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Research Article

Magnitude of Timely Initiation of Complementary Feeding and Associated Factors among 6-23 Months Old Children in Chifra District, Afar, North East Ethiopia Community-Based Cross-Sectional Study, 2021

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ABSTRACT

Background: Timely initiation of complementary feeding is the transition from exclusive breastfeeding to other foods in addition to breast milk at the age of 6 months. Initiating complementary feeds too early or too late can lead to malnutrition. Assessment of influencing factors associated with the initiation of complementary feeding practices among mothers of children of age 6–23 months in the districts found to be vital.

Objective: The aim of this study was to assess the magnitude of timely initiation of complementary food and associated factors among children 6–23 months old in Chifra district, Afar region, North East Ethiopia, 2021.

Methods: A community-based cross-sectional study was conducted in Chifra district from June first to end of July, 2021, with a randomly selected total sample of 398 mothers or caregivers of children 6–23 months old. Data collection was started after an ethical clearance was received from the Ethical Review Board of Samara University. Data was entered into Epi Info version 7.14 and exported to SPSS software version 21 for analysis. Binary logistic regression with an odds ratio and 95 percent confidence interval was used to see the strength of the association between the dependent variable and each independent variables. Finally, multivariable logistic regression was used to see the predictors of the outcome variable for those variables with a p value < 0.25 at bivariate, which were further analyzed, and statistically significance was considered at a p-value of < 0.05 in multivariable logistic analysis.

Result: The prevalence of timely initiation of complementary feeding in Chifra district was 63.1 percent. After adjusting other variables, frequency of breastfeeding [AOR=2.924 (95% CI: 1.577-5.434)], BCG vaccination [AOR= 2.352 (95% CI: 1.102-5.024)], birth spacing [AOR=1.720 (95% CI: 1.001-2.961)] and place of birth [AOR=2.828 (95% CI: 1.557-5.137)] were statistically significant predictors of timely initiation of complementary food.

Conclusion: The prevalence of timely initiation of complementary food in the district was low as compared with WHO recommendations. Frequency of breastfeeding, BCG vaccination, birth interval and place of delivery were statistically significant predictors.

Keywords: Timely initiation, Complementary feeding, Chifra, Afar, Ethiopia

INTRODUCTION

Timely initiation of complementary feeding is the transition from exclusive breastfeeding to family food or the process of giving other food in addition to breast milk from the age of 6 months. Complementary feeding is introduced into an infant's diet at 6 months because breast milk alone cannot adequately meet the child's nutritional requirements. Timely introduced complementary foods that are appropriate for age, safe and nutrient dense are vital for child growth and development [1–3].

Initiating complementary food too early or late can lead to malnutrition, while introduction before six months can lead to an increased risk of morbidity, which further contributes to weight loss and malnutrition, while delayed introduction is also associated with negative consequences for the infants' health [4–6].

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Malnutrition remains one of the main public health problems, and over one-third of under-five mortality is caused by undernutrition related to inadequate complementary feeding. About 10.9 million children under the age of five die each year due to preventable causes, and a lack of timely initiation of complementary feeding is an important cause of undernutrition in children under 5 years, which is an underlying cause of more than 40% of morbidity and mortality [7, 8].

Only 35% of infants worldwide have a timely initiation of complementary food and in Africa there is a low rate [9], although a study from Uganda indicated that almost half of women initiate complementary feeding at six months [10], while local studies in Kamba district, Debre Berhan District, Jima and Goba district revealed that the prevalence of early initiation of complementary feeding was 59.6%, 31.4%, 42.9% and 28.7%, respectively [11–14]. According to the 2016 EDHS, the Afar region had low optimal complementary feeding practice, which is 7% [15].

Although most studies in pastoralist societies revealed that there is too early or late initiation of complementary feeding, there has been no study done yet in Chifra district, and this study will determine the prevalence of timely initiation of complementary feeding and factors associated with it among 6–23-month-oldchildren in Chifra district.

METHODS

Study design and area

A community-based cross-sectional study design was conducted in Chifra district from June 1 up to July 30, 2021. Chifra district is one of the 34 districts of afar regional state which is found 172 km east of Samara, the capital city of Afar regional state. The total population of the district is expected to be 106,670 based on the 2007 census (CSA), of which 2,573 are 6–23-month-old children. The district has four health centers, nineteen health posts and 25 schools.

Study population

Mothers with 6–23 months old children who live in Chifra district.

Study population

Mothers with 6-23 months old children who lived in the selected kebelles of Chifra district.

Inclusion criteria

Mothers of children aged 6-23 months who have lived in the study area for a minimum of six months were included.

Exclusion criteria

Sick mothers or those who were terminally ill and unable to respond and communicate appropriately at the time of the study were excluded.

Sample size determination

The sample size was calculated using a single population proportion formula by considering the following assumptions: 95% confidence level, margin of error (0.05), expected prevalence of timely initiation of complementary feeding practice, Benishangul Gumuz region, Ethiopia(p = 61.8%) [16], and 10% non-response rate was considered. Finally, the calculated sample size was 362, and by adding 10% of non-response, the required final sample size was 398.

Chifra district was selected purposefully by a regional health bureau recommendation. In Chifra, there are 19 kebelles (smaller administrative unit) and six kebelles were selected randomly by the lottery method. According to the sociodemographic data obtained from the health posts, the number of study participants was allocated for each kebelles based on the population proportion to size allocation method. Finally, study participants were selected using a systematic sampling technique from each kebelles by using the number of households with children aged 6-23 months registered by a health extension worker as a sampling frame. If there is more than one eligible individual in the selected household, the younger one was selected purposefully.

Data Collection process

The study was carried out by using a structured face-to-face interview on complementary feeding practices. A standardized, structured questionnaire was adapted from the 2016 demographic and health survey (DHS) [15]. Some modifications to the questionnaire were done in accordance with the local situation. The questionnaire was divided into socio-demographic and economic information about the parents, maternal and child health service characteristics, and complementary feeding practices.

Dependent Variables

Timely initiation of Complementary feeding practice

Independent Variables

Socio-demographic and economic factors, Child characteristics, Maternal caring and characteristics, and Source of Information.

Operational Definition

Timely initiation of complementary feeding: Complementary feeding should be timely, which means that all infants should start receiving foods in addition to breast milk exactly at the age of6 months [1].

Data Quality Control

The questionnaire was translated from English to the local language, Afar Af' then retranslated back to English to check consistency. Pretests, training and supervision were done to control quality. Data were collected by six health extension workers and supervised by one health officer. The age of the child was established using written evidence of their date of birth, but the majority of participants' birth certificates were not available, so the researcher relied on the data given by the mother or caregiver. For birthdates, local calendars like holidays were used to help with recall.

Data analysis and Management

The collected data was cleaned, edited, coded and entered into a computer using Epi Info software version 7.14 and exported to SPSS version 21 software for analysis. Cross-tabulation (frequency with percentage) was used to show the results of categorical variables, while median (IQR) was used to represent non-normally distributed continuous variables. Binary logistic regression was done to see the crude association, and variables with a p value < 0.25 at binary logistic regression analysis were further analyzed in the multivariable logistic regression. The odds ratio and 95% confidence interval were used to see the strength of the association between the dependent variable and each independent variable. Finally, statistical significance for the association was considered at a p value <0.05.

Ethical considerations

The study was approved by the Ethical Review Committee of

Samara University, College of Health Science. Letter of support was obtained from Afar regional health bureau and the Chifra district health office. Before starting the data collection process, the aim of the study was to obtain verbal consent from the mother. Confidentiality was assured as participants' names were not requested or recorded. Participants were informed that they could stop or withdraw from the interview at any time.

RESULT

Socio demography and economic characteristics of study participants

A total of 398 mothers with a 100% response rate participated in the study. Of them, 220 (55.3%) mothers were found between 25–40 years, 346 (86.9%) were rural residents, and 391 (98.2%) were married mothers. Two hundred fifty-eight (64.8%) children were from housewife mothers, while 156 (39%) participants made decisions on how to use money jointly. Almost half (50.3%) of mothers had more than one child under five years old (Table 1).

Child characteristics of study participants

Of the total number of children, 248 (62.3%) were female, and 216 (54.3%) were found in the 12-23 months age group. Two hundred six (51.8%) children had birth orders between 2 and 4. Ninety (37.1%), 138 (34.5%) and 67 (16.8%) children had diarrhea,

Table 1: Socio-economic and demographic characteristics of study participants with timely initiation of CF among 6-23 months old children in Chifra district, 2021 (n=398)

S.no	Variable	Category	Frequency	Percentage
1	Age of mother	15-25 years	162	40.7
		25-40 years	220	55.3
		>40 years	16	4
2	Residence	Rural	346	86.9
		Urban	52	13.1
3	Religion	Muslim	376	94.5
		Orthodox	22	5.5
4	Marital status	Married	391	98.2
		Other	7	1.8
5	Mother's occupation	Pastoralist	48	12.1
		Housewife	258	64.8
		Merchant	12	3
		Farmer	78	19.6
		Employed	2	5
6	Father occupation	Pastoralist	168	42.2
		Farmer	168	42.2
		Merchant	48	12.1
		Employed	14	3.5
7	Mothers education	Unable to read and write	276	69.3
		Able to read and write	18	4.5
		Grade 1-4	66	16.6
		Grade 5-8	30	7.5
		Grade 10-12	8	2
8	Fathers education	Unable to read and write	272	68.3
		Able to read and write	16	4
		Grade 1-4	52	13.2
		Grade 5-8	30	7.5
		Grade 10-12	28	7
9	Family size	<=5	208	52.3
		>5	190	47.7
10	Number of under five children	One child	198	49.7
		>One child	200	50.3
		One child		
11	Monthly income	<1000 EB	18	20
		1000-3000 EB	133	83
		>3000 EB	100	44
12	Decision maker	Husband	187	47
		Wife	55	14
		Jointly	156	39

fever and cough two weeks prior to data collection, respectively. Regarding breastfeeding, almost all (95.5%) children were ever breastfed and of them, 352 (88.4%) children were got breast milk within one hour of birth (Table 2).

Maternal characteristics of study participants

Of the total (80.2%), 219 (55%) mothers had a history of antenatal care and gave birth at home, respectively, while 201 (50.5%) mothers didn't get postnatal care. The majority of the mothers (90.2%) got information about complementary feeding; among them, 243 (68%) mothers got information from health facilities (Table 2).

Environmental condition of study participants

Of the total participants, 202 (50.8%) were from households that had latrines, and 218 (54.8%) disposed of child feces inside the compound. Regarding handwashing, 191 (48%), 139 (34.9%)and 24 (6%) of mothers or caregivers washed their hands before and after child feeding, before food preparation, and after toileting, respectively (Table 2).

Multivariable logistic regression analysis

In multivariable logistic regression, variables with p-value <0.25 in binary logistic regression like maternal age, child age, educational level of mother, religion, frequency of breastfeeding, father's occupation, monthly income, number of under-five children, birth order, information on EBF, presence of cough, birth spacing, BCG vaccination, measles vaccination, vitamin A supplementation and place of birth were included in the model. Finally, frequency of breastfeeding [AOR=2.924 (95% CI; 1.577-5.434), BCG vaccination [AOR=2.352 (95% CI; 1.102-5.024)], birth spacing [AOR=2.828 (95% CI: 1.557-5.137)] and place of birth [AOR=1.72 (95% CI; 1.001-2.961)] were statistically significant predictors of timely initiation of complementary food (Table 3).

Table 2: Child, maternal and environmental characteristics on timely initiation of Complementary food among 6-23 months old children in Chifra district, Afar, Northern East Ethiopia, 2021 (n=398).

Variable	Category	Frequency(n)	Percentage (%)
Child age	6-9 months	68	17.1
	9-12 months	114	28.6
	12-23 months	216	54.3
Birth order	First	82	20.6
	2^{nd}-4^{th}	206	51.8
	>fourth	110	27.6
Presence of diarrhea	Yes	90	22.6
	No	308	77.4
Child sex	Female	248	62.3
	Male	150	37.7
Presence of cough	Yes	67	16.8
	No	331	83.2
Presence of fever	Yes	138	34.7
	No	260	65.3
BF with one hour	Yes	352	88.4
	No	46	11.6
Pre lacteal feeding	Yes	46	11.6
	No	352	88.4
Type of Pre lacteal feeding	Other milk	36	75
	Sugar water	6	12.5
	Other	6	12.5
Ever breast fed	Yes	396	99.5
	No	2	0.5
Currently BF	Yes	355	89.2
	No	43	10.8
BCG vaccine	Vaccinated	341	85.7
	Not vaccinated	57	14.3
Measles vaccination	Yes with card	231	58
	Yes without card	85	21.4
	Not vaccinated	30	7.5
	Child <9 month	52	13.1

Vit A supplementation	Yes	327	82.2
	No	71	17.8
ANC visit	Yes	319	80.2
	No	79	19.8
Number ANC visit	1st	149	37.4
	2nd	123	30.9
	3rd	88	22.1
	4th	38	9.5
Place you give birth	Health institution	179	45
	Home	219	55
Birth spacing	>= 3 years	282	70.8
	< 3 years	116	29.2
PNC	Yes	197	49.5
	No	201	50.5
Information about CF	Yes	359	90.2
	No	39	9.8
Source information	HF	243	68
	TBAs	26	7.2
	Family	60	17
	Friends	12	3.34
	Relative	6	1.67
	Media	12	3.34
When informed CF	ANC	142	40
	PNC	90	25
	Delivery	61	17
	Other	66	18
Reason for starting of CF before six month	Unsatisfactory growth	21	6
	Insufficient BM	58	15
	Poor quality of breast	28	7
	Common usage	14	4
Mother age	15-25	162	40.7
	25-40	220	55.3
	>40	16	4
Opinion what child thrives best	Breast milk only	22	5.5
	CF only	11	2.8
	Both BM &CF	355	89.2
	I don't know	10	2.5
Presence of latrine	Yes	202	50.8
	No	196	49.2
Child feces disposed area	Inside compound	218	54.8
	Outside compound	130	32.7
	Buried inside compound	8	2
	Buried outside compound	2	0.5
	Disposed in latrine	40	10.1
Time for hand washing	Before food preparation	139	34.9
	Before and after food preparation	191	48
	After toilet	24	6
	Before and after child cleaning	44	11.1

Table 3: Binary and Multivariable logistic regression analysis showing factors associated with timely initiation of CF among 6-23months old children in Chifra, Afar, North East Ethiopia, 2021 (n=398).

Variable	Category	Timely imitation of CF		COR (95%CI)	AOR(95%CI)	P value
		Yes	no			
Age of the mother	15-25	97	65	0.213(.047-.969)		
	25-40	140	80	0.250(.055-1.128)		
	>40	14	65	1		
Religion	Orthodox	18	4	2.76(.91-8.32)		
	Muslim	233	143	1		
Frequency of BF	<8	84	68	1		
	>=8	167	79	1.71(1.12-2.59)	2.924(1.577-5.434)	0.001
Fathers occupation	Pastoralist	97	71	0.22(.04-1.04)		
	Farmer	112	56	0.33(.07-1.54)		
	Merchant	30	18	0.27(.05-1.38)		
	Employed	12	2	1		
Monthly Income in Birr	<1000	18	20	0.39(.19-.32)		
	1000-3000	133	83	0.70(.45-1.10)		
	>3000	100	44	1		
Number of <5 children	One	119	79	0.77(.51-1.16)		
	>one	132	68	1		
Age of the child	06-Sep	36	32	0.56(.32-.99)		
	09-Dec	76	38	1.01(.62-1.64)		
	Dec-23	133	67	1		
Birth order	First	37	45	0.47(.26-.84)		
	2nd-4th	144	62	1.32(.81-2.16)		
	>4th	70	40	1		
Presence cough	Yes	38	29	0.72(.42-1.23)		
	No	213	118	1		
Received an information on EBF	Yes	241	118	0.169(0.08-.36)		
	No	10	29	1		
BCG vaccine	Yes	229	112	3.25(1.82-5.80)	2.352 (1.102-5.024)	0.027
	No	22	35	1		
Measles vaccine	Yes	211	105	2.29(1.08-4.88)		
	No	14	16	1		
Vitamin A supplementation	Yes	215	112	1.75(1.02-2.99)		
	No	34	31	1		
Number of child	< 4	127	85	0.74(49-1.12)	.	
	>=4	124	62	1		
Place of birth	Health institution	125	54	1.70(1.12-2.59)	1.720 (1.001-2.961)	0.049
	Home	126	93	1		
Birth spacing	>= 3 years	192	90	2.06(1.32-3.20)	2.828 (1.557-5.137)	0.001
	< 3 years	59	57	1		

DISCUSSION

The prevalence of timely initiation of complementary food was 63.1% [95% CI: 58.3-67.8], which is low as compared with the WHO recommendation of timely initiation of complementary food, which is >80% [1]. Frequency of breastfeeding, BCG vaccination, birth spacing and place of birth were statistically associated.

The result of this study was consistent with the study conducted in Benshangul (61.8%) [16], Hiwot Fana specialized hospital (60.5%) [17] and Lalibela (63%) [18]. This result is high compared with studies from Sodo (57%) [19], Nepal (50%) [20], Bahridar city (7%) [21], EDHS 2016 (56%) [15], Hyderabad (48%) [22] and Kamba woreda (41.4%) [23]. The finding is also low compared to studies from Southern Ethiopia (72.5%) [24], Wolayita Zone (88.2%) [25] and Goba Town (84.4%) [26].The higher prevalence of timely initiation of complementary feeding could be related to the improvement in utilization of ANC, and institutional delivery where good contact point for nutrition education.

Mothers who breastfed their children frequently were nearly three times (AOR=2.924; 95% CI; 1.577-5.434) more likely to practice timely initiation of complementary food than their counterparts (<8 times per day). Mothers who breastfeed their children frequently might have good awareness, as the health workers counsel them

to practice optimum nutrition. Mothers whose children were vaccinated for BCG were two times (AOR = 2.352; 95% CI: 1.102–5.024) more likely to start receiving timely complementary food than their counterparts. It seems plausible that the mother's utilization of health services for themselves and their children, like vaccination, creates a good opportunity for mothers to get health education and counseling on child nutrition. Mothers who gave birth at health institutions were three times [AOR=1.72 (95% CI: 1.001-2.961)] more likely to timely start complementary food for their children than those mothers who gave birth at home. The result is consistent with the studies done in Lalibela [18], Sodo [19], Bahirdar [21] and India [25]. This might be because mothers who deliver at health institutions can have a chance to get health education on nutrition. Mothers who had a short interval between births (<3 years) were nearly three times [AOR = 2.828 (95% CI: 1.557–5.137)] less likely to start timely complementary food than those mothers who had a long birth interval (>= 3). This result is supported by studies done in Ethiopia [21]. This might be due to the fact that those mothers who have a long interval between births can be economically capable and may have a good awareness of when to initiate complementary food.

CONCLUSION

The prevalence of timely initiation of complementary foods was low compared to WHO recommendations. Frequency of breastfeeding, BCG vaccination, birth interval and place of delivery were statistically significant predictors of the timely initiating of complementary food. The varieties of risk factors identified in this study emphasize the need for a multidisciplinary approach to address the issues of early and late initiation of complementary food.

LIMITATIONS

There might be some limitations in study like;

- As the study was conducted in a rural population with a high illiteracy rate, recall bias and inaccurate responses in variables are expected and may have affected the results.
- Due to a lack of transparency on age, there may be excluded children from the study considered as above 23 months or inclusion of participants who are above the target age.

List of abbreviations and acronyms

ANC- Antenatal Care

AOR- Adjusted Odd Ratio

BF- Breastfeed

BCG- Bacillus Calumet Guerin

CF- Complementary Feeding

CI- Confidence interval

COR- Crude Odd Ratio

EBF- Exclusive Brest Feeding

EDHS- Ethiopian Demographic and Health Survey

Epi Info- Epidemiological Information

IYCF- Infant and Young Child Feeding

OR- Odd Ratio

PNC- Post Natal Care

WHO- World Health Organization

AUTHORS' CONTRIBUTIONS

All authors conceived, designed, and supervised the data collection. KG develops the proposal, and all the authors performed the data analysis and interpretation of the data and drafted the manuscript. All authors read and approved the final manuscript.

CONSENT TO PUBLISH

Not applicable

AVAILABILITY OF DATA AND MATERIALS

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

COMPETING INTEREST

All authors declare that they have no competing interests.

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ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

The study has obtained ethical approval from Samara University Institutional Review Board before its commencement. The aim of the study was explained and informed written consent was obtained from each study participant. Permission letter was also obtained from Afar Regional Health Bureau and Chifra district.

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