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Research

Assessment of breastfeeding practice of mothers and the Nutritional status of infants (0–12 months) in Ife North Local Government Area, Osun State, Nigeria

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Background

According to UNICEF, annually 5.4 million Nigerian children are not exclusively breastfed, worsening the nation's chronic malnutrition issue.

Objective

This study evaluated the breastfeeding knowledge and practices of mothers and the anthropometric status of breastfed infants in Ife North Local Government Area, Osun State, Nigeria.

Methods

In a community-based cross-sectional study, a multi-staged sampling technique was used to recruit 380 women with infants 0–12 months-old from four wards in Ife North LGA. Data on socio-demographic traits of mothers and children, mothers' knowledge and behaviors about breastfeeding, and factors influencing breastfeeding practices were gathered using a semi-structured self-administered questionnaire. The mothers' and infants' anthropometric indices (weight, height, and mid-upper arm circumference (MUAC)) were measured. WHO Anthro was used to analyze and categorize the children's nutritional status. The chosen significance threshold was $p = 0.05$.

Results

63.9% of sample mothers were knowledgeable about breastfeeding practices. All the infants had been breastfed and 41.8% of those < 6 months were exclusively breastfeeding on the day before the survey. 67.4% stated that they had started breastfeeding within an hour of delivery. Delays were stated to be due to no breastmilk production (29.5%), insufficient lactation (24.7%), illness (18.7%), and cracked nipples (17.9%). 38.7% of the infants were underweight, 22.9% were stunted, and 7.4% were wasted. MUAC identified 15.3% and 19.5% of children with severe acute and moderate acute malnutrition respectively. Among mothers, 37.6% were overweight and 56.8% had normal BMI.

Conclusions

There is significant malnutrition despite high levels of breastfeeding awareness and behavior. This study's high rates of malnutrition highlight the urgent need for nutrition assistance.

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INTRODUCTION

The first year of life is a key window for promoting optimum growth, health, and behavioral development, yet it is also a sensitive time for malnutrition. Poor nutrition during this crucial period is linked to significant morbidity and mortality as well as delayed motor and mental development as immediate consequences (Likhar and Patil, 2022). Long-term consequences include impairments in intellectual performance, work capacity, reproductive outcomes, and overall health during adolescence and adulthood. In recent decades, there has been a decrease in the number of stunted children everywhere except Africa. In Nigeria, the prevalence of stunting in children aged less than five years is 34.2% (UNICEF, World Health Organization, and The World Bank, 2023).

Infants should begin breastfeeding within one hour of birth, be breastfed exclusively for the first six months and then start eating safe, nutrient-dense complementary foods and continue to be breastfed for up to two years and beyond (WHO, 2018). This infant feeding pattern will to a large extent protect infants from the risks of becoming malnourished.

Several studies have reported that breastfeeding is culturally accepted in various ethnic groups in Nigeria, also indicating that there is a high level of knowledge about breastfeeding (Balogun et al., 2017; Onah et al., 2014). According to the 2018 National Demographic and Health Survey (NDHS), in Nigeria, 97% of children were breastfed at some time, 42% initiated it during the first hour of delivery, and 82% within the first day of life (NDHS, 2019). However, only 29% of Nigerian newborns under the age of six months are exclusively breastfed (NPC and ICF, 2019). This is partly because solid foods are introduced too soon. 16% of Nigerian infants are introduced to solid and semi-solid foods at two to three months, while 40% are introduced at four to five months (NDHS, 2019).

In some parts of southwest Nigeria, it has been reported that less than 40% of women initiated breastfeeding within one hour of delivery while fewer than 60% exclusively breastfed their babies for six months (Balogun et al., 2017; Adebayo and Oluwaseyi, 2020). However, little data has been reported from the Ife area on breastfeeding or on the nutritional status of infants. Therefore, the purpose of this research was to evaluate the anthropometric condition of babies (0–12 months) and the breastfeeding practices of mothers in Ife North Local Government Area, Osun State, in southwestern Nigeria.

METHODS

This descriptive and cross-sectional study was conducted in Ife North Local Government Area, Osun State, Nigeria. A semi-structured self-administered questionnaire was used to collect information on socio-demographic characteristics of mothers and index children, knowledge and practice of mothers towards breastfeeding, and factors affecting breastfeeding practices. The anthropometric indices (weight, height, and mid-upper arm circumference (MUAC)) of the infants and mothers were obtained and their nutritional status was determined using WHO classification. The study population consisted of 380 mothers with infants (0-12 months) in Ife North Local Government Area, Osun State, Nigeria. Mothers who understood the purpose of the study and willing to participate were recruited in the study; they were from different backgrounds and ethnic groups.

VALIDATION OF INSTRUMENT

Semi-structured interviewer-administered questionnaire adapted from previous works of literature related to the study was used to collect information from the mothers of the children on breastfeeding practices.

SAMPLE SIZE

The minimum sample size for a given population was determined using

$$n = \frac{Z^2 (p\ q)}{d^2}$$ (Cochran's formula)

where n = required sample size, Z = confidence level with a standard value of 1.96, e is the preferred level of precision set at 0.05, p = prevalence of undernutrition among infants in Nigeria set as 37% (Nwankwo et al., 2022), and q is 1- p. This gave a sample size of 358. To cater for 10% attrition or non-responses and incomplete responses, the sample size was assumed to 380 mothers with infants (0-12 months).

SAMPLING PROCEDURE AND DATA COLLECTION

A four-stage sampling procedure was used to select mother-child pairs in the community for this study. In the first stage, Ife North Local Government Area, Osun State was purposively selected. In the second stage, a sampling frame of the wards in the local government area was made and 4 wards were randomly selected from the 10 wards present. Systematic sampling technique was used to select every tenth house in each community until the sample size was achieved. Next, eligible households with mother-child pair were selected and every consenting eligible mother-child pair was included in the study. A total of 380 mother-child pairs were interviewed.

MEASUREMENT OF ANTHROPOMETRIC STATUS OF MOTHERS AND INDEX CHILD

MOTHERS' HEIGHT: The mothers' height was measured using a stadiometer by placing their heels, buttocks, and backs against the tall block while holding their hands loosely on each side and staring straight ahead.

MOTHERS' WEIGHT: While they were wearing light clothing and were not wearing shoes, their weight was measured using a bathroom scale calibrated with a standard weight. Weight (kg)/height $(m)^2$ (BMI) was calculated and categorized as underweight (BMI< 18.5), normal weight (BMI = 18.5 – 24.9), overweight (BMI = 25.0 – 29.9), and obese (BMI ⩾ 30) by the WHO definition.

LENGTH OF THE INDEX CHILD: The index child's length was measured using an infantometer. Mothers were asked to place their infants on the infantometer, head against the head plate, and play with them until they lie down comfortably. To make sure the baby's head stays in place while the mother is speaking to him, she was urged to gently keep the head of the child in place. To eliminate the

space between the foot and the footplate, the bent knee was softly forced on the centerboard and the dorsum of the foot was placed against it. The tape's measurement was read.

WEIGHT OF INDEX CHILD: Before weighing the child, the mother's weight was recorded. The mother was then weighed while the nude baby was being carried. The child's weight was calculated by deducting the former from the latter.

MID-UPPER ARM CIRCUMFERENCE: The child's left arm was flexed at a 90-degree angle. The top of the shoulder to the end of the elbow was where the MUAC tape was placed. The midpoint was estimated by dividing the number by two. The tape was put around the child's arm at the midpoint after it had been straightened. There was just the right amount of tape tension.

MEASUREMENT OF INFANT FEEDING PRACTICES

We used an earlier WHO definition of exclusive breastfeeding (EBF), which meant that the infant received only breast milk or expressed breast milk and no other liquids or solids, not even water, the day before the survey, with the exception of drops, or syrups consisting vitamins, minerals or supplements. Breastfeeding practices were evaluated based on three key indicators: the early initiation of breastfeeding within the first hour of life, infants who were not introduced to water in the first six months of life, and infants (6-12 months) who had been exclusively breastfed for six months at the time of study.

DATA ANALYSIS

Data were cleaned and cross-checked for correctness. Statistical Package for the Social Sciences (SPSS) version 20 was used to analyze the data. Descriptive statistics were used to summarize the socio-demographic characteristics of the mothers and infants, breastfeeding practices, and the reasons for delayed breastfeeding. Data were presented in frequencies and percentages for categorical variables. The nutritional status; wasting, stunting, and underweight of the children was determined using WHO Anthro. To ascertain relationships between the mothers' breastfeeding practices and the child's nutritional status, Chi-square Test for Independence was used. In all cases, p-value threshold of 0.05 was used to determine the statistical significance.

ETHICAL CONSIDERATIONS

Ethical approval for this study was obtained from the Ethics and Research Committee of the Lead City University, Ibadan with reference number, LCU-REC/23/372**.** Before the survey, informed consent was obtained from the mothers of each study participant. The confidentiality of the data collected was guaranteed to the responders.

RESULTS

A total of 380 questionnaires were completed after the distribution of the survey instruments. Table 1 displays the socio-demographic details of both the mothers and infants. The mean age of the mothers was 31 years. Findings showed that 48.2% of the mothers completed their university degree, two-thirds (64.7%) worked for themselves, and 61.8% thought they belonged to a middle-class socioeconomic level. 53.2% of respondents listed a government hospital as their prenatal care provider. Of the index children, half (54.7%) were between the ages of 6 and 12 months, and most of them (57.4%) were females.

Table 1. Socio-demographic characteristics of the respondents (N=380)

Characteristics	Mean± SD (in bold text) and Frequency (%)
Age (years)	**31.19±7. 39**
≤ 20	29 (7.6)
21 – 30	131 (34.5)
31 – 40	192 (50.5)
Religion	
Christianity	189 (49.7)
Islam	180 (47.4)
Traditional	11 (2.9)
Marital status	
Married	301 (79.2)
Single	31 (8.2)
Divorced	31 (8.2)
Widowed	17 (4.5)
Mothers' education level	
Primary	14 (3.7)
Secondary	156 (41.1)
Tertiary	183 (48.2)
No formal education	27 (7.1)
Mother's occupation	
Self-employed	246 (64.7)
Government employed	57 (15.0)
Others	23 (6.1)
Unemployed	54 (14.2)
Self-reported socio-economic class	
Low	72 (18.9)
Middle	235 (61.8)
High	73 (19.2)
Child's characteristics	
Sex	
Male	162 (42.6)
Female	218 (57.4)
Age (months)	**6.28 ± 2.98**
< 6	172 (45.3)
6 – 12	208 (54.7)
Position among siblings	
1st	81 (21.3)
2nd	111 (29.2)
3rd	106 (27.9)
4th	56 (14.7)
≥ 5th	26 (6.8)

63.9% were judged to have good knowledge about breastfeeding practices, and 36.1% had poor knowledge. Table 2 displays mothers' breastfeeding practices. At the time of the study, the majority of mothers (90.8%) were breastfeeding their children; most mothers (68.9%) had introduced water to their infants at six months of age or older; some mothers (36.6%) delayed starting to breastfeed beyond one hour after birth; and, before giving birth, 79.2% of mothers intended to breastfeed exclusively.

Table 2: Practice of mothers on breastfeeding (N= 380)

Practice	Frequency (%)
Initiation of breastfeeding	
≤ 1 hour	256 (67.4)
> 1 hour	124 (32.6)
Intention to breastfeed exclusively	301 (79.2)
Child currently breastfeeding	345 (90.8)
If no, when was breastfeeding stopped?	
< 6 months	2 (0.5)
≥ 6 months	33 (8.7)
If yes, when do you intend to stop?	
< 6 months	9 (2.4)
1 – 11 months	111 (29.2)
12 – 18 months	194 (51.1)
19 – 24 months	31 (8.2)
When was water introduced to the baby?	
≤6 months	142 (37.4)
>6 months	122 (32.1)
I have not introduced water	116 (30.5)
Did you practice exclusive breastfeeding for six months?	
Yes	276 (72.6)
No	104 (27.4)
Reported practice of exclusive breastfeeding	117 (30.8)
<6 months	159 (41.8)
6-12 months	
Reported delay in initiating breastfeeding (beyond one hour)	139 (36.6)

Table 3 displays the factors mothers perceived as typically influencing breastfeeding practices.

Table 4 displays the mothers' and infants' anthropometric status. Mothers were disproportionately overweight (37.5%). Stunting, underweight, and wasting affected 7.4%, 22.9%, and 38.7% of children, respectively. Based on MUAC, severe acute malnutrition affected 15.3% of the children, and moderate acute malnutrition affected another 19.5%.

The Chi-Square Test for Independence was used to show the correlation between mother's breastfeeding practice and child's nutritional status as shown in Table 5. The mother's breastfeeding habits did not significantly correlate with the child's underweight, wasting, or stunting ($p>0.05$). That is, past feeding practices -- the breastfeeding duration, time of introducing water to baby, and the practice of EBF as reported by mothers were not significantly associated with the children's likelihood of currently being classified as wasted, stunted and underweight.

Figure 1 lists the reasons why the initiation of breastfeeding was delayed beyond one hour.

Table 4: Nutritional Status of Mothers and Infants

Parameters	Frequency (%)
Child's nutritional status	
Weight-for-age	
Underweight (< -2.0 S.D)	147 (38.7)
Normal (≥ 2.0 S.D)	233 (61.3)
Height-for-age	
Stunted (< -2.0 S.D)	87 (22.9)
Normal (≥ 2.0 S.D)	293 (77.1)
Weight for length	
Wasted (< -2.0 S.D)	28 (7.4)
Normal (≥ 2.0 S.D)	352 (92.6)
Mid-upper-arm-circumference	
Severe Acute Malnutrition (< 11.0 cm)	58 (15.3)
Moderate Acute Malnutrition (11.0 – 12.5cm)	74 (19.5)
Normal (> 12.5cm)	248 (65.3)
Mother's body mass index	
Underweight	7 (1.9)
Normal	216 (56.8)
Overweight	143 (37.6)
Obese	14 (3.7)

Table 3. Factors that mothers perceived can affect breastfeeding practices

Factors	Strongly Agree	Agree	Not Sure	Disagree	Strongly Agree
	n (%)	n (%)	n (%)	n (%)	n (%)
Mother's age	141 (37.1)	203 (53.4)	12 (3.2)	9 (2.4)	15 (3.9)
Mother's education level	141 (37.1)	179 (47.1)	21 (5.5)	17 (4.5)	22 (5.8)
Sore nipple	101 (26.6)	224 (58.9)	35 (9.2)	20 (5.3)	0 (0.0)
Low-milk supply	103 (27.1)	217 (57.1)	34 (8.9)	25 (6.6)	1 (0.3)
Over-supply of breastmilk	89 (23.4)	165 (43.4)	91 (23.9)	32 (8.4)	3 (0.8)
Inverted nipples	83 (21.8)	190 (50.0)	80 (21.1)	26 (6.8)	1 (0.3)
Breast infections	120 (31.6)	205 (53.9)	25 (6.6)	29 (7.6)	1 (0.3)
Lack of support	83 (21.8)	202 (53.2)	48 (12.6)	40 (10.5)	7 (1.8)
Sagging breasts	88 (23.2)	215 (56.6)	47 (12.4)	22 (5.8)	8 (2.1)
Workload	84 (22.1)	205 (53.9)	41 (10.8)	46 (12.1)	4 (1.1)
Stress	88 (23.2)	221 (58.2)	38 (10.0)	29 (7.6)	4 (1.1)
Type of delivery	103 (27.1)	199 (52.4)	57 (15.0)	18 (4.7)	3 (0.8)
Unwillingness of child to suckle	111 (29.2)	204 (53.7)	52 (13.7)	13 (3.4)	0 (0.0)
Doctor's recommendation	102 (26.8)	204 (53.7)	62 (16.3)	10 (2.6)	2 (0.5)
Medical complications	111 (29.2)	196 (51.6)	55 (14.5)	16 (4.2)	2 (0.5)
Traditional belief/culture	110 (28.9)	169 (44.5)	64 (16.8)	25 (6.6)	12 (3.2)

Table 5: Relationship between mother's breastfeeding practices and child's nutritional status (Chi-Square Test for Independence)

Factors	Wasting (n=28) n (%)	p-value	Stunting (n=87) n (%)	p-value	Underweight (n=104) n (%)	p-value
Breastfeeding initiation						
≤ 1 hour	21 (75.0)		62 (71.3)	0.377	104 (70.7)	0.264
> 1 hour	7 (25.0)	0.371	25 (28.7)		43 (29.3)	
Water introduction to Baby						
< 6 months	10 (35.7)	0.580	26 (29.9)	0.789	53 (36.1)	0.94
≥ 6 months	18 (64.3)		61 (70.1)		94 (63.9)	
Reported practice of exclusive breastfeeding						
No	5 (17.9)	0.241	18 (20.7)	0.112	42 (28.6)	0.676
Yes	23 (82.1)		69 (79.3)		105 (71.4)	

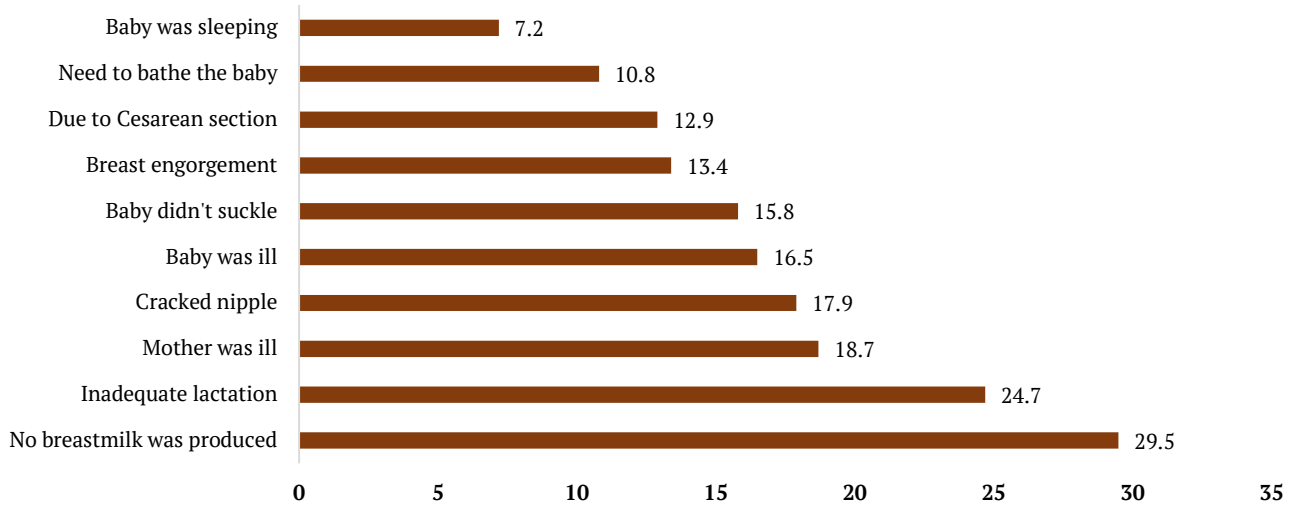

Figure 1. Reasons for delays in initiating breastfeeding (multiple responses were possible) (N=139)

DISCUSSION

To ensure that children can reach their full developmental potential, breastfeeding mothers need adequate knowledge about optimal nutrition and its impacts on child health and development. This study revealed that the average age of nursing mothers was similar to previous research by Ekeleme et al. (2021) and Balogun et al. (2024), which reported an average maternal age of 31 years, indicating that these mothers were in their reproductive years. The mothers self-reported being from a middle socioeconomic class, with two-thirds working for themselves. This contrasts with studies by Srinidhi et al. (2020) and Abolurin et al. (2021), where participants were predominantly upper-class or low-class.

The study findings confirmed that breastfeeding practices are widely understood among Nigerian women, consistent with prior studies (Balogun et al., 2017; Oguizu and Ogbonnaya, 2021). Notably, 72.6% of mothers reported practicing EBF. This research, however, deviates from a prior one in which the majority of the mothers lacked adequate understanding of breastfeeding techniques (Shalu et al., 2018). However, maternal recall was used to measure EBF, which is prone to biases such as overreporting due to social desirability. Also, while 72.6% reported EBF, 37.4% of mothers introduced water to their infants at ⩽6 months, raising questions about adherence to the strict definition of EBF. This suggests the need for further education and support to help mothers maintain EBF practices.

We also found that 67.4% of mothers initiated breastfeeding within one hour of delivery. This rate surpasses the 54.9% national average (Ministry of Health, 2017) and is comparable to the 67.2% reported by Anselm and Siddika (2016). In comparison, less than 40% of the women in the prior trial (Adebayo and Oluwaseyi,2020; Golluri, 2023) began breastfeeding within an hour of giving birth. EIBF ensures that newborns receive colostrum, which is rich in immunoglobulins that protect against infections (WHO, 2018).

Despite high intentions to breastfeed for 12–18 months (51.1%), the result of this study reveals variability in planned breastfeeding durations, with a few mothers intending to stop as early as six months or less. It is rare, according to Adewuyi and Adefemi (2016), for women to want to breastfeed appropriately yet be unable to do so due to challenges encountered in the breastfeeding process. This variability may reflect cultural norms, maternal workloads, or traditional beliefs. Barriers to breastfeeding practices, such as stress, low milk supply, cultural expectations, and

educational background, were similarly identified in previous studies (Chapagain 2013; Demilew et al., 2017; Singh et al., 2017).

A higher percentage of mothers had normal BMIs than has been found in other places. Additionally, around two-thirds of the index infants had normal weight for their age, and the majority of the children had normal height and weight for their age. WHO and UNICEF (World Health Organization and United Nations Children Fund, 2019) state that a prevalence of stunting between 20% and 30% is considered high, while a prevalence between 30% and above is considered very high. Additionally, wasting between 5 and 10% is classified as medium, overweight between 10 and 15% is classified as high, and over 15% is classified as high. As a result, the proportion of stunted, wasted, and underweight children in this research is high, medium, and low.

The introduction and other drinks to infants among some ethnic groups could impact breastfeeding practices and nutritional outcomes. We did not find a significant relationship between mothers' past breastfeeding practices and their children's current nutritional status. This contrasts with prior research (Ahmed et al., 2017), which found that non-EBF children were at a greater risk of stunting or underweight. Differences in community diets and breastfeeding customs may explain these variations, but timing of the measurements is also important. From the result of this study, 32.1% of mothers had not introduced water, reflecting an adherence to EBF guidelines, while 37.4% did so by six months, highlighting room for improvement in adherence to global breastfeeding standards.

RECOMMENDATION AND CONCLUSION

The study reaffirms the cultural acceptance of breastfeeding among the study population and the high prevalence of EIBF. However, the discrepancies between reported EBF rates and the early introduction of water highlight the need for targeted interventions to improve adherence to global EBF recommendations. While breastfeeding is foundational to infant nutrition, it must be complemented by strategies addressing broader nutritional needs, especially after six months of age. To tackle malnutrition effectively, community-based nutrition programs offering supplemental feeding and micronutrient support should be implemented, alongside education on appropriate complementary feeding practices. Strengthening breastfeeding education to overcome cultural and practical barriers, coupled with regular monitoring and evaluation of breastfeeding and nutrition practices, is essential. These interventions, if culturally sensitive and context-specific, can significantly reduce malnutrition and improve child health outcomes.

AUTHOR CONTRIBUTIONS

OOB: Designed the study, collected data performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. **OPO:** Managed the analysis, literature searches, and review of manuscript. **PIO**: Collected the data and managed the analysis. All authors have read and approved the final version of the paper and its submission.

CONFLICT OF INTEREST

Regarding the research, authorship, and/or publishing of this work, the authors declare that they have no conflicts of interest

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