 months	female	DT town
05	27	grade 6	house wife	13 months	female	DT town
06	25	Degree	house wife	11 months	female	DT town
07	33	grade 2	house wife	17 months	male	Simada
08	32	Degree	Employed	9 months	female	DT town
09	19	grade 12	student	20 months	female	DT town
10	50	no education	house wife	10 months	male	Ebinat
Note; DT= Debre Tabor						

Sociodemograph :This study indicated that the odds of good sick child feeding practices were about sixteen times higher among mothers having a formal education than those mothers having no formal education (AOR = 15.8; 95% CI: 6.1,41.0). The odds of good sick child feeding practice were reduced by 92% among mothers who were house wives' as compared with all other workers (AOR = 0.08; 95% CI: 0.03, 0.2).

In qualitative data perspective, about 80% of the respondents reported that there is no time deficit to attend and feed their children, there are mothers having a limited time to feed their child frequently due to different reasons, most of them were farmers and one of them was office worker.

"…As a housewife, I don't have any other job. I only have her and that one, and I don't have any other children" (participant 6).

"I may not have time, but sometimes I am forced to do it in a hurry. For example, in June, during farming time, we will go to the farm area to work, and during such times, children will stay without food for a longer

time "(participant 1).

"I have shortage of time; I have milk from home, so I'm with the cow; there's no family; it's me and him" (participant 2).

The odds of good sick child feeding practice were reduced by 90% (AOR = 0.1; 95% CI: 0.02, 0.6) and 91% (AOR = 0.09; 95% CI: 0.03, 0.9) among mothers who were earning an average estimated monthly income of ≤ 3200 ETB and 32001 to 7200 ETB respectively as compared with those earning ≥ 7201 ETB per month.

From the in-depth interviewer participant perspective, 20% of the mothers reported that the presence of problem of affording the require food item to give for their sick children and all others reports that they can provide what the child wants to feed even by brought from the market.

"Oh, I don't have a shortage, I prepare the food, the problem child is not taking the food. there is no shortage of food" (Participant 3).

"I will give what we have to her when she eats; if she refuses, I will give her my breast; if refuses the other one I have no alternative… We face food shortage, because I am a full-time sit in the house caring my children and my husband is a daily laborer…." Participant5).

"…Even though there is food shortage we try to avail and feed by buying" (participant 9).

Clinical factors :The odds of good sick child feeding practice were eight times higher for mothers whose pregnancy was wanted as compared to those mothers whose pregnancy was not wanted (AOR = 8.0; 95%CI: 1.4,45.1).

The odds of good sick child feeding practice were 7.5 higher for mothers who received an ANC visit as compared to those mothers who did not receive an ANC visit (AOR = 7.5; 95%CI: 2.4,23.2).

In qualitative data perspective, the majority of the women responded that, there is no any changes made in frequency as well as the quantity of food provided for their sick children as compared with when he or she was healthy. There is a reduction of food quantity provided for their children during illness as their desire to feed is concomitantly decreased.

"…When a child is sick, he refuses to eat, even though I tried to give him. I did not give him other thing new from the usual…" (Participant 01).

"…, I did not give him as much as a healthy person would eat, since he did not feed it, I reduced it. Now I will give him half cup because he doesn't use it" (participant 03).

"He mostly did not take food When he is sick, he doesn't take it often, So, I give him a little, when I give him the food, he vomits it due to fever and cough, at the time of vomiting I don't as it is rather, I try to prepare and feed him little by little…" (participant 02).

Similarly, mothers who received PNC visits were fourteen times more likely to feed their children frequently during illness compared with their counterparts (AOR = 14.4; 95% CI: 5.7,36.2).

Another one in-depth interviewee participant narrated about feeding practices, the mothers reported that she will reduce the amount and frequency of feeding while her child was having vomiting or diarrhea.

"…There is nothing to eat, just breastfeed. She doesn't take anything; she just comes without food. She doesn't take anything; she just came here…When they brought bread, before that she used to take bread with shahi. I tried her gruel "Atmit", she dislikes before she feeds and not volunteer to take. I try to give timely can't take it" (participant 08).

"I was feeding the same as before which with bottle and breast milk but when he feeds, he vomits and stop taking. Then I brought to the hospital. I don't decrease bottle feeding and breast milk but he vomits. I didn't stop preparation but vomits when feeding it.Rather than increasing feeding declines taking as before" (participant 10).

Mothers who had counseling about IYCF were four times more likely to feed sick children appropriately than those who did not receive counseling about IYCF (AOR = 4.2; 95% CI: 2.5,11.7).

Some of the mothers have reported that low level of understanding to wards feeding the sick children, as they think that only for some type of disease needs to be increased the amount and frequency of feeding.

"The diet should be increased for diseases like diarrhea and vomiting. Otherwise, the child will suffer from the disease …It was thought that a boy's saliva is thin and a girl's is thick. but I don't believe in it. I am not biased with it" (participant 01).

It is necessary to eat food for [up and down diseases] disease with vomiting and diarrhea…

Discussion

Inadequate and or inappropriate dietary intake and infectious diseases are the immediate direct causes of malnutrition, while these in turn are related to a number of socio-economic and environmental factors(31).

According to the findings of this study, the overall magnitude of good sick child feeding practice is 61.4% (95% CI: 56.6, 66.0), which means that 61.4% of mothers provide their children with breast milk or a soft and complementary diet more frequently during illness than when they are healthy. This proportion of good sick child feeding practice was higher than the study report done in Arbaminch Zuria woreda (31%) (32), Hiwot Fana specialized hospital, Harar, eastern Ethiopia (45.0%)(33), Burayu town, southern Ethiopia (53.6%)(4), the tribal district of Maharashtra (51.5%)(34). This difference might be due to most of the studies being conducted in rural areas, as this study was conducted in urban areas. Access to health services, health-seeking behavior, and cultural differences may cause inconsistencies between

findings. Second, this might be due to the high literacy level in urban areas, which can affect the sick child feeding practices by mothers, as better-educated mothers are more likely to understand and apply appropriately the counseling provided by health workers regarding sick IYCF practices.

But this proportion of good sick child feeding was lower than a study in an urban slum of Delhi, India 68% (35), Nellore district, Andhra Pradesh, India (69.94%)(22), Mirab Abaya district(70.7%)(26) and Debre Berhan Town (70.3%)(27). The difference might be due to socio-economic, cultural, and geographical differences across the study population. Furthermore, variations in societal child feeding habits and utilization of health services by mothers vary in child feeding practices across countries.

This study shows that the odds of having good sick child feeding practice is fifteen times higher among mothers having formal education as compared with those who have no formal education. This may be due to the known fact that educated women are more likely to know the recommended child caring practice than those of with no formal education. This study also revealed that women having an estimated average household monthly income of less than or equal to 3200 ETB were less likely to have good sick child feeding practice than those women earning greater than 7200 ETB per month. This finding was supported by qualitative interview of this study as two of the women responded that, they have a shortage of food supply to feed their children as per the recommendation.

Women who were house wives' were reduce good sick child feeding practice by 92% as compared with all other workers. This finding was contradicting with the study finding from Gamo zone, southern Ethiopia which reveals that being house wife increase the likelihood of good sick child feeding practice by 2.4-fold(25). It is also disconfirmed by the qualitative interview of this study as the majority of the interviewee responded that being house wife will enables them not to have a time deficit to feed their sick child frequently. This study revealed that mothers who had an ANC visit were 7.5 times more likely to feed their sick children than those who had not received an ANC visit. The results of this study are consistent with other studies conducted in Nellore district, Andhra Pradesh, India(22), the Dabat Health and Demographic Surveillance System site in Gondar(28), the rural communities of Sidama(36), Harar in Ethiopia(37), and Debre Birhan in Ethiopia(27). This may be because mothers who follow ANC visit gain nutrition education or counseling about how to feed children during illness from health workers.

The findings of this study showed that mothers who received PNC visits were fourteen times more likely to feed their children frequently during illness than their counterparts. Almost similar findings were reported in studies in Debre Berhan town Ethiopia(27) and a study conducted using EDHS 2016 data in Ethiopia(38). The reason could be that a lack of PNC visits after delivery may reduce the chance of getting information about how to feed the child properly during illness, and it may result in improper feeding practices of mothers.

The current study providing counseling on IYCF found a significant association with sick child feeding practices. Mothers who got counseling about IYCF were four times more likely to feed their children during illness appropriately than mothers who did not get counseling about IYCF. These findings corroborate those reported in Burayu town(4), Mirab Abaya district(26), and Arba Minch Zuria

district(32). The possible reason might be explained by the potential effect of counseling about IYCF on sick child feeding practice, as mothers who are better informed are more likely to practice proper sick child feeding practices. The qualitative result is not discussed?

Strength and limitation

Current study interviews were conducted with well-trained clinical workers who spent considerable time with the patients to obtain accurate answers from the participants' links with memorable events. Additionally, it lies in its mixed method design that enables it to assess the magnitude and associated factors of sick child feeding practices by using quantitative and qualitative approaches. The study has some limitations, first, the study included sick child attending only public health facilities for treatments, and it excluded patients in the private sector. Additionally, the other drawback was that stands on the patient’s viewpoint and it needs to be the provider and community perspective. Again, it may have recall bias due to information relied on by self-reports.

Conclusion

In this study, the magnitude of good sick child feeding practices was found to be low in the study settings. Factors such as mothers’ educational status, mothers’ occupation, average monthly income, desirability of the pregnancy, ANC visit, PNC visit and counseling about IYCF practice were significantly associated with sick child feeding practices. From an in-depth interview patient's perspective was first sought by a formal education, mother occupation, economical hardships were a main challenge for sick child feeding practices.

Recommendation

Health managers: Well-designed information, education and promotion strategy for good sick child feeding practices that may be improving the IYCF control program and reducing of magnitude. .

Facility level

The health care providers should strive to strengthen maternal and child health services utilization rate such as ANC, PNC, and IYCF, which focus on nutrition counseling.

Researchers

To conduct both public and private mix to sick child practices with qualitative studies in order to obtain further information on care givers and health system related factors contributing to bad outcome that strength malnutrition prevention and control program.

The mothers

play their roles in reducing magnitude of low sick child feeding practices sick in actively participate health education session in order to improve their knowledge suggestive symptom of malnutrition and reducing of traditional feeding practices.

ABBREVIATION

ACF : Active Child Feeding; ANC: Antenatal Care; AOR : Adjusted Odds Ratio; EDHS: Ethiopian Demographic and Health Survey; IDI: In-Depth Interview; IYCF: Infant and young child feeding; MPH :Master of Public Health ;HIs : Health Institutions; PNC : Postnatal Care ;UNICEF: United Nation International Children's Emergency Fund, WHO :World Health Organization

Declarations

Acknowledgment

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Ethics approval and consent to participate

Ethics approval and consent to participate The study protocol was approved by the Institutional Review Board (IRB) of the Debre Tabor University (Ref.No.□□□./□□/305/2016). Informed consent was obtained from all participants. The patients were also informed of the confidentiality of their information regarding the use of codes instead of any personal identifiers. Data security and participant confidentiality were maintained at all levels of data management. This study adhered to the Declaration of Helsinki. All methods were performed according to the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests both financial and nonfinancial.

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Availability of data and materials

All data analyzed during this study are included in this manuscript and its supplementary information files. The data sets are accessible from the corresponding author on reasonable request.

Authors' contributions

Agmas Lakew Ngatie , and Belete Asnake Sitotaw were conceived the original idea and were involved in proposal development, design, execution, acquisition of data, analysis, and Amare Yirga, Hiwot Yisak, and Tsion Desalegn were analysis and interpretation and in all stages of the research project. All authors read and approved the final manuscript.

Clinical trial number

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Supporting information

Study result of tables, Figure and ethical consent form (DOC).

References

1. Organization WH, UNICEF. Global strategy for infant and young child feeding: World Health Organization; 2003.
2. Aneja S. Integrated management of newborn and childhood illness (IMNCI) strategy and its implementation in real life situation. The Indian Journal of Pediatrics. 2019;86(7):622-7.
3. Neumann CG, Marquardt M, Bwibo NO. The impact of morbidity on food intake in rural Kenyan children. South African Journal of Clinical Nutrition. 2012;25(3):142-8.
4. 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. International Journal of Pediatrics. 2019;2019.
5. Bhandari N, Chowdhury R. Infant and young child feeding. Proceedings of the Indian National Science Academy. 2016;82(5):1507-17.
6. UNICEF. WHO and UNICEF Recommit to Accelerating Health and Well-Being at all Ages. the official website of UNICEF, accessed June. 2021;16.

7. Katona P, Katona-Apte J. The interaction between nutrition and infection. Clinical Infectious Diseases. 2008;46(10):1582-8.
8. Adhikari N, Acharya K, Upadhya DP, Pathak S, Pokharel S, Pradhan PMS. Infant and young child feeding practices and its associated factors among mothers of under two years children in a western hilly region of Nepal. PLoS One. 2021;16(12):e0261301.
9. Organization WH. Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals: World Health Organization; 2009.
10. <Feeding practice during diarhoeal epizode 202103231.pdf>.
11. Zegeye B, Adjei NK, Ahinkorah BO, Ameyaw EK, Seidu AA, Olorunsaiye CZ, et al. Does attitude towards wife beating determine infant feeding practices during diarrheal illness in sub-Saharan Africa? Tropical medicine and health. 2021;49(1):80.
12. <9241593431.pdf>.
13. Victora CG, de Onis M, Hallal PC, Blossner M, Shrimpton R. Worldwide timing of growth faltering: revisiting implications for interventions. Pediatrics. 2010;125(3):e473-80.
14. Degefa N. Suboptimal Child Feeding and Its Determinants. 2023.
15. Organization WH. Children: improving survival and well-being. September 8, 2020. 2020.
16. Arlinghaus KR, Truong C, Johnston CA, Hernandez DC. An intergenerational approach to break the cycle of malnutrition. Current nutrition reports. 2018;7:259-67.
17. <Diarhoeal epizode-2330-1-10-202103231.pdf>.
18. <sick child management.pdf>.
19. Organization WH. The State of Food Security and Nutrition in the World 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all: Food & Agriculture Org.; 2021.
20. Russell J. Food System Resilience in Resource-Poor Countries in Conflict and Crisis: A Diagnosis of the Lebanese Food System 2021.
21. Hill AC. The Fight for Climate after COVID-19: Oxford University Press; 2021.
22. Kishore E, Umamahesh RM, Matli VV, Nagaram PP. Feeding practice during diarrheal episode among children aged between 6 to 23 months in Nellore District, Andhra Pradesh, South India. Int J Health Clin Res. 2021;4(6):43-6.
23. Giri PA, Phalke DB. Beliefs and practices regarding diet in common childhood illnesses among rural caregivers. Journal of Medical Nutrition and Nutraceuticals. 2014;3(2):99.
24. LODAMO B. UTILIZATION OF GROWTH MONITORING AND PROMOTION SERVICE AND ASSOCIATED FACTORS AMONG CAREGIVERS OF UNDER TWO YEARS OF CHILDREN IN KEDIDA GAMELA DISTRICT, KEMBATA TEMBARO ZONE, SOUTHERN ETHIOPIA 2022.
25. Hailu FM, Kefene SW, Sorrie MB, Mekuria MS, Guyo TG. Sick child's feeding practices and associated factors among mothers with sick children aged less than 2 years in Gamo zone, southern Ethiopia.

Does the participation of fathers contribute to improving nutrition? A facility-based cross-sectional study. Frontiers in Public Health. 2023;11.

26. 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. International journal of pediatrics. 2018;2018.
27. Asfaw T. Prevalence and determinants of appropriate child feeding practice among mothers having children with and without diarrhea aged 6–23 months in Debre Berhan town, Ethiopia. Research and Reports in Neonatology. 2021:35-42.
28. Bikes GA, Tariku A, Wassie MM, Mekonnen S, Muhammad EA, Belew AK, et al. Feeding practice and associated factors among infants and children with common childhood illness at Dabat health and demographic surveillance system site: A community based cross-sectional study. 2020.
29. Hailu FM, Kefene SW, Sorrie MB, Mekuria MS, Guyo TG. Sick child's feeding practices and associated factors among mothers with sick children aged less than 2 years in Gamo zone, southern Ethiopia. Does the participation of fathers contribute to improving nutrition? A facility-based cross-sectional study. Frontiers in Public Health. 2023;11:1256499.
30. 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;2019:3293516.
31. Ersado TL. Causes of malnutrition. Combating Malnutrition through Sustainable Approaches: IntechOpen; 2022.
32. Mohammed S, Tamiru D. The burden of diarrheal diseases among children under five years of age in Arba Minch District, southern Ethiopia, and associated risk factors: a cross-sectional study. International scholarly research notices. 2014;2014.
33. Semahegn A, Tesfaye G, Bogale A. Complementary feeding practice of mothers and associated factors in Hiwot Fana Specialized Hospital, Eastern Ethiopia. The Pan African Medical Journal. 2014;18.
34. Dongre A, Deshmukh P, Garg B. Childhood morbidity, household practices and health care seeking for sick children in a tribal district of Maharashtra, India. Indian journal of medical sciences. 2010;64(1):7.
35. Chaudhary P, Basu S, Dzeyie AK, Gulla S, Khade S, Patel A, et al. Knowledge, attitude and practice of mothers regarding diarrhoeal illness in children under five years of age: a cross sectional study in an Urban Slum of Delhi, India. J Commun Dis. 2014;46(3):13-21.
36. Tessema M, Belachew T, Ersino G. Feeding patterns and stunting during early childhood in rural communities of Sidama, South Ethiopia. Pan African Medical Journal. 2013;14(1).
37. Abera K. Infant and young child feeding practices among mothers living in Harar, Ethiopia. Harar Bulletin of Health Sciences. 2012;4:66-78.
38. Tsehay CT, Aschalew AY, Dellie E, Gebremedhin T. Feeding practices and associated factors during diarrheal disease among children aged less than five years: evidence from the Ethiopian

Figures

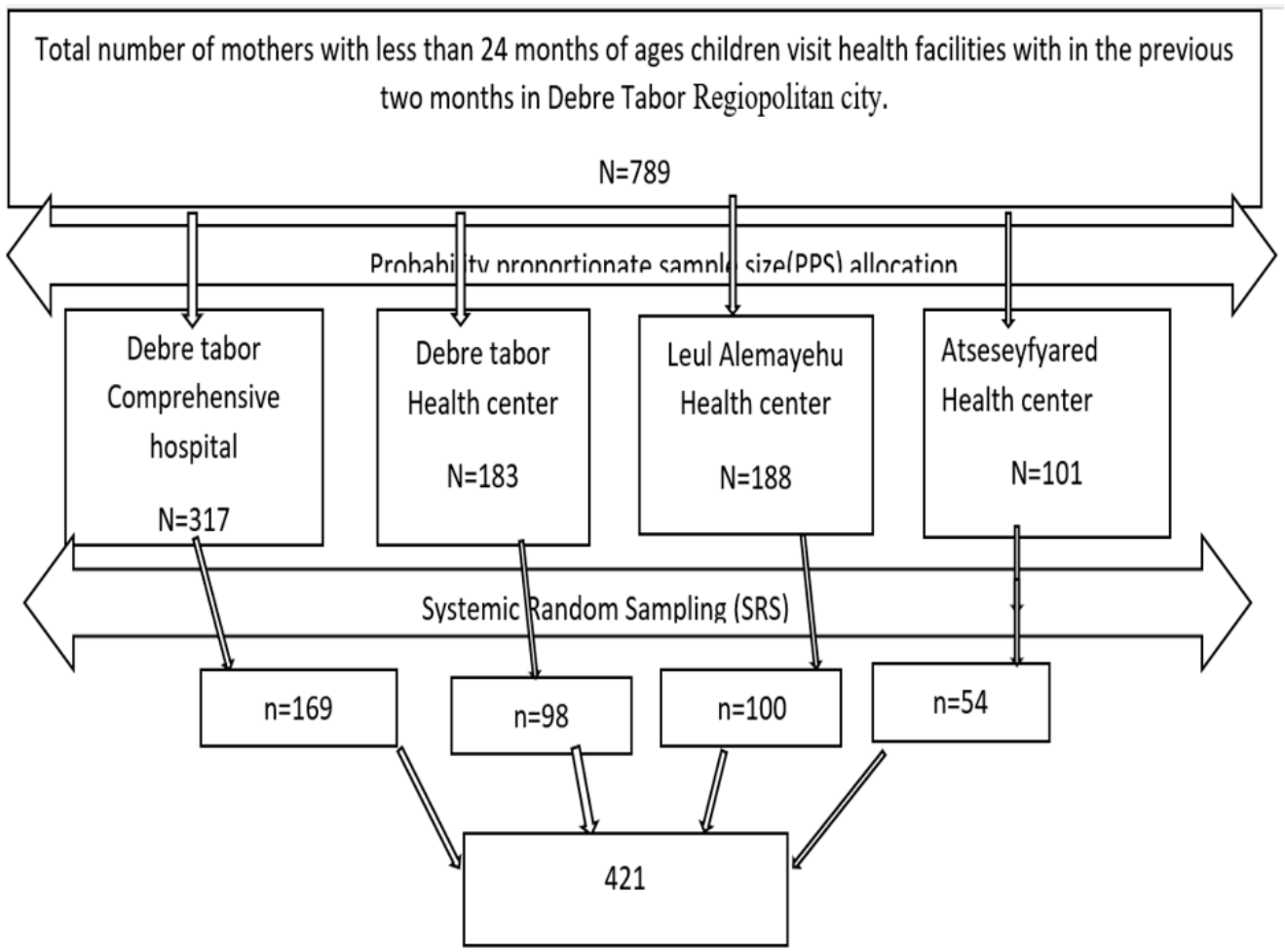


Figure 1

Sampling procedure of the study