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## Complementary feeding practices and nutritional status of young children in a community in Sokoto

DOI:<http://dx.doi.org/10.4314/njp.v47i4.5>

Accepted: 13th July 2020

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**Abstract:** *Background:* Complementary feeding is the cornerstone of child's nutrition. Most malnourished children had their predicament originating from the period of transition from breast-feeding to family diet.

*Objectives:* To determine the complementary feeding practices and nutritional status of young children in Gwiwa community.

*Materials and Methods:* This cross-sectional study was carried out in Gwiwa community, Wamakko LGA, Sokoto State between January and June, 2018. Three hundred and ten mothers with their children aged 6 –36 months were interviewed using structured interviewer-administered questionnaire and the children's nutritional status was assessed using WHO classification of malnutrition. Data was analysed using SPSS version 22.0. A p-value 0.05 was taken as significant

*Results:* One hundred and forty (45.2%) respondents were aged 15 – 24years and 168(54.2%)

were of low socio-economic class. There were 190 males and 120 females with 66 (21.3%) children exclusively breast-fed for 6months. The mean age of cessation of breast feeding was 17.8  $\pm$ 3.6 months. One hundred and sixty-nine (54.5%) children commenced complementary feeding at 6-8month of age with the mean age of 5.7( $\pm$ 2.6) months. One hundred and eighty-four (59.4%) used plain pap with 41.2% fed more than 3 times per day. Eighty-two (26.5%), 56(18.1%) and 76 (24.5%) children were underweight, wasted and stunted respectively.

*Conclusion:* The complementary feeding practices were suboptimal in this community and might explain the poor nutritional status of their under-fives. Efforts should be geared towards optimal complementary feeding practices in this community.

**Key words:** Complementary, Feeding, Practice, Nutritional, Status, Under-5.

### 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.<sup>1</sup>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.<sup>2,3</sup>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. It should not be too early or delayed beyond the age of six months.<sup>3</sup> It should be adequate, meaning it should be of high nutritional value. It should be safe during preparation and administration- all meas-

ures 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.<sup>3</sup>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.<sup>1-3</sup> 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.<sup>1,3,4</sup> 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.<sup>5</sup>

Most guidelines for the complementary feeding are based on cultural factors and food availability.<sup>4</sup> In the developing world the focus is on providing adequate nutrients to support growth and development, while in developed world, the focus is on achieving a better balance of nutrients and avoiding excess.<sup>3,6</sup> In Africa, the traditional complementary foods are modified adult foods without consideration to the nutritional needs of these children.<sup>3,7</sup> There are also concerns of the timing, how and what is used as complementary feeding. It has been shown that the complementary feeding practices are suboptimal in developing countries, Nigeria inclusive.<sup>5,8-10</sup> Most of the children are already on other foods before the age of six months, and in many cases the foods are of poor nutritional quality and quantity.<sup>8</sup> This results in under nutrition and increased childhood morbidity and mortality rate in these communities. Globally, efforts are being made to improve childhood nutrition, reduce malnutrition and attendant morbidities and mortalities and ensure compliance with recommended feeding practices.<sup>11</sup> In view of this, there is need for more studies on complementary feeding practices in Nigeria especially in the communities. This study was conducted to determine the complementary feeding practices and nutritional status of young children seen during medical outreaches in Gwiwa community, a semi-urban settlement in Sokoto, North-western Nigeria.

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## Materials and Methods

A descriptive cross-sectional study carried out at Gwiwa Primary Health Care Centre, Gwiwa community, Wammakko LGA, Sokoto State, North-western Nigeria among mothers and their children aged 6 – 36 months seen during weekly medical outreach programme between January<sup>1<sup>st</sup></sup> and June 30<sup>th</sup>, 2018 by the Islamic Medical Association of Nigeria (IMAN), Usmanu Danfodiyo University and Teaching Hospital, Sokoto branch.

Gwiwa community is within Sokoto town under Wammakko Local Government Area, Sokoto State. The medical outreach is a free medical services provided as a community service to all members of the community irrespective of faith or ethnic group. It was carried out on a weekly basis. The services provided during the outreach include health talk on breastfeeding, environmental sanitation, medical consultations, free drugs and referral of emergency cases and those that require further evaluation and treatment.

Approval was obtained from the Health department of Wammakko local government area and Ethics and Research Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria; and informed consent was obtained from the mothers. Confidentiality of

the information obtained was maintained within the members of the research team.

The participants at the outreach were all residing in Gwiwa community. Mothers, with children aged 6 – 36 months, who consented were recruited with their children consecutively once for the study. Those children with incomplete information, life threatening condition (s) or features of chronic illnesses such as sickle cell diseases, tuberculosis, malignancies were excluded from the study. Information was obtained from the participants by interviewing using structured interviewer questionnaire. The data obtained include the mother's age, education and occupational statuses of both parents, exclusive breast feeding status, age of commencement of complementary feeding, type of food used and age when breast feeding was stopped. The weights of the children were measured to nearest 0.1kg using the appropriate weighing scales following the standard procedures and their length or height were measured to the nearest 0.1cm using locally fabricated length measuring board (infantometer) for those aged 2 years or less and height measuring board (floor-type weighing scale with stadiometer C-202MWunder®, Italy) for those aged more than 2 years. They were also examined for the presence or absence of nutritional oedema and other features of undernutrition. The nutritional status was determined using World Health Organization's<sup>12</sup> classification of malnutrition and socio-economic status were determined using Oyediji's socio-economic classification scheme.<sup>13</sup> Data was analysed using SPSS version 22.0. The results were presented in frequency tables, multivariable tables and pie charts. Chi-square test was used to assess the association between the rate of malnutrition and related variables of complementary feeding practice. A p-value 0.05 was considered significant.

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## Results

Three-hundred and ten mother-infant pair respondents studied. One hundred and forty (45.2%) respondents were aged 15 – 24 years, 106 (34.2%) 25 – 35 years and 64 (20.6%) above 35 years of age. One hundred and sixty-two (52.3%) mothers had informal education, 114 (36.7%) had formal education up to different levels while 34 (11.0%) had no form of education. One hundred and sixty-eight (54.2%), 100 (32.3%) and 42 (13.5%) of the respondents were of lower, middle and upper socio-economic classes respectively as shown in Table 1.

The mean age of the children was 19.8 ( $\pm$ 9.8) months with 107 (34.5%) aged 18.1 – 24.0 months (Table 2). There were 190 males and 120 females among the children studied. Sixty-six (21.3%) of the children were exclusively breast fed. The median age of cessation of breast feeding was 18 months. One hundred and sixty-nine (54.5%) of the children studied commenced complementary feeding at 6-8 months of age with 85 (27.4%) at 6 months of age. The mean age at commencement of complementary feeding was 5.7 $\pm$ 2.6

(range 2 – 12 months) months (Fig 1). One hundred and eighty-four (59.3%) used plain millet gruel, 100 (32.3%) fortified pap (pap was fortified with other ingredients such as soya beans, groundnut flour, crayfish and palm oil) and 26 (8.4%) commercially processed feeds (Table 3).

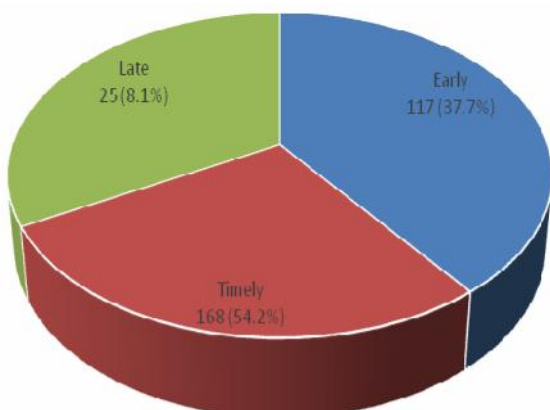
Eighty-two (26.5%) children studied were underweight, 56 (18.1%) wasted and 76(24.5%) stunted (Fig 2). There was a significant association between the rate of underweight and type of complementary food ( $\chi^2=3.92$ ,  $p=0.04$ ) and the timing of initiation of complementary feeding ( $\chi^2=9.98$ ,  $p=0.007$ ) as shown in Tables 4 and 5 respectively. Among the children who were underweight, 42 (51.2%), 30 (36.6%) and 10 (12.2%) were initiated on complementary feed early (before 6 months of life), late (after 8 months of life) and timely (6 - 8 month of life) respectively; and 62 (75.7%), 17 (20.7%) and 3 (3.6%) had plain pap, fortified pap and commercially packaged complementary feeds respectively.

Forty-two (55.3%), 32(42.1%) and 2(2.6%) of the stunted children were fed on plain millet gruel, fortified pap and commercially packaged complementary feeds respectively. There was no significant association between the rate of stunting and type of complementary feed ( $\chi^2=5.32$ ,  $p=0.07$ ) and the timing of initiation of complementary feed ( $\chi^2=3.78$ ,  $p=0.15$ ). There was significant association between the rate of wasting and timing of initiation on complementary feed ( $\chi^2= 11.2$ ,  $p=0.004$ ) (Table 5).

**Table 1:** Socio-demographic characteristics of the respondents

Characteristics	Number	Percentage
<i>Age Group (years)</i>		
15 – 24	140	45.2
25 – 34	106	34.2
35	64	20.6
<i>Educational Status</i>		
None	34	11.0
Informal	162	52.2
Primary	37	11.9
Secondary	47	15.2
Tertiary	30	9.7
<i>Socio-economic status</i>		
Upper	42	13.5
Middle	100	32.3
Lower	168	54.2

**Fig 1:** Timing of initiation of complementary feeding among the studied children.

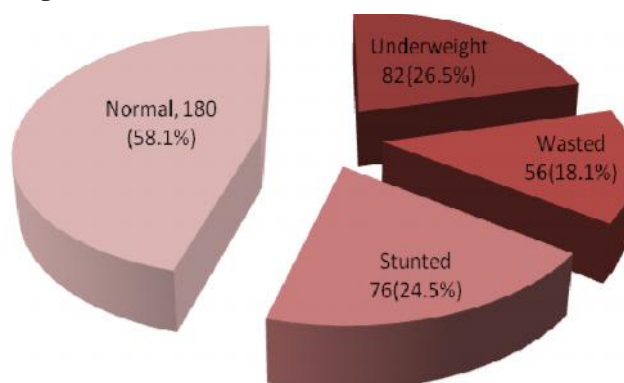


**Table 2:** Age and gender distribution of children studied

Age Group (months)	Gender		Total
	Male	Female	
6.1 – 12.0	24	14	38
12.1 – 18.0	52	29	81
18.1 – 24.0	61	46	107
24.1 – 30.0	31	18	49
30.1 – 36.0	22	13	35
Total	190	120	310

$\chi^2=34.1$ ,  $p=0.0001$ .

**Fig 2:** Nutritional status of the children studied



**Table 3:** Type of Complementary Foods

Complementary Foods	Number (%)
Plain pap	184 (59.3)
Fortified pap	100 (32.3)
Processed/Commercial foods	26 (8.4)
Total	310 (100)

**Table 4:** Association between the type of complementary foods and undernutrition

Type of Complementary foods	Normal no	Undernutrition		
		Underweight* n (%)	Wasting <sup>±</sup> n (%)	Stunting <sup>+</sup> n (%)
Plain pap	91	62(75.7)	28(50.0)	42(55.3)
Fortified pap	69	17(20.7)	24(42.9)	32(42.1)
Processed/Commercial	20	3(3.6)	4(7.1)	2(2.6)
Total	180	82 (100)	56 (100)	76 (100)

\*  $\chi^2=3.92$ ,  $p=0.04$ ,  $\chi^2=1.5$ ,  $p=0.47$ ,  $\chi^2=5.32$ ,  $p=0.07$

**Table 5:** Association between the initiation of complementary feeding and undernutrition

Age at Initiation of Complementary foods	Normal no	Undernutrition		
		Underweight* n (%)	Wasting <sup>±</sup> n (%)	Stunting <sup>+</sup> n (%)
Early	59	42(51.2)	28(50.0)	42(55.3)
Timely	98	30(36.6)	24(42.9)	32(42.1)
Late	23	10(12.2)	4(7.1)	2(2.6)
Total	180	82(100)	56(100)	76(100)

\*  $\chi^2=9.98$ ,  $p=0.007$ ,  $\chi^2=11.2$ ,  $p=0.004$ ,  $\chi^2=3.75$ ,  $p=0.15$

## Discussion

The study has demonstrated the pattern of complementary feeding practices and the nutritional status of young children in a semi-urban community in the North-western part of Nigeria. Majority (54.5%) of the mothers interviewed in this study initiated complementary feed timely i.e. 6 – 8 months of age with about a third of the mothers introduced complementary foods early and mainly using plain pap, and often fed more frequently. This is similar to the reports of Anigoet *et al*<sup>14</sup> in Kaduna, Tagbo and co-worker<sup>4</sup> in Enugu, Onayade and colleagues.<sup>8</sup> The timely initiation of complementary feeds in this series is encouraging but more proportion is still desired as a third of the children had been initiated earlier before 6 months. The early initiation of complementary feed may not be unconnected to the mothers' perception of breast milk alone not being sufficient for the child. At 6 months of life, breast milk is not enough to provide a growing infant with adequate nutrients for normal growth and development, hence, the need for appropriate and adequate complementary feed to ensure adequate physical growth and development.<sup>1-3</sup>

Earlier in infancy, before 4 months of life, the gastrointestinal system is immature to digest such complex food and also, the kidneys are not matured to handle the solutes that result from their digestion. The immune system too, at this age, is not fully mature to handle infectious particles that might contaminate these foods, predisposing the child to diarrhoeal diseases thereby worsening the nutritional status and mortality rate among the under-5s.<sup>15-17</sup> This may be a reflection of high level of poverty and low formal education, and by implication, poor nutritional education among the respondents and indeed in the community as shown in the study. Similar findings were reported in Osogbo, Enugu and Kitui county, Kenya.<sup>5,10,18</sup> Family empowerment and introduction of basic nutrition education into our education curriculum including the informal education sectors such as Qur'anic schools in the Northern Nigeria, in collaboration with religious leaders and bodies may improve the acceptance and compliance with the infant and young children nutrition guidelines. This may improve the complementary feeding practices and eventually the nutritional status of children in this community.

The commonest type of complementary food as depicted in this study was pap- which is millet gruel and highly carbohydrate-based food. This is similar to the earlier reports from most parts of Nigeria and most other African countries where the most staple food, mainly carbohydrate-based, is used as the complementary food for young infants.<sup>4-6,9,10,17-19</sup> Some respondents fortified this food with soya beans powder, milk powder, crayfish, groundnut paste to various degrees based on information from friends or health facilities. Despite this, the gruel is still deficient in energy, protein and micronutrients necessary for sustaining adequate growth and development at this age.<sup>7</sup> This may be responsible for faltering of growth parameters and indeed the high prevalence of under-nutrition in this study.

Normal growth and development require adequate nutrition especially during early childhood. This include exclusive breastfeeding in the first six months of life and initiation of appropriate, adequate and safe complementary feeding at 6 month of life while breastfeeding on demand continues till 2 years or beyond as recommended by WHO and National Infants and Young Children Feeding Guidelines.<sup>20</sup> In this study, children are commonly wean-off breastfeeding 18 months of life with only 4.8% breast-fed for 2 years or more. This is similar to what was reported by the report of National Health and Demographic Survey (NHDS) of 2018 in which the median age of cessation of breast feeding among Nigerian mothers was reported to be 18.5 months but about 28% breastfed by 2 years.<sup>17</sup> This is, however, longer compared to the findings of Oladoyinbo and colleagues among mothers in Osogbo, South-west Nigeria.<sup>19</sup> Breast milk remains an important source of nutrients for the young infant and child despite the introduction of complementary foods.<sup>18,21</sup> It provides between one-third to half of the caloric need of the child during the second year of life and it continues to supply high quality nutrients and protective factors.<sup>18,21</sup>

The prevalence of stunting, underweight and wasting reported by Oladoyinbo<sup>19</sup> and colleagues among young children in Osogbo, South-Western Nigeria were 30.3%, 25.4% and 15% respectively. This is comparable to findings in this study, but our findings differ from the 2018's NHDS findings of 37%, 22% and 7% for stunting, underweight and wasting respectively.<sup>17</sup> Similar finding was reported for stunting by Udoh<sup>9</sup> and co-worker and Kimiywe<sup>10</sup> and colleague among children in rural areas in Cross Rivers State, South-East Nigeria and Kitui county, Kenya respectively. This might be explained in part by the suboptimal complementary feeding practices noted in this study, poor nutritional education, poverty and ignorance. Additionally, some other aspects of infants feeding practices (low rate of exclusive breastfeeding) are inappropriate and this might have contributed to the high prevalence of stunting, underweight and wasting observed.<sup>17</sup> Early and delayed initiation of complementary feeding and the low quality or less nutritious complementary foods are factors associated with the high prevalence of the underweight, wasting and stunting in this series. These findings corroborated well with previous studies from within and outside the countries.<sup>9,10,18,19,22</sup> The early introduction of complementary feeds, especially before the age of four months has been associated with recurrent infections such as diarrhoeal diseases which may worsen the nutritional status of the young infant, while delayed introduction is associated with inadequate nutrients intake, hence poor growth. The fortified pap has additional nutrients such as protein, fat and lipids and, in some situations, trace elements and micronutrients such as vitamin A, calcium; while the commercially prepared complementary foods are fortified with the relevant micronutrients in addition to the macronutrients contained in a relatively appropriate quantity and quality.<sup>21</sup> These food, when well tolerated, provide the right nutrients for normal growth and development, hence the low prevalence

of under-nutrition among children fed with fortified or commercially prepared foods in this series. It is recommended to use locally available foods for complementary feeding while continuation of breastfeeding takes care of other nutritional deficiencies and, where a baby is not breastfed, a minimum of 500ml of milk is recommended each day in addition to the complementary foods.<sup>3,16,21</sup>

## Conclusion

In conclusion, the complementary feeding practices are suboptimal in this community and might explain the poor nutritional status of the under-fives in this community. Efforts should be geared towards optimal complementary feeding practices in our community so as to reduce rate of childhood malnutrition and by extension morbidity and mortality rates in our communities. Emphasis on nutritional education as regards the impor-

tance of exclusive breastfeeding and timely introduction of appropriate, adequate and safe complementary foods in our formal and non-formal educational settings may improve the attitudes towards optimal complementary feeding and child survival in our communities.

## Limitation to this study

The study subjects were those children who were brought to the outreach programme which may not represent the children of the whole of community.

## Contributions to Author

Tahir Y: Concept, design, data acquisition and analysis and manuscript preparation.

Baba J: Data acquisition, literature search, manuscript editing and review.

**Conflict of interest:** None

**Funding:** None

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