

Age-appropriate feeding practices and nutritional status of infants attending child welfare clinic at a Teaching Hospital in Nigeria

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ABSTRACT

Background: Appropriate infant feeding is the key to optimum infant and child development and survival. This study investigates age-appropriate infant feeding practices and nutritional status of infants attending the immunization and child welfare clinic at Aminu Kano Teaching Hospital. **Materials and Methods:** Using a cross-sectional descriptive design, a sample of 300 sets of infants (age ≤12 months) and caregivers was systematically selected and studied. The data were analyzed using the MINITAB® 12.21 (USA) statistical software. **Results:** All the infants studied were still on breast milk. Most of the mothers demonstrated correct body positioning (89.9) and attachment (78.7%) during breastfeeding, and effective suckling was demonstrated in 77.0%. Interestingly, none of the infants was either exclusively breastfed for 6 months or currently on exclusive breastfeeding. Furthermore, only 64 (58.2%) of the 110 infants that were more than 6 months of age had appropriately been started on complementary feeding from 6 months of age. Overall, most caregivers (88.7%) had “fair” to “good” infant feeding practices. The practices were significantly associated with their level of education, and their relationship with the infants. Up to 40.0% and 73.7% of the infants had varying degrees of wasting and stunting respectively. Infant feeding practices and the age of the infants emerged as the only factors significantly associated with stunting, while both the caregivers’ practices and age of the infants emerged as significant predictors of wasting in the infants. **Conclusion and Recommendations:** Barely 3 years to the 2015 target of the millennium development goals (MDGs), infant feeding and nutritional status still poses a serious threat to the dream of realizing the MDG-4. The Ministry of Health and relevant developing partners in this region should as a matter of urgency, formulate and implement a strong community-based public health intervention program to improve the knowledge and practices of mothers on infant feeding.

Key words: Age-appropriate feeding, infant feeding practices, Kano-Nigeria, nutritional status

INTRODUCTION

Good infant feeding and healthcare are critical for growth and development of children in the first few years of life. Optimal infant feeding practice recommended by World Health Organization (WHO) and United Nations Children’s Fund involves exclusive breastfeeding

for the first 6 months of life, followed by adequate complementary feeding, and breastfeeding until the child is at least 2 years old.^[1] This feeding pattern is expected to supply the macro and micronutrients in adequate amounts required for optimal growth and development of the child.^[1] Globally, an estimated 1.3 million lives are lost each year as a result of the lack of exclusive breastfeeding and another 600,000 from not continuing breastfeeding with proper complementary feeding.^[2] Breastfeeding remains a pivotal factor between life and death for the vast majority of children in developing countries such as Nigeria, but the current data reveals that 55% of Nigerian mothers are ignorant of the importance of exclusive breastfeeding.^[3] Also, the underlying factor of more than 50% of all childhood deaths in Nigeria is under-nutrition.^[4]

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Appropriate complementary feeding requires not only introducing foods too early or too late to infants, but also feeding infants and young children between 6 and 24 months foods considered safe and nutritionally adequate without discontinuing breastfeeding.^[5] However, despite the unparalleled benefits of optimal infant feeding, less than 35% of infants worldwide are exclusively breastfed during first 6 months of life.^[2] A study from Kano, Nigeria revealed that the proportion of mothers who exclusively breastfed their babies for 1 month, 3 months and 6 months after their last delivery were 26.0% 24.8% and 22.0% respectively.^[6] A similar study from southern Nigeria also reported that more than 90% of mothers had adequate knowledge of exclusive breastfeeding, 21.2% practiced exclusive breastfeeding for all their children, 51.6% had never practiced exclusive breastfeeding with any child.^[7]

Several changes have occurred in the traditional breastfeeding and weaning practices in sub-Saharan Africa over the years. These changes emanated from the introduction of alien cultures and values; and urbanization with the consequent changes in lifestyle. Furthermore, many mothers in sub-Saharan Africa do not know the appropriate time to initiate breastfeeding, have little knowledge of the proper positioning and attachment of infants to the breast for breastfeeding; or have little knowledge of when and what to introduce as complementary feeds. These deviations from what is appropriate during infancy and early childhood may result in irreversible faltering in linear growth and cognitive deficit. Growth during 1st year of life is greater than at any other time after birth and good nutrition during this period of rapid growth is vital to ensure that the infant develops both physically and mentally to the fullest potential.^[8] Thus, appropriate feeding practice is an early investment towards the making of a healthy generation. This study was, therefore, to investigate the infant feeding practices of caregivers for the different age groups of infants attending the immunization and child welfare clinic at Aminu Kano Teaching Hospital (AKTH), and how this relates to their nutritional status. It was also to determine the correlates of the observed feeding practices and the nutritional status of the infants. It is envisaged that the information would be useful to policy makers and programme managers especially for the achievement of millennium development goals (MDG)-4, i.e., the reduction of child mortality.

MATERIALS AND METHODS

Kano is the largest commercial center in Northern Nigeria and the most populous state, according to the 2006 Nigeria Population Census. The majority of patients who come to this hospital are indigenous Hausa and Fulani, although members of other ethnic groups such as the Yoruba and Igbo also constitute a substantial part of the clientele.

Most of the people of Kano state are traders, farmers, or civil servants; and the predominant religions are Islam and Christianity.

In the heart of Kano city is situated AKTH, a 500 bed tertiary hospital that provides health services to the population in Kano and the neighboring states. The immunization and child welfare clinic of the hospital offers immunization, nutrition services and treatment of minor ailments to children under the age of five. The clinic operates 5 times a week, attending to an average of 100 clients/day.

The study was cross-sectional descriptive in design. We studied a sample of 300 sets of infants (age ≤ 12 months) and their caregivers systematically selected over 1 month between September and October 2012. The required sample size was arrived at using an appropriate statistical formula for calculating minimum sample size for descriptive studies,^[9] and prevalence of 75.6% for babies that were appropriately breastfed up to 18 months obtained from a past study.^[10] The sample was selected using a sampling interval of two obtained by dividing the average monthly attendance of the clinic with the required sample size, i.e., 2000/300. Thus, one in every seven caregiver-infant sets was selected until the required sample was met. Informed consent was obtained from the caregivers before administering the questionnaire. Literate respondents indicated acceptance by signing the consent form while non-literate participants affixed their thumbprint. Data was collected using a pretested semi-structured interviewer administered questionnaire that provides for eliciting information on the socio-demographic profile of the caregivers and the infants, the infant feeding practices consisting of questions around the type, method and timing of feeds and a structured observation of breastfeeding for correctness of body positioning, attachment and effective suckling based on the WHO breastfeeding criteria;^[11] and weights and heights of the infants. Babies that were more than 1 year old at the time of the study and those whose caregivers did not give consent for the study were excluded from the study. Ethical approval was obtained from the ethics committee of AKTH before conducting this study.

The collected data were analyzed using the MINITAB[®] 12.21 (USA) statistical software. Absolute numbers and simple percentages were used to describe categorical variables while quantitative variables were described using mean and standard deviation. Infant feeding practice was scored using a scoring and grading system adopted from a past study^[12] where one point was accorded for any correct practice and zero was accorded for a wrong practice. Out of a maximum of 21 points, respondents that scored 0-7 points were considered to have poor practice of infant

feeding while those that scored 8-14 or 15-21 points were adjudged to have fair or good practice respectively. Furthermore, the nutritional status of the infants was assessed by first comparing the infants' weights and lengths with the median z scores of the WHO weight for length and length for age reference cards.^[13] The Waterlow's classification of malnutrition was then used to determine wasting and stunting in the infants.^[14] Thus, infants that had more than 95% of the median reference values of their length for age were considered to have normal nutrition status while those that had 87.5-95% and 80-87.5% of the reference values were considered to have moderate and mild stunting respectively. Those whose length for age values were less than 80% of the reference values were adjudged to have severe stunting. In the same vein, infants whose weight for length was more than 90% of the median reference values were considered to have normal nutrition status while those with 80-90% and 70-80% of the reference values were considered to have moderate and mild wasting respectively and those with less than 70% of the reference values were adjudged to have severe wasting.

The Chi-square test (χ^2) was used to determine the association between categorical variables. Significance level of *P* was fixed at ≤ 0.05 . Binary logistic regression was used to determine the associates of infant feeding practices and the nutrition status of the infants.

RESULTS

Socio-demographic characteristics of the respondents

Three hundred questionnaires were administered to mothers at the immunization clinic and child welfare clinic of AKTH by trained interviewers. The age of the mothers ranged from 19 to 50 years with a mean of 28.0 ± 5.5 years. The majority (59.3%) were in the age group 25-29 years, Hausa and Fulani ethnic groups made up 63.7%, 95.7% were mothers of children; and 72.7% had at least secondary level of education. The mean age of the infants was 147 ± 99 days. More than half (52.3%) were males, and were 0-90 days (0-3 months old) as shown in Table 1.

Caregivers' infant feeding practices

The majority of the infants 190 (63.3%) were aged 6 months and below while the remaining 110 (36.7%) were more than 6 months of age. All the infants studied were still on breast milk. More than half (65.0%) were put to the breast within an hour of delivery, and 63.3% had breast milk as their first feed. Most of the mothers demonstrated correct body positioning (89.9) and attachment (78.7%) during breastfeeding, and effective suckling was demonstrated in 77.0%. Interestingly, none of the infants was either exclusively breastfed for 6 months or is currently on exclusive breastfeeding. About a quarter (24.2%) of those

infants who were younger than 6 months were already commenced on water, and the remaining 144 (75.8%)

Table 1: Caregivers' and infants' biological and socio-demographic characteristics

Characteristics	Frequency (%)
Caregivers (n=300)	
Age group (years)	
19-24	52 (17.3)
25-29	178 (59.3)
30-34	42 (14.0)
35-39	23 (7.7)
≥ 40	5 (1.7)
Ethnicity	
Hausa/Fulani	191 (63.7)
Igbo	44 (14.7)
Yoruba	57 (19.0)
Others	8 (2.7)
Type of caregiver	
Mother	287 (95.7)
Grand mother	3 (1.0)
Aunt	10 (3.3)
Marital status	
Single	3 (1.0)
Married	266 (88.7)
Widowed	12 (4.0)
Separated	15 (5.0)
Divorced	4 (1.3)
Educational status	
No education	20 (6.7)
Quranic only	32 (10.7)
Primary	30 (10.0)
Secondary	87 (29.0)
Tertiary	131 (43.7)
Occupation	
Unemployed/HW	102 (34.0)
Trading	104 (34.7)
Civil service	69 (23.0)
Self-employed/private	25 (8.3)
Infants (n=300)	
Age group (months)	
0-3.0	122 (40.7)
3.1-5.9	68 (22.7)
6.0-8.9	96 (32.0)
9.0-12.0	14 (4.6)
Sex	
Male	157 (52.3)
Female	143 (47.7)
Birth order	
1	40 (13.3)
2	62 (20.7)
3	92 (30.7)
4	59 (19.6)
>4	47 (15.7)
No. of children in the family	
≤ 4 children	211 (70.3)
>4 children	89 (29.7)

on a type of complementary feed in addition to water. Furthermore, only 64 (58.2%) of the 110 infants that were more than 6 months of age were appropriately commenced complementary feeding from 6 months of age. The type of complementary feeds used is as depicted in Figure 1. More than one-third (36.2%) used porridge or gruel made from a mixture of maize or sorghum flour and soya beans flour. The parameters that were used for the assessment of the infant feeding practices are summarized in Table 2.

We graded the respondents based on their scores on the parameters we used to assess their infant feeding practices. We found that most (88.7%) had “fair” to “good” infant feeding practices [Table 2]. The caregivers’ practices were significantly associated with their education ($\chi^2 = 58.4, P < 0.05$), occupations ($\chi^2 = 9.0, P < 0.05$), and their relationship with infant (Fisher exact $P < 0.05$) but, not with their ages (Fisher exact $P = 0.606$), ethnicity ($\chi^2 = 1.91, P = 0.167$), marital status (Fisher exact $P = 0.226$), number of children in the family ($\chi^2 = 0.114, P = 0.736$); or with the ages ($\chi^2 = 0.87, P = 0.351$) and the birth order of the infants ($\chi^2 = 0.87, P = 0.351$). However, on binary logistic regression using a model comprising the three associated variables, level of education of the mothers ($\chi = 3.65, P < 0.05$) and relationship of the caregivers with the infant ($\chi = 2.31, P < 0.05$) emerged as the only predictors of the infants’ feeding practices. Caregivers that have at least secondary school level education were 1½ times more likely to have “fair to good” infant feeding practices compared to those without secondary school education (odds ratio [OR] = 1.52, 95% confidence interval [CI] OR [1.21; 1.90]). Similarly, caregivers that were mothers of the infants were also 1½ times more likely to have “fair to good” practices of infant feeding (OR = 1.58) (95% CI OR [1.07; 2.33]) compared to the other categories of caregivers. None of

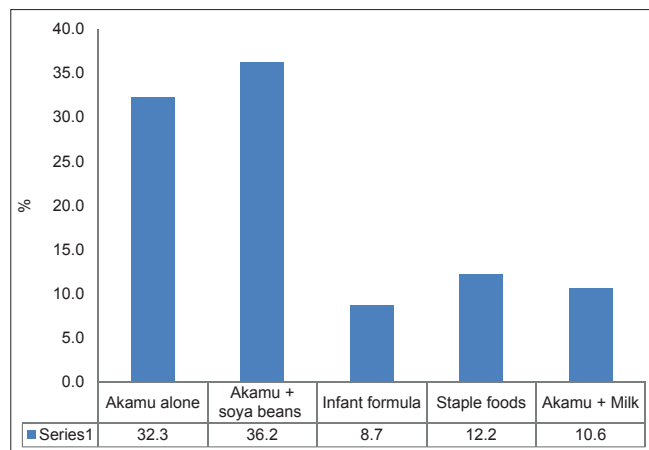


Figure 1: Type of complementary feeds given to infants (n=254). *Akamu is porridge or gruel made from ground maize or sorghum, traditionally or locally used as a complementary feed

the infant social or biological characteristics influenced the respondents’ practices [Table 3].

Nutritional status of the infants

The nutritional status of the infants is as summarized in Table 4. Up to 40.0% and 73.7% of the infants assessed had varying degrees of wasting and stunting respectively. On bivariate analysis, the caregivers’ infant feeding practices ($\chi^2 = 8.27, P < 0.05$) and the number of children in the family ($\chi^2 = 6.0, P < 0.05$) were found to be significantly associated with stunting in the infants. The infants’ variables associated with stunting include age ($\chi^2 = 32.7, P < 0.05$) and birth order of the infants ($\chi^2 = 4.1, P < 0.05$). On multivariate analysis using a combination of the significant caregiver and infant variables, the caregivers’ infant feeding practices and the age of the infants were the only factors found to be significantly associated with stunting [Table 3]. In the same vein, an analysis of the factors that are associated with wasting in the infants revealed at the bivariate level that the caregivers’ infant feeding practices ($\chi^2 = 24.8, P < 0.05$) and age of the infants ($\chi^2 = 81.9, P < 0.05$) were the only factors significantly associated. The number of children in the family ($\chi^2 = 2.09, P = 0.149$) and birth order of the infants ($\chi^2 = 0.82, P = 0.364$) were not associated with wasting. On multivariate analysis, both the caregivers’ practices and age of the infants emerged as significant predictors of wasting in the infants [Table 3].

Table 2: Parameters for assessing the caregivers’ infant feeding practices

Parameter for assessment (n=300)	Correct response	Percentage
Put to breast within an hour after delivery	195	65.0
Had breast milk as the first feed after birth	190	63.3
Was fed colostrum	185	61.7
Was exclusively breastfed for 6 months/ currently on exclusive breastfeeding	-	0.0
Breastfeeding on demand/ complementary feeding at least three times in a day	300	0.0
Introduced complementary feeds from 6 months only (n=110)	64	58.2
Correctly use cup and spoon for complementary feeding	127	42.3
Demonstrated good/average body positioning during breastfeeding (n=287)	258	89.9
Demonstrated good/average attachment during breastfeeding (n=287)	226	78.7
Demonstrated effective suckling (n=287)	221	77.0
Grading of caregivers’ infant feeding practices		Frequency
Good	120	40.0
Fair	146	48.7
Poor	34	11.3

Table 3: Factors associated with infant feeding practices and nutrition status

Factor	Practice		Total	Multivariate	
	Good/fair (n=266)	Poor (n=34)		Statistical test (P value)	OR (95% CI)
Education					
Secondary+	212 (97.2)	6 (2.8)	218	0.001*	1.52 (1.21; 1.90)
No secondary	54 (65.9)	28 (34.1)	82		
Occupation					
Formal	91 (96.8)	3 (3.2)	94	0.710	-
No formal	175 (85.0)	31 (15.0)	206		
Relationship to infant					
Mother	257 (96.6)	30 (88.2)	287	0.021	1.58 (1.07; 2.33)
Others	9 (69.2)	4 (30.8)	13		
Stunting					
	Stunted (n=221)	Normal (n=79)			
Feeding practice					
Poor	32 (94.1)	2 (5.9)	34	0.010*	7.12 (1.60; 31.68)
Good/fair	189 (71.1)	77 (28.9)	266		
No. of children in family					
1-4	164 (77.7)	47 (22.3)	211	0.103	-
>4	57 (64.0)	32 (36.0)	89		
Infants age (months)					
0-6	161 (84.7)	29 (15.3)	190	0.001*	4.45 (2.54; 7.79)
>6	60 (54.5)	50 (45.5)	110		
Birth order					
1-4	192 (75.9)	61 (24.1)	253	0.98	-
>4	29 (61.7)	18 (38.3)	47		
Wasting					
	Wasted (n=120)	Normal (n=180)			
Feeding practice					
Poor	27 (79.4)	7 (20.6)	34	0.001*	4.42 (1.87; 10.45)
Good/fair	93 (35.0)	173 (65.0)	266		
Infant age (months)					
0-6	113 (59.5)	77 (40.5)	190	0.001*	12.92 (5.58; 29.90)
>6	7 (6.4)	103 (93.6)	110		

*Statistically significant. OR: Odds ratio; CI: Confidence interval

Table 4: Nutritional status of infants

Status	Weight for length (wasting) frequency (%)	Length for age (stunting) frequency (%)
Mildly impaired	27 (9.0)	38 (12.7)
Moderately impaired	41 (13.7)	45 (15.0)
Severely impaired	52 (17.30)	138 (46.0)
Normal	180 (60.0)	79 (26.3)

DISCUSSION

We observed in this study that many of the mothers initiated breastfeeding within 1 h of delivery, but sadly none of them was practicing exclusive breastfeeding at the time of the study. These mothers started well, but as noted in previous studies, introduced other liquids with or without solids resulting in declining prevalence of exclusive breastfeeding; almost approaching zero

before and at 6 months.^[15,16] The strong cultural myth in Africa that infants must be given water to prevent dehydration may have contributed to the non-practice of exclusive breastfeeding as noted amongst mothers in this study and similar African studies.^[7,17-19] Studies from Nigeria^[7,20] including the 2011 “Saving Newborn Lives” maternal, newborn, child health survey reported that Nigeria was one of the countries with the lowest rates of exclusive breastfeeding on the African continent. Recent data indicates that the percentage of infants exclusively breastfed to the age of 6 months declined from 17% in 2003 to 13% in 2008.^[21] The zero prevalence observed in this study may suggest a further decline in the practice. The situation becomes more alarming because the study was conducted in a tertiary health institution where the majority of the clients presumably were of a high socioeconomic background as demonstrated in this study. However, the developed world has also noted a less than optimal

prevalence rate of the practice of exclusive breastfeeding^[16] A zero awareness of breastfeeding had been noted in some rural areas of Nigeria some years ago.^[5]

Infant feeding practice is a major determinant of nutritional status of infants as shown in this study. Although the majority (88.7%) of the care givers had fair/good infant feeding practice, there was evidence of long term poor infant feeding (stunting) in about three-quarters of the children. This is a pointer to the fact that malnutrition begins early in life with poor infant feeding practices such as the lack of exclusive breastfeeding, and the institution of complementary feeds earlier than recommended as this study indicates. The high prevalence of wasting and stunting observed in the infants studied may have resulted from the early introduction of complementary feeds, possibly of poor quality and perhaps augmented by the frequent bouts of diarrhea associated with contamination of the feeds. A Malawian study showed that infants that were commenced early on complementary feeds progressively had lower weight for age from as early as 2 months,^[22] corroborating the fact that breast milk is the full diet required by the human baby at that early stage of development. Interestingly, despite the low practice of exclusive breastfeeding reported from Nairobi, Kenya (5.2%), the figures for underweight (6.5%), wasted (6.3%) and stunted (11.7%) children were much lower than observed in our study. This could be the result of differences in the pattern of complementary feeding according to the local norms and culture.^[23] Furthermore, a retrospective survey of mildly wasted children admitted to the community program on nutrition in Nias Island, Indonesia, revealed that only 12% of the 215 children examined were exclusively breastfed for up to 6 months of age. Supplementary liquids were given besides breast milk within the first 7 days of life by 74% of mothers, and 79% of infants were given solid, semi-solid or soft foods as complementary feeds before 6 months.^[24]

We observed that caregivers with at least secondary education, formal occupation and who were mothers of the infants were significantly better in their infant feeding practices. Education plays a beneficial role in many health seeking behaviors, and has been noted to be a major determinant in achieving positive health outcomes for mothers, promoting child survival and improving the health of the family as a whole.^[16,24,25] Furthermore, it is acknowledged that better education usually connotes better health.^[26] The preliminary finding on bivariate analysis that caregivers with formal occupation had better infant feeding practices is not surprising as occupational status is often linked to educational status. Better educated individuals are more likely to be employed in the formal sector and practices such as good infant feeding may be common to

both groups. On the other hand, working mothers may not always be available to their children and this can adversely affect breastfeeding. A Canadian study noted that women with formal employment were less likely to exclusively breast feed their infants for 6 months. This was attributed to their early return to work post-partum.^[16] In addition, caregivers who were mothers of the infants had better feeding practices as seen in this study since perhaps maternal health is intertwined with child health.^[4] Efforts directed at attaining MDG-5, that is, a reduction of maternal mortality and ensuring that mothers stayed alive to care for their own children may be one of the surest means of attaining MDG-4, as care given by a mother to her infant may not be comparable to what other care givers will provide.

The 2015 target for the achievement of the MDGs is only 3 years away, but the key to infant and child development and survival in Kano as measured by the infant feeding and nutritional status still poses a serious threat to the realization of these goals. The ministry of health and the relevant developing partners in this region should as a matter of urgency develop and implement a good community-based Public health intervention program to improve the knowledge and practices of mothers on infant feeding.

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