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Infant Feeding Practices and Nutritional Status of Children in North Western Nigeria*

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Abstract: Studies on infant feeding practices and nutritional status of children in North Western Nigeria were carried out. More than 50% of caregivers were full-time housewives while about 39% do not have any form of education. Main source of drinking water was from unprotected sources like river/lake (24%), private well (23.0%) and public well (13.5%) while the predominant source of energy for cooking and main type of toilet in the households were wood (85.7%) and pit latrines (67%) respectively. On the average, over 70% of mothers were still breastfeeding at the time of the survey and duration of breastfeeding was between 13-24 months (73.4%). Only 54.3% of mothers in North West practiced exclusive breastfeeding for the first six months but in addition to breastmilk over three-quarter of caregivers gave plain water while 50% of caregivers in Kaduna state ever bottlefed their child with infant formula mostly from the 6th month. Few caregivers (19%) that bottlefeeds always sterilizes them. Complementary foods were introduced to majority of the children much earlier at 3rd month (41.2%) than the 6th month recommended while some caregivers introduces complementary foods at 1-2 months (17.8%). This study revealed that on the average, 31.7% of the children sampled were severely stunted which was lower than the National average. More attention needs to be paid to the specific behaviours surrounding feeding and any constraints to childcare in North Western Nigeria.

Key words: Nigeria, north west, caregiver, feeding practices, nutritional status

INTRODUCTION

Malnutrition is one of the biggest health problems that the world currently faces and is associated with more than 41% of the deaths that occur annually in children from 6 to 24 months of age in developing countries which total approximately 2.3 million (Sandoval-Priego *et al*., 2002). WHO (2001) reported that 54% of all childhood mortality was attributable, directly or indirectly, to malnutrition. Sub-Saharan Africa has a high prevalence of stunting, low weight-for-age and acute malnutrition (Lutter and Rivera, 2003).

Feeding practices during infancy are critical for the growth, development and health of a child during the first two years of life (WHO, 1979) and of important for the early prevention of chronic degenerative diseases. Progress in improving infant and young child feeding practices in the developing world has been remarkably slow (Ruel, 2003) due to several factors. It is estimated that among children living in the 42 countries with 90% of global child deaths, a package of effective nutrition interventions could save 25% of childhood deaths each year (Jones *et al*., 2003).

The survival risks of early childhood in Nigeria remain considerable. A newborn Nigerian baby has a 30 times higher chance of dying before the age of 5 years than a baby born in the developed, industrialized countries. The data available on the regional prevalence of diarrhoea, undernutrition and under 5 mortality in Nigeria showed that each of them are far more prevalent in the northern than in the southern part of Nigeria (UNICEF, 2001).

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Attention need to be refocused on the promotion of household level feeding practices that are beneficial to the survival of children and caregivers in this part of Nigeria in order to be able to meet the commitment of Nigeria to the United Nations Millennium Development Goals (MDGs) for reduction in childhood mortality by two-thirds and a reduction in the number of people who suffer from hunger by half by the year 2015 (Daelmans and Saadeh, 2003). Therefore, it is vital that a comprehensive study on the risk factors such as infant feeding practice is conducted which will help to identify current good practices to be supported for improving the feeding practices as effective strategies for solving childhood malnutrition. This present study is a contribution to knowledge on current infant feeding practices and nutritional status of children in North Western Nigeria.

MATERIALS AND METHODS

This study was carried out in North Western Nigeria during the 2005 using the Multiple Indicator Cluster Surveys (MICS) zones and Nigeria Demographic and Health Survey (NDHS) 1990 zones (UNICEF, 2001), which was based on agro-ecological zones of the country. Three States (Kaduna, Kebbi and Niger) were randomly selected based on principal food crop grown in the Northwest zone for the study. Mothers with children more than 6 but less than 24 months were eligible in a mother/child pair while in the absence of the biological mother, the person considered as the child's primary caretaker (Father, Aunt, Grandmother) was eligible.

A cross-sectional descriptive study was carried out which incorporated quantitative and qualitative data collection techniques. Data collection was through random cluster sampling using assembly-type method wherein subjects were gathered in a centrally located place in the community. Preparation for field data collection includes training of local data interviewers and instruments that were used in this study includes pretested structured questionnaire, semi-structured interviews, observations and focus group discussion, key informant interview. Information on Demographic and social economic status and nutrition-related practices were obtained from caregivers.

Anthropometric measurements were taken (Hossain *et al*., 2005). Children (in light clothing) were weighed by a Salter scale with a precision of 100 g and recumbent length was measured in centimeters to the nearest 0.1 cm using an infantometer. The Z-scores outcome was used as children nutritional status according to WHO criterion on basis of height-for-age, weight-for-height and weight-for-age for stunted, wasted and underweight, respectively.

The questionnaires were coded and analyzed and frequencies for various responses were generated to describe the care practices/behaviours of mothers and caregivers using the Microsoft Excel data analysis package for windows.

RESULTS

Table 1 presents the data on some demographic characteristics of the caregivers studied, over 50% of caregivers were full-time housewives and 39.0% had no form of education and about double that proportion was obtained in Niger state (70.5%) while average annual income of most caregivers in the states studied fell below fifteen thousand naira ($115) per annum. The most common source of drinking water to households was the river/lake (24.0%) while private well was 23.0% followed by water obtained from Tap inside the house which was 18.66% and that from borehole (14.1%). Clay pot was the main means of storing drinking water (51.3%) while wood (85.7%) was the predominant source of energy and 67% of caregivers household used pit latrines, with 25% using the bush as main toilets (Table 2).

Table 1: Demographic characteristics of caregivers in North Western Nigeria (%)

Characteristics	N	North West	Kaduna State	Kebbi State	Niger State
Caregiver (%)					
Mother	226	88.1	87.5	96.9	81.60
Father	22	8.5	9.6	0.9	13.60
Grandmother	6	2.5	2.2	2.2	2.90
Aunt	2	0.9	0.7	-	1.80
Age caregiver (year)					
≤20	43	17.0	15.8	25.3	11.40
21-30	130	51.6	49.6	50.2	54.60
31-40	68	27.5	30.4	23.1	27.10
41-50	9	3.5	2.7	0.9	6.20
>50	2	0.9	1.5	0.5	0.70
Household size (%)					
<6	104	43.3	44.1	38.4	47.40
6-10	78	32.8	37.8	30.6	29.90
11-15	30	12.5	13.5	13.4	10.60
16-20	13	5.3	3.4	5.1	7.60
21-25	6	2.4	1.3	2.8	3.00
>25	8	3.8	-	9.7	1.50
Marital status (%)					
Married	241	94.4	91.2	94.4	97.80
Single	2	0.8	1.8	-	0.40
Divorced	6	2.2	3.3	2.7	0.70
Widowed	5	2.0	2.6	2.3	1.10
Separated	1	0.4	0.4	0.9	-
Declined Response	1	0.3	0.7	-	-
Formal education (%)					
No school	96	39.0	16.3	38.4	70.50
Primary school uncompleted	21	8.7	13.0	3.1	9.82
Primary school completed	44	17.8	26.3	15.1	11.60
Secondary school uncompleted	23	9.4	13.3	1.8	13.00
Secondary school completed	42	17.1	20.7	27.7	3.60
Post secondary	17	7.0	8.5	12.1	0.90
Postgraduate education	3	1.3	1.9	1.8	0.50
Occupation (%)					
Civil servant	36	14.4	21.1	17.2	5.20
Trader	24	9.5	13.3	13.6	2.20
Farming	48	19.0	13.0	1.4	39.80
F/T House wife	138	54.6	48.5	64.3	52.80
Craftsman	4	1.7	3.3	1.8	-
Others	2	0.8	0.7	1.8	-
Income per annum (%)					
<4.99 thousand naira	112	47.8	33.7	53.9	57.30
5-14.99	59	25.1	31.8	15.5	25.70
15-24.99	24	10.4	12.8	9.7	8.30
25-34.99	11	4.8	7.8	3.9	2.50
35-44.99	10	4.4	4.3	3.4	5.40
45-54.99	9	4.0	3.5	8.3	0.80
>54.99	8	3.5	5.4	5.3	-

N represent sample size average for North West

Table 2: Socioeconomic characteristics of caregivers in North Western Nigeria (%)

Characteristics	N	North West	Kaduna State	Kebbi State	Niger State
Source of drinking water (%)					
Own tap inside house	43	18.7	10.8	44.8	0.4
Own tap outside house	2	1.0	0.7	2.2	-
Public tap	20	8.8	11.9	13.0	-
Water tank	3	1.3	3.3	-	-
Private well	53	23.0	41.6	21.1	7.1
Public well	25	13.5	21.9	6.3	0.8
River/lake	39	24.0	1.1	1.3	52.9
Spring	2	0.9	1.1	0.4	0.8

Table 2: Continued

Characteristics	N	North West	Kaduna State	Kebbi State	Niger State
Buy water	8	3.7	4.8	5.4	-
Borehole	33	14.1	2.6	5.4	38.1
Storage of drinking water (%)					
Plastic container	57	21.9	17.7	17.7	21.1
Aluminium container	11	4.2	1.7	7.8	10.4
Clay pot	159	51.3	36.5	71.9	68.5
Others	70	22.6	44.1	2.7	
Energy for cooking (%)					
Wood	218	85.7	75.7	85.7	94.8
Kerosene	158	7.7	12.9	12.5	2.2
Gas	7	2.9	6.3	0.4	1.5
Electricity	5	3.4	3.3	1.3	1.5
Others	2	0.7	1.8	-	
Type of Toilet (%)					
Bush	62	24.6	23.4	10.4	37.6
Pit latrine	166	65.7	61.3	78.7	62.0
VIP latrine	16	6.2	14.5	3.3	0.4
Water system	6	2.4	0.7	7.6	-
Refuse disposal (%)					
Bush	56	22.1	7.8	15.7	41.6
Refuse dump	181	71.9	77.4	82.9	57.6
City service	6	2.1	5.6	0.5	0.7
Others	9	3.9	9.3	0.9	-
Food storage (%)					
Refrigeration	42	19.0	27.1	12.8	13.5
No means of storage	163	71.0	61.1	83.5	74.5
Others	23	10.0	11.8	3.7	12.0

N represent sample size average for North west

Table 3: Hygienic practices in food preparation by caregivers in North Western Nigeria

Practices (%)	N	North West	Kaduna State	Kebbi State	Niger State
Washing of hand with soap and water					
Always	72	28.2	33.2	16.1	33.2
Sometimes	156	61.2	65.7	77.2	43.5
Never	27	10.6	1.1	6.7	23.2
Washing of fruits					
Always	93	36.3	36.5	39.3	33.5
Sometimes	161	63.0	62.7	60.3	65.4
Never	2	0.8	0.7	0.4	1.1
Sterilize feeding bottle					
Always	33	19.4	16.6	25.4	21.0
Sometimes	91	52.7	57.3	19.0	57.5
Never	48	27.9	26.1	55.6	21.5
Boiled drinking water					
Always	79	31.9	53.2	19.0	21.1
Sometimes	107	43.2	45.3	50.9	34.7
Never	62	24.9	1.5	30.1	44.2
Re-heat leftover food					
Always	187	73.7	65.8	95.9	63.5
Sometimes	54	21.3	22.7	1.8	35.8
Never	13	5.0	11.5	2.3	0.7
Use of cup and spoon					
Always	63	24.7	35.6	19.6	18.0
Sometimes	169	66.7	53.0	66.7	80.5
Never	22	8.7	11.5	13.8	1.5
Blow food to cool					
Always	61	23.9	32.5	20.2	18.4
Sometimes	135	53.2	24.0	64.6	73.4
Never	58	22.9	43.5	15.2	8.2
Hand feeding					
Always	54	21.6	16.5	14.4	32.7

Table 3: Continued

Practices (%)	N	North West	Kaduna State	Kebbi State	Niger State
Sometimes	132	52.5	40.8	75.7	45.1
Never	65	25.9	42.7	9.9	22.2
Masticate/pre-chew food					
Always	35	14.1	7.1	38.8	0.8
Sometimes	100	40.1	29.7	54.3	38.8
Never	115	45.8	63.2	6.8	60.4

N represent sample size average for North west

Table 4: Percentage of children 6-24 months old by feeding practice and state

	Breastfeeding				Bottle feeding			
Area	N	Ever breastfed (%)	N	Still breastfed (%)	N	Ever bottlefed (%)	N	Still bottlefed (%)
North west	235	98.4	182	71.7	88	35.3	47	31.3
Kaduna state	269	99.3	185	68.8	155	58.1	97	45.3
Kebbi sate	221	98.7	177	79.0	50	23.4	32	34.4
Niger state	214	97.3	184	68.4	60	28.0	13	8.9

Table 5: Breastfeeding initiation, giving of colostrum, frequency and duration (%)

Practices	N	North West	Kaduna State	Kebbi State	Niger State
Initiation					
Immediately after delivery	170	67.5	68.4	68.3	65.9
Within 12 h	61	24.2	26.7	23.4	22.2
Within 24 h	14	5.7	4.1	3.2	9.3
Within 48 h	4	1.7	0.4	2.8	2.2
After 48 h	2	0.9	0.4	2.3	0.4
Giving of colostrum	205	81.7	93.5	86.3	66.5
Frequency per day					
2-4 times	5	1.9	3.8	1.8	-
5-6 times	17	6.7	16.3	2.7	0.4
7-8 times	10	3.9	6.4	5.0	0.4
>8 times	27	10.6	16.0	15.5	1.5
Don't count feed on demand	193	77.0	57.6	75.0	97.8
Duration/Termination					
2-3 months	1	0.4	0.4	1.4	-
4-5 months	1	0.1	0.8	-	-
6-7 months	1	0.5	0.4	0.5	0.3
8-10 months	3	1.0	9.1	-	2.3
11-12 months	14	5.2	61.7	3.2	3.2
13-24 months	194	73.4	27.7	80.0	78.6
>24 months	51	19.4	1.4	15.0	15.6

N represent sample size average for North west

Data on the practice of hand washing before preparing foods was 61% for those that wash sometimes, followed by 28% which does it always while 11% never (Table 3) and the proportion of caregivers who sterilized feeding bottles in North West was 19% always, 53% sometimes and 28% never. The use of boiled water for drinking as well as in the preparation of milk was not a popular practice among the caregivers while 52% sometimes practiced hand feeding. Table 4 shows that breast-feeding was a universal practice and feeding colostrums. Table 5 presented practiced among mothers in North Western Nigeria (81.8%). Reasons given by caregivers who did not feed their children with colostrums includes tradition (67.5%) which was passed on by elders in the communities without knowing the actual reason, this was followed by those that believed that the first milk is dirty (16.6%) while 4.4% were due to lack of breast-milk (Table 6). Reasons given by majority of caregivers for stopping breastfeeding before the 24th month (Table 7) was that the child can eat on his/her own (41.4%) and At the time of the survey, only 54.3% of the caregivers practiced exclusive breastfeeding (Table 8) but 85.5% of the children were giving water in addition to breastmilk. Over 60% of caregivers introduced bottlefeeding from the 5th to 6th month with worst situation recorded in Niger state

Table 6: Reasons for not giving colostrums (%)

Reason	N	North West	Kaduna State	Kebbi State	Niger State
Tradition	35	67.5	55.6	65.3	73.4
First milk dirty	9	16.6	44.4	1.3	26.6
No breastmilk	2	4.4	-	9.3	-
Wash breast with local herbs	4	6.3	-	13.3	-
Sickness	3	5.2	-	10.7	-

N represent sample size average for North west

Table 7: Reasons for stopping breast feeding before 24 months (%)

Reason	N	North West	Kaduna State	Kebbi State	Niger State
Child can eat on his own	43	41.4	42.4	1.4	75.6
Weaning	9	8.9	7.3	-	20.5
No breastmilk	2	1.6	3.0	-	-
Tradition	28	26.8	20.0	71.8	-
Breast pain	1	1.2	2.4	-	-
Child is healthy	9	8.6	16.4	-	-
Pregnancy	8	7.9	8.4	15.5	-
Mother busy in office	3	2.6	-	11.3	-
Child refuse breastmilk	1	1.0	-	-	3.8

N represent sample size average for North west

Table 8: Exclusive breastfeeding and duration (%)

Practices	N	North West	Kaduna State	Kebbi State	Niger State
Give only breastmilk	136	54.2	58.5	39.4	62.4
Duration of exclusive breastfeeding					
<1 month	9	6.3	10.9	8.5	0.6
1-2 months	2	1.7	3.0	-	1.2
3-4 months	13	9.4	18.2	11.0	-
5-6 months	114	82.6	67.3	80.5	98.2
Give water in addition to breastmilk	216	85.5	85.1	95.5	77.9
Month start giving water					
From birth	105	47.3	37.3	87.7	19.0
1-2	28	12.5	6.9	3.8	26.7
3-4	33	15.0	31.8	6.6	5.4
5-6	56	25.2	24.0	1.9	48.9

Table 9: Bottlefeeding practices in North western Nigeria (%)

Practices	*N	North West	Kaduna State	Kebbi State	Niger State
Month start bottlefeed					
<1	10	11.3	6.4	31.6	4.9
1-2	11	11.8	9.0	28.0	3.3
3-4	12	12.9	13.5	17.5	6.6
5-6	19	20.9	30.8	12.2	3.3
>6	40	43.6	40.4	10.5	82.0
Average bottlefeeding per day					
<5 times	13	19.1	20.4	33.3	8.9
5-10 times	27	40.2	25.7	3.3	89.3
11-15 times	2	3.5	6.2	-	-
16-20 times	3	4.5	8.0	-	-
>20 times	22	32.7	39.8	63.3	1.8

N represent sample size average for North west

(Table 9). 41.9% of caregivers gave something to their children before initiation of breastfeeding while majority of the respondents disclosed that the reason for giving it was that, it makes the children healthy (33.5%) while some simply said it reduces thirst (27%) (Table 10).

Based on Fig. 1, complementary foods in the North west were introduced to children at age 3-4 months (41.2%) and 5-6 months (38.9%) while 17.7% introduced it at an earlier age 1-2 months. Continuous feeding of children during an episode of illness were practiced by caregivers (Fig. 2).

Table 10: Pre-lacteal feeding (%)

Practices	N	North West	Kaduna State	Kebbi State	Niger State
Give anything before initiating breast milk	108	41.9	37.6	45.7	42.5
What give					
Plain water	58	51.5	17.1	81.0	49.2
Glucose water	19	17.0	37.1	8.6	6.5
Honey	2	2.7	-	4.3	10.5
Milk formula	6	5.7	11.4	1.7	4.0
Others	19	23.2	34.3	5.3	29.8
Reason for giving					
Child's mother sick	5	4.9	11.1	-	4.1
Make child healthy	32	33.5	74.7	16.8	-
Reduce thirst	12	12.5	14.1	14.6	30.1
Cleanse child stomach	8	8.6	-	2.9	28.8
Tradition	26	27.0	-	37.2	37.0
No enough breastmilk	8	8.3	-	17.5	-
Child cry for hunger	5	5.2	-	10.9	-

N represent sample size average for North west

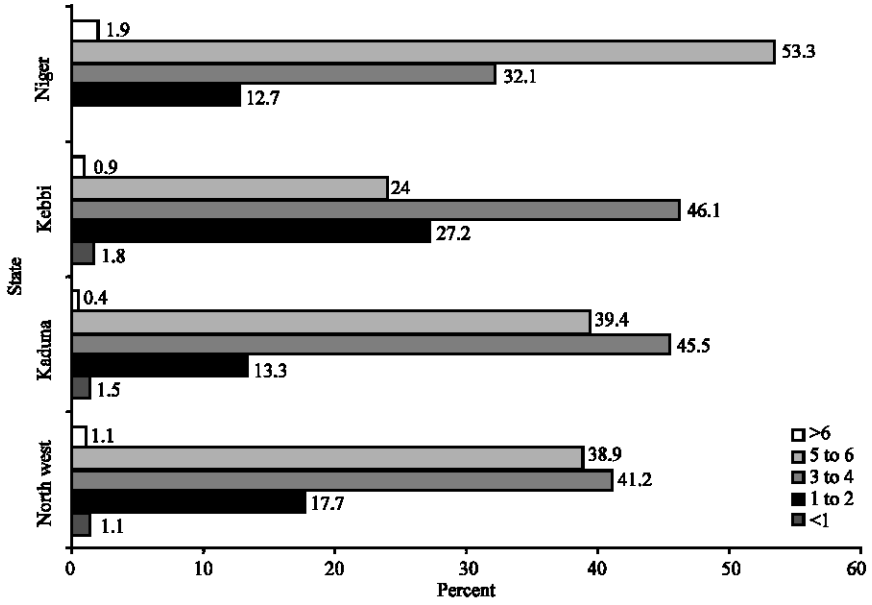

Fig. 1: Age of introduction of other foods

The nutritional status of children in North West which showed that 31.7% of children in North west were severely stunted with Kebbi state recording the highest prevalence rate of 51.9% among states studied (Fig. 3).

DISCUSSION

As depicted in the extended (UNICEF, 1990) model of care, child survival, growth and development depend not only on food intake and health, but also on the amount and quality of care given by the caregiver. Lack of education by many of the caregivers (Table 1) may hinder their ability to give care to their child since according to Sandoval-Priego *et al*. (2002) a more educated mother/caregiver raises a better quality child than a less educated mother, which also enhances efficient

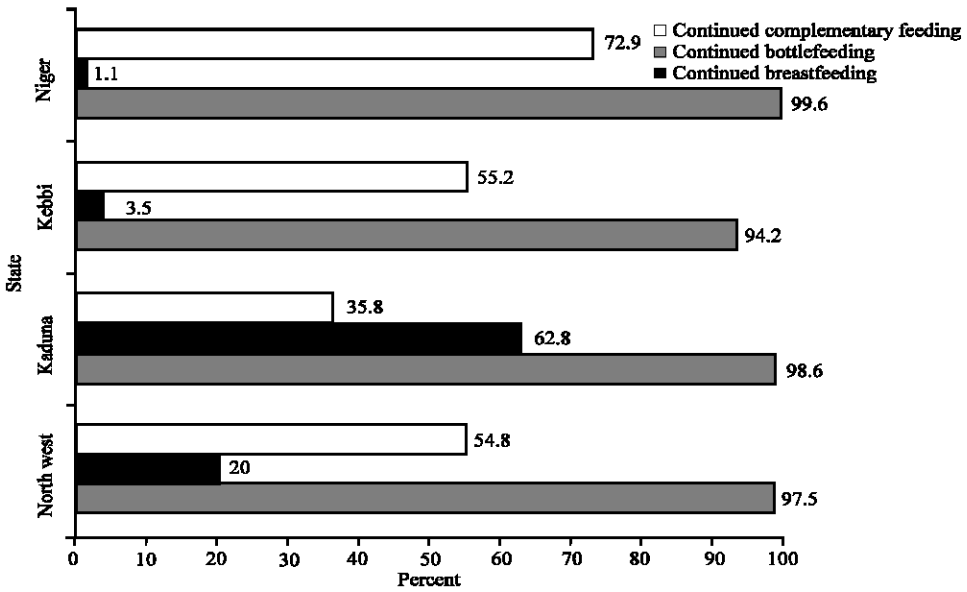

Fig. 2: Distribution of feeding practice during childhood illnesses

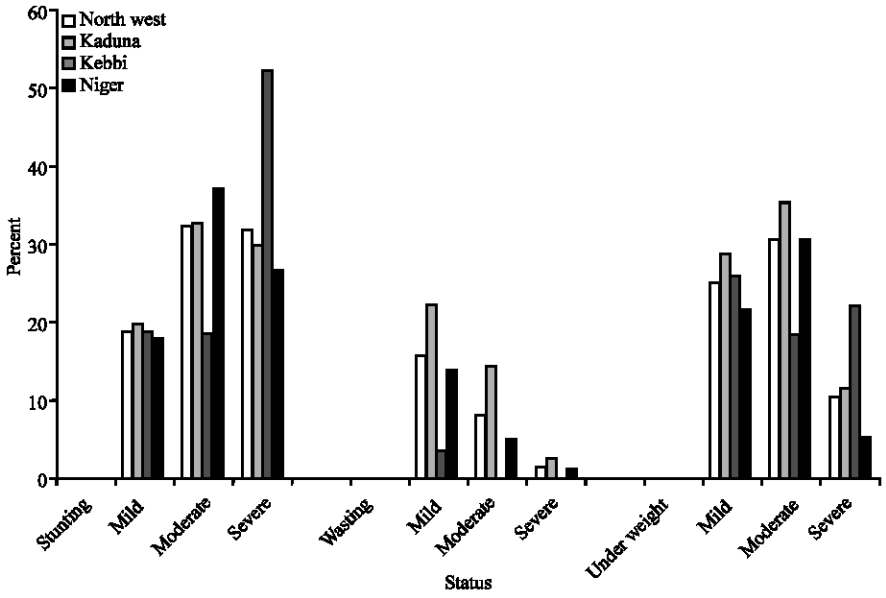

Fig. 3: Nutritional status of children in North west and state

use of time of mother or caregiver. Ruel *et al*. (1999) reported that care practices are strong determinants of children's nutritional status, particularly for children with mothers having less than a secondary school education.

The income of the caregivers were very low (Table 1) hence, there may be inadequate resources for childcare and inability to utilize or contribute to the creation of resources for health in the household on a sustainable basis. Studies have shown that poor drinking water facilities, inadequate

sanitary facilities and poor hygiene, particularly during food preparation are the main causes of many infections among the young children (WHO, 1993). And the best way to ensure that food and water are free from contamination is to heat them to a sufficiently high temperature (> 70°C) immediately prior to serving. Despite the simplicity of this recommendation, the limitations of available facilities in the household like distance from the source of water supply, refrigeration and sufficient fuel for cooking often makes this guideline impracticable to many mothers (Black *et al*., 1989). This was what obtained in this study as caregivers boiled drinking water sometimes (Table 3) and predominant source of energy and drinking water were wood and river/lake and unprotected well, respectively while most caregivers had no means of storing household foods (Table 2). Inadequate facilities in the household and the poor hygiene practices in the preparation of foods, results in infections due to contaminated foods and feeding utensils (Black *et al*., 1989). Lack of access to safe water and poor environmental sanitation due to unsanitary waste disposal are considered important causes of infectious diseases, especially diarrhea and intestinal parasites. Illness due to contaminated food is now regarded as one of the most widespread health problems (Mini and Reeta, 2006). The quality of household health environments is measured using indicators of type of water and latrine use but most caregivers that participated in this study uses pit latrines (Table 2).

Exclusive breast feeding is widely recognized as the optimal means of feeding and caring for the young infants during the first few months of life (Brown *et al*., 1995). The WHO (2002) recommends exclusive breast feeding for the first six months of life and continued breastfeeding until the age of two years and beyond. This study found that practices of exclusive breastfeeding in North west were not in full compliance with the International recommendation (Table 8). Only about half of mothers that participated in the study practiced exclusive breastfeeding from birth up to the age of six months but in addition to the breast milk over three-quarter of them gave water, most of start giving water to their children at birth (Table 8, 10). The main question arising from these data is why are so many children given something before initiation of breastfeeding, while some caregivers reasoned that it makes child healthy and also help to reduce thirst, others simply said it was a tradition passed on them by eders in their community. International consensus indicates that complementing breast milk even with water during the first six months of a child's life is unnecessary and may increase the risk of diarrhoea as extra solids and liquids are often contaminated (Martines *et al*., 1992). Providing other liquid or food in addition to breast milk during the first six months could potentially be harmful that is, risk of infection, poorer stimulation of breast milk production and should only be done if medical reasons exist (De Pee *et al*., 2003). It was found that majority of the children (51.5%) were given plain water (Table 10) followed by those children given other things like cow butter (23.2%) before the initiation of breastfeeding. Additionally, because of the associated exposure to pathogens and interference with successful breastfeeding, current feeding recommendation strongly discourages use of baby bottles throughout childhood (PAHO/WHO, 2003). Over 50% of caregivers in Kaduna state bottlefeed their child at the 6th month with infant formula while some in Kebbi state (31.58%) start as early as less than one month of age.

Complementary foods were introduced to majority of the children much earlier at 3rd month than the 6th month recommended (Fig. 1) contrary to the recommendation of World Health Organization, that complementary feeding should be initiated on the 6th month (WHO, 1995). Studies in Malawi revealed that children who were given foods according to the timing set by the World Health Organisation were found well-nourished as compared with children who were introduced to solids too early (Madise and Mpoma, 1997). The high proportions of mothers in North Western Nigeria who sustained breastfeeding/bottle feeding/complementary feeding during child's illness (Fig. 3) indicate that the practice of withholding foods during an episode of illness was uncommon.

In rural Africa the prevalence of linear growth retardation, also called stunting, among children is generally high (De Onis *et al*., 1993). This can lead to serious functional complications, such as lower

mental development, reduced work capacity in adulthood and increased obstetric risk (Hautvast *et al*., 1999). In Nigeria, 42% of the children were stunted while 10% were wasted and underweight, 25% (NFCNS, 2004). This study revealed that North Western Nigeria average for severely stunted children was lower (31.7%) than the National average but that obtained for Kebbi state was higher (51.9%). This reflects the cumulative effects of numerous insults (chronic malnutrition) experienced by children during infancy and early childhood (Lutter, 2003). The region also had an almost equal proportion of moderately wasted children (10.38%) compared to the 10% National average reported (NFCNS, 2004).

In order to meet the Millennium Development Goals, there is the need to strengthen nutrition education among mothers/caregivers focusing on the importance of proper techniques of breastfeeding, proper timing of complementary foods, economic empowerment of caregivers and other intra-household factors.

The nutrient composition of the commonly used complementary foods in the region should be studied.

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