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Feeding Patterns of Infants and its Determinants ….in Southwestern Nigeria
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Original

Feeding Patterns of Infants and its Determinants among Mothers Attending Infant Welfare Clinic in a Tertiary Healthcare Institution in Southwestern Nigeria

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Abstract

Background: Adequate nutrition in infancy is important to every individual to have a healthy head-start in life for growth, development, and survival. This study assessed the feeding patterns of infants (among infant < or ≥6month) and its determinants among mothers attending infant welfare clinic in a tertiary hospital.

Methodology: This institutional-based, cross-sectional study included 320 infants, and their mothers/caregivers recruited at the infant welfare clinics of a tertiary hospital in Ekiti State, Nigeria using systematic sampling technique. Ethical clearance was obtained from the Ethical and research committee of the institution. Data was collected with an adapted pre-tested semi-structured questionnaire. Binary logistic regression was used to assess determinants of timely infant complementary feeding. Statistical significance was set at $p<0.05$.

Results: Findings showed that in infants < 6months, the prevalence of exclusive breastfeeding was 169 (85%). Also, 146 (73.4%) of infants breastfed in the first hour of life, while 170(85.4%) of the mothers gave colostrum. Furthermore, among infants (≥ 6month) the prevalence of timely introduction of complementary feeding was 88 (73%). The only independent predictor of timely introduction of complementary feeding was the mothers who attended any counselling on breastfeeding by the healthcare worker (OR: 4.26, 95% CI:1.21–15.00; p=0.024).

Conclusions: The prevalence of exclusive breastfeeding and timely introduction of complementary feeding was high. The only identified predictor of timely introduction of complementary feeding was the counselling of mothers on breastfeeding by the healthcare workers. It is recommended that healthcare workers should counsel mothers who attends health clinic.

Keywords: Infant, Feeding pattern, Determinant, Welfare clinic, Tertiary health institution, Nigeria.

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Introduction

Globally, 75% of all under-five deaths (about 4 million) occurred within the first year of life.[1] The risk of a child dying before completing the first year of life was highest in the African continent (52 per 1000 live births), with Nigeria's infant mortality set at 67 deaths per 1000 live birth. [1,2] One of the commonest causes of infant mortality is malnutrition. [3,4] Hence, adequate nutrition in infancy is important for healthy head-start in life for growth, development and survival. [3-7]

Exclusive breastfeeding (EBF), the early initiation of breastfeeding as soon as a child is born (within 1 hour), as well as colostrum feeding are essential for optimal growth and development for the first six months of life.[8] After the first six month of life, breastfeeding alone is not adequate to supply all the nutritional needs of the infant, however, children should receive breast milk for at least two years.[3,8,9] The World Health Organization (WHO) recommends complementary feeding which is the introduction of nutritionally appropriate and safe foods to infants aged six months and above to supplement breastfeeding.[3,5] Breastmilk provides immediate and long-term health benefits to both babies and their mothers.[3-5] According to the United Nations Children's Fund (UNICEF), only one-third of infants were exclusively breastfed, well below the target of 50% set for breastfeeding in West and Central Africa.[10,11] A significant barrier to EBF in this region is the practice of giving water in addition to breast milk, affecting 40% of infants aged zero to six months.[10]

Khan et al [7] in a study in Pakistan revealed that only 49% of mothers-initiated breastfeeding within one hour of birth, while 37% of mothers exclusively breastfed their infants for six months.[7] About 70% of mothers introduced complementary feeding at six to eight months of age.[7] Around 82% of mothers continued breastfeeding for at least one year and 75% for at least two years of age.[7]

Some factors have been linked to affect feeding pattern of infants which includes socio-economic factors, place of birth, maternal education status and cultural factors.[3,5,8,13] EBF duration is shown to be significantly associated with maternal education, maternal occupation and gender of the child.[12] According to Eke et al., [12], improving girl child education and baby-friendly hospital initiative with baby-friendly community initiative should be adopted to improve EBF duration.

In another study carried out in Tanzania, higher maternal education and household wealth, mother's employment, health facility birthing and postnatal care visit have been associated with minimum dietary diversity (MDD), minimum acceptable diet (MAD), and minimum meal frequency (MMF).[5]

On the other hand, childbirth in the health facility was associated with the delayed introduction of complementary foods.[8] There is a need to strengthen the promotion of infant and young child feeding practices during postnatal care and the use of mass media to lay emphasis on optimal complementary feeding practices, especially for mothers with a lower educational status.[8]

A study by Esan et al, [3] found that mothers' knowledge of the ideal age for the introduction of complementary feeding is associated with the age of introduction of complementary feeding. In this study by Esan et al., [3] more than three-fifths of the respondents had commenced complementary feeding for their infants between three and five months while an excess of two-fifths of the respondents started giving their children water to drink at three months of age.

Infant feeding practices have also been linked to gender of the child.[13] In this study, the odds of a male child who was bottle-fed in the age group of 6-23 months were two times higher than that of a female child. Also, the odds of a male child in the age group of six to eight months being introduced to solid, semi-solid or soft food were five times higher than that of a female child. Similarly, the odds of a male child receiving MDD, MMF and MAD in the age group of 6-23 months were found to be higher than that of a female child in the same age group.[13] Another study by Meva et al., [14] showed that mothers were well-informed about EBF but seem not to be practicing it.

However, due to the paucity of study in this part of the world, and the need to re-evaluate infant feeding practices as we move closer to 2025 (50% target for EBF). It has become paramount because this information is needed by the policymaker to make informed decisions concerning the nutrition of infants. Hence, this study aimed at investigating the feeding patterns of infants and their determinants among mothers attending the infant welfare clinic in a tertiary health institution in southwestern Nigeria.

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Methodology

Study design and area

The study used institutional-based, cross-sectional study design and was conducted at the infant welfare clinics of the Community Medicine Department of Ekiti State University Teaching Hospital, Ado-Ekiti (EKSUTH), Ekiti State, Nigeria. Ekiti State is situated in the tropics, Southwestern, Nigeria and EKSUTH is one of the three tertiary healthcare facilities in the State.[3]

EKSUTH is located at the heart of the State capital making it easily accessible to both urban and rural clients.[15] It is the most patronized by the indigenous people of Ekiti State, who are predominantly Yorubas, farmers and civil servants.[3] The health facility renders breastfeeding support to mothers usually during infant welfare clinics.

Study population

This study included all mothers/caregivers whose children were aged one year and below attending the infant welfare clinics. Mothers/caregivers who were severely ill and or with health conditions such as mental/psychologically unfit, and non-consenting mothers were excluded.

Sample size calculation and sampling

Fisher's formula was used to calculate the sample size; for a population >10,000 for this study.[16]

$$n = (z^2\, pq)/d^2$$

Where: n= desired sample size; z = standard normal deviate, 1.96; p = proportion of children exclusively breast feeding [17] = 0.28; q = 1 – p = (1-0.28) = 0.72; d = degree of accuracy desired = 0.05.

$$n = (\llbracket 1.96 \rrbracket^2 \times 0.28 \times 0.72)/ \llbracket 0.05 \rrbracket^2$$
$$\approx 310 \text{ (Sample size)}$$

The non-response sample size was calculated as 10%[16] of the total sample size = 344 (sample size)

An average of 30 infants visits the infant welfare clinic daily immunization and other services. Using a systematic sampling technique, selection of 15 clients per clinic was done. The sample interval was 2 and every 2nd clients were selected till 15 clients were obtained per clinic day. Hence, the number of respondents recruited every week (Monday to Friday) was 75 clients. Information was collected over a 5-week period.

Data collection instrument

A pretested (35 individuals in another tertiary facility (FETHI Ido-Ekiti), semi-structured, adapted questionnaire was employed for data collection. The questionnaire was adapted from previous studies conducted. [3,12-14] Test–retest method was done to assess the reliability of the instrument (Overall Cronbach's alpha was 0.75). The face and content validity study were ensured by an expert in the field. The questionnaire was administered to 344 respondents at the infant welfare clinic.

Data management and statistical analysis

The data collected for the study was first checked for errors and incomplete data to ensure good data quality. Furthermore, data were cleaned and analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0. Descriptive analysis used frequency tables, charts and graphs. The Chi-square test and binary logistic regression were used to test for significance of association between the independent and dependent variable. P-values ≤ 0.05 were considered statistically significant.

Ethical consideration

Ethical approval for the study was obtained from the Ethics and Research Committee of EKSUTH, Ado-Ekiti (Approval number: EKSUTH/A67/2022/12/009). Approval and permission for the study were obtained from the Department of Community Medicine, EKSUTH. Written informed consent was obtained from individual participants. In addition, respondents were informed of their right to voluntarily participate or withdraw from the study at any stage without adverse consequences. Confidentiality was maintained as the questionnaire was set to be anonymous.

A total of 344 questionnaires were distributed, however, only 320 respondents returned a completed questionnaire, which gave a response rate of 93%.

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Table 1: Socio-demographic characteristics of the participants (n=320)

Variable	Frequency	Percentage (%)
Mother's Age (in years) (*Mean age ± SD = 31±5*)		
<25	41	12.8
25-35	220	68.8
>35	59	18.4
Age of Child		
<6Months	199	62.2
≥6Months	121	37.8
Sex of the Child		
Male	158	49.4
Female	162	50.6
Child spacing from the last child		
< 1year	171	53.4
1-2 Years	26	8.1
>2years	123	38.5
Relationship with the child		
Caregiver	4	1.3
Mother	316	98.7
Number of children in the household		
1-2 Children	261	81.6
>2 Children	59	18.4
Residence		
Urban	312	97.5
Rural	8	2.5
Marital Status		
Single	14	4.4
Married	306	95.6
Religion		
Christianity	287	89.7
Islam	33	10.3
Ethnicity		
Hausa	8	2.5
Ibo	47	14.7
Yoruba	265	82.8
Highest Educational Qualification		
No formal Education	8	2.5
Primary Education	1	0.3
Secondary Education	54	16.9
Tertiary Education	257	80.3
Employment		
Yes	257	80.3
No	63	19.7
Monthly Household Income (in Naira)		
≤50000	158	49.3
>50000-100000	60	18.8
>100000-200000	64	20.0
>200000	38	11.9

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Table 1 reveals the socio-demographic characteristics of the mothers and infants; the majority (68.8%) of the mothers were aged between 25 to 35 years, with mean age being 31 ±5 years. Most of the children (62.2%) were < 6 months of age, while female infants were slightly (50.6%) more than the male. The respondents were largely mothers 316 (98.7%), with 1-2 child(ren) 216 (81.6%), Christians 287(89.7%), Yoruba 265(82.8%) and married 306 (95.6%). The socio-economic factors revealed that majority of the respondents were employed 257 (80.3%) and majority had tertiary education 257(80.3%). However, 68.1% (218) of the respondents' household income was less than ₦100,000 and the majority 196 (61.3%) lived in rented apartment.
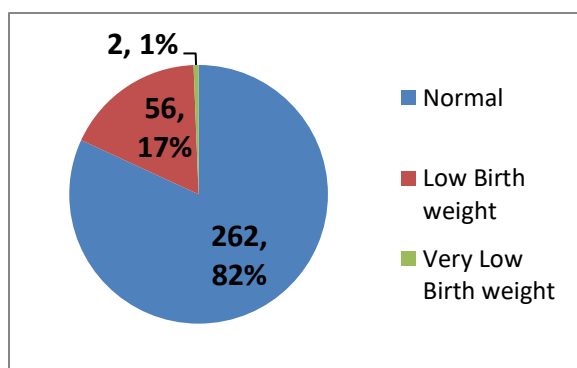

Figure 1: Nutritional status of the infants at birth using birth weight

The birth weight of the infants revealed that majority, 262 (82%) of the babies were normal (≥2.5kg). However, 56 (17%) babies had low birth weight (<2.5kg), while 2 (1%) had very low birth weight (<1.5kg) (as shown in figure 1).
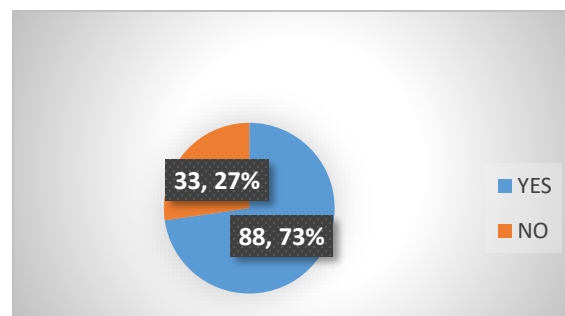
Figure 2: Prevalence of Timely introduction of complementary feeding at 6months and above

Majority 88 (73%) of the infants had timely introduced to complementary feeding at 6months (as shown in Figure 2).

Table 2: Feeding pattern of infants less than 6 months of age (n=199)

Variable	Frequency	Percentage (%)
Was the baby breastfed in the first hour of life		
Yes	146	73.4
No	53	26.6
Did your child take colostrum		
Yes	170	85.4
No	29	14.6
In the last 24hrs; What was given to the child		
Breastmilk Only	176	88.5
Breastmilk and Water	10	5.0
Breastmilk and Infant Milk/Formula	10	5.0
Only Infant Formula	3	1.5
Frequency of feeding for a child less than 6months		
< 4times Per Day	46	23.1
≥4times Per Day	153	76.9

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Variable	Frequency	Percentage (%)
What did he/she feed on last 6months		
Breastmilk Only	169	85.0
Breastmilk and Water	15	7.5
Breastmilk and Infant Milk	15	7.5
Number of increase frequent watery stooling among Infant		
0-1 times	188	94.5
2-3 times	10	5.0
4-5 times	1	0.5

Among the infant less than 6 months, the majority 146 (73.4%) of the infants were breastfed in the first hour of life, 85.4% (170) were given colostrum, in the last 6months, 85% (169) were fed with breast milk only, while in the last 24hrs, 176 (88.5%) of the infant had only breast milk. A large proportion 188 (94.5%) of the infants had zero to one episode of increase frequent watery stooling since birth. However, 15% (30) of the infants had been introduced to complementary feeding, while 46 (23.1%) had been fed less than 4 times a day (as shown in Table 2).

Table 3: Feeding pattern of infants 6months of age and above (n=121)

Variable	Frequency	Percentage (%)
Was the baby breastfed in the first hour of life		
Yes	75	62.0
No	46	38.0
Did your child take colostrum		
Yes	107	88.4
No	14	11.6
In the last 24hrs for a child 6 months of age and above but less than a year: What was given to the child?		
Breastmilk Only	6	5.0
Breastmilk and Water	47	38.8
Breastmilk and Infant Milk/Formula	52	43.0
Only Infant Formula	2	1.6
Grain Based Food (Ogi Baba)	14	11.6
What is the frequency of feeding for a child 6 months of age and above but less than 1year		
<4times Per Day	38	31.4
≥4times Per Day	83	68.6
For a child 6months of age and above but less than a 1year: What did he/she feeds on?		
Breastmilk Only	20	16.5
Breastmilk and Water	21	17.4
Breastmilk and Infant Milk/Formula	40	33.1
Only Infant Formula	12	9.9

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Variable	Frequency	Percentage (%)
Grain Based Food (Ogi Baba)	28	23.1
Number of increase frequent watery stooling among Infants		
0-1 times	89	73.6
2-3 times	28	23.1
4-5 times	4	3.3

Among the infants 6 months and older, the majority 75 (62.0%) of the infants were breastfed in the first hour of life, 88.4% (107) were given colostrum, in the last 6months large proportion of infants were fed with breast milk and Infant milk/formula 40 (33.1%) and grain-based food ("Ogi Baba") 28 (23.1%) respectively. About a quarter 28 (23.1%) of the infants had increase frequent watery stooling 2-3times in their lifetime (as shown in Table 3).

Table 4: The relationship between socio-demographic characteristics and timely introduction of complementary feeding at 6months (n=121)

Variable	No	Yes	X^2	P-value
Mother's age (in years)				
<25	4(30.8)	9(69.2)	0.825	0.653
25-35	22(29.3)	53(70.7)		
>35	7(21.2)	26(78.8)		
Sex of the Child				
Male	16(25.4)	47(74.6)	0.629	0.390
Female	17(29.3)	41(70.7)		
What is the Child interval from the last child				
< 1year	23(32.9)	47(67.1)	3.229	0.199
1-2 Years	0(0.0)	3(100.0)		
>2years	10(20.8)	38(79.2)		
Number of children in the household				
1-2 Children	29(29.9)	68(70.1)	1.698	0.305
>2 Children	4(16.7)	20(83.3)		
Residence				
Urban	31(26.5)	86(73.5)	1.077	0.299
Rural	2(50.0)	2(50.0)		
Marital Status				
Single	3(60.0)	2(40.0)	2.816	0.124
Married	30(25.9)	86(74.1)		
Religion				
Christianity	32(28.1)	82(71.9)	0.632	0.672
Islam	1(14.3)	6(85.7)		
Ethnicity				
Hausa	1(50.0)	1(50.0)	2.847	0.241
Ibo	1(8.3)	11(91.7)		
Yoruba	31(29.0)	76(72.0)		
Highest Educational Qualification				

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Variable	No	Yes	X²	P-value
No formal Education	0(0.0)	1(100.0)	0.974	0.685
Primary Education	0(0.0)	1(100.00)		
Secondary Education	4(33.3)	8(66.7)		
Tertiary Education	29(27.1)	78(72.9)		
Employment				
Yes	24(23.1)	80(76.9)	6.570	**0.01***
No	9(52.9)	8(47.1)		
Monthly Household Income (in Naira)				
≤50000	16(29.1)	39(70/9)	1.414	0.702
>50000-100000	5(18.5)	22(81.5)		
>100000-200000	9(30.0)	21(70.0)		
>200000	3(33.3)	6(66.7)		

Table 4 revealed the association between socio-demographic characteristics and timely complementary feeding introduction at 6 months. Only one factor was statistically significant and related to timely introduction complementary feeding, which is employment status (p=0.01). All other factors (mother's age, infant gender, child space from last child, number of children in the household, ethnicity, religion, marital status, educational status, monthly household income and residence) were not statistically significant.

Table 5: The relationship between other characteristics and timely introduction of complementary feeding at 6months (n=320)

Variable	No	Yes	X²	P-value
Mother breast disease or condition				
Yes	1(9.1)	10(90.9)	2.017	0.142
No	32(29.1)	78(70.9)		
Mothers with other chronic disease or conditions				
Yes	0(0.0)	15(100.0)	**6.421**	**0.006***
No	33(31.1)	73(68.9)		
Mode of delivery				
CS Delivery	7(24.1)	22(75.9)	0.189	0.664
Vaginal Delivery	26(28.3)	66(71.7)		
Had ANC				
Yes	29(27.1)	78(72.9)	0.013	0.908
No	4(28.6)	10(71.4)		
Had PNC				
Yes	24(25.0)	72(75.0)	1.210	0.271
No	9(36.0)	16(64.0)		
Have access to healthcare service covering feeding practice			0.858	0.354
Yes	25(29.8)	59(70.2)		
No	8(21.6)	29(78.4)		
Promotional Marketing of Infant Formula				
Yes	6(17.6)	28(82.4)	2.209	0.137
No	27(31.0)	60(69.0)		

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Variable	No	Yes	X²	P-value
Any Cultural belief hindering EBF* in the first 6months of life				
Yes	2(33.3)	4(66.7)	0.117	0.523
No	31(27.0)	84(73.0)		
Baby friendly workplace				
Yes	22(24.7)	67(75.3)	1.106	0.293
No	11(34.4)	21(65.6)		
Attended counseling on BF by the Healthcare worker				
Yes	23(21.7)	83(78.3)	13.397	**0.000***
No	10(66.7)	5(33.3)		
Do you think you have many children to care for?				
Yes	2(7.7)	24(92.3)	6.401	**0.008***
No	31(32.6)	64(67.4)		

Table 5 revealed the association between the others factors and the timely introduction of complementary feeding at 6months. Mothers with other chronic disease (p = 0.006), attending health workers counseling on breastfeeding (p = 0.000) and caring for many children (p = 0.008) were the three factors significantly related to timely complementary feeding introduction at 6 months. All other factors were not statistically significant.

Table 6: Binary logistic regression analysis of the predictors associated with the timely introduction of complementary feeding among mothers/caregivers

Factors	Adjusted Odds Ratio (95% Confidence Interval)	P-Value
Employment		
No	1	
Yes	2.00(0.59-6.79)	0.269
Mothers with other chronic disease or conditions		
No	1	0.071
Yes	40.02(0.02-1.83)	
Attended any counselling on breastfeeding by the Healthcare worker		
No	1	**0.024***
Yes	4.26(1.21-15.00)	
Do you think you have many children to care for?		
No	1	0.076
Yes	4.08(0.86-6.79)	

Statistically significant

After binary logistic regression analysis, only one factor was a significant predictor associated with timely introduction of complementary feeding: which was mothers who attended any counselling on breastfeeding by the healthcare worker. Those mothers/caregivers who attended any counselling on breastfeeding by the healthcare worker were 4.26times likely to introduce timely complementary feeding for their children compared to those mothers/caregivers who don't attend any counselling on breastfeeding by the healthcare worker (OR:4.26, 95%CI:1.21–15.00; p=0.024) (as shown in table 6).

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Discussion

In this study, we investigated the prevalence of EBF, and the pattern of infant feeding practices by mothers and caregivers. It was observed that the majority of the mothers and caregivers were between (25-35) years of age, with a mean age of 31 ±5years. The respondents were majorly mothers, with 1-2 child(ren), married, employed and the majority had tertiary education. The nutritional status of infants at birth using the birth weight revealed that majority of the babies had good nutrition. However, about one-fifth of the infants had some level of low birth weight at birth which might indicate they might have suffered some form of intrauterine growth restriction before birth; hence, there may need to be closely monitored for growth and development.

The proportion of infants less than 6 months of age who were exclusively breastfed was 85%. This might have occurred because a large majority of the mothers/caregiver had tertiary education, and received counselling on child feeding from healthcare workers. This study result is similar to a study by Demilew et al[8] in the slum areas of Bahir Dar City, Ethiopia. The similarity may have occurred because the two studies were done in sub-Sahara Africa, and both used a cross-sectional study design, however, this study was institutional-based, and done among infants compared to the community-based study done by Demilew et al among children 6-23 months of age.[8] In addition, this is also similar to a study in Rwanda by Issaka et al[18] and Nwabueze et al[19] in Anambra State, Nigeria. However, the study findings is in contrast to several studies, [18,20-22] that showed a low level of breastfeeding practice among mothers. The difference may have resulted from differences in sample size, location of the study, and differences in study design.

Feeding patterns among infants less than 6 months, revealed that most of the infants were breastfed in the first hour of life and were given colostrum. This is similar to a study in Ethiopia where 85% of the children were breastfed in the first hour of life.[8] However, in contrast to this study, a study done by Solomon et al[23] revealed that only one-third of the infants were breastfed in the first hour of life, both studies, however, were done in Ekiti state but this present study used an institutional-based cross-sectional study design when compared to the community-based, cross-sectional study done by

Solomon et al.[23] The feeding practice in this study may have resulted from the high level of education of the mothers, which is reflected in the few episodes of frequent watery stooling among the infants since birth, also the majority of the infants were fed more often. This is similar to a study in Anambra State, [19] Nigeria which revealed that the majority of children were breastfed frequently, had few episodes of frequent watery stooling and most children started complementary feeding at 6 months of age.[19]

Among the infants above 6 months, the majority of the infants were fed with breastmilk and/or infant formula, and grain-based food in the last 6 months. This similar to a study by Deborah et al[3] which revealed that cereal, animal products, and formula feed were the most common feeding practices. Similarly, breastmilk with water and breastmilk with formula were the commonest feeding practices in Anambra, Nigeria.[19] About a quarter of the infants had frequent watery stooling 2-3times around this time. Equally, a study in Anambra revealed that about one-fifth of the respondent suffered from episodes of diarrhoea.[19]

About three-quarter of the infants have been introduced to complementary feeding timely, similarly high proportion of the respondents in studies by Shumey et al, Semahegn et al, Chane et al, in Ethiopia had timely introduced complementary feeding.[24-26] The four studies were conducted in sub-Sahara African and used cross-sectional study design. However, our sample size was slightly smaller[24-26] and our study was institutional-based compared to community-based study done by Chane et al.[26] In contrast to this study, the study by Esan et al [3] revealed that about one-third of infant were timely introduced to complementary feeding. The differences may be due to the lower level of education in the study by Esan et al. Also, the mothers in this study were older and likely more experienced. Also, the sample size in this study was similar to the study by Esan et al.[3] The only predictors of the timely introduction of complementary feeding in this study was the mothers who attended any counselling on breastfeeding by the healthcare worker. In this study, mothers who attended any counselling on breastfeeding by the healthcare worker during ANC, PNC or any other routine check were more likely to introduce timely complementary feeding. This is similar to studies done in New Zealand, by Ferreira et al, and Yeheyis et al in Ethiopia.[27-28] This may have occurred because most hospital ensures that

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during the antenatal, postnatal and immunization clinic visits counselling of the mothers are done regularly by healthcare workers. Also, the high education level of the respondent might have increased the adoption of positive behavioural change into the mother to imbibing timely introduction of complementary feeding practices. In a similar study by Chane et al it was revealed that mother who had sources of information concerning complementary feeding were more likely to introduce it on time.[26] However, in contrast to the present study, several other studies, [25,26] showed that mothers who attended any counselling on breastfeeding by the healthcare worker during ANC had no relationship with timely introduction of complementary feeding. This may have resulted because of a larger sample size was considered and the study sites were different.

Study Limitation
The study is prone to recall bias which was reduced by limiting the study to asking questions of events that are not beyond the last one year.

Conclusion
The prevalence of exclusive breastfeeding and timely introduction of complementary feeding was high among the participants. Also, the pattern of feeding is different among different age groups (<6mth and ≥6mth). The only identified predictor of timely introduction of complementary feeding was the mothers who attended any counselling on breastfeeding by the healthcare worker. It is recommended that healthcare workers should counsel all mothers/caregivers who attends antenatal, postnatal and infant welfare clinic to reinforce the importance of exclusive breastfeeding and timely introduction of complementary feeding to child growth, survival and development.

Declarations

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