Original Research Article

Assessment of Complementary Feeding Practices of Under 5 in Akuku Toru Local Government Area of Rivers State

ABSTRACT

The study focused on assessing the complementary feeding practices of under 5 in Akuku Toru Local Government Area of Rivers State. The study employed descriptive cross-sectional study. Questionnaires were prepared and distributed to 210 nursing mothers with infants below 5 months. The research instrument was structured into five different sections, namely A, B, C, D and E, which captured the specific objectives of the study. Data generated using the research instrument was analyzed using frequency, percentages and mean. The findings obtained showed that most nursing mothers initiate complementary feeding at early age and their reasons often times are pressure from their family members who do not understand the benefits of adequate breastmilk and pressure from employers to resume work. Majority of the sampled nursing mothers in the study area prefer cereal/grain, fruits, vegetables, yoghurt and custard over other complementary foods used in nursing a child. Majority of the respondent agreed that the nutritional status of infants introduced to complementary foods at their early stage of development are usually underweight, stunting and wasting. It was also established that inappropriate complementary feeding practices adopted by nursing mothers in the study areas has significant effect on the nutritional status of their infants. Therefore, the study recommends that there is need for promotion of women's health and nutrition as a strategy that will benefit child nutritional status. Interventional programmes should target poorer household and mothers with lower educational level to improve complementary feeding practices of mothers. Developmental programmes should focus on empowering women in rural communities by improving of household income through creation of employment and access to credit facilities that will enable women engage in sustainable means of livelihood.

Keywords: Complementary feeding; Malnutrition; Feeding Practices; Breast Milk

1.0. INTRODUCTION

Complementary feeding is the corner stone of child's nutrition. This involves complementing breast milk or breast milk substitute with other foods, from the age of six months, appropriate for sustaining normal growth and development while breast feeding continues till two years or beyond. Okeahialam (2017) opined that breast feeding provides an ideal nutrition for the healthy growth and development during the first six months of life. Thereafter, it is no longer adequate in quality and quantity for the normal growth and development of the child. The complementary feeding has to be timely, implying that infants should be receiving other foods in addition to the breast milk from six months of age (WHO, 2009). It should not be too early or delayed beyond the age of six months. It should be adequate, meaning it should be of high nutritional value. It should be safe during preparation and administration, all measures should be taken to minimize contamination and it should be appropriate meaning that the foods should be in sufficient quantity and texture acceptable to the infant (Ibe, 2017).

Similarly, Brown, Dewey and Allen (2008) stated that complementary foods refer to foods and liquids other than breast milk or infant formulas. They are required during the second half of the first year of life for nutritional and developmental purposes, and to enable the transition from milk feeding to family diets. During this period, infants develop interest in other foods than milk and also the ability to chew. The child's normal physical growth and physical activities during this period place more demand on the nutritional requirements during this period of life (Tagbo & Ughasoro, 2009). Therefore, the nutritional recommendations for the complementary feeding period are based on the concept that breast milk will not meet full requirements for macronutrients and micronutrients beyond the age of six months. As a result, most malnourished children had their predicament originating from the period of transition from breastfeeding to family diet. This is often associated with recurrent infections and stress as the foods are not appropriately tailored to the needs of these children (Okeahialam, 2017).

Comment [UP1]: If your sample included mothers of infants below 5 months, where did you get the complementary feeding history? Hope not from children not sampled. Please clarify here.

Comment [UP2]: Look for a more recent study for your reference

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Malnutrition is the largest risk factor in the world for disability and premature mortality among young children, especially in developing countries. Although the condition is entirely preventable, malnutrition is a significant underlying factor in more than half of the deaths of young children in these countries (Pelletier, 2014). Malnutrition is a background factor for deaths from diarrhea, measles, acute respiratory infection, meningitis and malaria (Pelletier, 2014). In Nigeria, 40%, 29% and 10% of children under five years of age are stunted, wasted and underweight, respectively (UNICEF, 2017). An African child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe and the most common cause of child death is the interacting combination of malnutrition and infection (UNICEF, 2017). Some children in low-income countries with high rates of malnutrition grow normally due to better education and household management, or coping skills of their mothers (Pelto, 2010). Moreover, proper feeding practices, which ensure intake, are as important as the provision of complementary foods that meet daily nutritional requirements.

Malnutrition, especially in children resulting from inadequate feeding and child care and disease is a major public health problem throughout the developing world including Nigeria (Muller & Krawinkel, 2015). Malnutrition is one of the principal underlying causes of death for many of the world's children contributing to more than a third of under-five deaths globally. About 178 million children globally are stunted and Africa has the highest rates (WHO, 2012). In Nigeria, 41% of children under-5 years of age are stunted, with an increase from 27% at age 6 months to 50% at 23 months which is the period were complementary feeding intensifies. About 23% of children under-5 years are underweight in Nigeria and the prevalence among children aged 6–23 months is 24%; wasting among under-five children is 13%, and 17% among children aged 6–23 months. On the other hand obesity stands at 9% among under-five children (National Population Commission (NPC) and ICF Macro 2009). Generally, the risk of malnutrition in the first 2 years of life has been directly linked with poor breastfeeding and complementary feeding practices of mothers together with high rate of infectious diseases (Arimond & Ruel 2014; Lutter & Rivera 2013; Daelmans & Saadeh 2013). In Nigeria, over 50% infants are given complementary foods before 6 months and these foods are often of poor nutritional value—mostly inadequate in terms of energy, protein and micronutrients such as iron, zinc, iodine and vitamin A (Federal Ministry of Health [FMH] 2005). Also, during the complementary feeding period, the frequency of feeding for the child is usually low, while the quantities and qualities of foods given are usually less than that required for the ages of the child. Thus, complementary feeding process has been associated with major changes in both macronutrient and micronutrient intake of children resulting in malnutrition.

Appropriate child feeding practices and behaviors of parents have a positive effect on growth of infants and young children (Saha, Persson, Rasmussen, Arifeen & Frongillo, 2008). For instance, an analysis of data sets from several Latin American countries demonstrated that appropriate breastfeeding and complementary feeding practices were positively associated with child height-for-age in most of the countries studied (Pelto, 2010). Transition from exclusive breastfeeding to family foods typically covers the period from 6 to 23 months of age. It is the time when malnutrition starts in many infants, contributing significantly to the high prevalence of malnutrition in children <5years of age worldwide. During this time, complementary foods should be added to the diet of the child (Muller and Krawinkel, 2015). It is needed to fill the gap in energy and iron and other essential nutrients, between what is provided by exclusive breastfeeding and the total nutritional requirements of the infant. This gap increases with age, demanding an increasing contribution of energy and nutrients especially iron, from foods other than breast milk (WHO, 2009). Therefore, it should be timely, adequate, and be given in a way that is appropriate for the age of the child, applying responsive feeding. As the child ages, feeding practices must change in response to the child's changing nutritional requirements, motor skills, and maturing digestive and immune systems.

The Millennium Development Goals (MDGs) number 4 targeted the reduction of child mortality by two-third by the year 2015. However, from recent report Nigeria's progress towards reducing child mortality by a two-third since 1990 is off track, with only an average of 1.2% reduction in under-five mortality yearly (FMH and Save the Children 2011). Annually, nearly one million children die in Nigeria before they reach the age of 5 years and globally about 11 million under-five children die. In 2006 there was an estimated 9.5 million deaths of children of under-5 years of age globally and poor nutrition which increases the risk of illness contributed directly or indirectly to more than one-third of these deaths. Undernourished children are regularly prone to measles, malaria, diarrhea, pneumonia and other illnesses (FMH and Save the Children 2011). Evidence has shown that children who are malnourished and have deficiencies of micronutrient early in life have a lifelong impairment of cognitive and physical development.

Comment [UP5]: Nutrition is very dynamic and evolving every daily, so your reference should be able to reflect they dynamic.
Unless this study is very old, we are now using the DSGs. Please, review the new targets.

Growth faltering as a result of inadequacy of complementary food in terms of quality, quantity and frequency of meals has been reported (Awobgenja & Ugwuona 2010; Kruger & Gericke 2013; Mushaphi *et al.*, 2008). In a study in northern Nigeria on feeding practices and nutritional status of under-five children, Awogbenja and his colleague adduced that mothers who introduced complementary food too early had high incidence of children who were under-nourished (Awogbenja & Ugwuona 2010). Since malnutrition is a significant public health problem in the nation and poor complementary feeding habits of mothers has been linked with poor nutritional status of infants, addressing the influence of complementary feeding practice of mothers on nutritional status of children may be an important approach towards reducing the burden of child malnutrition.

Currently in Nigeria, but also in many developing countries, interventions mainly address the issue of what to feed infants (Ibe, 2017). Although early childhood malnutrition can be attributable to poverty and lack of resources, family and caregiver characteristics, such as education and household management or coping skills of the mother, can determine normal growth and development. Lack of knowledge regarding appropriate foods and feeding practices can contribute to malnutrition to a greater degree than lack of food. It is not only providing the appropriate combination of complementary foods to meet the child's nutritional needs that is important, but also feeding practices such as frequency of feeds and feeding style need to be considered. However, there has not yet been information known about the current complementary feeding practice in a study area. Therefore, this study aimed to assess the complementary feeding practice of infants and young children aged 5 months and below.

METHODOLOGY

Research Design: The research design for this study is descriptive cross-sectional study with a target population of nursing mothers with infants below 5 months, in Akuku Toru Local Government Area, Rivers State. Descriptive cross sectional research design involved collecting data from respondents to answer questions concerning the current status of the subject of the study and also involves a one-time observation of variables.

Area of the Study: The area of study is Akuku Toru Local Government Area of Rivers State in Nigeria. Akuku-Toru is a Local Government Area in Rivers State, Nigeria. Its headquarters are in the town of Abonnema. It has an area of 1,443 km^2 and a population of 156,006 at the 2006 census (Nigerian Decide, 2019).

Population of Study: The population of the study comprised all the nursing mothers with children below five (5) months attending their normal post-natal care in seven (7) major primary health care centres in Akuku Toru Local Government Area, Rivers State during the period of this research work. These seven (7) major primary health care centres are; Abonnema Comprehensive Health Centre, Abonnema General Hospital, Obonoma Model Primary Health Centre, Abissa Primary Health Centre, Elem-Sangama Primary Health Centre, Idama Primary Health Centre and Soku Cottage Hospital.

Sample and Sampling Techniques: The sampling technique the study adopted is convenient sampling technique. Here the samples are selected based on the availability and accessibility. Based on the above, the study conveniently selected respondents from the entire population based on their availability and accessibility. The researcher conveniently selected 30 nursing mothers from the seven major primary health care centres in Akuku Toru Local Government Area, with children below 5months that visit these primary health care centres for their post-natal care. Therefore, the sample size of this study is 210 respondents.

Research Instrument: The instrument for data collection is a structured questionnaire. Enumerators who were trained for this purpose will be used for field data gathering. The research instrument was structured into five (5) broad sections namely A, B, C D and E.

Validity of the Instrument: To ensure the validity of the instrument, the questionnaire was submitted to the project supervisor and other lectures in the department of Food Sciences and Technology for a thorough scrutiny and suggestions, correction and amendment.

Reliability of the Instrument: To ensure that the research instrument is reliable, it was distributed to some selected respondents. After two weeks, the test was carried out again on the same set of respondents after which the data collected was computed using simple tables and percentages.

Comment [UP6]: Quote a recent census, 2006 is a long time ago and many things must have changed.

Comment [UP7]: There is a mix here, if all children were below 5 months, I hope, then how did you get details of 6 to 10, and 10 months to 1 5months. You need to clearly point out your sample population. Have a table with socio-demographic characteristics of study children.

Comment [UP8]: Describe further how you conveniently sampled the mothers, at the hospital or in the village. I have noted that all children sampled were either stunted, underweight, or wasted, if that the criteria, the you should explain in deal how you sampled the mother with children who were either stunted, underweight, or wasted.

Comment [UP9]: Tense

Administration of the Instrument: The researcher personally administered the questionnaire to the respondents with the help of research assistant, who carefully read out the instructions to them, to ensure that the entire study area is fully covered, completed instrument was collected immediately after completion by the respondents.

Method of Data Collection: The researcher used direct delivery method to administer the questionnaire to the respondents. The research assistants were educated by the researcher on the purpose of the study and how to administer the questionnaire. The researcher and research assistants administered the questionnaire to the respondents and collect it back immediately on completion. The reason for the use of research assistants was to facilitate the quick distribution and retrieval of the questionnaire copies from the respondents.

Comment [UP10]: Correct the tense here

Method of Data Analysis: The data obtained in the course of the study from the sampled respondents through the use of structured questionnaire was analyzed using frequency, percentage, cumulative percentage, mean and standard deviation with the aid Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Table 1. Age nursing mothers initiate complementary feeding

OPTIONS	FREQUENCY	PERCENTAGE (%)
0 – 5 months	160	80
5 – 10 months	30	15
10 – 15 months	10	5
TOTAL	**200**	**100**

Source: Field Survey, 2021.

Table 1 showed results obtained on the age nursing mothers initiate complementary feeding to their infants. Result obtained showed that 160(80%) of the sampled nursing mothers introduce complementary feeding at 0 – 5 months, 30(15%) of the sampled nursing mothers initiate complementary feeding to their infants at 5 – 10 months, while 10(5%) of sampled nursing mothers in Akuku Toru LGA, Rivers State went for the option that they introduce complementary feeding to their infants at 10 – 15 months.

Comment [UP11]: Give a table with demographic data of study children to show age distribution which can then act as reference to this table.

Table 2. Reasons for early initiation of complementary feeding

OPTIONS	FREQUENCY	PERCENTAGE (%)
Inadequate knowledge on the benefit of breastmilk	40	20
Insufficient breast milk production	10	5
Pressure from family members	90	45
Pressure from employers to resume work	60	30
TOTAL	**200**	**100**

Source: Field Survey, 2021.

Table 2 present data generated and analyzed on the reasons behind the early initiation of complementary feeding to infants by nursing mothers. Hence, it was realized that 40(20%) of sampled nursing mothers in the study area opined that the reason for early initiation of complementary feeding is because of their inadequate knowledge on the benefit of breastmilk, 10(5%) of the sampled nursing mothers went for insufficient break milk production as reason, 90(45%) of total sampled nursing mothers identified pressure from family members of reason for early initiation of complementary feeding while 60(30%) opined that pressure from employers to resume work could be the reason for early initiation of complementary feeding to infants.

Table 3. Mothers with male child initiate complementary feeding early than mothers with female child.

DECISION	FREQUENCY	PERCENTAGE (%)
Strongly Agreed	65	32.5
Agreed	100	50
Disagreed	20	10
Strongly Disagreed	15	7.5
TOTAL	**200**	**100**

Source: Field Survey, 2021.

Table 3 present result obtained on respondents' opinion as to whether mothers with male child initiate complementary feeding early than mothers with female child. Result illustrated above showed that 65(32.5%) of the sampled nursing mothers strongly agreed to the statement made, 100(50%) agreed to the above statement, 20(10%) disagreed to the statement, while 15(7.5%) strongly agreed to the statement made. Hence, it could be reasonable said that majority of the sampled nursing mothers in the study area were of the opinion that mothers with male child initiate complementary feeding early than mothers with female child.

Table 4. Nutritional status of children in the study area

OPTIONS	FREQUENCY	PERCENTAGE (%)
Underweight	78	39
Stunting	60	30
Wasting	62	31
TOTAL	**200**	**100**

Source: Field Survey, 2021.

Table 4 illustrates data generated and analyzed on the nutritional status of children in the study area. Result obtained showed that the nutritional status of children of 78(39%) of the total sampled nursing mothers in the study area were underweight, nutritional status of children of 60(30%) of sampled nursing mothers in the study area were stunting as at the time of the study. Finally, on the nutritional status of children in the study area, it was realized that the nutritional status of children of 62(31%) of the sampled nursing mother were wasting. Therefore, it can be concluded that the nutritional status of children of nursing mothers that introduced complementary food to their infant early is usually underweight, stunting and wasting.

Comment [UP12]: Please indicate the percentage of children with normal weight, or did you conveniently sampled mothers with malnourished children. The study would be interested to see the picture of the nutrition status of children in the locality

Comment [UP13]: Please, look at your study population. We need to know whether you sampled conveniently only mothers with malnourished children or all mothers who presented to the clinic. This is important because we need to see the general picture of the study population. Review this

Table 5: Types of complementary foods utilized by nursing mothers in the study area

Complementary food used	Frequency	Percentage (%)
Cereal/grain	185(15)	92.5(7.5)
Pureed meats	95(105)	47.5(52.5)
Cheese	75(125)	37.5(62.5)
Fruits	195(5)	97.5(2.5)
Vegetables	180(20)	90(10)
Yoghurt	200	100
Fats/Oils	50(25)	150(75)
Custard	200	100

Source: Field Survey, 2021.
Note: The figures in the parenthesis represent the number and percentage of nursing mothers that do not utilize the specified types of complementary foods.

Table 5 showed data analysed on the types of complementary foods utilized by nursing mothers in the study area. Result obtained from the analysis conducted showed that 185(92.5%) of the sampled respondents used cereal/grain, while 15(7.5%) do not utilized cereal/grain. Similarly, 95(47.5%) nursing mothers in the study area utilized pureed meats as complementary food, while 105(52.5%) do not used pureed meat as complementary food. It was also realized that 75(37.5%) of the sampled respondents utilized cheese, while 125(62.5%) do not utilized cheese as complementary food. 195(97.4%) of the sampled nursing mothers use fruits as complementary food, while 5(2.5%) of the sampled respondents do not use fruit as complementary food. 180(90%) of the sampled respondents utilize vegetables as complementary food, while 20(10%) of the total sampled nursing mothers do not adopt vegetables as complementary food. More so, all the nursing mothers in the study were of the opinion that they utilize yoghurt as complementary food. As per the use of fat/oil, 50(25%) of the total sampled respondents opined that they utilize fat/oil as complementary food, while 150(75%) do not utilize fat/oil as complementary food. Finally, it was realized that all the sampled respondents opined that they utilized custard as complementary food when nursing their infants. Based on the above statistical representation, it is deduced that majority of the sampled nursing mothers adopt cereal/grain, fruits, vegetables, yoghurt, and custard as complementary food when feeding their infants.

Table 6. Mean rating of respondents' responses on complementary feeding practices adopted by nursing mothers in the study area

Complementary feeding practices	$\bar{X}$	S.D	Remark
2 – 3 times per day at 0 – 5 months of age	3.77	0.33	Accept
3 – 4 times per day at 9 – 11 months of age	3.42	0.64	Accept
1 – 2 times per day at 12 – 24 months of age	3.77	0.33	Accept
1 – 2 times per day at 12 – 24 months of age, with additional nutritious snacks	3.73	0.35	Accept
2 – 3 times per day at 6 – 8 months of age	3.53	0.44	Accept
Average Mean	**3.64**		

Source: Researcher's Computation, 2021

Table 6 illustrates data analyzed on the complementary feeding practices adopted by nursing mothers in the study area. It was realized that the average mean value obtained is greater than 2.50 (3.64 > 2.50). Therefore, it can be reasonable concluded that virtually all the nursing mothers in the study area agreed that 2 – 3 times per day at 0 – 5 months of age, 3 – 4 times per day at 9 – 11 months of age, 1 – 2 times per day at 12 – 24 months of age, 1 – 2 times per day at 12 – 24 months of age, with additional nutritious snacks, and 2 – 3 times per day at 6 – 8 months of age are complementary feeding practices usually adopted nursing mothers to ensure child wellbeing in the study area.

Table 7. Mean rating of respondents' responses on the effect of inappropriate complementary feeding practices on nutritional status of infants

Inappropriate complementary feeding practices & nutritional status of infants	$\bar{X}$	S.D	Remark
Infants introduced complementary foods at age 2 – 3 months had 2 times higher risk of being stunted	3.42	0.64	Accept
Infants introduced to complementary foods at age 0 – 1 month had 3 times higher risks of being wasted and underweight	3.12	0.34	Accept
Infants who did not receive the minimum meal diversity had 29% higher risk of stunting	3.17	0.33	Accept
Infants who did not receive the minimum meal frequency had 3 times higher risk of stunting	3.77	0.33	Accept
Infants who did not receive the minimum meal frequency had 93% higher risk of wasting and underweight	3.13	0.34	Accept
Average Mean	**3.32**		

Source: Researcher's Computation, 2021

Table 7 above presents statements made on the effect of inappropriate complementary feeding practices on nutritional status of infants. The result showed that the average mean value obtained is greater than mean criteria value for acceptance or rejection of each statement i.e 3.22 > 2.50. Based on the above statistical representation, it can be affirmatively said that majority of the sampled respondents agreed to the opinion that infants introduced to complementary foods at age 2 – 3 months had 2 times higher risk of being stunted, infants introduced to complementary foods at age 0 – 1 month had 3 times higher risks of being wasted and underweight, infants who did not receive the minimum meal diversity had 29% higher risk of stunting, infants who did not receive the minimum meal frequency had 3 times higher risk of stunting and infants who did not receive the minimum meal frequency had 93% higher risk of wasting and underweight. This finding of Ekerette and Olukemi (2016), supports the above assertion, where it was realized that inappropriate complementary feeding practices adopted by nursing mothers determine the nutritional status of their infants. Similarly, Laura et al., (2020) realized that nursing mothers' early introduction of complementary foods to their infants results in high prevalence of underweight, wasting and stunting among infants.

Test of HO_1: There is no significant association between inappropriate complementary feeding practices and under nutritional status of infant.

Table 8: t – test comparison on the significant association between complementary feeding practices and nutritional status of infant.

Respondents	N	Std. err	t-cal.	t-crit.	P – value	Decision
Nursing mothers	200	0.8548	2.569	1.983	0.0005	Accept ($H0_2$)

Source: Data Analysis using SPSS Version 22

The computed value of t-test using SPSS version 22 is 2.569 while the tabulated value of "t" is 1.98. Since the t-cal > t-tab (2.569 > 1.983), the formulated null hypothesis which states that there is no significant association between inappropriate complementary feeding practices and under nutritional status of infant is rejected while the alternative is accepted. Therefore, it can be concluded that there is a significant association between inappropriate complementary feeding practices and under nutritional status of infant. The above finding is in line with the result obtained by Oluwaseun *et al.*, (2021), that inappropriate complementary feeding is largely responsible for infant undernutrition. In corroboration, Aripin *et al.* (2018) also reported that there is a significant association between complementary feeding practices and nutritional status of infants. Most malnutritional discovered in infants is largely attributed to complementary practices adopted by nursing mother.

CONCLUSION

The high prevalence of under nutrition (including wasting, stunting and underweight) is a public health problem, among infants and young children in Akuku Toru Local Government Area of Rivers State. The observations made in the study has it that children who received timely complementary foods had normal status based on weight-for-height than children who did not receive timely complementary foods even after controlling for maternal, child and health factors. However, dietary diversity was a predictor of better weight-for-age. Children who received the minimum feeding frequency had the likelihood of becoming less stunted and underweight than their peers who did not receive the minimum feeding frequency. Therefore, the study concludes that the initiation of complementary foods to infants within the ages of 0 – 6 months is responsible for poor nutritional status of infants. Even when complementary foods are introduced to infants at an appropriate age, inappropriate complementary feeding practices of nursing mothers is responsible for underweight and stunting of infants. A greater percentage of nursing mothers in the study area prefer giving their infants complementary foods like cereal/grain, vegetables, yoghurt and custard, and lastly, it is concluded that there is a significant association between inappropriate complementary feeding practices and under nutritional status of infant.

Comment [UP14]: Where is this result on your result section?

Recommendations: The following recommendations are made based on the finding of the study:

i. Intervention efforts to improve nutritional status of infants through nutrition and educational inputs should emphasize optimal infant's breastfeeding practices.
ii. Interventional programmes should target poorer household and mothers with lower educational level to improve complementary feeding practices of mothers.
iii. Developmental programmes should focus on empowering women in rural communities by improving of household income through creation of employment and access to credit facilities that will enable women engage in sustainable means of livelihood.
iv. Caregivers and mothers should be educated on maintenance of hygienic conditions of the home and during feeding of the child to prevent diarrhea and illness, and on the management of diarrhea.
v. There is need for promotion of women's health and nutrition as a strategy that will benefit child nutritional status.

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