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Influence of Food-Insecurity on Breastfeeding and Complementary Feeding Practices Among Nursing Mothers Attending State Specialist Hospitals, Akure, Ondo State, Nigeria

Oluwole Steve Ijarotimi[1]* Kolawole Paul Olaiyapo[2], Ayotomiwa Faith Oludahunsi[3] and Remilekun Akinrinmade[4]

[1]*Department of Nutrition and Dietetics, Federal University of Technology, Akure, Nigeria.*
[2]*Department of Food Science and Technology, Federal University of Technology, Akure, Nigeria.*
[3]*Department of Nursing, School of Nursing, Babcock University, Ilishan-Remo, Nigeria.*
[4]*Department of Human Nutrition and Dietetics, University of Medical Sciences, Ondo, Nigeria.*

*soijarotimi@gmail.com (Corresponding Author)

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ABSTRACT

Background: Poor access to healthy foods as a result of poverty is becoming a public health challenge, particularly in many low-income countries, where many households are threatened with low purchasing power.

Purpose: The aim of the study was to evaluate the influence of maternal food insecurity on infant-feeding practices among caregivers attending State Specialist Hospital, Akure, Nigeria.

Method: The research was a cross-sectional study to assess maternal so-ciodemographic characteristics, nutrition knowledge, and the influence of food insecurity status on breastfeeding and complementary feeding practices. A semi-structured questionnaire was used to collect information on socio-demographic characteristics of mothers, breastfeeding and complementary feeding practices, and food-insecurity-related situations in the previous 30 days of the survey. Data were analyzed using a statistical package.

Results: The maternal age was between 18 and 40 years, and a large percentage of the nursing mothers were Yoruba (75.1%). Most of the mothers had formal education (98.1%) and were self-employed (79.1%). Maternal-child-feeding knowledge showed that four-fifths (80%) had good knowledge on when to initiate breastfeeding, 68.9% on the duration of exclusive breastfeeding, 66.6% on the age at which to introduce complementary foods to infants, and 71.4% on the risks associated with late introduction of complementary food to the infants. Mothers experiencing mild food insecurity (20.2%), moderate food insecurity (15.2%), and severe food insecurity (8.9%) reported that they were not practicing exclusive breastfeeding, breastfeeding less than 3 times daily, and abruptly stopping breastfeeding, respectively. Besides, results showed that a high percentage of mothers were unable to feed their infants with a variety of complementary foods and quantity. The types of complementary foods used by the mothers varied from unfortified sorghum (36%), fortified sorghum (egg or soybean) (45%), and commercial infant formula (19%).

Conclusion: The findings of the study showed that almost half of the nursing mothers were food insecure, and the food-insecure mothers did not practice exclusive breastfeeding, and most of the mothers were using unfortified cereals as complementary foods for their infants due to low income and lack of food.

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1. Introduction

Household food insecurity is defined as a situation where members of a household lack reliable access to sufficient, affordable, and nutritious food to meet their dietary needs and maintain a healthy and active life (Yohannes *et al.*, 2023). In recent reports, it was documented that young child feeding practice is becoming a public health challenge, particularly in many low-income nations, where many households are threatened with food insecurity (Al Mamun *et al.*, 2022; Yohannes *et al.*, 2023). It is well documented that the relationship between mother and infant during feeding was associated with household food insecurity (Francis *et al.*, 2024), and that high maternal depression as a result of food insecurity usually leads to poor child nutritional and health well-being (Harpham *et al.*, 2005). It is evident that household food insecurity, a stressor, is associated with maternal anxiety and depressive illnesses (Whitaker *et al.*,

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2006), which contributed to unfavorable parenting practices (McLean *et al*., 2006) like poor breastfeeding (Henderson *et al*., 2003) and complementary feeding (Tadesse *et al*., 2023). Studies have established that household food insecurity was strongly associated with poor nutritional and health well-being of nursing mothers and under-five children (Hadley & Patil, 2006; Cook *et al*., 2004; Baig-Ansari *et al*., 2006). Healthy diets influence infant and maternal health, and the cumulative effect of adequate nutrition continues throughout the lifespan of an individual (Iqbal & Ali, 2021). Failure to have access to healthy foods as a result of poor access and economic burden often leads to maternal and child food insecurity and chronic malnutrition (Beyene, 2023).

Scientifically, it has been proven that mothers with food insecurity challenges usually fail to breastfeed adequately or use nutritious complementary foods to feed their infants (Dinour *et al*., 2020). The main reason for this is that most of the nursing mothers feel that they are not adequately nourished to withstand the breastfeeding stress and also not economically stable enough to have access to nutritious infant formula (Neves *et al*., 2019). Food insecurity causes low dietary intake and lack of dietary diversity, which may pose adverse consequences on maternal health, economic productivity, and a decline in life expectancy (Shetty, 2009). Studies have reported that food insecurity contributes to the early cessation of infant breastfeeding (Francis *et al*., 2024), and that exclusive breastfeeding practices for the first 6 months of life of the infants are less common among mothers with food insufficiency compared to food-sufficient mothers (Guerrero *et al.,* 2024). Epidemiological study indicates that food insecurity is the underlying cause of malnutrition and high prevalence of morbidity and mortality among nursing mothers and under-five children (Black *et al*., 2008). This can result in low birthweight, stunting (low height for age), wasting (low weight for height), and developmental delays in children. It is worth noting that adequate access to nutritious food is becoming important for mothers and children because it has potential consequences for infant development as well as for maternal nutritional and health well-being (Benson *et al*., 2024). In view of this, the present study was aimed at assessing the influence of maternal food insufficiency on the breastfeeding and complementary feeding practices of nursing mothers attending the Postnatal Clinic at State Specialist Hospital, Akure.

2. Methodology

2.1. Study Areas and Periods

The study location was in Akure, Ondo State, Nigeria. Ondo State is presently made up of 18 Local Government Areas. The population of the Akure community ranges from 34,60,877 to 46,71,695 persons, according to the last census conducted by the National Population Commission (National Population Commission, 2019). Akure is one of the commercial centers of the state and has mixed tribes. The study was carried out at the Postnatal Clinic Units of the State Specialist Hospital Akure, Nigeria, between September 2023 and February 2024.

2.2. Ethical Issues and Informed Consent

The study protocol was considered and approved by the Ethical Committee (code: FUTA/SAAT/2024/011) of the Federal University of Technology, Akure, Nigeria, and approval was obtained from the Ministry of Health, Ondo State. The respondents were briefed on the procedure of the research, and a written informed consent was signed by the respondents. The volunteers were then given the consent form to sign.

2.3. Study Design

The study design was cross-sectional, and it was employed to collect information on sociodemographic characteristics and the influence of household food insecurity on breastfeeding and complementary feeding practices of nursing mothers that attended the Postnatal Clinic Unit of State Specialist Hospital, Akure, Nigeria.

2.3.1. Determination of Sample Size

Sample size was determined according to the method of Yamane (1967) formula:

$$N = \frac{z_{\alpha/2}{}^2 p(1-p)}{d^2}$$

Where:

N= minimum sample size.

z= the standard normal deviation set at 1.96 which corresponds to a 95% confidence level.

p= the expected proportion of individuals in the target population estimated to have the characteristics of interest, Prevalence of underweight children (infants less than a year old) in Nigeria -22.9% (NPC and ICF, 2019).

d= degree of precision 5%

Minimum sample size N= 271.

However, a population correction formula, , was used to cater for non-response rate and improper filling of the questionnaires. Therefore, a total sample size of 350 respondents was used for this study.

2.3.2. Study population and Sampling Technique

The study population was mothers with children <24 months attending the Postnatal Clinic, State Specialist Hospital, Akure, Nigeria. The multistage sampling technique was used for data collection. The State Specialist Hospital in

Akure was purposively selected because of its facilities. The caregivers/nursing mothers and infants' pairs were selected using simple random techniques.

2.4. Research Instrument and Data Collection

A well-designed and pretested questionnaire was used for the study. The self-administered and structured questionnaire was used to collect information on (a) socio-demographic characteristics (age, educational attainment, occupation, tribes) of the nursing mothers and infants; (b) maternal food insecurity using the USAID Household Food Insecurity Access Scale (HFIAS) developed by the United States Agency for International Development (Coates *et al.*, 2007); (c) knowledge on breastfeeding and complementary feeding practices; and (d) influence of food insecurity on child feeding practices (i.e., breastfeeding and complementary feeding).

2.5. Statistical Analyses

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software, version 21.0. Descriptive statistics, that is, mean±SD, and percentages, were used for the presentation of results. The Spearman test was used to determine the relationship between knowledge and food security questionnaires. Chi-square test and logistic regression analysis were used to determine the relationship between food insecurity indices and child feeding practices. at a significant level of 0.05 and OR with 95% CI.

3. Results

3.1. Socio-demographic Characteristics of Nursing Mothers Attending Postnatal Clinics at State Specialist Hospitals, Akure

The socio-demographic characteristics of nursing mothers attending postnatal clinics at the State Specialist Hospitals, Akure, are presented in Table 1. The results indicate that a large proportion of the respondents were within the age range of 18 to 35 years, while marital status showed that the majority of the respondents (87.7%) were with their spouse, while others, that is, 8.6% and 3.7%, were divorced and widowed, respectively. For the ethnic group and religion, the majority of the respondents were Yoruba (75.1%) and Christian (81.4%).

Table 1: Socio-Demographic Characteristics of Nursing Mothers Attending Postnatal Clinics at State Specialist Hospitals, Akure, Nigeria

Parameters	Respondents	%
Age (years)		
≤18	19	5.4
18-25	45	12.9
26-30	86	24.6
31-35	104	29.7
36-40	78	22.3
≥40	18	5.1
Marital Status		
Married	307	87.7
Divorced	30	8.6
Widower	13	3.7
Ethnic Group		
Yoruba	263	75.1
Igbo	54	15.4
Hausa	16	4.6
Others	17	4.9
Religion		
Not respondent	-	-
Christian	285	81.4
Muslim	59	16.9
Traditionalist	6	1.1
Education		
Not respondent	-	-
Primary	22	6.3
Secondary	122	34.9
Post-secondary	197	56.3
None	9	2.9
Occupation		
Not respondent	6	0.0
Self-employed	277	79.1
Civil servant	67	19.1
Monthly Income		
Not responded	5	0.0
≤30000	151	43.1
30000-50000	136	38.9
≥50000	58	16.6

For the educational background, 56.3% of mothers completed post-secondary school education, 34.9% had secondary school education, and 6.3% had primary school education, while the remaining 2.9% had no formal education. While employment status shows that a large proportion of the nursing mothers were self-employed, i.e., tailoring, fashion design, hairdressing, petty trading, etc., with a monthly income less than 30000 Naira.

3.2. Knowledge on Child Feeding Practices by the Nursing Mothers Attending State Specialist Hospital, Akure

The maternal knowledge on child feeding practices is shown in Table 2. The maternal responses to the knowledge of breastfeeding practices indicated that a large proportion of the nursing mothers significantly (P=0.000) had good knowledge on when a mother should initiate breastfeeding within the first hour of childbirth (80%). Similarly, the result indicates that a high percentage of the respondents had good knowledge on the importance of exclusive breastfeeding (87.4%), while 64.3% of the nursing mothers agreed with the continuation of breastfeeding even after the introduction of complementary foods to the infants. However, a low percentage (32.9%) of respondents reported correctly on the duration of breastfeeding of infants recommended by the World Health Organization. In the case of the complementary feeding practices, quite a number of the nursing mothers correctly reported the age at which complementary foods should be introduced to infants (66.6%), while 71.4% of nursing mothers were aware of risks that may be associated with late introduction of complementary foods to the infants. It is worth noting that a large percentage of nursing mothers (67.9%) had a good knowledge of child feeding practices, while 32.1% exhibited poor knowledge in terms of child feeding practices (Figure 1).

Table 2: Knowledge on Child Feeding Practices by the Nursing Mothers Attending State Specialist Hospital, Akure, Nigeria

Parameters	Correct Response		Incorrect Response	
	n	%	n	%
It is important to initiate breastfeeding within 1 hour after birth?	280	80	70	20
Is exclusive breastfeeding important?	306	87.4	44	12.6
When should exclusive breastfeeding commence?	241	68.9	109	31.1
When should breastfeeding stop?	115	32.9	235	67.1
How frequently should a child breastfeed after they start on other feeds?	225	64.3	125	35.7
What is complementary feeding?	252	72.0	98	28.0
What age should complementary food be introduced?	233	66.6	117	33.4
What is the risk of starting complementary feeding late?	250	71.4	100	28.6

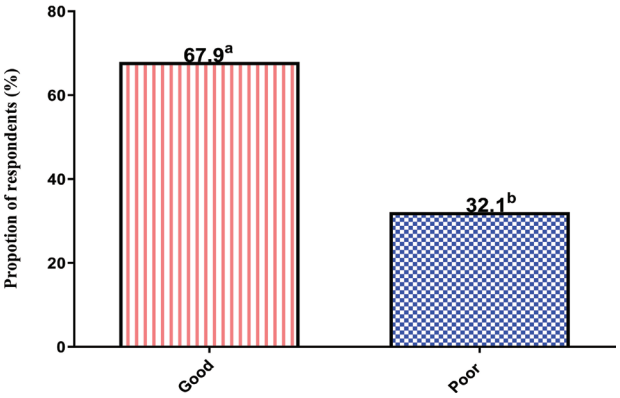

Figure 1: Classification of Knowledge on Child Feeding Practices of Nursing Mothers Attending State Specialist Hospital, Akure, Nigeria

3.3. Maternal Food Insecurity Status and its Influence on Child feeding practices

3.3.1. Breastfeeding Practices

The response and influence of maternal food insecurity on child feeding practices are presented in Table 3 and Figure 2, respectively. The study established that one-quarter (25.1%) of the nursing mothers responded that they did not practice exclusive breastfeeding based on the fact that they were unable to have access to enough food to eat. Similarly, 21.7% and 13.7% of respondents reported that they were not breastfeeding their infants satisfactorily or on demand due to unhealthy dietary intakes and not having enough food to eat, respectively. Also, the influence of food insecurity on the breastfeeding pattern of the mothers indicates that 15.4% were breastfeeding infants thrice (morning, afternoon & night), 17.4% were breastfeeding twice (i.e., morning & night), 7.4% were breastfeeding once (i.e., morning/afternoon/evening) (7.4%) per day, and 10.3% abruptly stopped breastfeeding their infants because they were either skipping meals, eating fewer meals, running out of food, or not eating for the whole day due to lack of food. The result of maternal food insecurity's influence on breastfeeding practices showed that 20.2% of mothers who were classified as mildly food insecure (MFI) agreed that they did not follow the WHO recommendation to breastfeed their infants exclusively based on the fact that they were not consuming quality food to enhance breastmilk production. For moderately food insecure, 15.2% of the nursing mothers agreed to rationing breastfeeding between 1 and 3 times daily because of their limited access to food; hence, they were either skipping meals or eating less quantity. The nursing

mothers who were classified as severely food insecure (8.9%) reported that they breastfed their babes either on alternate days or abruptly stopped breastfeeding their infants because of being hungry due to lack of food at home.

Table 3: Influence of Maternal Food Insecurity on Breastfeeding Practices

Question Content	Label	*Assumed severity of FI	Affirmative responses (%)
I do not practice exclusive breastfeeding, because I do not have enough food to eat due to lack of money or other resources	Worried	Mild	25.1
I do not breastfeed my child satisfactorily, because I do not have the stamina due to poor dietary intake	Healthy	Mild	21.7
I do not breastfeed my child on demand, because I do not have enough food to eat due to lack of money or other resources	Few food	Mild	13.7
I breastfed my child thrice per day (morning, afternoon & night), because I skipped meals due to shortage of food and no stamina to breastfeed on demand	Skipped	Moderate	15.4
I breastfed my child twice (morning & night) per day, because I ate less meals due to lack of foods, hence, no stamina to breastfeed on demand	Ate less	Moderate	17.4
I breastfed my child once (night) per day, because my household ran out of foods, hence, I ate less and no stamina to breastfeed	Run out	Moderate	12.9
I breastfed my child on alternate day, because I was hungry but did not eat due to lack of foods, hence, no staminal to breastfeed	Hungry	Severe	7.4
I abruptly stop breastfeeding my child, because I did not eat for whole day due to lack of foods	Whole-day	Severe	10.3

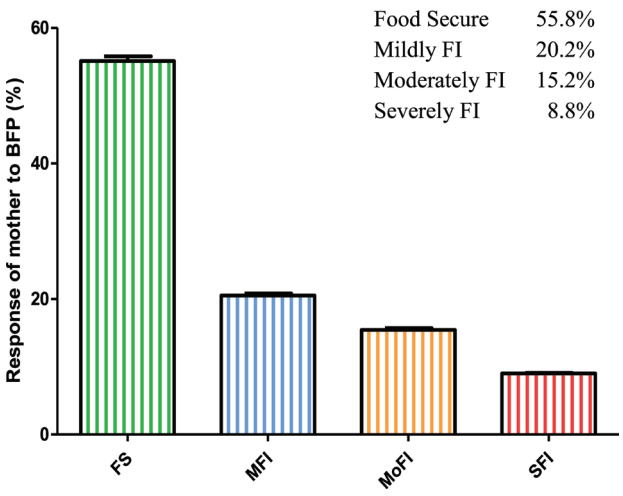

Figure 2: Influence of Maternal-Food-Insecurity on Breastfeeding Practices (BFP)

3.3.2. Complementary Feeding Practices and Type of Complementary Foods used by the Mothers

The influence of maternal food insecurity on infant complementary feeding practices and the type of complementary foods used by the mothers are presented in Figures 3 and 4, respectively. The result indicates that 16.9% of the nursing mothers were grouped as mildly food insecure, and they agreed to using low-cost complementary food to feed their

babes because they lacked money to buy quality complementary foods. For the moderately food insecure mothers, 15.1% agreed that they were unable to feed their infants a variety of complementary foods, and the quantity given was reduced. While severely food insecure mothers (14.1%) reported that the frequency and quantity of complementary food feeding of their infants were reduced because of the shortage of foods and lack of money to buy complementary foods. The influence of maternal food insecurity status also reflected on the types of complementary foods used by the nursing mothers to feed their infants. It was observed that 36% of the nursing mothers used unfortified cereal-based complementary foods, while the remaining mothers, that is, 45% and 19%, used cereal-based complementary foods enriched with either soybean, egg, or crayfish and commercial infant formulas as complementary foods, respectively.

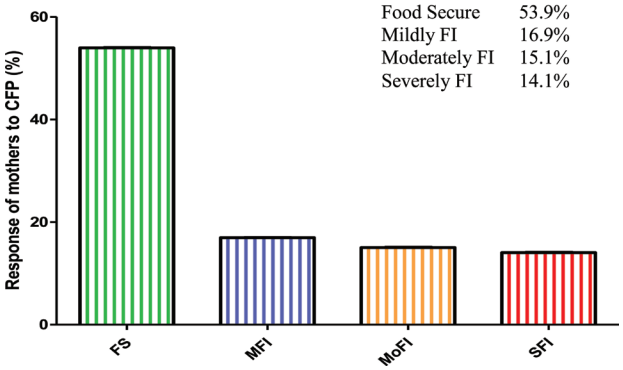

Figure 3: Influence of Maternal-Food-Insecurity on Complementary Feeding Practices (CFP)

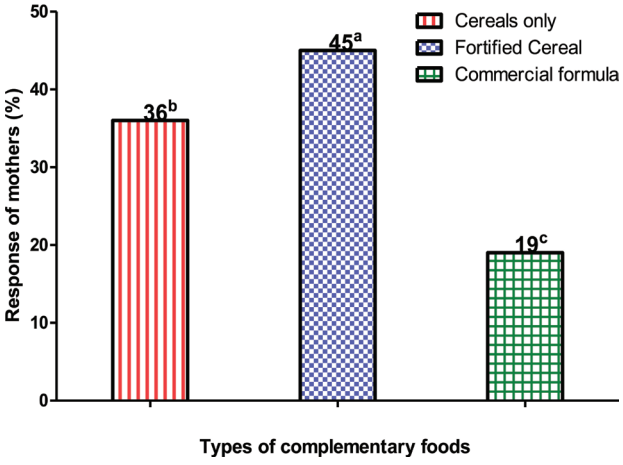

Figure 4: Types of Complementary Foods Used by the Nursing Mothers to Feed their Children. Means Within the Same Column with Different Superscripts are Significantly Different at P≤0.05

4. Discussion

Sociodemographic factors like age, education, income, and occupation significantly influence maternal nutritional well-being (Islam *et al.*, 2016). These factors can impact a mother's ability to access, comprehend, and utilize health information, affecting their dietary choice and overall health. A study shows that higher education and stable incomes are often associated with better access to resources and a greater understanding of health information (Zajacova *et al.*, 2018). Conversely, factors like lower education, poverty, and limited access to resources can hinder a mother's ability to make informed choices about her diet, hence potentially leading to nutritional deficiencies. Epidemiological studies have reported that the nutritional well-being of a woman is influenced by various demographic and socio-economic factors such as age, educational level, income, age at first marriage, number of ever-born children, religion, and occupation (Subramanian *et al.*, 2009; Hossain *et al.*, 2012). In this study, the socio-demographic characteristics of the nursing mothers indicated that a large proportion of the respondents were within the age range of 18 to 35 years, and it could be inferred that the reproductive age of Nigerian women is within this age bracket. This assertion agrees with the report of Okafor *et al.* (2014). In this present study, the result indicated that over half of the nursing mothers had formal education, were self-employed in jobs like tailoring, fashion design, hairdressing, petty trading, etc., and had a monthly income less than 30000 Naira. This finding agrees with a similar report, which revealed that the majority of the studied population were self-employed and worked in very low-paying jobs, hence affecting their income and food accessibility (Ella *et al.*, 2016). It is evident that individual or family income is a good determinant of their nutritional well-being and that a well-paid individual or family will have access to adequate and quality foods that may promote their nutritional and health well-being (French *et al.*, 2019). In the report of French *et al.* (2019), it was revealed that family income consistently determines types of dietary intakes. Also, Ahmad *et al.* (2021) established that the proportion of expenditure spent on food is inversely related to total income and that low income could lead to household food insecurity, poor feeding practices, and acute malnutrition, particularly in children.

Maternal nutritional knowledge significantly influences child feeding practices and health outcomes (Forh *et al.*, 2022). Mothers with higher knowledge about proper infant and young child feeding practices are more likely to adopt appropriate meal frequency, dietary diversification, and inclusion of iron-rich foods (Forh *et al.*, 2022). Poor breastfeeding and complementary feeding practices have adverse consequences on the health and nutritional

outcome of infants, particularly in terms of mental and physical development (World Health Organisation, 2009). Inappropriate feeding practices are a leading factor in infant morbidity and mortality. It is well documented that a mother is the main determinant of health of the family, particularly the children. Interestingly, evidence has shown that the type of care a mother provides depends to a large extent on her level of nutrition and health knowledge. In the present study, a large proportion of the nursing mothers exhibited a good knowledge of child feeding practices. This finding could be attributed to the nutrition education rendered to the mothers during antenatal and postnatal clinics. This report agrees with a similar study by Ijarotimi and Ogunsemore (2006), who reported that nutrition education enhances maternal knowledge on child feeding practices. It is worthy to note that poor maternal education significantly influenced child feeding practices in terms of what and when to feed a child, hence, it is often implicated as one of the major causes of malnutrition among children compared to food unavailability (Mutuku *et al.*, 2020; Ganesan *et al.*, 2022). A mother's ability to feed a child with adequate breastmilk and quality complementary foods has been linked to optimal nutrition in children, as it ensures normal growth, development, and health and thereby reduces the prevalence of morbidity and mortality in children (Akpor *et al.*, 2020; World Health Organisation, 2009). Appropriate breastfeeding provides nutritional content for proper growth and development of infants and also improves infants immunity and possibly reduces future health care spending (Ahmed *et al.*, 2023). However, adequate and safe complementary feeding should start from age 6 months with continued breastfeeding up to 24 months or beyond (WHO/UNICEF, 2003; World Health Organisation, 2009). It is worth noting that complementary feeding practices in developing countries are less desirable, and the majority of children do not meet the minimum indicators for appropriate complementary feeding due to food insecurity (World Health Organisation, 2009; White *et al.*, 2017).

Food insecurity can lead to poorer maternal nutritional status, shorter exclusive breastfeeding durations, and limited dietary diversification in complementary feeding (Al Mamun *et al.*, 2022). The finding of this study showed that one-fifth of the mothers were classified as mildly food insecure (MFI) and agreed that they did not follow the WHO recommendation to breastfeed their infants exclusively based on the fact that they were not consuming enough foods to boost their stamina to practice exclusive breastfeeding. For the moderately food insecure, the nursing mothers (15.2%) agreed to rationing breastfeeding between 1 and 3 times daily because of their limited access to food; hence, they were either skipping meals or eating smaller quantities of meals. While those classified as severely food insecure (8.9%) reported that they breastfed their babes on alternate days or abruptly stopped breastfeeding their infants because of being hungry due to lack of food at home. Interestingly, these observations agree with similar reports (Elolu *et al.*, 2023). For instance, a study has established that a food-secure nursing mother has the tendency to practice exclusive breastfeeding compared to a mother experiencing food insecurity (Al-mamun *et al.*, 2022). It is well documented that food insecurity could have a deleterious effect on household members, particularly mothers and children (Iqbal & Ali, 2021). This assertion agrees with the report that the nutritional well-being of mothers is directly influenced by infants' health as well (Naaz & Muneshwar, 2023). Availability, accessibility, sustainability, and utilization of foods are of public health significance when considering the health and nutritional well-being of mothers and children (Ezeneme *et al.*, 2023).

The influence of maternal food insecurity on infant complementary feeding practices indicated that mothers who were classified as mildly food insecure reported on using low-cost complementary food to feed their babes because they lacked resources to buy quality complementary foods. Similarly, moderately food-insecure mothers agreed that they were unable to feed their babes with a variety of complementary foods and that the quantity given was lowered to the daily requirement. Likewise, the severely food-insecure mothers reported that the frequency and quantity of food given to their babes were reduced because of the shortage of foods and lack of money to buy complementary foods. Comparatively, the report in this study agrees with the report of Al Mamun *et al.* (2022), who reported that household food insecurity level was significantly associated with timely initiation of complementary feeding and that mothers experiencing food insecurity were less likely to practice timely initiation of complementary feeding than mothers of food-secure households.

The impact of food insecurity on health varies within populations, being greatest at vulnerable stages of the life course, especially in children, when growth and development are most rapid (Piperata *et al.*, 2023). From the present study, the findings are in line with the study of Eyinla (2021) on food security and nutritional status of under-five children from Oyo State, Nigeria. Food insecurity is a global problem, and it is increasing in both developed and developing nations, including Nigeria (Khaleque *et al.*, 2023). In children, food insecurity is associated with delays in physical development and behavioral problems, particularly during the first two years of life. It is usually increased the risk of diseases, which may lead to mental and behavioral dysfunction in adulthood (Khan & Ali, 2023). The types of complementary foods used by the nursing

mothers to feed their children depend on their level of food security. For instance, in this present study, the majority of mothers used fortified cereal-based complementary foods, and this could be attributed to food security status coupled with the level of nutrition education received during antenatal and postnatal clinics or the income of the households. Similarly, the proportion of mothers that used unfortified cereal-based complementary foods was equally high, and this could be attributed to low purchasing power, poor nutrition knowledge, and cultural belief. This finding has previously been documented: in developing countries, complementary foods are predominantly cereal-based with low nutrient density and poor mineral bioavailability, hence leading to severe acute malnutrition and micronutrient deficiency among weaning-aged infants (Dewey, 2013). In developing countries like Nigeria, commercial fortified foods are often beyond the reach of financially challenged mothers; therefore, homemade complementary foods from unfortified cereals and tubers remain commonly used (Abeshu *et al.*, 2016). These traditional complementary foods are usually characterized by low energy, protein, and essential micronutrients (Mitchodigni *et al.*, 2017). Hence, leading to high prevalence of acute malnutrition in children (Magaji *et al.*, 2021; Edafioghor *et al.*, 2021).

5. Conclusion

The study showed that a high proportion of the nursing mothers were food insecure and were unable to practice exclusive breastfeeding due to poor feeding and lack of stamina to withstand breastfeeding stress. Also, the complementary foods used by two-fifths of the respondents were basically leguminous-based with low essential nutrients due to poor access to foods. Hence, there is a need for nutritional intervention for nursing mothers in order to improve their health and well-being and child-feeding practices.

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Authorship Contribution

All the authors have equally contributed to conceptualization, data interpretation, and methodology.

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Conflict of Interest

Authors declare that there is no conflict of interest.

Ethical Approvals

No ethical approvals were required for this study.

Declaration

It is an original article and has been neither sent elsewhere nor published anywhere.

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Chitkara University, Saraswati Kendra, SCO 160-161, Sector 9-C, Chandigarh, 160009, India

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