Breastfeeding pattern, anthropometry and health status of infants attending child welfare clinics of a teaching hospital in Nigeria

[a] **Ukegbu AU,** BMedSc, MBBS, FMCPH [b] **Ebenebe EU,** MBBCh, FMCPH [c] **Ukegbu PO,** MSc Human Nutrition and Dietetics
[a] Department of Public Health, Federal Medical Centre, Umuahia, Abia State, Nigeria [b] Department of Community Medicine, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria [c] Department of Human Nutrition and Dietetics, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
Correspondence to: Dr Andrew Ukegbu, e-mail: andyukegbu@yahoo.com
Keywords: breastfeeding pattern; anthropometry; health status; infants

Abstract

Objective: To determine the breastfeeding pattern and its relationship with the physical growth and health status of infants aged 0–24 weeks.

Design and setting: A prospective cohort study was carried out at three comprehensive health centres of Nnamdi Azikiwe University Teaching Hospital, Anambra State (Nigeria) from September 2006 to June 2007. The feeding pattern, body weight, length and morbidity of 228 infants were assessed at birth, 6, 10, 14, 20 and 24 weeks when they visited the child welfare clinics for routine immunisations or on appointment. The infants were recruited from the immunisation registers by a systematic random sampling method. Based on their current feeding pattern during the period under study, infants were classified into exclusive breastfeeding (EBF) and non-exclusive breastfeeding (non-EBF) groups. Data analysis was carried out using SPSS and Epi Info statistical computer software. A probability value (p-value) of less than 0.05 was considered statistically significant.

Results: The EBF rate declined progressively from 64.9% at birth to 37.3% at 24 weeks of age. Maternal older age, multiparity and delivery at a government health facility were positively associated with higher rates of EBF ($p < 0.05$). Only 110 (48.2%) babies were put to the breast immediately (≤ 1 hour) after delivery. The numbers that received colostrum and prelacteal feed were 118 (82.5%) and 59 (25.9%), respectively. On-demand breastfeeding was more popular than timed feeding (95.5% vs 7.5%; $p < 0.05$).

At 24 weeks of age EBF males and females achieved a better and more rapid growth in weight and length compared to those in the non-EBF group ($p = 0.000$). Episodes of diarrhoea and fever were significantly associated with non-EBF ($p = 0.000$).

Conclusion: The study revealed that EBF had a positive effect on the physical growth and health status of infants, but the rate of EBF was low. It is suggested that activities that promote appropriate breastfeeding practices should be targeted at mothers and locations in which poor breastfeeding practices exist.

Ⓟ **Peer reviewed. (Submitted: 2010-04-08, Accepted: 2010-10-25). © SAJCN** **S Afr J Clin Nutr 2010;23(4):191-196**

Introduction

Breastfeeding is the one practice that simultaneously provides a child with food, health and care.[1] It provides valuable benefits to the infants, mothers and a nation as a whole.[2,3] Breast milk contains all the nutrient and antimicrobial factors that an infant needs to thrive.[4] It is widely reported in literature that the risks of certain health problems, such as diarrhoea and acute respiratory tract infections, are lower in breastfed infants.[5-9]

In Nigeria, despite the fact that most mothers consider breast milk as the best food for infants, reports indicate that the majority do not practice optimal breastfeeding, and exclusive breastfeeding for the first six months of life is still as low as 17%.[10,11] In order to ensure that all maternity facilities support optimal breastfeeding, Nigeria adopted the Baby-friendly Hospital Initiative (BFHI) in 1992, and by 2002 about 1 147 health facilities had been designated 'baby-friendly', including all the centres of the Nnamdi Azikiwe University Teaching Hospital (NAUTH).

One of the noticeable factors that contributes to the early introduction of breast milk substitutes and supplementation, especially in developing countries like Nigeria, is the general belief of parents that breast milk alone is inadequate for the growth and survival of the baby.[12,13] Growth retardation is usually an indication of malnutrition, especially in the absence of recurrent episodes of infection and the absence of adverse genetic and environmental influences.[4] Growth assessment is used to promote child health and survival worldwide.[14]

Thus there is a need to evaluate the extent to which breastfeeding patterns meet infants' growth requirements and well-being.

The aim of this study was to determine the breastfeeding pattern of infants during the first 24 weeks of life and its effect on their physical growth and health outcomes. The information obtained will be used as a demonstration tool for health workers to counsel parents as well as to design interventions in order to motivate actions that will promote and support optimal breastfeeding practice.

Materials and methods

A prospective cohort study was carried out in three comprehensive health centres of NAUTH. These centres were located in the Neni, Nnewi and Ukpo communities, in Anambra State (Nigeria). The period of study was from September 2006 to June 2007. These centres operate antenatal and child welfare clinics (CWCs) that cater for pregnant women and babies born within and outside the centres, and also provide other healthcare services. The CWCs are run once weekly, on different days, by doctors and nurses who provide services that include routine immunisations (based on the National Programme on Immunization [NPI] schedule), management of childhood illnesses, health education and growth monitoring.

Mothers and neonates who attended the child welfare clinics for BCG immunisation were recruited into the study. The inclusion criteria were the following:

(1) Full-term, normal babies 0–7 days of age, and weighing at least 2 500 g at birth (to minimise the possible influence of postnatal 'catch up' growth that may occur in other infants);15 and
(2) Mothers who gave their informed consent to participate in the study.

Excluded from the study were multiple deliveries and infants with serious illness. Mothers and neonates residing outside the host communities and those who defaulted at follow-up for two or more consecutive visits and could not be traced to their homes were also excluded. An average of 26–30 infants received BCG immunisation each week in each of the three health care centres, representing 83.4% coverage (the estimated BCG national coverage for Nigeria is 69%). On each day of BCG immunisation the list of mother–neonate pairs was obtained from the immunisation registers. Using a sampling fraction of one in three, each third mother-neonate pair that met the inclusion criteria was enrolled. This was done for 10 consecutive weeks until a total of 240 mothers and neonates were recruited for the study. Five research assistants (female nurses) were trained over a period of one week on anthropometric measurements and translation of the questionnaire from English into vernacular.

At recruitment, a pretested, semi-structured questionnaire was used to obtain information from the mothers on socio-demographic and birth-related characteristics. Thirty-six babies whose birth weights and lengths could not be obtained from the records were measured and the values used as baseline. Another questionnaire designed by WHO[16] was used subsequently during follow-up visits at 6, 10, 14, 20 and 24 weeks to obtain infants' anthropometric data, information on infant feeding patterns over the previous one week, and whether the baby had suffered any episodes of diarrhoea, fast breathing or fever since the last visit. The infants were classified into exclusively breastfed (EBF) or non-exclusively breastfed (non-EBF) based on their current feeding patterns during the period under study. Exclusive breastfeeding was defined as the intake of breast milk by an infant without the addition of any other liquids or solids, except drops or syrups consisting of vitamins, mineral supplements or medication (nothing else);[17] while non-EBF involved the intake of other liquids and/or solids in addition to breast milk.

The weights and lengths of the infants were recorded before they were immunised, using standard procedures.[18] A Salter (London) infant weighing scale (checked for zero adjustment before each measurement) was used to measure the weight, and a locally constructed steadiometer was used to measure length. Each measurement was recorded three consecutive times and the mean recorded to the nearest 0.05 kg (weight) and 0.1 cm (length). For the purpose of this study, the disease conditions were defined as follows:

1. Diarrhoea – passage of loose or watery stool more frequently than is usual for the baby, or more than three times per day.
2. Fever – when the child's body temperature is ≥ 37.5°C and above axillary (38°C rectal), or if the baby feels hot, or there is a history of fever.[19]
3. Fast breathing – when the child's breathing is unusually rapid or when the rate of breathing is persistently > 60 breaths per minute.

The study was approved by the ethics committee of the NAUTH. The concepts of the study were explained to the participants and their written consent obtained before the questionnaires were administered and measurements taken.

Data entry and analysis were carried out using SPSS version 11.0 (SPSS, Chicago, IL, USA) and Epi Info 2003 (CDC, Atlanta, USA) statistical computer software. Data generated were summarised in table form. The chi-square test (χ^2) was used to compare percentage distributions and the student's t-test to compare weights and lengths achieved or gained at different time periods by the two breastfeeding groups. A probability value (p-value) of less than 0.05 was considered statistically significant.

Results

A total of 240 mother–neonates pairs were recruited for the study, but only 228 (95%) completed the follow-up over 24 weeks. Those who dropped out had either changed location, died, or could not be traced at their addresses.

Socio-demographic and birth related characteristics

The socio-demographic profile of the mothers, according to their breastfeeding practices, is presented in Table I. The majority of mothers who breastfed exclusively were 20 years or older and had more children compared to those who practised non-EBF ($p < 0.05$). Educational level and occupation of the mothers had no significant influence on their breastfeeding choices.

Table II reveals that the babies' sex had no effect on the breastfeeding mode. However, the place of birth showed significant difference between the two groups. EBF was observed in 45.0% of babies delivered in government (govt) health facilities compared to 34.5% and 26.6% delivered at home by traditional birth attendants (TBAs) and in private health facilities, respectively ($p = 0.030$). It is noteworthy that none of the babies delivered by Caesarean section received EBF for any period of time.

Table I: Breastfeeding pattern according to mothers' demographic characteristics

Parameters	Breastfeeding pattern				χ^2	p-value
	EBF (n = 85)		Non-EBF (n = 143)			
	n	%	n	%		
Mothers age (years)						
< 20	5	(21.7)	18	78.3)	9.89 df = 4	0.042
20–24	35	(44.9)	43	(55.1)		
25–29	25	(38.5)	40	(61.5)		
30–34	12	(25.5)	35	(74.5)		
35–39	8	(57.1)	6	(42.9)		
40+	-	-	1	(100)		
Mothers' education						
No education	-	-	2	(100)	5.20 df = 2	0.074
Primary	14	(32.6)	29	67.4)		
Secondary	56	(36.8)	96	(63.2)		
Tertiary	15	(48.4)	16	(51.6)		
Occupation						
Full-time housewife	25	(37.9)	41	(62.1)		
Trader	32	(37.2)	54	(62.8)	0.97	0.913
Artisan	13	(41.9)	18	(58.1)		
Civil servant	7	(29.2)	17	(70.8)		
Farmer	8	(38.1)	13	(61.9)		
Parity						
1	14	(22.2)	49	(77.8)	11.43	0.003
2–4	52	(40.0)	78	(60.0)		
5+	19	(54.3)	16	(45.7)		

Table II: Birth-related characteristics of the infants according to their breastfeeding group

Parameters	Breastfeeding group				χ^2	p-value
	EBF (n = 85)		Non-EBF (n = 143)			
	n	%	n	%		
Baby's sex						
Male	41	(35.7)	74	(64.3)	0.26	0.608
Female	44	(38.9)	69	(61.1)	df = 1	
Place of delivery						
Home/TBA	10	(34.5)	19	(65.5)		
Govt health facility	54	(45.0)	66	(55.0)	7.02	0.030
Private health facility	21	(26.6)	58	(73.4)	df = 2	
Mode of delivery						
Normal vaginal delivery	85	(39.0)	133	(61.0)	-	-
Caesarean section	-	-	10	(100)		

Infant breastfeeding pattern

As shown in Table III, all the babies (228, 100%) received one form of breastfeeding or the other (EBF or non-EBF). However, only 110 (48.2%) were put to the breast immediately (within one hour) after delivery. The number of babies who received colostrum was 188 (82.5%), while 59 (25.9%) received prelacteal feeding (mainly in the form of glucose water). On-demand breastfeeding was more popular than timed feeding (92.5% vs 7.5%). The EBF rate declined progressively from 64.9% at birth to 64.0% at six weeks, 58.8% at ten weeks, and 51.3% at fourteen weeks. By the age of twenty-four weeks, a few (85, 37.3%) were still breastfed exclusively. Supplementary foods used by the mothers included non-human milk, maize gruel ('pap') and porridge.

Table III: Distribution of infants with respect to their breastfeeding pattern

Parameters	Number (n = 228)	Percentage (%)
Time (after delivery) at which mother initiated BF		
Immediately (< 1 hr)	110	48.2
1–24 hr	92	40.3
> 24 hr	26	11.5
Frequency of breastfeeding		
On demand	211	92.5
Timed	17	7.5
Colostrum feeding		
Yes	188	82.5
No	40	17.5
Prelacteal feeding		
Yes	59	25.9
No	169	74.1
Breastfeeding type at:		
birth		
EBF	148	64.9
Non-EBF	80	35.1
6 weeks		
EBF	146	64.0
Non-EBF	82	36.0
10 weeks		
EBF	134	58.8
Non-EBF	94	41.2
14 weeks		
EBF	117	51.3
Non-EBF	111	48.7
20 weeks		
EBF	86	37.7
Non-EBF	142	62.3
24 weeks		
EBF	85	37.3
Non-EBF	143	62.7

Anthropometry

The comparisons of the mean weights and lengths of male infants according to their breastfeeding group at birth and 24 weeks of age are shown in Table IV. There was no significant difference in the mean weight and length of the male infants at birth. At 24 weeks the EBF males had an average weight of 8.29 ± 0.47 kg compared to 7.36 ± 0.77 kg for non-EBF males (p = 0.000). Likewise, the EBF males grew significantly taller (68.84 ± 2.24 cm/24 weeks) compared to the non-EBF males (66.95 ± 1.13 cm/24 weeks, p = 0.000). Furthermore, the EBF males recorded a 157.5% increase in weight over their birth weight compared to a 117.6% increase achieved by the non-EBF group. Similarly, an average length increase of 37.0% was achieved by the EBF males above their birth length compared to 33.4% achieved by the non-EBF group.

The comparisons of the mean weights and lengths of female infants according to their breastfeeding group at birth and 24 weeks of age are shown in Table V. Neither breastfeeding groups showed an

Table IV: Comparison of the mean weights (kg) and lengths (cm) of male infants according to their breastfeeding group at birth and 24 weeks of age

Anthropometry	BF group (n = 115)		t-test	p-value
	EBF	Non-EBF		
At birth (0 weeks)				
Number of infants	76	39	1.514	0.129
Mean weight (kg)	3.22 ± 0.53	3.38 ± 0.54	0.474	0.543
Mean length (cm)	50.25 ± 0.94	50.18 ± 0.63		
At 24 weeks				
Number of infants	41	74		
Mean weight (kg)	8.29 ± 0.47	7.36 ± 0.77	8.031	0.000
Mean length (cm)	68.84 ± 2.24	66.95 ± 1.13	5.058	0.000

Table V: Comparison of the mean weights (kg) and lengths (cm) of female infants according to their breastfeeding group at birth and 24 weeks of age

Anthropometry	BF group (n = 113)		t-test	p-value
	EBF	Non-EBF		
At birth (0 weeks)				
Number of infants	71	42		
Mean weight (kg)	3.20 ± 0.31	3.27 ± 0.49	0.829	0.263
Mean length (cm)	50.54 ± 1.08	50.28 ± o.85	1.368	0.146
At 24 weeks				
Number of infants	44	69		
Mean weight (kg)	7.68 ± 0.44	6.29 ± 0.59	7.835	0.000
Mean length (cm)	68.11 ± 2.40	66.41 ± 1.10	4.412	0.000

appreciable difference in growth performance at birth, except at age 24 weeks when the mean weight and length of the EBF group were significantly higher than the non-EBF group ($p = 0.000$). The mean weight gains for the EBF and non-EBF groups were 140% and 92.4% above their birth weights, respectively, while the length increase over their birth lengths were 34.8% and 32.1%, respectively.

The mean changes in anthropometric indices by time period and breastfeeding group of the male and female infants are presented in Tables VI and VII. Infants in the EBF group gained significantly more weight than those in the non-EBF group at 0–6 weeks, 14–20 weeks and 20–24 weeks. The maximum gain (about 1 kg/month) was during the first six weeks of life. The mean weight gain declined rapidly at 10–14 weeks, and was then comparable with that of non-EBF infants ($p > 0.05$). Similarly, the average length gains by the EBF infants at 0–6 weeks, 6–10 weeks and 14–20 weeks were higher compared to non-EBF group ($p < 0.05$). The mean lengths gained by both breastfeeding groups showed no significant difference at 20–24 weeks ($p > 0.05$).

Table VI: Mean changes in anthropometric index of the male infants by time period and BF pattern

Period and BF pattern	Weight gain (kg)	t-test	p-value	Length gain (cm)	t-test	p-value
0–6 weeks						
EBF (n = 6)	1.86 ± 0.62	3.809	0.000	5.62 ± 2.43	2.465	0.02
Non EBF (n = 39)	1.38 ± 0.65			4.73 ± 1.43		
6–10 weeks						
EBF (n = 76)	0.93 ± 0.17	1.693	0.10	4.4 ± 0.64	2.538	0.02
Non-EBF (n = 39)	0.92 ± 0.53			4.0 ± 0.53		
10–14 weeks						
EBF (n = 60)	0.72 ± 0.40	0.556	0.69	3.02 ± 1.85	2.596	0.01
Non-EBF (n = 55)	0.76 ± 0.37			3.83 ± 1.49		
14–20 weeks						
EBF (n = 56)	0.93 ± 0.18	3.185	0.000	3.4 ± 0.62	2.86	0.01
Non-EBF (n = 59)	0.72 ± 0.32			3.0 ± 0.44		
20–24 weeks						
EBF (n = 41)	0.58 ± 0.28	3.333	0.01	1.90 ± 1.16	0.965	0.38
Non-EBF (n = 74)	0.39 ± 0.31			2.12 ± 1.19		

Table VII: Mean changes in anthropometric index of the female infants by time period and BF pattern

Period and BF pattern	Weight gain (kg)	t-test	p-value	Length gain (cm)	t-test	p-value
0–6 weeks						
EBF (n = 71)	1.67 ± 0.57	3.966	0.000	5.20 ± 1.83	3.189	0.008
Non-EBF (n = 42)	1.27 ± 0.48			4.39 ± 0.85		
6–10 wks						
EBF (n = 70)	0.88 ± 0.13	0.600	0.058	3.2 ± 0.52	4.001	0.000
Non-EBF (n = 43)	0.91 ± 0.22			3.7 ± 0.41		
10–14 weeks						
EBF (n = 66)	0.64 ± 0.19	0.132	0.896	3.26 ± 1.67	0.073	0.942
Non-EBF (n = 47)	0.66 ± 0.26			3.24 ± 1.24		
14–20 wks						
EBF (n = 61)	0.79 ± 0.13	7.080	0.000	3.5 ± 0.67	3.033	0.011
Non-EBF (n = 52)	0.54 ± 0.22			3.0 ± 0.57		
20–24 weeks						
EBF (n = 44)	0.47 ± 0.16	4.082	0.000	2.51 ± 1.08	1.977	0.054
Non-EBF (n = 69)	0.35 ± 0.14			2.11 ± 0.98		

Table VIII: Health status of study infants with respect to their breastfeeding group

Health status	Breastfeeding group							
	EBF (n = 85)		Non-EBF (n = 143)		Total	χ^2	p-value
	n	%	n	%			
Diarrhoea							
Yes	6	(7.4)	75	(92.6)	81	48.59 df = 1	0.000
No	79	(53.7)	68	(46.3)	147		
Total	85		143		228		
Fever							
Yes	29	(25.9)	83	(74.1)	112	15.82 df = 1	0.000
No	56	(48.3)	60	(51.7)	116		
Total	85		143		228		
Fast breathing							
Yes	4	(28.6)	10	(71.4)	14	8.97 df = 1	0.21
No	81	(37.9)	133	(62.1)	214		
Total	85		143		228		

Health status

The health status of the infants with respect to their breastfeeding group is presented in Table VIII. The non-EBF infants were more likely to suffer from diarrhoea and fever than the EBF infants. About 75 (92.6%) and 83 (74.1%) of the non-EBF infants had at least one episode of diarrhoea and fever, respectively, compared to 6 (7.4%) and 29 (25.9%) of the EBF infants ($p < 0.000$).

Discussion

Although previous studies carried out in Nigeria showed that a high percentage of mothers consider breast milk to be the best food for their babies[13] (breastfeeding prevented their babies from always being sick[20]) this study revealed that the prevalence of EBF at any time between birth and 24 weeks is low. The EBF rate declined from 64.9% at birth to 37.3% at 24 weeks of age. However, this rate is higher compared to previous values reported for Nigeria[11,21] and other developing countries.[22] The improvement in the EBF rate could be attributed to the progressive impact of the BFHI programme adopted by this country in 1992. Prior to the programme, use of baby formula milk was freely encouraged in both the public and private health facilities among nursing mothers. The health facility-based EBF rate reported in this study may, however, simply represent the tip of the iceberg of the true situation in the country, since a large number of women lack access to health facilities for maternal and child health services.

The place of delivery was positively associated with the type of breastfeeding that mothers practised. Babies delivered at home (by TBAs) and in private health faculties were less likely to receive exclusive breastfeeding compared to those delivered in government health facilities ($\chi^2 = 7.02$, df = 2, $p = 0.030$). This corroborates the findings of a study carried out in rural Vietnam, where women who delivered at home with TBAs were less likely to receive appropriate instruction on breastfeeding.[23] Appropriate information about breastfeeding is usually received from government health facilities during the antenatal and postnatal visits.[24,25] We observed that many private health facilities located in the study communities lacked skilled health care staff and time to provide recommended breastfeeding counseling to mothers at the antenatal and postnatal clinics. The importance of providing correct information to mothers by medical and paramedical personnel about proper feeding of infants has been emphasised.[26] It becomes imperative, therefore, to actively involve TBAs and private healthcare providers in training programmes aimed at promoting and supporting EBF.

The age of the mother and her parity appeared to influence her breastfeeding pattern. EBF was more likely among those aged 20 years or above, and multiparous, compared to those who were less than 20 years old, and nulliparous. Earlier studies[27,28] have shown maternal age to be a predictor for continuation of breastfeeding. A study conducted in Saudi Arabia[29] revealed that 80.6% multiparous mothers breastfed exclusively compared to 45.7% nulliparous mothers. It is probable that, over time, mothers acquire experience and confidence in proper child care practices such as breastfeeding. This is supported by a report that older women probably know more about the benefits of breastfeeding and have more realistic outcome expectations.[30]

It was very interesting to note that none of the babies delivered by Caesarean section breastfed exclusively for any period of time. Previous studies have identified Caesarean section as one of the factors that significantly decreases the prevalence of EBF.[31] Following a Caesarean section delivery, the baby is usually separated from the mother because of the belief that the mother needs to recuperate from the effects of surgical trauma and anaesthesia.

It is highly desirable that breastfeeding should be initiated immediately after birth, preferably within the first 30 minutes of delivery.[32] In this study, less than half the babies (110, 48.2%) were put to breast within one hour after delivery. A similar trend of late initiation of breastfeeding has been reported in Nigeria.[20,33] This is in contrast to what was found among rural women in Vietnam.[23] Late initiation of breastfeeding deprives infants of colostrum that has anti-infective properties, and exposes them to unnecessary death. This is confirmed by a recent study in Ghana; about 22% of newborn deaths were prevented if babies started breastfeeding within one hour after birth.[34] There is a need to intensify breastfeeding education among these mothers, with emphasis on the advantages of the early initiation of breastfeeding. The high prevalence of on-demand breastfeeding (92.5%) in this study is better than that reported in Nsukka Urban,[20] but comparable to 73.6% reported in India.[35] Demand feeding has a positive influence on breastfeeding as it leads to earlier maximum milk production than feeding on fixed schedule does.[36] The proportion of babies who received prelacteal feeds in this study was 25.9%; feeding was mainly in the form of water, usually mixed with glucose. This is less than what is reported in previous studies in Nigeria.[12,37] Although this indicates that the practice is decreasing with time (from 90% and 99.8%, respectively, to the current level), the observed rate is still cause for concern. Prelacteal feeds are not recommended because of the resulting effect on the onset of lactation, and on perinatal morbidity and mortality.[23]

None of the breastfeeding groups had an undue growth advantage at the commencement of the study. It is instructive to note the significant increase in mean weight and length among EBF infants when compared with the non-EBF infants at age 24 weeks (see Tables IV and V). This clearly indicates the adequacy of breast milk alone for infant growth during the first 24 weeks of life. EBF infants do not have their breast milk intake displaced by fluids with lower nutrient values.[38] The poorer weight gain in the non-EBF group might have been due to episodes of illness, as the absence of recurrent episodes of infection is necessary for normal growth and development.[4] The age of maximum growth in weight and length at 0–6 weeks for the EBF infants, and the subsequent decline at 10–14 weeks (Tables VI and VII), are similar to what is reported in other studies.[39-41] The decline is suggested to be most likely a normal physiological phenomenon, since the infants were well and thriving.

The morbidity rates were lower in EBF infants than in the non-EBF infants (Table VIII). This was significantly so for diarrhoea and fever ($p = 0.000$). The findings of this study are in agreement with those of other studies, namely that EBF infants had fewer hospital visits for diseases such as diarrhoea and acute respiratory tract infections.[5] This is probably because breast milk contains antimicrobial factors and a number of other substances that play an important role in the protection of the infant against infections.

Conclusion

Optimal breastfeeding practice was poor among the mothers, as reflected in their late initiation of breastfeeding and low rate of EBF. Maternal older age, multiparity and delivery at a government health facility were significantly associated with higher rates of exclusive breastfeeding. EBF infants achieved a better and more rapid growth, and were also healthier when compared with non-EBF infants. Activities to promote appropriate breastfeeding practices should be targeted at mothers and locations in which poor breastfeeding practices exist. The unfortunate practice of mixed feeding by nursing mothers, on the premise that breast milk alone is inadequate, should be discouraged. This can be done through intensive breastfeeding education and the use of practical demonstrations.

Limitations of the study

The following limitations are applicable to this study. The centres were designated 'baby-friendly' and this may have affected the reliability of the responses given by the mothers, with a possibility of EBF practice being overestimated. There was also the possibility that an infant had received some other type of feeding from someone else without the mother's knowledge. Furthermore, some infants may have shifted from one feeding pattern to another, and then returned to the previous one.

References

1. Armstrong HO. Breastfeeding as the foundation of care. Food and Nutr Bull 1995;16:299–312.
2. Cutting WAM. Breastfeeding and HIV – a balance of risks. J Trop Pediatr 1994;40:6–11.
3. Omolulu A. Significance of breastfeeding in developing countries. Environ Child Health 1975;270–2.
4. Park K. Park's Textbook of preventive and social medicine. 16th edition. India: M/S Banarsidas Bhanot Publishers;2000.
5. Ebrahim G.J. Breast milk immunology. J Trop Pediatr 1995;41:2–4.
6. Saarinen UM, Kojosaari M. Breastfeeding as prophylaxis against atopic disease: a prospective follow-up study until 17 years old. Lancet 1995;346:1065–69.
7. Koletzko S, Sherman P, Corey M, Griffith A, Smith C. Role of infant feeding practices in development of Crohn's disease in children. Br Med J 1989;298:1617–8.
8. Mayer EJ, Hamman RF, Gay EC, Lezotte DC, Savitz DA, Klingensmith GJ. Reduced risk of IDDM among breastfed children: the Colorado IDDM Registry, Diabetes 1988;37:1625–32.
9. Lucas A, Cole TJ. Breast milk and neonatal necrotizing enterocolitis. Lancet 1990;336:1519–23.
10. UNICEF State of the Worlds' Children, 2001. Available from www.unicef.org/sw01 (Accessed 16 May 2005).
11. Nigerian Demographic and Health Survey (NDHS). National Population Commission, ORC Macro, Calverton, Maryland, USA 2003;151–4.
12. Nwankwo BO, Brieger WR. Exclusive breastfeeding is undermined by use of other liquids in rural south western Nigeria. J Trop Pediatr 2002;48:109–11.
13. Orumabo RS, Mbuagbaw LT. Attitudes of mothers admitted to a maternity ward in Port Harcourt to breastfeeding. Nig J Paediatr 1985;13(3):81–5.
14. Grant JP. The State of the Worlds' Children. UNICEF Publication, 1982/83.
15. Eregie CO. Exclusive breastfeeding and infant growth studies: reference standards for head circumference, length and mid-arm circumference/head circumference ratio for the first 6 months of life. J Trop Pediatr 2001;47:329–34
16. WHO. Breastfeeding and replacement feeding practices in the context of mother-to-child transmission of HIV: an assessment tool for research. WHO/CAH/01.21. WHO Geneva, 1999. Available from http://www.who.int/child-adolescent-health/new.../tool-breast_feeding.ht (Accessed 18 Nov 2005).
17. WHO indicators for assessing breastfeeding practices. WHO/CDD/SER/91.14. WHO Geneva, 1991.
18. Eregie CO, Abraham R. Studies on exclusive breastfeeding: observation on the adequacy of breast milk as sole nutrient for the first six months of life. Int Child Health 1997;4:49–54.
19. WHO. Integrated management of childhood illness: A model chapter for textbooks. WHO/FCH/CAH/00.40. WHO Geneva, 2001.
20. Onuoha N, Ene-Obong HN. Exclusive breastfeeding: mother's experience, attitude and effect on child's health in Nsukka Urban, Nigeria. Nig J Nutr Sci 2005;26(1):34–42.
21. Omotola BD, Grange AO, Adedoyin JA, Brai BIC, Omotola EB, Njepuome N. Breastfeeding practice in the first six months of life in Epe Local Government Area of Lagos State. Nig J Nutr Sci 2005;26(2):16–22.
22. Foo LL, Quek SJS, NG SA, Lim MT, Duerenberg-Yap M. Breastfeeding prevalence and practices among Singaporean Chinese, Malay, and Indian mothers. Health Prom Internat 2005;20(3):229–37.
23. Duong DV, Binns CW, Lee AU. Breastfeeding initiation and exclusive breastfeeding in rural Vietnam. Public Health Nutr 2004;7(6):795–9.
24. Ludvigsson JF. Breastfeeding in Bolivia – information and attitudes. BMC Pediatr 2003. Available from www.pubmedcentral.nih.gov/articlerender.fcgi?artid=161813 (Accessed 17 November 2005).
25. Al-Sheri SN, Farag MK, Baddo MH, Al-Mazrou YY, Aziz KMS. Overview on breastfeeding pattern in Saudi Arabia. J Trop Pediatr 1995;41(Suppl. 1):38–44.
26. Taneja DK, Misara A, Mathur NB. Infant feeding – an evaluation of text and taught. Indian J Pediatr 2005;72:127–9.
27. Barbara G, Ilse M, André Knottnerus J, Van Schayck CP. Factors associated with the duration of exclusive breastfeeding in asthmatic families. Health Ed Res 2008;23(1):158–69.
28. Scott JA, Landers MC, Hughes RM, Binns CW. Factors associated with breastfeeding at discharge and duration of breastfeeding. J Paediatr Child Health 2001;37(3):254–61.
29. Al-Ayed IH, Qureshi MI. Breastfeeding practices in urban Riyadh. J Trop Pediatr 1998;44:113–7.
30. Lawson K, Tulloch MI. Breastfeeding duration: prenatal intentions and postnatal practices. J Adv Nurs 1995;22:841–9.
31. Qui L, Zhoo Y, Binns CW, Lee HA, Xie X. Initiation of breastfeeding and prevalence of exclusive breastfeeding at hospital discharge in urban, suburban and rural areas of Zhejiang China. Int Breastfeed J 2009;4(1):1746–53.
32. World Health Organization. Baby Friendly Hospital Initiative. WHO Geneva, 2005.
33. Holdges A (ed.). Children's and women's rights in Nigeria: a wake-up call. Situation assessment and analysis. NPC/UNICEF Nigeria, 2001.
34. Edmond KM, Zandoh C, Quigley MA, Amenga-Etogo S, Owusu-Agyei S, Kirkwood BR. Delayed breastfeeding initiation increases risk of neonatal mortality. Pediatrics. 2006;117:e380–6.
35. Parehk C, Bavdekar SB, Shaharao V. Study of infant feeding practices: factors associated with faulty feeding. J Trop Pediatr 2004;50(5):306–8.
36. Chiang Mai. Lactation project. Breastfeeding practices in the developing world. Int J Gynaecol Obstet 1989;30(Suppl 1):129–32.
37. Ighogboja IS, Odumodu CU, Olarewaju RS. Breastfeeding pattern in Jos, Nigeria, before Baby Friendly Hospital Initiative. J Trop Pediatr 1996;42:178–9.
38. Victora CG, Morris SS, Barros FC, Horta BL, Weiderpass E, Tomasi E. Breastfeeding and growth in Brazilian infants. Am J Clin Nutr 1998;67:452–8.
39. Otaigbe BE, Aliko EAD, Nkanginieme KEO. Growth pattern of exclusively breastfed infants in the first six months of life: a study of babies delivered at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. Nig J Med 2005;14(2):137–45.
40. Diaz S, Herreros C, Ararena R, Casado ME, Keyes MV, Schiappacasse V. Breastfeeding duration and growth of fully breastfed infants in a poor urban Chilean population. Am J Clin Nutr 1995;62:371–6.
41. Juez G, Diaz S, Casado E, et al. Growth pattern of selected urban Chilean infants during exclusive breastfeeding. Am J Clin Nutr 1983;38:464–8.