



Maternal Nutrition Literacy and Complementary Feeding Practices in Osun State, Nigeria

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Abstract

Background: *Maternal nutrition literacy is a significant indicator of appropriate complementary feeding practices. This study focused on effects of Maternal Nutrition Literacy on achievement of Complementary Feeding indicators.*

Methodology: *The study was a cross-sectional designed, and data were collected using multistage sampling techniques. The sample size was statistically calculated to arrive at 407 nursing mothers. A structured self and self/interviewer-administered questionnaire was used to collect information on socio-economic status, complementary feeding practices and maternal nutrition education from the respondents. Data were analysed using both descriptive and inferential statistics.*

Results: *The mean age of the mothers and children were 28.85 ± 5.40 and 11.49 ± 5.56 , respectively. The maternal nutrition literacy level shows that 26.0% was aware of introducing breastfeeding at least 30 minutes after birth, while 19.2% believed in introducing complementary feeding at six months after birth. The linear regression analysis showed that the maternal nutrition literacy was not a determinant of achieving minimum dietary diversity among the children during complementary feeding practices ($R = 1.834$; $p = 0.067$). Meanwhile minimum feeding frequency ($R = 3.804$; $P = 0.000$) and minimum adequate diets ($R = 2.055$; $P = 0.041$) were achieved by the mothers.*

Conclusion: *The study concluded that there was no significant relationship between maternal nutrition literacy and minimum dietary diversity. Meanwhile, MAD and MFF were achieved. Hence, there is a need for maternal nutrition education on child complementary feeding practices in order to improve on minimum dietary diversity.*

KEYWORDS: MATERNAL NUTRITION LITERACY, COMPLEMENTARY FEEDING, ADEQUATE DIET

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Introduction

Maternal Nutritional Literacy (MNL) is the latest topic discovered in the nutritional education for mothers and children. Its emphasis is placed on the general ability of mothers to understand the concept and implementation of nutrition in all aspect of life, especially in the adequate diet for all age groups and those that are prone to nutritional problems (Sirajuddin et al., 2021). Nutrition literacy is a condition that plays an important role in the formation of eating habits (Keles et al., 2020). As well, maternal nutrition literacy can be a significant indicator of the dietary outcome of children since mother is the principal provider of the primary care that her child needs during the first 1000 days of life Likhar & Patil, (2022).

The reviewed complementary feeding indicators by WHO (2021) were seventeen out of which four were selected for this study. These were the main focus indicators in complementary feeding (WHO, 2021). The selected four include Minimum Feeding Frequency (MFF), Minimum Dietary Diversity (MDD) and Minimum Adequate Diet (MAD). This study focused on how maternal nutrition literacy could achieve these indicators during complementary feeding. Mother being the first caregiver of the child requires nutrition literacy to avoid nutritional problems in children in order to achieve optimal growth (Mohammed et al., 2021).

The inadequacies in complementary feeding is a global issue (Usheva et al., 2021), although nutritional literacy of the mother influences complementary feeding practices (Keikha et al., 2021) and quality of complementary foods (Rakotomanana et al., 2020). Mothers with sufficient nutrition education (Simanjuntak et al., 2019) will implement a good nutrition practice (Lyvonne et al., 2021); hence, their children will be healthy and free from malnutrition (Muluye et al., 2020; Khanmohammadi et al., 2020). Adequate maternal nutrition literacy helps to ensure efficient breastfeeding and complementary feeding practices, which reduces not only malnutrition, but also death among under-five children (Zaidi et al., 2021). Recent findings established that maternal nutrition literacy helps to avoid early introduction of complementary foods to under-aged infants (WHO, 2021). Furthermore, knowledgeable mothers may be less likely to succumb to taboos and traditional beliefs, which may negatively affect the general well being of the children Al-Gashanin & Ghazwani (2022).

Epidemiological reports established that the level of nutrition knowledge of caregivers could influence complementary feeding practices (Akinrinmade et al., 2019; Samuel et al., 2021; Scalvedil et al., 2021). For instance, Esan et al., (2022) studied a cross-sectional study on complementary feeding practices among mothers in Ekiti State, Nigeria, and reported that fermented cereal gruel formed the main complementary food for the infants. Similarly, Anosike (2019) found that women refused feeding their young ones with animal-based foods like snail, grasscutter meat, and egg, because of the belief that such foods would make the children to become sluggish, lazy, and predispose them to stealing. In the United States of America, complementary feeding is accompanied with beverages and milk which gave the infants more energy than the one achieved from the complementary foods alone (Bailey et al., 2021). However, the author further observed that complementary feeding was not perfectly practiced among the US mothers due to the fact that majority of the mothers introduced complementary feeding earlier than six months. In addition, higher percentage of the US mothers was feeding the infants with formula rather than breast milk. In Taiwan, almost half of the mothers believed that infant formula with no added sugar is the best for the infants and it was a misconception among the mothers (Chien et al., 2018).

The aim of this study is to determine the effect of maternal nutrition literacy level, since other studies had worked on the effect of maternal educational status on the complementary feeding indicators during complementary feeding practices. Nutrition literacy is therefore the key area of this study.

Methodology

Study Location

The study was carried out in Ile-Ife. Ile-Ife is an ancient Yoruba city in south-western Nigeria. The city is located in the present-day Osun State. Ile-Ife is about 218 kilometres northeast of Lagos with a population of 509,813. (National Nutrition Health Survey [NNHS], 2017).

Study Design and Sample Size Determination

The design of this study was cross-sectional and descriptive. The study was carried out between the months of March and May 2022, that is, for three (3) months duration. Data were collected from eleven (11) Basic Health Centres (BHCs) in Ife City, which were purposely selected for this study. The BHCs are in charge of ante-natal and post-natal care.

The sample size

Sample size determination for larger population is used and calculated thus:

$$\text{Sample Size} = N = [z^2 * p(1-p)] / e^2$$

N = population size

z = z-score = 90% confidence interval = 1.65

e = margin of error = 3% = 0.03

p = standard of deviation = 50% = 0.5

$$\frac{1.65^2 \times 0.5 \times (1-0.5)}{0.03^2}$$

$$N = 956.94$$

Attrition rate was calculated thus; 10% of 956.94=95.6.

Approximately 96

Therefore, the sample size equal to 956.94+96

$$N = 1,052.94 \text{ approximated to } 1,053$$

The sample size was statistically calculated to comprise 1,053 mothers with children age 6-23 months. Pilot study conducted using Pearson et al.'s (2020) method among 41 mothers outside the Basic Health Centres in Ile-Ife after the simple random sampling techniques.

Selection of Participants and Data Collections

The simple random sampling was done by picking one out of two mothers selected for the study and who attended the postnatal clinic in the eleven selected basic health centers. This was done because the study cannot cover all the mothers. Out of the five hundred and twenty seven (527) mothers selected, the total number of mothers consented to participate in the study was four hundred and seven (407). The mothers were selected during the postnatal visitation to Basic Health Centers for routine immunization of their children at Ile-Ife, Osun State, South West Nigeria.

A structured self and interviewer-administered questionnaire was used to collect information on socio-economic status, complementary feeding practices and maternal nutrition literacy during complementary feeding practices. Healthy mothers with healthy children ages six (6) to twenty three (23) months were selected using simple random technique. Meanwhile, for the illiterates mothers, interviewer-administered questionnaire comprising similar information in the self-administered questionnaire was used. The interviewer interpreted the questions in the local dialects to get the response of the local mothers.

The questionnaire comprises of socio-demographic parameters and maternal nutrition literacy during complementary feeding practices. To assess maternal nutrition literacy, questions like appropriate time to initiate breastfeeding, time to start complementary feeding, and number of times a child should be fed daily with reference to age and breastfeeding were asked. Also, question on the importance of feeding the children with protein rich foods such as fish, meat, milk and egg and as well as fruits and vegetables intakes by the children were included.

Complementary feeding practices by the mothers were assessed using WHO (2021) 24-hour dietary recalls methods on complementary feeding using WHO (2021) feeding indicators. For Minimum Dietary Diversity (MDD), seven (7) food groups were itemized on the questionnaire, which are grains, tubers, legumes, nuts, dairy products, flesh foods, Vitamin A rich fruits and vegetables. The child that ate each of the food group was scored 1, if not 0 was scored. The child that scored up to 4 and above achieved MDD. For Minimum Meal Frequency (MMF), the children that were fed minimum number of times in reference to their age were scored 1, while the children that did not were scored 0. Minimum of 2 times for breastfed infants 6-8 months, 3 times for breastfed children 9-23 months, 4 times for non-breastfed children 6-23 months. The children that achieved both MDD and MFF, have achieved Minimum Adequate Diet (MAD) they were scored 1, while those that did not achieve both MDD and MMF were scored 0 and could not achieve MAD. Achieving all the feeding indicators was termed Adequate Complementary Feeding Practices (ACFP) in this study (UNICEF, 2021).

Maternal nutrition literacy during complementary feeding was determined using a yes or no question. One point was awarded to a passed question while zero was awarded to a failed question. Nine questions on adequate complementary feeding were asked to determine the maternal literacy on complementary feeding. A mother that scored above five (>5) points was considered to have high maternal literacy, the mother that scored exactly five points (= 5) points was considered to have medium complementary feeding literacy and mothers that scored below 5 points (< 5) was considered to have low complementary feeding literacy.

Ethical Approval

The approval of the study was obtained from the Ethical Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Osun State, and the Health Research Committee assigned number was HREC No IPH/OAU/2/1801.

Data Analysis

Data was processed using the Statistical Package Software for Social Sciences (SPSS) 21 Computer Software. The socio-demographic indices of the respondents were expressed in frequencies and percentages. The descriptive values were expressed in mean (\pm SE) and percentages of the study population. Chi-Square test (χ^2) was used to establish relationship between adequate complementary feeding practices and maternal nutrition literacy.

Results

Socio-demographic characteristics of the mothers

The socio-demographic and economic characteristics of the mothers were presented in Table 1. The mean age of the nursing mothers in this presents study was 28.85 ± 5.40 , and majority (90.9%) had their first child at age range between 21 and 40 years. The marital status of the respondents indicated that 96.1% were married, while the remaining 3.9% were single mothers. The educational background showed that large proportion of the nursing mothers had formal education ranging from primary (14.7%) to secondary (41.5%) education, while 2.9% had no formal education. Trading is the major occupation of the nursing mothers (41.5%), while high proportion of their spouse engaged in artisan work (30.2%). For the monthly income, large proportion of the mothers (61.4%) earned less than forty thousand Naira (<N40,000), while the remaining respondents earned above.

Table 1 Socio-Demographic and Economic Characteristics of the Mother

Parameters	Variables	Frequency	%
Age of mother (years) Mean±S.D = 28.85±5.40	<= 20	37	9.1
	21 - 40	370	90.9
Age of mother at first birth (years)	<= 20	58	14.3
	21 - 40	349	85.7
Marital status	Married	391	96.1
	Divorced	2	0.5
	Separated	14	3.4
Religion	Christianity	313	76.9
	Islam	89	21.9
	Traditional	5	1.2
Ethnicity	Yoruba	346	85.0
	Igbo	47	11.5
	Hausa	14	3.4
Level of formal education	Primary	60	14.7
	Secondary	169	41.5
	Tertiary	166	40.8
	None	12	2.9
Level of formal education of spouse	Primary	54	13.3
	Secondary	143	35.1
	Tertiary	196	48.2
	None	14	3.4

Table 1 Socio-Demographic and Economic Characteristics of the Mother (cont)

Parameters	Variables	Frequency	%
Monthly income (₦)	<20,000	97	23.8
	20,000-40,000	153	37.6
	41,000-60,000	62	15.2
	61,000-80,000	41	10.1
	81,000-100,000	32	7.9
	>100,000	22	5.4
Occupation	Trader	169	41.5
	Civil servant	56	13.8
	Teacher	46	11.3
	Health worker	42	10.3
	Banker	3	0.7
	Artisan	91	22.4
Spouse's occupation	Trader	111	27.3
	Civil servant	94	23.1
	Teacher	28	6.9
	Health worker	26	6.4
	Banker	3	0.7
	Lecturer	22	5.4
	Artisan	123	30.2

Maternal nutrition literacy during complementary feeding practices

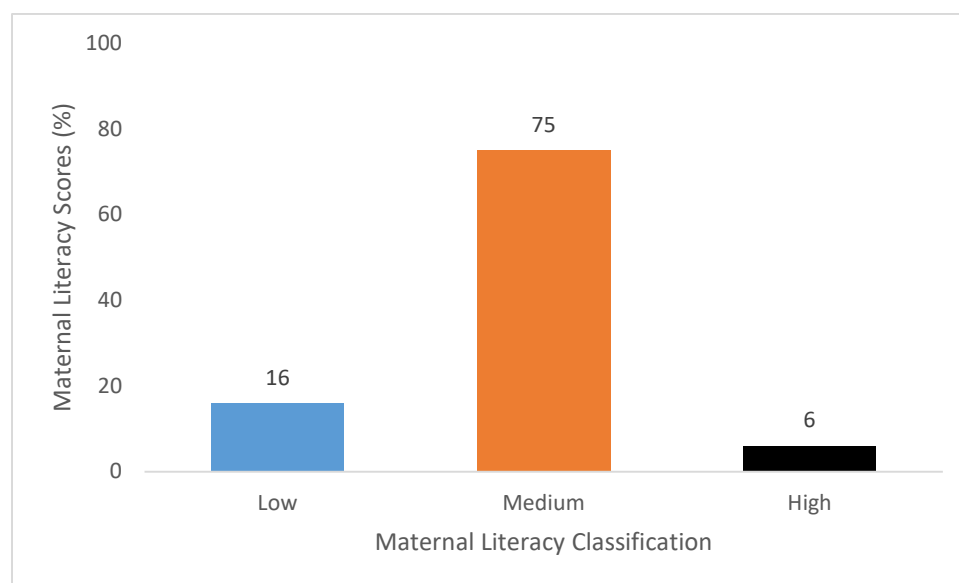
The maternal nutrition literacy complementary feeding practices were presented on Table 2 and figure 1, respectively. The complementary feeding literacy of mothers was based on the knowledge of mothers on complementary feeding. The results showed that timely initiation of breastfeeding to the infant immediately after birth was 26.0% among the respondents, this shows that large proportion of the mothers (74%) did not have the knowledge. Similarly, the proportion of nursing mothers who had good knowledge of timely introduction of complementary food to the infants after six months was 19.2%, while 80.8% of the respondents had poor knowledge. The mothers exhibited good knowledge of food diversification to the infants, for instance, the study showed that over three-quarter of the respondents agreed that given fruits and vegetables to the infants would prevent them against diseases, and that animal-based foods like milk and liver would promote strong bone and teeth formation and good iron status. The maternal nutrition literacy on child feeding practices indicated that 19% of respondents had low knowledge, while 75% and 6% of the mothers were classified as medium and high knowledge, respectively.

Table 2 Maternal Nutrition Literacy during Complementary Feeding Practices

Maternal nutrition literacy	Answer	Freq.	%
The appropriate time to initiate breastfeeding is soon after birth	Yes	106	26.0
	No	301	74.0
Child should start eating solid foods as the age is after six months	Yes	78	19.2
	No	329	80.8
Children after 8 months should be fed at least thrice in a day	Yes	394	96.8
	No	13	3.2
Lack of the right type of food causes Kwashiorkor (protein malnutrition)	Yes	354	87.0
	No	53	13.0
Fruits and vegetables help protect the body against diseases	Yes	385	94.6
	No	22	5.4
Milk will help a growing child build strong bones and teeth	Yes	380	93.4
	No	27	6.6
Liver and fish are rich in iron	Yes	346	85.0
	No	61	15.0
Foods that are rich in protein help to build and repair worn out tissue	Yes	392	96.3
	No	15	3.7
Children should be breastfed til the age of 2 years	Yes	20	4.9
	No	387	95.1

Note: N = 407

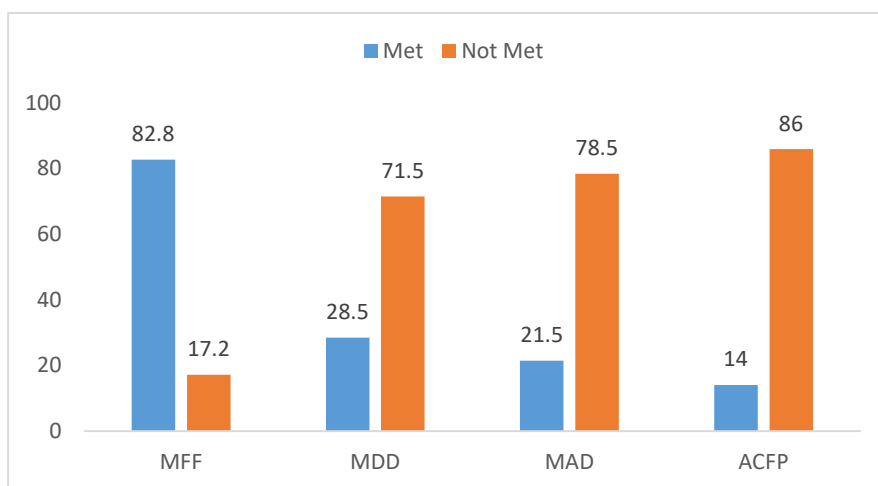
Figure 1 Maternal nutrition literacy classifications



The Complementary Feeding Practices of the Mothers

The complementary feeding practice indicators were presented in Figure 2. The result indicated that over four-fifth (82.8%) of respondents met the minimum feeding frequency (MFF) during child feeding practices, However, large proportion of nursing mothers did not meet minimum dietary diversity (MDD) (71.5%), minimum adequate diet (MAD) (78.5%) and appropriate complementary feeding practices (ACFP) (86%) level.

Figure 2 Complementary feeding practices of nursing mothers



Relationship Between Maternal Nutrition Literacy and Complementary Feeding Practices

The relationship between maternal nutrition literacy and complementary feeding practices of the respondents is presented in Table 3. The result showed that there was strong relationship between maternal nutrition literacy and minimum feeding frequency ($R = 3.804$; $p = 0.000$), and minimum adequate diet ($R = 2.055$; $p = 0.041$). However, there was no significant relationship between maternal nutrition literacy and minimum dietary diversity ($R = 1.834$; $p = 0.067$).

Table 3 Regression Analysis Showing the Relationship Between Maternal Nutrition Literacy and Complementary Feeding Practices of the Mothers

Complementary Feeding Practices	Maternal Nutrition Literacy						R	p-value
	Low		Medium		High			
	Freq. (38)	%	Freq. (323)	%	Freq. (46)	%		
Minimum Dietary Diversity								
Not Achieved	22	5.4	186	45.7	35	8.6		
Achieved	16	3.9	137	33.7	11	2.7	1.834	0.067
Minimum Feeding Frequency								
Not Achieved	0	0	29	7.1	11	2.7		
Achieved	38	9.3	294	72.2	35	9.0	3.804	0.000
Minimum Adequate Diet								
Not Achieved	22	5.4	187	46.0	36	8.8		
Achieved	16	3.9	136	33.4	10	2.5	2.055	0.041

Discussion

Maternal literacy on complementary feeding is an important determinant of optimal child nutrition and health (Elekeh et al., 2022; Owais et al., 2019). Improving maternal knowledge and attitudes through nutrition counseling and education can lead to improved infant and young child feeding practices, and consequently, improved child growth and development, especially in settings with low maternal literacy (Bimpong et al., 2020). In this present study, it was observed that majority of the respondents had formal educational background, and exhibited average knowledge during complementary feeding practices. This finding is in line with the report of Prasetyo et al., (2023) in a systematic review, that maternal education is an important determinant of quality of nutrient intakes, and good health status of infants. Meanwhile, this study determined the MNL among the nursing mothers, since the maternal education level alone cannot determine the adequate complementary feeding (Akinrinmade et al., 2019).

It is well established that there is a strong relationship between maternal literacy and complementary feeding practices during child feeding as stated by Awaf et al, (2023) in Jazan City, Saudi Arabia. Besides, it has been documented that children born of educated mothers have access to quality nutrition, better access to health facilities and lower mortality risk than uneducated mothers; this was also discovered by Vikram & Vanneman, (2020) in India.

Early years of life have been established as the time for developing good dietary habits and important time for taking in nutrients for optimal growth and development (WHO, 2021). In recent time, epidemiological studies associated poor child feeding practices to low maternal complementary feeding literacy not on the maternal education status. This factor is one of the main causes of malnutrition in children. This was corroborated by Abate et al., (2023) a study conducted among mothers in Dessie Zuria District, Northeast Ethiopia. Malnutrition has a profound effect on a child's growth and development, as it can lead to permanent stunting and impaired brain development (Handryastuti et al., 2022). Infant and young child feeding practices directly affect the nutritional status of children under two years, and thereby affecting child survival (Palanichamy & Solanki, 2021).

In this study, it was observed that the level of maternal nutrition literacy on complementary feeding practices along with breastfeeding was on average level, and this finding agrees with the reports of Temoirokomalani et al. (2021) who established that mothers are not breastfeeding their children up to the recommended age in Suva, Fiji.

In the case of complementary feeding practices, this study revealed that the mother had good knowledge of introducing complementary feeding to the infants at age six months. However, majority of the mothers agreed on introducing complementary feeding earlier than the recommended periods, and this observation is similar to the report of Bazezew et al. (2020), who established that Ethiopian mothers had poor attitude towards timely introduction of complementary feeding to their infants. In Europe, Usheva et al., (2021) showed timely introduction of solid food during complementary feeding with no risk of overweight among the children. Meanwhile, majority of the European mothers continued complementary feeding with infant formula rather than the breast milk. This occurred due to inadequate nutrition literacy on complementary feeding. Also, the reason for untimely introduction of complementary foods to the infants was not established in the developing countries. Meanwhile, it was associated with low maternal complementary feeding knowledge (Bazezew et al., 2020).

The level of maternal nutrition literacy could not influence the achievement of minimum dietary diversity (MDD) in this present study as shown in Figure 2 and Table 4. It is worthy to note that majority of the mothers failed to feed their children with 4 or more of the 7 food groups recommended. This agreed with the medium level of maternal nutrition literacy during child feeding practices recorded in this present study. Similar finding was also reported by Sekartaji et al., (2020) in Indonesia, the report stated that intake of foods from four or more food groups is related to maternal education on complementary feeding. Theurich et al., (2022) showed that poor feeding practices during complementary feeding is a global issue in a report on a “Workshop of the Federation of International Societies for Paediatric, Gastroenterology, Hepatology and Nutrition” organised by the World Health Organization Regional Office for Europe. MDD being an indicator of micro nutrient intake of the children (Diop et al., 2021) should be adequately met during complementary feeding practices. Meanwhile, Figure 2 showed that over 70% of the mothers could not meet the MDD during the complementary feeding practices. This implies that maternal nutrition literacy in this present study had low influence on MDD in which another factor might be the determinant. Forsido et al., (2019) also reported low achievement of MDD among mothers in Southwest region of Ethiopia.

Achievement of the minimum feeding frequency (MFF) showed that, majority of the mother fed their children with the number of times required daily in respect to the age of the children. Hence, the mothers were able to meet up with the recommendation of WHO, (2021). There was a significant relationship between the MFF and the maternal nutrition literacy as presented in Table 3. Achievement of MFF during complementary feeding by the mothers in this study corroborates with the report of Ahmed et al., (2022). The author stated that majority of mothers in Shashemene City West Arsi Zone, Oromia, Ethiopia met the MFF recommendation. Meanwhile this result is in contrary to Taha et al., (2020), who reported that majority of mothers in Abu Dhabi, United Arab Emirates, could not achieved MFF during complementary feeding practices.

The present study established that there was a significant relationship between MAD and maternal nutrition Literacy (Table 4). This implies that mothers in the study area were able to achieve some level of minimum adequate diet (MAD) among the children during complementary feeding practices. Similar findings have been previously reported by Lee et al. (2000) that maternal nutrition knowledge might have influence on complementary feeding practices. In addition, mothers with sufficient knowledge are usually implementing a good nutrition practice; hence, their children may be healthy and free from malnutrition disorders (Ickes et al., 2015). It is a right assumption that mothers with good nutritional knowledge acquire right foods for themselves and their children (Ozdogan et al., 2020).

Conclusion

The findings of this study established that maternal nutrition literacy has association with children’s MFF and MAD. Meanwhile, the maternal nutrition literacy has no statistical correlation with MDD. The implication is that, the maternal average knowledge that indicates the level of the maternal nutrition literacy is not sufficient to achieve all the feeding indicators selected for this study. The inability of the mothers to achieve dietary diversity during complementary feeding in the study area could be linked to the average level of the maternal literacy. Hence, concerted effort must be in place to improve maternal nutrition literacy in order to achieve appropriate complementary feeding practices. This may go a long way in enhancing adequate child feeding practices among mothers and help to prevent the occurrence of malnutrition among weaning-aged children.

Author Contribution Statement


Aluko, O. G. and Adaralegbe M. G. administered questionnaire to the nursing mothers at the Basic Health Centers, Ile-Ife, Osun State. Ogunba B.O. designed and supervised the study while Akinrinmade Remilekun prepared the manuscript.

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