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# Does maternal education impact infant and child care practices in African setting? The case of Northern Nigeria

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## ABSTRACT

**Background:** In many African settings, infant and child care practices are dictated by long-established social norms and cultural values, some of which may be disastrous to the health of the baby. To determine how maternal education is related with child health and rearing practices in Kano. **Materials and Methods:** Using a descriptive cross-sectional design, 386 randomly selected mothers of under-five children and their babies were examined. Data were analyzed using IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, NY, USA). Children's weight-for-height, height-for-age, and weight-for-age Z-scores were obtained. Infant and child care, feeding and weaning practices were assessed and scored based on a system adapted from past study. **Results:** The mean  $\pm$  standard deviation of the mothers was  $27.3 \pm 5.2$  years, 69.7% had at least secondary school education. The mothers had  $4 \pm 2$  children, and 79.3% were  $\geq 12$  months old. More than half of the children (58.2%) had suffered one or more of the common childhood diseases within the previous month, 60.3% had a form of malnutrition and less than half (42.5%) were fully immunized for age. Varying infant and child care, feeding and weaning practices were observed. Overall, half (49.2%) of the mothers had good care practices, 42.2% had good feeding practices and 57.6% had good weaning practices. Interestingly, neither the mothers' care practices nor the feeding practices were statistically associated with their educational status. However, the proportion of the mothers with good weaning practices was higher among those with no secondary education (59.7%). **Conclusion:** The finding suggests that cultural beliefs are specific areas of focus in campaigns for improving infant and child care and rearing practices of mothers, and eventually for reducing the high infant and child morbidity and mortality in the Northern Nigeria.

**Keywords:** Infant and child care, infant and child feeding, Northern Nigeria, practices, weaning

## INTRODUCTION

Education of females is not only important for the purpose of employment or attainment of a desirable social standard but also contributes significantly to how they manage their families. Education increases

the confidence of women and is associated with increased health awareness, reproductive and health seeking behavior, as well as the health status of their children.<sup>[1,2]</sup> Studies have demonstrated that increasing level of maternal education positively influenced child health.<sup>[3-7]</sup> In many African settings, infant and childcare practices are dictated by long-established social norms and cultural values, some of which are disastrous to the health of the baby and the society.<sup>[1]</sup> Among the Hausa

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and Fulani people of the Northern Nigeria, the 40-day postbirth period called “Jego” is highly revered and mothers and their neonates receive special attention and care. During this period, an older female relative, often times the mother-in-law, comes in to support the mother with the care of the new baby, supervision of cultural rites, as well as household chores.

Hazardous newborn practices considered tradition are widespread in the Northern parts of Nigeria and include traditional surgical rites such as traditional body marks (tattoos), removal of tonsils and/or adenoids, removal of “Beli/Angurya” from private part from female babies (a form of female genital cutting where some part of the clitoris is scrapped). Common practices largely related to child feeding with potentially negative health impact on the newborn include discarding colostrum, use of prelacteal feeds such as honey, holy water, or pre-masticated date. In addition, in many families in the room where the mother and neonate live are heated with charcoal over this 40-day period. Detrimental customs also extend to older infants and children and include commencement of complementary feeding with “koko” (gruel made from sorghum, maize, millet, or soya beans) before 6 months, as well as abrupt weaning with separation of baby from the mother are also widely reported. These practices can result in serious health consequences including diarrheal diseases, sepsis, neonatal tetanus, exposure to HIV and hepatitis B or C infections, and under-nutrition (both macro- and micro-nutrients), many of which have consequences that extend well beyond the childhood period. In extreme cases, death may ensue.<sup>[8-10]</sup>

Mothers are generally the homemakers and the primary caregivers of children in many sub-Saharan African societies. In addition, the attitude, social, and cognitive consequences of education underlie changes in maternal behavior toward children leading to improved health and lower morbidity and mortality.<sup>[6]</sup> However, studies have shown that culturally relevant parenting beliefs related to childrearing and socialization are among the most resistant to change.<sup>[11]</sup> Despite the cosmopolitan nature of Kano, socioeconomic indicators including gross school attendance ratio for females, maternal, and child mortality are among the worst in the country and vary with the status of the women.<sup>[12]</sup> This study was therefore aimed to determine how maternal education is related with child health and rearing practices in Kano. Findings from this study would be useful in conceptualizing the role of maternal education in child care practices in the African context and would also

be useful to health authorities and program managers for packaging interventions for promoting healthy child care practices as well as reducing morbidity and mortality of vulnerable children in Africa.

## MATERIALS AND METHODS

### Setting

The study was carried out in the eight local government areas (LGAs) (Kano Municipal, Dala, Gwale, Fagge, Nassarawa, Tarauni, Kumbotso, and Ungogo LGAs) that comprise Kano municipality.

Kano State is located in the North-Western Nigeria and is one of the oldest and largest among the 36 states in the country. The economy of Kano is largely dependent on agriculture and commerce. Islam is the dominant religion, although there are significant groups of Christians. Urban drift from rural areas, from within Kano and other states in Nigeria, as well as from the West Africa countries has provided a steady stream of migrants adding to Kano’s growing population. There were over 9 million people in Kano state according to the last national census in 2006;<sup>[13]</sup> with nearly 3 million (30.1%) residing in the metropolitan LGAs. The city of Kano is characterized by deeply rooted traditional infant and childcare practices, low female literacy rate (36.3%), and poor health indices according to a recent national survey.<sup>[12]</sup> The survey reported infant and child mortality rates of 89 and 105 per 1000 live births, and 48.3% prevalence of stunting in under-five children (percentage below Z scores  $-2$  standard deviations [SD]).

### Study design

A cross-sectional descriptive design was used.

### Participants and sampling

Three hundred and eighty-six mothers of under-five children and their children resident in the metropolitan LGAs were estimated for the study using the Fisher’s formula for descriptive studies.<sup>[14]</sup> They were recruited using multistage sampling technique. Using this method, four (Gwale, Tarauni, Dala, and Kumbotso) out of the eight LGAs were randomly selected in stage one. In the second stage, three wards were randomly selected from each of the four LGAs, making up a total of 12 wards. Next, one settlement was selected from each of the chosen wards. Thirty-two households were selected from each of the selected settlements using a systematic sampling technique and eligible mother-child pair selected.

### Data collection

An interviewer-administered pretested questionnaire was used to collect data from the mothers on sociodemographic characteristics, prevalence of childhood illnesses and immunization status, and infant and child feeding and rearing practices. Anthropometry measures of children under-5 years were obtained. We pretested the questionnaire using a sample of participants drawn from a different LGA other than the study area. Some of the questions were rephrased for clarity based on of the pretesting. All interviews were conducted in Hausa language, since this is the language widely spoken in the study area. Six trained Hausa speaking research assistants were recruited to administer the questionnaires. Ethical approval was obtained from the Institutional Review Board of Aminu Kano Teaching Hospital and local permission obtained from the Kano State Ministry for Local Government and Chieftaincy Affairs in addition to the local government authorities. Informed consent was obtained from each respondent prior to interviews. The consent form was in the local language (Hausa), and literate respondents indicated acceptance by signing the consent form, while nonliterate participants affixed their thumbprint.

### Data management

Data were analyzed using IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, NY, USA). Educational status of the mothers was defined as those with completed secondary school level of education and those without. The nutritional status of the children was assessed using weight-for-height, height-for-age, and weight-for-age Z-scores to define wasting, stunting, and underweight. Infant and child care, feeding and weaning practices were scored and assessed on an ordinal scale based on recommended practices using a scoring system adapted from a past study and graded into “good practice” for percentage greater than the mean score and “bad practice” for scores than the mean value.<sup>[15]</sup> Age and sex specificity of the questions were taken into consideration in the scoring. We assessed the health status of the children using nutritional and immunization status, common illnesses (fever, cough, diarrhea, and skin infections) suffered by the children in the month preceding.

### Data analysis

Continuous variables were summarized using means ( $\pm$ SD) or medians interquartile range. Categorical variables were described using frequencies and percentages. The Chi-square test was used to determine the relationship between mothers’ education and infant

and child feeding and rearing practices of the mothers as well as with child health and nutritional status.

## RESULTS

### Sociodemographic characteristic of the respondents

The age of mothers ranged from 18 to 42 years with a mean  $\pm$  SD of 27.3  $\pm$  5.2 years. The majority was married (97.9%) and from the Hausa/Fulani ethnic background. More than two-third of the mothers (69.7%) had at least secondary school education. The mothers had between one and twelve children (mean  $\pm$  SD = 4  $\pm$  2), and majority of the children (79.3%) were aged 12 months and above. The characteristics of the mothers and their children are as summarized in Table 1.

### Infant and child health status

Only 146 of the 368 children examined (39.7%) had normal nutritional status. The remaining 60.3% had a form of malnutrition. More than half of the children (58.2%) had suffered one or more of the common childhood diseases within the previous month, and less than half (42.5%) were fully immunized for age. Bivariate analysis shows that nutritional status and prevalence of fever, cough, diarrhea, and skin

**Table 1: Sociodemographic profile of the respondents**

Characteristic	Frequency (n=386)	Percentages
Age group (years)		
18-22	67	17.4
23-27	173	44.6
28-32	88	22.8
33-37	41	10.6
38-42	18	4.7
Marital status		
Married	378	97.9
Divorced	5	1.3
Widowed	2	0.5
Separated	1	0.3
Ethnicity		
Hausa	312	80.8
Fulani	66	17.1
Yoruba	6	1.6
Igbira	2	0.5
Parity		
Primipara	46	11.9
Multipara	235	60.8
Grand multipara	105	27.2
Educational status	70	18.1
Qur'anic only		
Primary	47	12.2
Secondary	219	56.7
Tertiary	50	13.0
Age of children (months)		
0-5	32	8.3
6-11	48	12.4
$\geq$ 12	306	79.3
Sex of children		
Male	217	56.2
Female	169	43.8

infections were similar among children of mothers with and without at least secondary school level of education. However, children born to mothers who had secondary school education were more likely to complete all recommended immunization for their age compared with children born to mothers with no education ( $P < 0.001$ ) as shown in Table 2.

### Infant and child care practices among mothers

The parameters used to assess the infant and childcare practices are summarized in Table 3. Varying practices related to cord “care” were reported by women with and without secondary education. However, the most commonly reported practice in both groups was the application of dry heat compress to the umbilical

**Table 2: Proximate indicators of infant and child health (n=386)**

Indicator	Educational status		Total	$\chi^2$ (P)
	No secondary (n=117)	At least secondary (n=269)		
<b>Nutritional status</b>				
Normal	42 (35.9)	104 (38.7)	146	0.26** (0.61)
Under-weight	2 (1.7)	2 (0.7)	4	
Stunting	13 (11.1)	19 (7.1)	32	
Wasting	16 (13.7)	46 (17.1)	62	
Wasting and underweight	25 (21.4)	71 (26.4)	96	
Stunting and underweight	9 (7.7)	9 (3.3)	18	
Wasting and stunting	-	1 (0.4)	1	
Wasting, stunting and underweight	10 (8.5)	17 (6.3)	27	
<b>Immunization status</b>				
Fully immunized for age	24 (20.5)	140 (52.0)	164	40.2 (0.0001)*
Partially immunized	49 (41.9)	89 (33.1)	138	
Not immunized	44 (37.6)	40 (14.9)	84	
<b>Common illnesses suffered within last month preceding the survey</b>				
Fever	52 (44.4) <sup>†</sup>	112 (41.6) <sup>††</sup>	164	0.26 (0.61)
Cough	41 (35.0) <sup>†</sup>	109 (40.5) <sup>††</sup>	150	1.03 (0.31)
Diarrhea	32 (27.4) <sup>†</sup>	63 (23.4) <sup>††</sup>	95	0.68 (0.41)
Skin infections	11 (9.4) <sup>†</sup>	24 (8.9) <sup>††</sup>	35	0.02 (0.88)

Multiple responses: <sup>†</sup>Each response out of 117; <sup>††</sup>Each response out of 269; \*Statistically significant; \*\*Calculated considering nutritional status as “normal” or “malnourished”

**Table 3: Infant and child care practices of mothers (n=386)**

Practice	No secondary education (n=117)	At least secondary education (n=269)	Total
<b>What was used for cord care</b>			
Dry heat compress	88 (75.2)	181 (67.3)	269
Cleaning with methylated spirit	14 (12.0)	44 (16.4)	58
Dry heat compress and application of toothpaste	7 (5.9)	29 (10.8)	36
Dry heat compress and application of salt	6 (5.1)	5 (1.9)	11
Cleaning with spirit and application of toothpaste	1 (0.9)	5 (1.9)	6
Cleaning with spirit and application of salt	1 (0.9)	3 (1.1)	4
Warm towel compress	-	2 (0.7)	2
<b>Methods used for cleaning babies in the neonatal period</b>			
Bathing with warm water	88 (75.2)	156 (58.0)	244
Draping with warm towel	29 (24.8)	113 (42.0)	142
<b>How frequent babies were cleaned per day in the neonatal period</b>			
Once	91 (77.8)	218 (81.0)	309
2-3 times	26 (22.2)	51 (19.0)	77
<b>How babies were kept warm in the neonatal period</b>			
Covered with wrapper/blanket	116 (99.2) <sup>†</sup>	269 (100.0) <sup>††</sup>	385
Warming room with charcoal	112 (95.7) <sup>†</sup>	251 (93.3) <sup>††</sup>	363
Tying baby to mother’s chest (Kangaroo care)	34 (29.1) <sup>†</sup>	127 (47.2) <sup>††</sup>	161
<b>Traditional surgical procedure performed on babies</b>			
Uvulectomy	54 (46.2) <sup>†</sup>	73 (27.1) <sup>††</sup>	127
Tribal mark (s)	1 (0.9) <sup>†</sup>	2 (0.7) <sup>††</sup>	3
Female circumcision* (n=169: no secondary - 51; at least secondary - 118)	2 (3.1) <sup>†</sup>	12 (10.2) <sup>††</sup>	14
<b>Where health care was sought for last illness</b>			
Administered orthodox drugs at home	n=70 31 (44.3)	n=155 60 (38.7)	91
Use of traditional remedies	2 (2.8)	-	2
Treated at patent medicine store	27 (38.0)	72 (46.5)	99
Treated in the hospital	10 (14.1)	23 (14.8)	33

Multiple responses: <sup>†</sup>Each response out of 117; <sup>††</sup>Each response out of 269. \*Procedure performed only on females

stump. This practice was slightly more prevalent among mothers with no secondary education (75.2%) compared to those with secondary education (67.3%). The use of methylated spirit for cord care was reported by less than one-fifth of the mothers from each of the group of women that had at least secondary education 44 (16.4%) and those without 14 (12.0%). Majority of the mothers cleaned their babies by bathing them with warm water 244 (63.2%), once a day 209 (54.1). Less than half of the mothers surveyed 161 (41.7%) reportedly used “Kangaroo mother care” method for keeping their neonates warm. Nearly, all (99.7%) of the mothers said they wrapped their babies with a piece of cloth or blanket or used charcoal heating system as a way of keeping them warm. Nearly, a third (32.9%) of the children had traditional uvulectomy, while female circumcision was done on fourteen (8.3%) of the female children.

When the mothers’ infant and childcare practices were scored based on recommended practices, nearly half (49.2%) had good practices. From the bivariate analysis [Table 4], infant and childcare practices were not associated with mothers’ educational status ( $P > 0.05$ ).

#### Infant and child feeding practices of mothers

Table 5 summarizes the responses of the mothers regarding their infant and child feeding practices. About 80% ( $n = 308$ ) indicated that they placed their newborn babies to the breast to suckle within 1 h after delivery. The responses from the mothers show that 26.4% ( $n = 102$ ) washed their breasts with soap and water before giving the breast to their child to breastfeed. More than half of the respondents (60.9%) reported that they gave various forms of prelacteal feeds to the newborn babies. Nearly, all the mothers reported to have given their newborn babies colostrum (99.5%), and breastfed their babies on-demand (97.2%). All the mothers reported that they gave some form of mixed feeding to the babies before 6 months of age;

the most common of which was plain water (57.3%). More than half (59.0%) of the mothers commenced complementary feeding for their babies at the ages of 6 and 7 months, respectively. The most common foods given were family food (41.2%) and gruel made from maize, millet, or sorghum (akamu) (30.2%). Infant feeding practices observed were similar among mothers with at least secondary school education and those with no secondary education [Table 5].

When the mothers’ infant and child feeding practices were scored, it was observed that 163 (42.2%) had good practices. When stratified by educational status it was found that 116 (43.1%) of women without secondary school education and 47 (40.2%) of those with at least secondary school education had good infant and child feeding practices ( $P > 0.05$ ) [Table 4].

#### Weaning practices of the mothers

The mean age at weaning in this study was  $19 \pm 2.4$  months. Majority (80.0%) were weaned between 18 and 24 months. When asked about the proportion of breast milk to complementary feeds the mothers used for feeding the children during the last 3 months before weaning, 222 mothers (90.6%) reported feeding with breast milk most times. More than three-quarters of the mothers used eggs (88.2%), fish 211 (86.1%), and milk 193 (78.8%) as an additional source of nourishment for their weaned off children. The weaning practices were also similar within mothers with at least secondary school education and those without secondary education.

When the weaning practices were scored, 141 mothers (57.6%) were found to have good practices. Interestingly, the proportion of the mothers with good weaning practices was higher among those with no secondary education (59.7%) as shown in Table 4. The weaning practices of the mothers are as summarized in Table 6.

**Table 4: Relationship between maternal education and child health care and rearing practice grades**

Practices	No secondary education	At least secondary education	Total	Chi-square	P
Child health care practices, frequency (%)	$n=117$	$n=269$	368		
Good	106 (90.6)	224 (83.3)	330	3.53	0.06 (NS)
Bad	11 (9.4)	54 (16.7)	56		
Infant and child feeding practices					
Good	93 (79.5)	200 (74.4)	293	1.78	0.28 (NS)
Bad	24 (20.5)	69 (25.6)	93		
Weaning practices	$n=69$	$n=176$	225		
Good	57 (82.6)	149 (84.7)	206	0.156	0.69 (NS)
Bad	12 (17.4)	27 (15.3)	39		

NS: Not significant

Table 5: Infant and child feeding practices of mothers (n=386)			
Practice	No secondary (n=117)	At least secondary (n=269)	Total
Time of initiation of breastfeeding			
Within an hour	97 (82.9)	211 (78.4)	308
1-24 h	18 (15.4)	43 (16.0)	61
>24 h	2 (1.7)	15 (5.6)	17
Treatment of breast before initiation of breastfeeding			
Washed with clean water only	30 (25.6)	42 (15.6)	72
Washed with soap and water	25 (21.4)	77 (28.6)	102
Not treated	62 (53.0)	150 (55.8)	212
Prelacteal feeds given			
Holy water (Zamzam) and/or Washings of scriptures of holy Qurán (Rubutu)	36 (30.8)	70 (26.0)	106
Plain water	2 (1.7)	1 (0.4)	3
Premasticated dates	8 (6.8)	13 (4.8)	21
Premasticated dates mixed with "Zamzam"	33 (28.2)	71 (26.4)	104
Premasticated dates mixed with "Rubutu"	1 (0.9)	-	1
None	37 (31.6)	114 (42.4)	151
Fed baby with colostrums	116 (99.2)	268 (99.6)	384
Frequency of breastfeeding			
Three times a day	-	5 (1.9)	5
More than three times	-	6 (2.2)	6
On-demand	119 (100.0)	258 (95.9)	375
Supplementary feeds given to babies before 6 months			
Plain water	67 (57.3)	154 (27.2)	221
Water and "Akamu" without milk	49 (41.9)	103 (38.3)	152
Water and infant formula	-	2 (0.7)	5
Infant formula	-	4 (1.5)	4
Water and "Akamu" with milk	1 (0.9)	1 (0.4)	2
Water and beans	-	5 (1.9)	2
Age of commencement of complementary feeding* (months)	n=103	n=251	354
6	47 (45.6)	162 (64.5)	209
7	53 (51.5)	88 (35.1)	141
8	1 (1.0)	1 (0.4)	2
9	2 (1.9)	-	2
Type of complementary feeds given*	n=103	n=251	354
Staple food	58 (56.3)	88 (35.1)	146
Akamu	27 (26.2)	80 (31.9)	107
Akamu with milk	8 (7.8)	35 (13.9)	43
Infant formula	4 (3.9)	37 (14.7)	41
Akamu and soya beans	6 (5.8)	11 (4.4)	17

\*Applies only to babies 6 months and above. NB: Akamu is gruel made from maize, millet, or sorghum

## DISCUSSION

This study highlights the various child care and feeding practices prevalent among mothers as well as the health status of their children in a typical Northern Nigerian setting. Undernutrition was prevalent among the children, with over a third having some of the undernutrition. Immunization was relatively poor and less than half of the children had been fully immunized. Several potentially hazardous practices related to child care were widely practiced by mothers irrespective of their educational attainment. For instance, traditional uvulectomy was practiced by nearly a third of mothers, while nearly all mothers reported using charcoal to heat their rooms. Feeding practices were mixed. Appropriate practices such as early initiation of breastfeeding, use of colostrum, and on-demand breastfeeding were widely

practiced. However, prelacteal and mixed feeding were also commonly practiced.

As reported by other studies,<sup>[16,17]</sup> this study also observed that more educated women had their children immunized more than those of the less educated women. Interestingly, the educational status of the mothers did not appear to have influenced the health status of the children as both children of the more educated and the less educated alike had poor health status. This surprisingly contrasts with evidence from studies that had shown that maternal education plays an even better role than income in improving the overall health of children.<sup>[18]</sup> Empirically, women who were more educated would have been more informed on the right diet to give the children and have better resources than the less educated to provide

**Table 6: Weaning practices of mothers (n=245)**

Practice	No secondary (n=76)	At least secondary (n=169)	Total
Proportion of complimentary feeds to breast milk given 3 months before weaning			
Breast milk most times	73 (96.1)	149 (88.2)	222
Almost same with breast milk	3 (3.9)	13 (7.7)	16
Complimentary feeds most times	-	7 (100.0)	7
Age breastfeeding was stopped (months)			
<18	11 (14.5)	38 (22.5)	49
18-24	65 (85.5)	131 (77.5)	196
Additional source of nourishment postweaning			
Egg*	63 (82.9)	153 (90.5)	216
Fish*	62 (81.6)	149 (88.2)	211
Milk*	51 (67.1)	142 (84.0)	193

\*Multiple responses: Each response is out of 245 (100%)

healthier meals and afford better health services and practices for their children that will reduce childhood morbidity and mortality.<sup>[18]</sup> In the same vein, there was a general uniformity in the practice of newborn care among the educated and the uneducated, poor cord care practices, unhealthy method of warming the room, lack of exclusive breastfeeding, traditional surgical procedures like female genital cutting and poor health seeking behavior; and some of these unhealthy practices were paradoxically higher among the educated than the noneducated women although the difference was not statistically significant. Though there is no conclusive evidence to show that ethnicity has a positive or negative effect on child health but there are assumptions that some cultural beliefs and practices affect child caring practices like the use of prelacteal feeds and childcare in some countries and probably the case in this study.<sup>[19]</sup>

Based on the report of the mothers in this study, one would assume that the complementary feeds they used on the children are fortified but this assertion did not concur with the nutritional status of the children as many were observed to be malnourished. It could also be that the quality of the complementary feeds given may be adequate, but the quantity given may be inadequate. This study also observed that the infant feeding and weaning practices were similar among mothers in the two categories of educational status. This finding contradicts the common reports from studies which attest that educated mothers had better infant and child feeding practices compared to noneducated or least educated mothers.<sup>[20]</sup> The scenario here suggests that deeply rooted cultural beliefs would have influenced the mothers' infant and child care practices albeit their levels of education. Sociocultural factors had been cited among key factors that influenced infant and child care practices in Africa.<sup>[21,22]</sup>

## CONCLUSION

Except for uptake of routine childhood immunization, mothers' education did not appear to have influenced the pattern of childcare and weaning practices of mothers examined. This finding suggests that cultural beliefs are specific areas of focus in campaigns for improving infant and child care and rearing practices of mothers, and eventually for reducing the high infant and child morbidity and mortality in the Northern Nigeria.

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### Conflicts of interest

There are no conflicts of interest.

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