



Mothers' Nutritional Knowledge, Infant Feeding Practices and Nutritional Status of Children (0-24 Months) in Lagos State, Nigeria

**I. A. Akeredolu^{1*}, J. O. Osisanya¹, J. S. Seriki-Mosadolorun¹
and U. Okorafor¹**

¹*Yaba College of Technology, Yaba, Lagos, Nigeria.*

Authors' contributions

This work was carried out in collaboration between all authors. Author IAA designed the study wrote the protocol and the final draft of the manuscript. Author JOO performed the statistical analysis and wrote the first draft of the manuscript. Author JSSM managed the literature searches. Author UO re-analyzed the data. All authors read and approved the final manuscript.

Original Research Article

Received 28th October 2013
Accepted 23rd April 2014
Published 6th May 2014

ABSTRACT

Aim: This study examined the nutritional knowledge, infant feeding practices of mothers and the nutritional status of children in Lagos State, Nigeria.

Study Design: A cross sectional survey design was used.

Place and Duration of Study: The study was conducted in three selected Local Government Areas (LGAs) of Lagos state. The LGAs were Ikeja, Shomolu and Ikorodu representing urban, sub-urban and rural areas respectively.

Methodology: A validated questionnaire and group interview was used as the instrument for data collection. Data was collected from 300 randomly selected mothers of children aged 0 months to 24 months, who visited three Government- owned childcare centres in Lagos State, Nigeria. Anthropometric indices were used to determine the children's nutritional status. The data obtained from mothers were analyzed using simple percentage and frequency counts. Epi Info 6 was used to analyze the anthropometric data.

Results: The findings indicated that the mothers' nutritional knowledge as revealed by the test score was fairly good. Majority (75%) of the respondents breastfed their children but only 14.7% of the mothers practiced exclusive breast feeding for six months, while 43.3% of the mothers in addition to breast feeding, included complementary foods for their

*Corresponding author: Email: favours94@yahoo.co.uk;

children at 4-6 months of age. About 16% of the mothers introduced complementary feeding and solid foods to their infants before 6 months of age. Occupation type was the most (45%) influential factor affecting breast feeding and appropriate complementary feeding practices. Also, 16.3% of the children were stunted while the prevalence of underweight and wasting were 13% and 10% respectively. The chi-square test showed a statistically significant association ($p < 0.05$) between mothers' nutritional knowledge and the children's nutritional status.

Conclusion: These findings are of public health concern. It is therefore recommended that the duration of maternity leave should be increased. Women of child bearing age should be educated by trained nutritionists on the types of locally available foods that promote growth in children.

Keywords: Nutritional knowledge; infant feeding practices; nutritional status; Nigeria.

1. INTRODUCTION

Poor infant feeding practices coupled with high rates of infectious diseases are the major causes of malnutrition during the first two years of life. Appropriate breast feeding and complementary feeding practices and access to adequate amounts of appropriate foods are essential for optimal infant nutrition [1]. Breast feeding provides infants with superior nutritional content that is capable of improving infant immunity and possible reduction in future health care spending [2]. Child mortality remains high in low and middle income countries [3]. It has been reported [4] that 17% of Nigerian children were exclusively breastfed for less than 4 months, while 13% were exclusively breastfed for less than 6 months. All these figures are still far below average levels. Children need complementary foods in addition to breast milk from the age of six months. Infancy period is a critical nutritional period for children, in which they should be transitioning from exclusive breast feeding to receiving complementary foods in addition to continued intake of breast milk.

The nutrition education given to mothers should emphasize the importance of breast milk only for the first six months of life and promote appropriate and timely complementary foods at six months with increased feeding frequency and change in food consistency, quality and diversity as the child ages. However, inadequate knowledge of appropriate foods and feeding practices is often a greater determinant of malnutrition than lack of foods [5]. It has been observed [6] that mothers who are nutritionally educated bring up their children in a healthier way than those who lack nutrition knowledge.

The need to assess the mothers' breastfeeding and complementary feeding practices and the nutritional status of children in Lagos state has become important since malnutrition can result from sub-optimal breastfeeding practices, poor quality complementary foods, detrimental feeding practices and contamination of feeding utensils and the effect of such practices on the growing child and mother.

To facilitate this investigation, five research questions were raised:

- (1) What is the level of the mothers' nutritional knowledge in Lagos State?
- (2) What is the level of exclusive breastfeeding practices among mothers in Lagos state?
- (3) What are the complementary feeding practices of mothers in Lagos State?
- (4) What is the Nutritional status of the children?

- (5) What is the relationship between mothers' nutritional knowledge and nutritional status of their children?

2. MATERIALS AND METHODS

2.1 Area of the Study

This cross sectional study was conducted in three selected Local Government Areas (LGAs) of Lagos state. The LGAs were Ikeja, Shomolu and Ikorodu representing urban, sub-urban and rural areas respectively.

2.2 Sample and Sampling Technique

Three hundred (300) nursing mothers of children aged 0-24 months visiting three childcare centres in three Government- owned hospitals in Lagos State were randomly chosen. The mothers who agreed to participate in the study were requested to fill the informed consent form.

2.3 Research Instrument

A validated questionnaire was used to assess the nutrition knowledge and feeding practices of the mothers. The researchers devised a questionnaire after reviewing the literature and other previous studies [7,8,9]. Key themes were derived using guidelines in National Policy on Infant and Young Child Feeding in Nigeria [10] and also indicators for assessing infant and young child feeding practices [11]. The questionnaire consisted of five sections. Section A recorded information on the socio-demographic characteristics, while Section B elicited information on the nutritional knowledge of the mothers.

Section C was on breast feeding and infant feeding practices. Section D recorded information on foods commonly consumed by the infants and section E was used to record the anthropometric data of the children. The weight and length measurements of the children were carried out following WHO reference standards for children aged 0 months to 24 months. The age/date of birth was obtained from each child's mother, and where the mother could not supply the data, hospital records were obtained.

The nutritional knowledge test was conducted for the mothers. The test comprised of 30-item questions on general concept of nutrition; infant nutrition; use of complementary foods, feeding practices and care of children. Questions asked included the meaning of exclusive breast feeding and the types of food that promote infant growth. The correct responses were assigned marks to make a total of 100%. The nutrition knowledge scores were categorized into excellent (80-100), good (60-79), average (40-59) and fair (0-39). For reliability, the questionnaire was initially pre-tested twice (within an interval of two weeks) to 50 women who were not among the final sample. The correlation coefficient was 0.79, which indicates a high reliability.

2.4 Data Collection and Statistical Analysis

The researchers, with the help of two research assistants, administered and collected data from the respondents. Each child care centre was visited twice on agreed days with the respondents, where the questionnaires were completed and returned. The data was

analyzed using frequency and percentage. Chi-square tests were used to infer relationships. Anthropometric indices were used to determine the children's nutritional status and was calculated using reference median recommended by the World Health Organization (WHO) and classified according to standard deviation units (Z-scores) based on the WHO criteria. The babies were weighed naked on a Salter scale (1889) which was placed on a flat table for balance. The scale was taken to zero before taking any measurement. The readings were taken to the nearest 0.1kg. Older children dressed in light clothing were weighed standing on a portable bathroom scale (Salter model, 1889). Height-O-meter was used in measuring the older children's height and was read to the nearest 0.1cm. The length board was used in taking the younger babies length. Each child was laid on the board on a flat surface and the length was also measured to the nearest 0.1cm.

The results obtained were compared with the NCHS/WHO reference standards.

Underweight: Underweight is identified by a low weight-for-age index. This index reflects both past (Chronic) and/or present (acute) under nutrition (although it is unable to distinguish between the two). Children were classified as underweight when their weight-for-height is below the reference median value minus two standard deviations.

Stunting: Low Height-for-age index identifies past under-nutrition or chronic malnutrition. It is associated with a number of long-term factors including chronic insufficient protein and energy intake, frequent infection, sustained inappropriate feeding practices and poverty. Children are classified as stunted when the height-for-age is below the reference median minus two standard deviations

Wasting: Low weight-for-height helps to identify children suffering from current or acute under nutrition or wasting. It is appropriate for examining short-term effects such as seasonal changes in food supply or short-term nutritional stress brought about by illness. Children are classified as wasted when their weight-for-age is below the reference median.

Malnutrition is further classified as mild (-2 to <-1SD), moderate (-3 to -2SD) and severe (<-3 SD).

Epi Info V 6 statistical software for epidemiology (developed by centres for disease control and prevention, Atlanta Georgia which allows users to create questionnaire and data entry forms) was used to analyze the anthropometric data. SPSS V17 was used to analyze all other data.

3. RESULTS

The demographic characteristics of the participants are presented in Table 1. With respect to age, participation was highest among mothers between 30-39 years and below. Results indicated that 70% of the women who participated in the study had completed secondary and post-secondary education. This suggests that the population is literate. More so, over 40% of them are in paid jobs, 34% of the respondents are self employed while 20.7% were housewives. Based on income, only 19.3% earn more than N50, 000 (\$ 333.3@ 150/\$1) monthly

Table 1. Socio-demographic characteristics of respondents

Variable	F	%
	300	100
Age (Years)		
>20	77	25.7
20-29	88	29.3
30-39	131	43.7
<40	4	1.3
Marital Status		
Single	14	4.7
Married	235	78.3
Separated/Divorced	41	13.7
Widow	10	3.3
Education		
Primary	38	12.6
Secondary	90	30.0
Post Secondary	122	40.7
Post Graduate	50	16.7
Occupation		
Civil servants	65	21.7
Private Company	70	23.3
Traders/Self Employed	103	34.3
Complete House Wives	62	20.7
Monthly Income		
>N5, 000(\$33.3)	48	16.0
N5, 000-14,999 (\$33.3-99.9)	87	29.0
N15, 000-24,999 (\$100-166.6)	62	20.7
N 25,000-49,999 (166.6-333.3)	45	15.0
N 50,000-99,999 (\$333.3-666.6)	34	11.3
>N100, 000 (\$666.6)	24	8.0

Table 1b. Demographic characteristics of the children (0-24 months)

Gender	F	%
Male	120	40.0
Female	180	60.0
Age		
Month		
0-6	28	9.3
7-12	194	64.7
13-18	46	15.3
19-24	32	10.7

3.1 Mothers' Nutritional Knowledge

While only 10.7% of the mothers had excellent scores (80-100%) in the nutrition knowledge test, majority (73.3%) scored above average (40-79). Results also revealed that the health/child care centres were the major (48.7%) source of information on nutrition-related issues while 19% reported getting information from family and friends. (Table 2)

Table 2. Source of nutritional information and nutritional knowledge score of mothers

Source of nutrition information	F	%
Radio/ Television	43	14.3
Newspaper/ Magazines	37	12.3
Family/ Friends	57	19.0
Health/ Child Care Centres	146	48.7
Others	17	5.7
Nutrition knowledge test scores		
0-39 (Fair)	48	16.0
40-59 (Average)	157	52.3
60-79 (Good)	63	21.0
80-100 (Excellent)	32	10.7

3.2 Infant Feeding Practices

Table 3 shows the data on infant feeding practices of the respondents. Majority (75%) of the mothers breastfed their children. Of the 74 percent that practiced breastfeeding, only 14.7% of the mothers breastfed exclusively. About 43.3% of the mothers in addition to breast feeding included complementary foods for their children at 4-6 months of age. However, about 16% of the mothers introduced complementary foods and solid foods such as mashed beans, amala with ewedu (a local food made from yam flour and green leafy vegetables), pap (a gruel made from fermented corn) with milk to infants before 6 months. Also, at 10-24 months, 32.7% of the mothers continued breast feeding with complementary feeding and 58.3% had introduced solid foods.

Table 3. Mothers' infant feeding practices

Age of Children	Exclusive BF	BF + Bottle	BF+ Complementary	Solid
	%	Feeding	Feeding	Food
		%	%	%
0-3 months	60.7	23.3	12	4.0
4-6 months	14.7	26.7	43.3	15.3
7-9 months		30.3	47.3	22.3
10-24 months		9.0	32.7	58.3

BF= Breast Feeding

The result from the study (Table 4) shows that pap with milk (54.7%) and mashed beans (48.7%) were the most frequently consumed complementary foods.

Table 4. Complementary foods commonly consumed by the children

Food Description	Frequency	%
Pap with milk	164	54.7
Egg custard	87	29.0
Mashed yam	67	22.3
Mashed beans	146	48.7
Rice with beans	77	25.7
Fish with okra soup	105	35.0
Amala with Ewedu soup	128	42.7

3.3 Nutritional Status of the Children

Results on Table 5 indicate that about 49.0% of the children have normal nutritional status while 39.3% were malnourished. The prevalence of underweight, stunting and wasting was 13.0%, 16.3% and 10.0%, respectively. Also, 11.7% of the children were either overweight or obese.

Table 5. Nutritional status of the children

	M (N=120)		F(N=180)		Overall (N=300)	
	F	%	F	%	F	%
Normal	50	41.7	97	53.9	147	49.0
Underweight	20	16.7	19	10.6	39	13.0
Stunting	21	17.5	28	15.6	49	16.3
Wasting	20	16.7	10	5.6	30	10.0
Overweight/Obese	9	7.5	2.6	14.4	35	11.7

3.4 Relationship between Nutritional Knowledge and Nutritional Status

The chi-square test on Table 6 reveals a significant association ($p < 0.05$) between mothers' nutritional knowledge and the nutritional status of the children.

Table 6. Mothers' nutritional knowledge and children's nutritional status

Value		Df	
x ² Pearson's chi-square	13.92	8	0.027
N of valid cases	300		

4. DISCUSSION

This study provides the level of breast feeding, complementary feeding practices, mothers' nutrition knowledge and the nutritional status of children (0-24 months) in Lagos state.

In the nutrition knowledge test, about 70% of the mothers had scores ranging from 40-79 marks. This shows that the nutrition knowledge of the mothers was good. This could have been informed by their level of education. Education has an important effect on mothers' nutrition knowledge, attitudes and on dietary intake of children [12].

Only a few (14.7%) of the mothers breastfed exclusively. This is far below average levels. The low prevalence of mothers who breastfed exclusively as reported in this study is similar to that obtained in another study [7] which reported that 17% of Nigerian children were exclusively breastfed for less than 4 months, while 13% were exclusively breastfed for less than 6 months. Breast feeding provides infants with superior nutritional content that is capable of improving infant immunity and possible reduction in future health care spending. Breast feeding for the first six months of an infant's life has been found to be a cost effective intervention in saving children's lives and can avert 13-15% of the 9 million deaths of children under 5 years old in low and middle income countries like Nigeria [4]. Also, all the mothers did not breastfeed beyond the first year. The common reason given was that the baby could not get enough from the breast milk and would soon be hungry. This shows that the likelihood of being fed appropriately does not increase with education nor nutrition

knowledge. Our finding is in disagreement with another study [13] carried out among Omani children, where it was observed that low levels of women's education had potential negative effects on the child's nutrition and feeding patterns. However, women who were formally employed indicated that the frequency and duration of breast feeding were affected as working conditions were not always conducive for optimal breast feeding practices. The sub-optimal breast feeding practices in terms of duration observed in this study are not limited to Nigeria alone. A study in South Africa, [14] reported a median duration of effective breast feeding of three weeks and a probability of 29% women breastfed for three months. Another study, [6] also reported that more than half of the breast feeding mothers did not breastfeed their infants for more than 4 months. This reveals that exclusive breast feeding was common up to 4 months and not up to 6 months of age. Supportive environment for breast feeding has been described as a critical determinant for successful breast feeding after 3 months or longer [3].

The present study revealed that the complementary feeding practices of the mothers were not adequate. About 76.7% of the mothers had introduced both complementary and solid foods to their infants before 4 months of age. The early introduction of complementary foods before the 4th month was more rampant among working mothers despite their level of education and nutrition knowledge, the most common reason being that they had to return to their places of work after 3 months of maternity leave. Earlier studies [7] made similar observations that the global recession has forced Nigerian women back into the labour market immediately after giving birth. This results into a shorter breast feeding span which in most cases may not be exclusive.

The inadequate complementary feeding practices as observed in this study means early introduction of breast milk substitutes such as formula and other kinds of complementary foods given to infants. Often, milk substitutes provide too few calories and expose the infants to the risk of dying from infections [15].

In this study, the nutritional status of the children on the basis of weight-for-age Z-score (WAZ, indicator of under-weight), showed that 13% of the children were under-weight which results from inadequate intake of food nutrients. Of the 13% that were under-weight, 10% of the children were moderately under-weight (-3 to <-2) while 3% were severely under-weight (<-3). The prevalence of wasting among the children in the present study is 10%. About 8% of the children were moderately wasted (-3 to <-2) and 2% were severely wasted (<-3). Wasting represents a more accurate reflection of current period of sickness and short term food shortage that led to significant weight loss. It also indicates deficit in tissue and fat mass compared with amounts expected in a child of the same height or length and may result either from failure to gain weight or from actual weight loss [8]. The nutritional status of the children on the basis of height-for-age (indicator of stunting) reported in this study showed that 16.3% of the children were stunted. About 12% of the children were moderately stunted (-3 to <-2) while 4.3% were severely stunted (<-3). Stunting is a common problem in Nigeria and may have serious implications. It results from extended periods of inadequate food intake, poor dietary quality, increased morbidity or a combination of these factors. It is worth-noting that children deprived of nutrients for healthy growth are also deprived of nutrients for brain development and healthy immune system [1]. The consequences of stunting may be grave as most children might never regain the lost height. It could also lead to premature death later in life because vital organs might never develop fully during childhood [15]. More than 90% of the world's stunted children live in Africa and Asia, where respectively 36% and 27% of children are affected. It could be suggested that the sub-optimal feeding practices of the mothers have influenced the children's nutritional status since poor nutritional status is a

result of detrimental feeding practices with consequences that may persist throughout the children's life [4].

Our study revealed a statistical significant association ($p < 0.05$) between mother's nutrition knowledge and the nutrition status of the children. Even though, majority of the mothers appeared to have high nutrition knowledge, it did not seem to translate into appropriate infant feeding practices since the prevalence of under-weight, stunting and wasting are of public health concern. Nutrition education appropriately delivered is an element of health promotion targeting individual people within a population. It includes the promotion of knowledge on human nutrition among the general public. Mothers with adequate nutrition education are likely to demonstrate better knowledge and attitudes to key infant and young children feeding practices. However, this is not the case in this study as only a few (14.7%) of the mothers breastfed exclusively despite their nutritional knowledge and the major complementary foods fed to children are not sufficient to promote growth. The major source of food was pap (gruel made from fermented maize) and amala (made from yam flour) and ewedu (*Corchorus olitoris*) soup. This finding does not agree with the study [9] on impact of nutritional education on nutritional Status of under-five children in two-rural communities of South-West, Nigeria, which reported that nutrition education of mothers had a positive impact on the feeding practices of children. These findings are of public health concern. It is therefore recommended that the duration of maternity leave should be increased. Women attending ante-natal clinics should be educated by trained nutritionists on the types of locally available foods that promote growth in children.

5. CONCLUSION

- The mothers' nutritional knowledge was good.
- There was sub-optimal breast feeding and complementary feeding practices among the mothers despite the nutritional knowledge score.
- The nutritional knowledge of the mothers showed significant association ($P < 0.05$) with the nutritional status of the children.

6. STUDY LIMITATION

The limitation of this study is that the authors were unable to get appropriate nutrient intake of the respondents, as such, only the food frequency was taken. Secondly, there may be under-reporting or exaggeration of feeding practices especially by mothers whose children were over 6 months of age.

7. IMPLICATIONS FOR RESEARCH AND PRACTICE

Many studies have been carried out on breast feeding and complementary feeding practices in Nigeria but only a few (to the best of the authors' knowledge) have been done on the impact of mother's nutritional knowledge on infant feeding practices and nutritional status in Lagos state, Nigeria. The study therefore provides evidence-based direction for future studies to enhance appropriate breast feeding and complementary feeding practices of children. Specifically, the results of this study provide a baseline data on the importance of establishing a standard indigenous nutrition education programme for mothers of young children in Nigeria. Emphasis should be placed on including pregnant women and women of child bearing age as the target audience. This will facilitate the mothers understanding of

nutrition which will in turn enhance the feeding practices and nutritional status of their children.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Faber M, Bernade S. Breast feeding, Complementary feeding and nutritional status of 6-12 months old infants in rural Kwazulu-Natal; 2007. Accessed on 1/10/2013. Available: www.sajen.co.za/index.php/SAJCN/article/viewfile/17
2. World Health Organization. Data Bank on infant and Young child feeding in Nigeria; 2010. Accessed on 27/12/2012 Available: www.who.int/nutrition/database/infant_feeding/countries/nga.pdf
3. Gabriele A, Shettimo F. Child malnutrition and mortality in developing countries: Evidence from a cross-country analysis. *Analyses of Social Issues and Public Policy*. 2008;8:1.
4. Nigeria Demographic and Health Survey. National Population Commission and ICF. Macro. Calverton, Maryland, USA. NPC and ICF Macro; 2008.
5. World Health Organization. Global Strategy for Infant and Young Child Feeding; 2003. Accessed 27/12/2012. Available: http://apps.who.int/gb/archive/pdf_files/WHASS/eassis.pdf
6. Okolo SN, Adewunmi YB, Okonji MC. Current Breastfeeding Knowledge, Attitudes and Practices of Mothers in 5 Rural Communities in Savannah Region of Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*; 1999.
7. Salami LI. Factors influencing Breast feeding practices in Edo State, Nigeria. *African Journal of Food Agriculture Nutrition and Development*. 2006;6:2.
8. WHO. Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality. Effect of Breastfeeding on Infant and Child Mortality due to Infectious Diseases in Less Developed Countries: A pooled analysis. *Lancet*. 2000;355:451-455.
9. Sule SS, Onayade AA, Abiona TC, Fatusi AO, Ojofeitimi EO, Esimai OA, Ijadunola KT. Impact of Nutritional Education on Nutritional Status of Under-five Children in Two-rural Communities of South-West, Nigeria; 2009. Retrieved from: www.ncbi.nlm.nih.gov/pubmed/19606191 on 19/12/13
10. National Policy on Infant and Child Feeding in Nigeria. FMOH, Abuja; 2005. Accessed: 10/2/2014. Available: <http://www.resourcedat.com.ng/wp-content/uploads/2012/01/FMOH - Infant Feeding Policy.pdf>
11. WHO. Indicators for Assessing Infant and Young Child Feeding practices; 2010. Accessed: 10/2/2014. Available: http://whqlibdoc.who.int/publications/2010/9789241599290_eng.pdf
12. Imdad A, Yakoob MY, Bhutta ZA. Impact of Maternal Education on Complementary Feeding and Provision of Complementary Foods on Child Growth in Developing Countries. *BMC Public Health* II. 2011;3:525.
13. Ali A, Layla A, Fouad H, Sadeq A, Saif A. Effect of Mothers' Nutritional Knowledge and Attitudes on Omani Children's Dietary Intake. *Oman Medical Journal*. 2011;26(4):253.
14. Mustaphi LF, Mbhenyane XG, Amey AKA. Infant feeding practice of mothers and the nutritional status of infants in the Vhembe District of Limpopo Province. *S Afr J Clin Nut*. 2008;21:2.

15. John G, Safari S, Kimambo C, James E, Welaimira L. Feeding practices and Nutritional Status of Infants in Morogoro Municipality, Tanzania. Tanzania Journal of Health Research. 2013;15:3.

© 2014 Akeredolu et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<http://www.sciencedomain.org/review-history.php?iid=513&id=30&aid=4481>