International Research Journal of Public and Environmental Health Vol.2 (12),pp. 238-249, December 2015
Available online at http://www.journalissues.org/IRJPEH/
http://dx.doi.org/10.15739/irjpeh.044

ISSN 2360-8803

Original Research Article

Assessment of infant feeding patterns among nursing mothers in Aguata and Anaocha Local Government Areas in Anambra State, Nigeria

Received 2 November, 2015 | Revised 29 November, 2015 | Accepted 2 December, 2015 | Published 7 December, 2015

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Infant feeding is the cornerstone in infant and childhood survival strategy. This study was carried out to determine infant feeding patterns in Aguata (urban) and Anaocha (rural) Local Government Areas (LGAs). This was a comparative cross sectional study of nursing mothers attending a child welfare clinic in Aguata and Anaocha LGAs. A total of 241 mother-infant dyads were interviewed (120 in Aguata and 121 in Anaocha) and the nutritional status of the infants was assessed. Data was analyzed using SPSS version 20 with a significance level set at p<0.05. The major source of information on infant feeding was from health workers in both LGAs (72.5% in Aguata and 90.1% in Anaocha). The majority of the mothers were still breastfeeding at the time of study (93.3% in Aguata and 95.4% in Anaocha). Majority of the mothers in both LGAs practised breast milk only when the child was less than 6 months (53.3% in Aguata and 79.3% in Anaocha). Using the WHO Z-score classification, majority of the infants in both LGAs had normal nutritional status (71.1% in Aguata and 76% in Anaocha had normal weight for age, 66.7% in Aguata and 51.2% in Anaocha had normal length for age, 62.5% in Aguata and 44.6% in Anaocha had normal weight for length).

Keywords: Assessment, infant feeding practice.

INTRODUCTION

An infant is any child that is less than 12 months. There are different forms of infant feeding which include: exclusive breastfeeding, predominant breastfeeding, use of artificial infant formula, use of natural animal milk including the use of pasteurized breast milk. The current World Health Organization's (WHO) infant feeding recommendation is that infants should be exclusively breastfed for the first six months of life. Thereafter adequate and safe complementary feeding should be introduced while breastfeeding is continued for up to two years of age or beyond (WHO, 2005). However, as breastfeeding continues above six months, complementary feeding should be added. This is an important time in every child's life and malnutrition remains a major health problem in resource poor communities. Lack of quality and quantity of complementary feeds has a great impact on the child's development. Exclusive breastfeeding (EBF) is when the infant receives breast milk only (including milk expressed or from wet nurse) (WHO, 2002). Predominant breastfeeding is when an infant receives breast milk (including milk expressed or from wet nurse) as the predominant source of nourishment WHO (2002). Breastfeeding with complementary foods is when an infant receives breast milk in addition to solid or semi solid foods (WHO, 2002).

A study conducted in Georgia, showed that

complementary feeding (CF) started in time only in 30.2%, too early (< 4 months) in 18.1%, early (4-6 months) in 27.3% and late in 11%. Also in urban areas, early CF was significantly higher (51.1%) than in rural (29.7%; p< 0.01). This is possibly due to higher population of working mothers who believe they have less time to breastfeed for six months (Kavlashvili et al., 2014). A cross sectional study in Vietnam showed that mixed feeding (79%) was the most common mode of feeding followed by exclusive formula feeding (14%) and lastly exclusive breastfeeding (7%) Rameo et al.,(2014). A study in India reported that breast feeding was universal and median duration of EBF was 5.5 months Meshram (2012). In Ethiopia it was reported that only 14.4% of mothers fed their children optimally. The prevalence of stunting was higher for infants aged 6-8 months (43%) than those aged 0-5 months (26.6%) or 9-23 months (39%) Tessema et al., (2013). A study done in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria, showed that awareness (95.3%) and knowledge (82.0%) of EBF was high among the surveyed mothers. Though the practice (33.5%) was low, there was positive attitude (71.0%) to EBF (Onah et al., 2014). In Kaduna State it was reported that mothers gave a variety of foods before 6 months. Seventy percent gave herbs/water, 12% gave water and pap, 5% gave infant formula/fresh cow milk, 3% gave honey/sugar while 10% fully breastfed. It was also reported that early introduction of complementary feeds was associated with malnourishment (Okwori et al., 2011). The aim of this study was to assess the infant feeding choices and practices among nursing mothers in Aguata and Anaocha LGAs.

METHODOLOGY

This is a comparative descriptive cross sectional study that was carried out among nursing mothers attending the PHCs in Aguata and Anaocha LGAs, which are both local government areas (LGAs) in Anambra State, Nigeria. Aguata is an urban LGA, with headquarters at Ekwulobia and a population of 501,329 (ASG, 2012). Anaocha is a rural LGA with headquarters at Neni and a population of 350,544 (ASG, 2012). The study population comprised of nursing mothers and their infants living in Aguata and Anaocha LGAs.

Sample size determination

The sample size was determined using the formula for comparative cross sectional descriptive studies (Araoye, 2004):

$$n = \frac{2z^2 pq}{d^2}$$

n= desired minimum study population size.
z= standard confidence limit taken as 1.96
p= prevalence of the condition (infant feeding practice) from previous similar studies done elsewhere taken as 7.6% (0.076).
q= 1-p =0.924
D= margin of error tolerable, set at 0.05

Therefore $n= \frac{2\times1.96^2\times0.076\times0.924}{0.05^2}$

=215.81 (for the two LGAs)

Therefore desired minimum sample size ≈ 216(a minimum of approximately 108 for each LGA).

Two hundred and sixty questionnaires were administered (130 for each LGA), however, only 241 were completely filled and returned (120 in Aguata and 121 in Anaocha).

Sampling technique

Multi Stage sampling was done. Simple random sampling was used to select two PHCs in each LGA. Neni PHC and Akwaeze PHC in Anaocha LGA were randomly selected while Ekwulobia PHC and Igbo-Ukwu PHC were randomly selected in Aguata LGA. However, a 3rd PHC (Ichida PHC) was randomly chosen in Anaocha LGA because of the small number of nursing mothers in the PHCs that were initially chosen.

Inclusion criteria

Nursing mothers with children from 0-12 months of age. Nursing mothers who gave their consent.

Exclusion criteria

Nursing mothers of all infants who have obvious congenital abnormalities which can affect infant feeding pattern, normal growth and development of the infant.

Data collection tool

An interviewer-administered questionnaire which was an adapted and adopted version of the questionnaire used to assess infant feeding practice in Limpopo province (Mushaphi et al. 2008). The weight for age, length for age and weight for length were interpreted using WHO standard z-score charts WHO (2015).

Data analysis

The questionnaires were analyzed using Statistical Package for Social Sciences (SPSS) version 20. Significance level was set at p <0.05.

RESULTS

Table 1 shows sociodemographics 120 and 121 mother-infant dyads were interviewed in Aguata and Anaocha LGAs respectively. The mean age of respondents in Aguata and Anaocha are 27.74 ± 4.94 years and 28.16 ± 6.27 years

Table 1. sociodemographic data

Characteristics		Local government area				x^2	p
		Aguata		Anaocha			
		Frequency	N %	Frequency	N %		
	<= 19	4	3.3	6	5.0	7.068	0.315
	20 – 24	28	23.3	31	25.6		
	25 – 29	45	37.5	41	33.9		
	30 – 34	33	27.5	22	18.2		
	35 – 39	7	5.8	13	10.7		
	40 – 44	2	1.7	6	5.0		
	45+	1	0.8	2	1.7		
	Total	120	100.0	121	100.0		
Religion	Christian	120	100.0	120	99.2	0.996	0.318
	Islam	0	0.0	1	0.8		
	Total	120	100.0	121	100.0		
Marital status	Single	5	4.2	7	5.8	1.347	0.510
	Married	115	95.8	113	93.4		
	Divorced	0	0.0	1	0.8		
	Total	120	100.0	121	100.0		
Highest educational level	None	2	1.7	3	2.5	25.735	0.000*
	Primary	6	5.0	22	18.2		
	Secondary	70	58.3	83	68.6		
	Tertiary	42	35.0	13	10.7		
	Total	120	100.0	121	100.0		
Occupation	Unemployed	24	20.0	29	24.0	11.883	0.018*
	Farmer	1	0.8	5	4.1		
	Petty trader	50	41.7	61	50.4		
	Student	23	19.2	8	6.6		
	Others*	22	18.3	18	14.9		
	Total	120	100.0	121	100.0		

*others include seamstress, drycleaner, civil servant, photographer, teacher and fashion designer

Table 1. Continued

Characteristics		Aguata		Anaocha		x^2	p
		Frequency	%	Frequency	%		
number of children	one child	32	26.7	37	30.6		
	2-4children	77	64.2	63	52.1		
	5 or more	11	9.2	21	17.4	4.883	0.087
	Total	120	100.0	121	100.0		
baby's age	0-3months	43	35.8	61	50.4		
	4-6months	34	28.3	35	28.9		
	7-9months	23	19.2	12	9.9	8.068	0.045*
	10-12months	20	16.7	13	10.7		
	Total	120	100.0	121	100.0		
Baby's sex	Male	53	44.2	60	49.6		
	Female	67	55.8	61	50.4	0.711	0.399
	Total	120	100.0	121	100.0		

respectively.

The majority of respondents are Christians in both LGAs (100% in Aguata and 99.2% in Anaocha) and married (95.8% in Aguata and 93.4% in Anaocha). The difference in educational level is statistically significant (p=0.000). The commonest occupation in both LGAs is petty trading (41.7% in Aguata and 50.4% in Anaocha). The commonest age group among the infants is 0-3 months. The majority of the infants in both LGAs are females (55.8% in Aguata and 50.4% in Anaocha).

Table 2 shows that the majority of the infants studied were of normal weight for age (71.7% of infants in Aguata, 76.0% in Anaocha), normal length for age (66.7% in Aguata, 51.2% in Anaocha) and normal weight for length (62.5% in

Table 2. Infants' nutritional status

Characteristics		Aguata		Anaocha			
		count	%	count	%	x^2	p
weight for age	severely underweight(>-3SD)	2	1.7	5	4.1		
	moderately underweight(-3SD to -2SD)	11	9.2	11	9.1		
	normal weight	86	71.7	92	76.0	4.099	0.393
	high weight (2SD TO 3SD)	15	12.5	11	9.1		
	very high weight (>3SD)	6	5.0	2	1.7		
	Total	120	100.0	121	100.0		
length for age	severe stunting (>-3SD)	9	7.5	22	18.2		
	moderate stunting (-3SD TO -2SD)	17	14.2	15	12.4		
	normal length	80	66.7	62	51.2	9.854	0.043*
	high length (2SD TO 3SD)	10	8.3	14	11.6		
	very high length (>3SD)	4	3.3	8	6.6		
	Total	120	100.0	121	100.0		
weight for length	severe (>-3SD)	3	2.5	12	9.9		
	moderate (-3SD TO 2 SD)	3	2.5	14	11.6		
	Normal	75	62.5	54	44.6	20.032	0.000*
	high (2SD TO 3SD)	24	20.0	16	13.2		
	very high (>3SD)	15	12.5	25	20.7		
	Total	120	100.0	121	100.0		

Table 3. Sources of information on infant feeding practices

Variables		LOCAL GOVERNMENT AREA			
		Aguata		Anaocha	
		Frequency(n=120)	%	Frequency(n=121)	%
was mother taught about food for the child	Yes	117	97.5	113	93.4
	No	3	2.5	8	6.6
sources of information	Family	43	35.8	15	12.4
	Friends	16	13.3	14	11.6
	radio/tv	19	15.8	23	19.0
	Newspapers	2	1.7	6	5.0
	health workers	87	72.5	109	90.1
	Internet	1	0.8	0	0.0
	Others*	3	2.5	1	0.8

*other sources of information include books and church

Aguata, 44.6% in Anaocha). There is a significant difference in the length for age (p=0.043) and weight for length (p=0.000) in the 2 LGAs.

Table 3 shows that the major source of information of infant feeding in both LGAs is the health workers (Aguata 72.5% and Anaocha 90.1%).

Table 4 shows that the difference in knowledge is statistically significant in terms of knowledge of starting semisolids after 6 months (p=0.037) and knowledge that BF should continue for up to 2 years (p=0.000).

Table 5 shows that most mothers (61.7% in Aguata and 82.6% in Anaocha) believe that breast milk only should be given to a child that is less than 6 months, the major reason being that it prevents infections. The difference in the choice of infant feeding option for a child less than 6 months is statistically significant (p=0.003). Cheapness of an infant feeding option was shown to be a statistically significant reason for infant feeding choice (p=0.000).

Table 6 shows that majority of the nursing mothers practice their preferred infant feeding options in both LGAs

Table 4. Knowledge of infant feeding

VARIABLES		local government area				x^2	P
		Aguata		Anaocha			
		Count	%	Count	%		
breastmilk only for 6 months	Yes	113	94.2	116	95.9		
	No	4	3.3	3	2.5	0.378	0.828
	not sure	3	2.5	2	1.7		
	Total	120	100.0	121	100.0		
semisolids after 6 months	Yes	101	84.2	113	93.4		
	No	10	8.3	2	1.7	6.602	0.037*
	not sure	9	7.5	6	5.0		
	Total	120	100.0	121	100.0		
breastfeeding for up to 2 yrs	Yes	48	40.0	89	73.6		
	No	60	50.0	12	9.9	46.267	0.000*
	not sure	12	10.0	20	16.5		
	Total	120	100.0	121	100.0		

Table 5. Attitude to infant feeding options

		local government area					
		Aguata		Anaocha			
		Count	%	Count	%	x^2	P
best infant feeding option when child is less than 6 months	breast milk only	74	61.7	100	82.6	15.808	0.003*
	breast milk and water	24	20.0	15	12.4		
	breast milk and artificial formula	7	5.8	3	2.5		
	breast milk and semisolid foods	13	10.8	3	2.5		
	artificial formula only	2	1.7	0	0.0		
	Total	120	100.0	121	100.0		
	prevents infections	77	64.2	91	75.2	3.478	0.062
	it is cheaper	16	13.3	46	38.0	19.211	0.000*
	gives child more energy	49	40.8	44	36.4	0.508	0.476
	child grows better	51	42.5	64	52.9	2.608	0.106
	it prevents obesity later in life	0	0.0	1	0.8	0.996	0.318

(Aguata-80.8%, Anaocha- 91.6%) and the difference in practice of the preferred option was statistically significant (p=0.025). All mothers breastfed their babies in both LGAs, majority were still breastfeeding at the time of the study (Aguata 93.3%, Anaocha 95.9%). In Aguata, 33.3% of mothers that were not breastfeeding at the time of study stopped at the age range of 10-12 months while in Anaocha, 40% stopped at the age range of 4-6 months. The difference in age of stopping breastfeeding for mothers who were still breastfeeding at the time of study was statistically significant (p=0.000).

The Table 7 shows that breastfeeding only was the major infant feeding practice for a child less than 6 months in both LGAs (Aguata 55%, Anaocha 79.3%). The difference in infant feeding practices in both LGAs is statistically significant (p=0.001).

Table 8 showed that in Aguata, 54.2% of women have started giving semisolid foods while in Anaocha only 35.5% have started semisolid foods. The difference in complementary feeding practice is statistically significant (p=0.04). The major semisolid food given in both LGAs is pap fortified with milk/soya beans (Aguata 76.5% and Anaocha 89.4%). The difference in the number of times the child was fed in a day was statistically significant (p=0.000). Majority of infants have had no episode of diarrhea (80% in Aguata and 82.6% in Anaocha). There is no significant difference in the number of episodes of diarrhea in the 2 LGAs.

Table 9 shows that the relationship between preferred infant feeding choice with mother's age (p=0.000), mother's parity (p=0.042) and baby's age (p=0.027) are statistically significant. However, the relationship between other

Table 6. Choice of infant feeding options

		Local government area					
		Aguata		Anaocha			
		Count	N %	Count	N %	x^2	P
Do you practice the preferred option?	Yes	97	80.8	110	90.9		
	No	23	19.2	11	9.1	5.048	0.025*
	Total	120	100.0	121	100.0		
IF NO, which infant feeding option do you practice?	breast milk only	5	21.7	1	9.1	2.618	0.454
	breast milk and water	10	43.5	3	27.3		
	breast milk and artificial formula	6	26.1	5	45.5		
	breast milk and semisolid foods	2	8.7	2	18.2		
	artificial formula only	0	0.0	0	0.0		
	Total	23	100.0	11	100.0		
if NO, what is the reason for not practising preferred option (multiple response)	less time for baby	4	13.0	2	18.2	3.567	0.468
	baby not gaining weight	2	4.3	2	18.2		
	family advised me	6	21.7	5	45.5		
	breast milk doesn't quench the thirst of the baby	8	34.8	2	18.2		
	Baby refused breast milk	1	4.3	0	0.0		
	Total	23	100	11	100		
did you ever breastfeed	Yes	120	100.0	121	100.0	-	-
	No	0	0.0	0	0.0		
are you still breastfeeding	Yes	111	93.3	116	95.9	0.321	0.571
	No	9	6.7	5	4.1		

Table 6. continued

		COUNT	%	COUNT	%	x^2	p
What age did you stop breastfeeding if NOT breastfeeding currently	0-3months	1	11.1	1	20	4.813	0.307
	4-6months	1	11.1	2	40		
	7-9months	2	22.2	1	20		
	10-12months	3	33.3	1	20		
	>12 months but not up to 2 years	2	22.2	0	0.0		
	up to 2 years	0	0.0	0	0.0		
	TOTAL	9	100	5	100		
What age do you intend to stop breastfeeding if still breastfeeding currently	0-3months	0	0.0	0	0.0	28.483	0.000*
	4-6months	6	5.4	0	0.0		
	7-9months	9	8.1	1	0.9		
	10s-12months	60	54.1	43	38.7		
	>12 months but not up to 2 years	33	29.7	63	56.7		
	up to 2 years	3	2.7	9	8.1		
	TOTAL	111	100	116	100		

sociodemographic variables and best infant feeding option is not statistically significant in Aguata LGA.

Table 10 shows that the relationship between sociodemographic variables and preferred infant feeding choice is not statistically significant in Anaocha LGA.

Table 11 shows that in Aguata LGA, infants that were exclusively breastfed were shown to have high weight for age than those who were not exclusively breastfed. This

Table 7. Breastfeeding practice when child is less than 6 months

		local government area					
		Aguata		Anaocha			
		Count	%	Count	%	x^2	p
infant feeding option practised	breast milk only	66	55.0	96	79.3		
	breast milk and water	30	25.0	14	11.6		
	breast milk and artificial formula	10	8.3	7	5.8	17.455	0.001*
	breast milk and semisolid foods	14	11.7	4	3.3		
	artificial formula only	0	0.0	0	0.0		
	TOTAL	120	100	121	100		

Table 8. Complementary feeding practice and infant feeding outcome

		Local Government Area					
		Aguata		Anaocha			
		Count	%	Count	%	x^2	P
have you started giving semisolid food	Yes	65	54.2	43	35.5		
	No	55	45.8	78	64.5	8.455	0.040*
	Total	120	100.0	121	100.0		
if yes at, what age did you start semi solid food	0-3months	1	1.5	3	7.0		
	4-6months	19	29.2	11	25.6		
	7-9months	42	64.6	29	67.4	4.207	0.240
	10-12months	3	4.6	0	0.0		
	Total	65	100.0	43	100.0		
if no, at what age will you start semisolids	0-3months	0	0.0	0	0.0		
	4-6months	8	14.8	10	12.8		
	7-9months	42	77.8	65	83.3	0.978	0.613
	10-12months	4	7.4	3	3.8		
	Total	54	100.0	78	100.0		
what semisolid food is usually given	fortified pap (milk, soyabeans)	52	76.5	42	89.4	9.662	0.047*
	Moimoi	0	0.0	0	0.0		
	Dawa	4	5.9	0	0.0		
	artificial baby cereal	5	7.4	4	8.5		
	Garri	0	0.0	1	2.1		
	mashed family meals	7	10.3	0	0.0		
	Total	68	100.0	47	100.0		
how many times a day does the child eat	once a day	2	1.7	0	0.0		
	twice a day	5	4.2	3	2.5		
	3 times a day	24	20.0	4	3.3		
	4 times or more	89	74.2	114	94.2		
	Total	120	100.0	121	100.0	19.861	0.000*
episodes of diarrhea	Yes	24	20.0	21	17.4		
	No	96	80.0	100	82.6		
	Total	120	100.0	121	100.0	0.277	0.598

was statistically significant (p=0.040). However the relationship between low weight for age, low length for age and low weight for length was not statistically significant. There is no significant relationship between infant feeding practice and episodes of diarrhea (p=0.715)

Table 12 shows that in Anaocha LGA, there is no significant relationship between infant feeding practice and nutritional status of the infants studied. However, there is a significant relationship between infant feeding practices and episodes of diarrhea (p=0.000) with a higher percentage (52%) among infants not exclusively breastfed.

DISCUSSION

In this study, 97.5% of mothers in Aguata and 93.4% of mothers in Anaocha were taught about infant feeding. The major source of information on infant feeding in the two LGAs was from health workers (72.5% in Aguata and 90.1% in Anaocha). This is different from the findings of a study conducted in a rural China community[13], where knowledge on infant feeding was very poor (20% of information on infant feeding was from health facilities). The reason for this is possibly because this study was conducted in a

Table 9. Relationship between sociodemographic variables and best infant feeding choice in Aguata Lga

		best infant feeding option						
		breast milk only	**breast milk and water**	**breast milk and artificial formula**	**breast milk and semisolid foods**	**artificial formula only**	x^2	**p**
Age (in years)	15-19	1.4	4.2	0.0	15.4	0.0	158.892	0.000*
	20-24	20.3	33.3	28.6	7.7	100		
	25-29	39.2	33.3	14.3	53.8	0.0		
	30-34	28.4	29.2	57.1	7.7	0.0		
	35-39	6.8	0.0	0.0	15.4	0.0		
	40-44	2.7	0.0	0.0	0.0	0.0		
	45 and above	1.4	0.0	0.0	0.0	0.0		
	Total	100	100	100	100	100		
marital status	Single	1.5	8.3	11.1	0.0	0.0	2.002	0.735
	Married	98.5	91.7	88.9	100.0	100.0		
	Divorced	0.0	0.0	0.0	0.0	0.0		
highest education level	None	1.5	0.0	0.0	0.0	0.0	13.662	0.323
	Primary	1.5	4.2	11.1	10.0	0.0		
	Secondary	63.1	66.7	55.6	40.0	100.0		
	Tertiary	33.8	29.2	33.3	50.0	0.0		
Occupation	unemployed	17.5	16.7	0.0	11.1	100.0	20.524	0.198
	Farmer	1.6	0.0	0.0	0.0	0.0		
	Petty trader	50.8	33.3	37.5	44.4	0.0		
	Student	14.3	25.0	37.5	22.2	0.0		
	Others*	15.9	25.0	25.0	22.2	0.0		
number of children	one child	24.6	41.7	33.3	0.0	0.0	16.012	0.042*
	2-4children	67.7	54.2	33.3	80.0	100.0		
	5 or more	7.7	4.2	33.3	20.0	0.0		

*Other occupations include seamstress, hair stylist, teacher, dry cleaner.

Table 9. continued

baby's age	0-3months	43.1	41.7	22.2	10.0	0.0	23.119	0.027*
	4-6months	23.1	25.0	33.3	40.0	0.0		
	7-9months	16.9	20.8	33.3	10.0	100.0		
	10-12months	16.9	12.5	11.1	40.0	0.0		
baby's sex	Male	43.0	41.7	12.5	60.0	100.0	6.986	0.137
	Female	56.9	58.3	87.5	40.0	0.0		

primary health centre where women are in contact with the health care workers who educate them on infant feeding practices.

In this study, there was also variation in knowledge of infant feeding in both LGAs. The knowledge that an infant should be given semi-solids after 6 months and that breastfeeding should continue up to 2 years is significantly higher in Anaocha (p=0.003 and p=0.000 respectively). Even though Aguata is an urban LGA, the knowledge on infant feeding is poor compared to that of Anaocha (rural LGA). This shows that location may not be an influence to the knowledge of infant feeding as evidenced by a study conducted in rural Egypt were 97.9% had good knowledge of breastfeeding practice. In both LGAs, majority of the mothers believe that breast milk only should be given to a child less than 6 months (Aguata 61.2%, Anaocha 82.6%). This is statistically significant (p=0.003). The reason that why breast-milk and water is the 2nd most preferred is possibly because of the myth that breast-milk alone cannot quench the thirst of the baby. (Brown et al. 2009) However the major reason for not practicing the preferred infant feeding option in Anaocha is due to family advice. This shows that family influence can override the information provided by the health workers. Influence of the family has also been found in a study conducted in Nepal (Karkee et al. 2014), where an infant feeding option (breastfeeding) was encouraged because of preference by family members. All the mothers studied in both LGAs, breastfed their babies. This supports the view that breastfeeding is universal all over the world (Karkee et al., 2014);Meshram, 2012). At the

Table 10. Relationship between sociodemographic variables and best infant feeding choice in Anaocha LGA

		best infant feeding option						
		breast milk only	breast milk and water	breast milk and artificial formula	breast milk and semisolid foods	artificial formula only		
		%	%	%	%	%	x^2	p
Age (in years)	15-19	5.0%	6.7%	0.0%	0.0%	0.0%	89.934	0.115
	20-24	24.0%	26.7%	66.7%	33.3%	0.0%		
	25-29	32.0%	46.7%	33.3%	66.7%	0.0%		
	30-34	20.0%	6.7%	0.0%	0.0%	0.0%		
	35-39	11.0%	13.3%	0.0%	0.0%	0.0%		
	40-44	6.0%	0.0%	0.0%	0.0%	0.0%		
	45 and above	2.0%	0.0%	0.0%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
marital status	Single	5.4%	0.0%	0.0%	0.0%	0.0%	1.799	0.937
	Married	93.5%	100.0%	100.0%	100.0%	0.0%		
	Divorced	1.1%	0.0%	0.0%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
highest education level	None	2.2%	0.0%	33.3%	0.0%	0.0%	14.092	0.119
	Primary	15.1%	23.5%	0.0%	33.3%	0.0%		
	Secondary	69.9%	70.6%	66.7%	66.7%	0.0%		
	Tertiary	12.9%	5.9%	0.0%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
Occupation	unemployed	17.0%	25.0%	0.0%	0.0%	0.0%	8.508	0.744
	Farmer	3.4%	6.2%	0.0%	0.0%	0.0%		
	Petty trader	56.8%	50.0%	66.7%	50.0%	0.0%		
	Student	8.0%	0.0%	0.0%	50.0%	0.0%		
	Others*	14.8%	18.8%	33.3%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
number of children	one child	28.6%	29.4%	0.0%	33.3%	0.0%	3.646	0.724
	2-4children	53.8%	47.1%	100.0%	66.7%	0.0%		
	5 or more	17.6%	23.5%	0.0%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
baby's age	0-3months	55.3%	35.3%	0.0%	0.0%	0.0%	16.194	0.630
	4-6months	28.7%	29.4%	33.3%	33.3%	0.0%		
	7-9months	7.4%	17.6%	33.3%	33.3%	0.0%		
	10-12months	8.5%	17.6%	33.3%	33.3%	0.0%		
	Total	100%	100%	100%	100%	0.0%		
baby's sex	Male	45.2%	50.0%	66.7%	100.0%	0.0%	3.752	0.290
	Female	54.9%	50.0%	33.3%	0.0%	0.0%		
	Total	100%	100%	100%	100%	0.0%		

*. Other occupations include hair stylist, seamstress and teacher

time of the study, 93.3% and 95.9% were still breastfeeding in Aguata and Anaocha respectively. Among those who were still breastfeeding, only few mothers intend to continue breastfeeding till the age of 2 years. The reasons for stopping breastfeeding were not explored in this study. However, the reason could be possibly due to the fact that a proportion of the mothers are not aware that breastfeeding should be continued till the age of 2 years (59.6% in Aguata and 24.4% in Anaocha).

In both LGAs, the majority of the mothers practiced Exclusive breastfeeding for 6 months (55% in Aguata, 79.3% in Anaocha) the difference in BF practice was shown to be statistically significant (p=0.001). This is different from the findings in a study conducted in Ethiopia (Gibson et al. 2009) and Kenya (Kimani-murage et al. 2011) where only 2% of infants were exclusively breastfed. Between the two LGAs, there is a disparity in the practice of complementary feeds where the majority of the mothers in Aguata had commenced semi-solid feeds while majority in Anaocha had not. This is possible because Anaocha has a higher percentage of children <6 months of age (79.3%) than Aguata (64.1%) and there is a statistically significant difference in the ages of the infants (p=0.045). The difference in complementary feeding practice is statistically significant (p=0.040). For mothers who have started semi-solid food, majority of the mothers in both LGAs started

Table 11. Relationship between infant feeding practice and outcome in Aguata LGA

Nutritional status		infant feeding option practised					
		Breast milk only		not exclusively breastfed			
		Count	%	Count	%	x^2	p
Low weight for age	severely underweight(>-3SD)	1	33.3	1	10.0		
	moderately underweight(-3SD to -2SD)	2	66.7	9	90.0	0.965	0.326
	Total	3	100.0	10	100.0		
High weight for age	High weight (>2SD TO 3 SD)	8	57.1	7	100		
	Very high weight (>3SD)	6	42.9	0	0	4.200	0.040*
	Total	14	100	7	100		
Low length for age	severe stunting (>-3SD)	3	25.0	6	42.9		
	moderate stunting (-3SD TO -2SD)	9	75.0	8	57.1	0.910	0.340
	Total	12	100.0	14	100.0		
Low weight for length	severe (>-3SD)	2	66.7	1	33.3		
	moderate (-3SD TO 2 SD)	1	33.3	2	66.7	0.667	0.414
	Total	3	100.0	3	100.0		
Episodes of diarrhea	Yes	14	21.2	10	18.5		
	No	52	78.8	44	81.5	0.135	0.715
	Total	66	100	54	100		

Table 12. Relationship between infant feeding practice and nutritional status of the infants in Anaocha LGA

Nutritional status		infant feeding option practised					
		breast milk only		not exclusively breast fed			
		Count	%	Count	%	x^2	p
Low weight for age	severely underweight(>-3SD)	4	44.4	1	14.3		
	moderately underweight(-3SD to -2SD)	5	55.6	6	85.7	1.667	0.197
	Total	9	100.0	7	100.0		
High weight for age	High weight (>2SD TO >3SD)	10	83.3	1	100		
	Very high weight (>2SD TO 3SD)	2	16.7	0	0	0.197	0.657
	Total	12	100	1	100		
Low length for age	severe stunting (>-3SD)	15	55.6	7	70.0		
	moderate stunting (-3SD TO -2SD)	12	44.4	3	30.0	0.632	0.427
	Total	27	100.0	10	100.0		
Low weight for length	severe (>-3SD)	10	43.5	2	66.7		
	moderate (-3SD TO 2 SD)	13	56.5	1	33.3	0.574	0.449
	Total	23	100.0	3	100.0		
Episodes of diarrhea	Yes	8	8.3	13	52		
	No	88	91.7	12	48	26.368	0.000*
	Total	96	100	25	100		

semi-solids at the age range of 7-9 months (64.6% in Aguata and 67.4% in Anaocha) and for mothers who have not started complimentary feeding, majority intend to start semisolids at the age of 7-9 months of age (77.8% in Aguata and 83.3% in Anaocha). This is different from a study conducted in Georgia (Kavlashvili et al. 2014);Sadoh et al. 2011) which showed that complementary feeding started in time only in 30.2% of the mothers that were studied. The study also showed that early complementary feeds were significantly higher in urban areas (51.1%) than rural areas (29.7%). The most common semisolid food given in both LGAs is pap (maize-based gruel) fortified with milk/soy

milk (76.5% in Aguata and 89.4% in Anaocha). The difference in the 2 LGAs is statistically significant (p=0.047). This is similar to findings in South Africa, where maize soft porridge was the major semisolid eaten by infants (Macintyre et al. 2006). In this study, most of the infants were fed 4 times or more in a day (74.2% in Aguata and 95% in Anaocha). The difference in the number of time an infant is fed is statistically significant between the two LGAs (p=0.000). The number of times a child is fed in a day is significantly influenced by age of the infant (p=0.016) and this is similar to findings in a study done in Limpopo (Mushaphi et al. 2008).

In both LGAs, the majority of the infants studied were of normal weight for age (71.7% of infants in Aguata, 76.0% in Anaocha), normal length for age (66.7% in Aguata, 51.2% in Anaocha) and normal weight for length (62.5% in Aguata, 44.6% in Anaocha). This is different from a study conducted at Aminu Kano Teaching Hospital which showed that, though most caregivers (88.7%) had fair to good knowledge of infant feeding practices, up to 40% and 73.7% of infants had varying degrees of wasting and stunting respectively (Lawan et al. 2014). The findings in this study showed that there is a significant relationship between preferred infant feeding choice and the following sociodemographic variables: mother's age, mother's parity and baby's sex (p value <0.05) in Aguata. However, in Anaocha LGA, there is no significant relationship between preferred infant feeding option and sociodemographic variables. Other studies have shown that, sociodemographic variables such as: mother's parity Okechukwu (2007), mother's occupation (Kavlashvili et al. 2014) ; Sadoh et al. 2011), mother's highest educational level (Lawan et al. 2014), baby's age (Tessema et al. 2013), baby's sex and area of residence (Kimani-murage et al. 2011) can affect infant feeding choices and practice. In Aguata LGA, there is no significant relationship between infant feeding practice and prevalence of diarrhea. However, this is different in Anaocha where the prevalence of diarrhea was significantly higher (52%) among infants that were not exclusively breastfed (p=0.000).

In Aguata, the number of overweight infants was significantly higher among infants that were exclusively breastfed (p=0.040). In Anaocha, there was no significant effect of infant feeding practice on the nutritional status of the infants. Stunting, wasting and underweight nutritional status were not shown to be significantly associated with infant feeding practice in both LGAs. The findings in Anaocha were similar to that in Limpopo Province (Mushaphi et al. 2008), which showed that the nutritional status of the infants was not significantly affected by infant feeding practices of the mothers. This is, however, different from a study conducted in Aminu Kano Teaching Hospital (Lawan et al. 2014) which showed that stunting was significantly associated with infant feeding practice.

In conclusion, the findings of this study showed there is a significant difference in the infant feeding knowledge, choices and practices in both Aguata and Anaocha. This study surprisingly revealed that the knowledge of infant feeding in Aguata (urban) was significantly less than that of Anaocha (rural) in terms of starting semisolids after 6 months and breastfeeding till the age of 2 years. The majority of the respondents practiced good infant feeding practices which had favourable outcome in both LGAs where nutritional status of the infants studied was normal. However, in Anaocha the prevalence of diarrhea was found to be significantly higher among infants that were not exclusively breastfed but in Aguata, there was no significant association between the prevalence of diarrhea and infant feeding practice. High weight for age was also found to be higher among exclusively breastfed infants in Aguata. However, in Anaocha, nutritional status of infants was not significantly affected by the infant feeding practice. Nutritional surveillance is still necessary for the community as this study was done in only health centres. This study has shown that information on recommended infant feeding practices has also been extended to the rural areas.

We therefore, recommend as follows:

1. Reinforcement on the recommended infant feeding practices where it has already been established.
2. Education on the components of breast milk including the fact that breast milk contains 90% water to disparage the myth of breast milk not quenching the thirst of the infant. Education on the effect of infant feeding practice on the nutritional status and infant outcome.

Ethical consideration

Ethical clearance was obtained from the Nnamdi Azikiwe University Teaching Hospital Ethical Committee. Permission was obtained from the respective study LGA secretariats. Informed consent by the mothers was sought after full explanation of the project and assurance of confidentiality.

Limitations

The sample did not include mothers who did not attend the child welfare clinic in the PHC, who may have different socioeconomic variables and different infant feeding choices and practices.

Conflict of Interest: None declared.

Funding: This article was funded by the researchers.

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