

Maternal nutritional knowledge and child nutritional status in the Volta Region of Ghana

Lily Yaa Appoh PhD and Sturla Krekling PhD

Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway

Abstract

The relationship between mother's nutritional knowledge, maternal education, and child nutritional status (weight-for-age) was the subject of investigation in this study. The data were collected in Ghana on 55 well nourished and 55 malnourished mother-child pairs. A questionnaire designed to collect data on mother's knowledge and practices related to child care and nutrition was administered to the mothers. Data on mother's demographic and socio-economic characteristics as well as child anthropometric data were also collected. A nutrition knowledge score was calculated based on mother's responses to the nutrition related items. Bivariate analysis gave significant associations between child nutritional status and the following variables: time of initiating of breastfeeding, mother's knowledge of importance of colostrum and whether colostrum was given to child, age of introduction of supplementary food, and mother's knowledge about causes of kwashiorkor. The two groups also showed significant differences in their nutrition knowledge scores. Maternal formal education, and marital status were also found to be associated with child nutritional status in bivariate analyses. Further analysis with logistic regression revealed that maternal nutrition knowledge was independently associated with nutritional status after the effects of other significant variables were controlled for. Maternal education on the other hand was not found to be independently associated with nutritional status. These results imply that mother's practical knowledge about nutrition may be more important than formal maternal education for child nutrition outcome.

Keywords: mothers, nutrition knowledge, educational status, child nutritional status.

The aetiology of early childhood malnutrition is complex, multifactorial and contextual. The immediate cause of childhood malnutrition is deficiencies in pro-

tein and energy, however, behind these deficiencies lies a myriad of factors, acting individually or interacting with one another to influence infant feeding practices and thus their nutritional status and health. Childhood malnutrition is a major health problem affecting about 32% of children in the developing countries (UNICEF, 2004). Attempts to reduce the

Correspondence: Lily Yaa Appoh, Department of Psychology, Norwegian University of Science and Technology, N-7491 Trondheim, Norway. e-mail: lily.appoh@svt.ntnu.no

incidence of childhood malnutrition have been met with limited success for several reasons. For example, most intervention attempts have been criticized as being 'prepackaged' and reflecting the priorities of the intervener more than the real needs of the communities they are attempting to help (UNICEF, 1990b). The interventions also reflect what has been known to be the risk factors of childhood malnutrition. Because poverty has been identified as the major cause of malnutrition numerous interventions in different parts of the world have been directed at reducing poverty levels or reducing the effects of poverty on child nutrition through provision of food. Whereas the linkage between poverty and poor nutritional status is indisputable, there is also evidence indicating that the linkage between child malnutrition and poverty has been oversimplified. Firstly, available evidence for the relationship between poverty and nutritional status has shown that, whereas global poverty reduction during the past decade has been progressive, economic gains have not automatically been translated into nutrition benefits and progress against malnutrition has been less than stellar (Webb & Lapping, 2002).

Secondly, several studies including positive deviance studies have shown that poverty does not necessarily result in malnourished children. Positive deviance refers to the ability of some caretakers (mostly mothers) to undertake successful practices that enable them to raise well nourished children in communities where there is poverty and child malnutrition, and studies have shown that in the midst of poverty and childhood malnutrition some mothers successfully raise well nourished children (e.g. Berggren & Wray, 2002; Mackintosh *et al.*, 2002). These findings suggest that it is the attitudes, beliefs and practices related to child care and the way limited resources are used rather than economic status that differentiates positive deviant mothers from other mothers. Mothers are the main providers of primary care for their children and the quality of the care they provide is largely dependent on their knowledge of nutrition and health practices. Nutritional knowledge may be obtained from several sources including formal education, families and friends, mass media and community health services (Glewwe, 1999). Also,

nutritional knowledge can be positive/correct knowledge which, if put into practice may result in good nutritional status, or negative/incorrect which, if put into practice, may result in poor nutritional status. Whereas nutritional knowledge obtained from formal education and community health services to a large extent may be relied upon to be the right one, the same cannot be said of knowledge about nutrition obtained through friends and families which may be related to the culture, tradition and beliefs in the community (Gittelsohn & Vastine, 2003).

Findings from studies which have investigated the association between nutritional knowledge and child nutritional status are inconsistent. Whereas some studies (e.g. Ruel *et al.*, 1992; Glewwe, 1999; Webb & Block, 2003) found significant association between maternal nutrition knowledge and child nutritional status, other studies reported no correlation between the two (e.g. Walia & Gambhir, 1975; Grant & Stone, 1986). Also, some studies (e.g. Webb & Block) found associations only for short-term nutrition (height-for-weight), but not for long-term nutrition (height-for-age).

Related to the issue of association between maternal nutrition knowledge and child nutritional status is the question of the relative importance of nutrition knowledge versus formal education with regard to nutrition outcomes. The beneficial effects of female education on child nutritional outcomes have been widely documented (e.g. Webb & Block, 2003). However, the majority of women in the developing countries where malnutrition is rampant have no formal education. The question that needs to be asked is: will nutrition education also be beneficial to mothers lacking formal education or is it only through formal education that appropriate nutrition knowledge can be obtained? The evidence from the few studies which have explored this question show that maternal education and maternal nutritional knowledge are significantly but independently associated with child nutrition outcomes (Webb & Lapping, 2002); that maternal knowledge (rather than schooling) is a strong contributor to child nutritional status (Glewwe, 1999); and that maternal care practices (which is an expression of knowledge) can mitigate against the negative effects of maternal

schooling on child's nutritional status (Ruel *et al.*, 1999).

Furthermore, the relationships between maternal nutritional knowledge, maternal education and child nutritional outcome have been found to be mediated by family socio-economic status (e.g. Ruel *et al.*, 1992; Reed *et al.*, 1996). Reed *et al.* for example, reported that maternal education only had positive effects on child nutritional status when mothers have adequate but not abundant resources. No effect was found for mothers from the lowest socio-economic group and only weak association was found for those who had the best socio-economic status. In contrast, Ruel *et al.* found that maternal education was only independently associated with child nutritional status for mothers in the lower socio-economic group but not in the upper socio-economic group. Maternal nutritional knowledge on the other hand had no effect on nutritional outcome in the lower economic group but was a mediating factor between maternal education and child nutritional outcome in the upper socio-economic group.

The present study was conducted in Ghana where about 25% of all children under five are underweight. The aim was to investigate whether there is an association between maternal nutritional knowledge and child nutritional status in this population and whether any association observed will be independent of maternal formal education (or schooling). There have been few studies undertaken in Ghana to investigate mother's nutritional knowledge based on their beliefs and attitudes and their association with child nutritional status. Researchers dealing with the determinants of childhood malnutrition in Ghana focused mostly on economic and demographic factors (e.g. Alderman, 1990; Asenso-Okere *et al.*, 1997). Other studies which investigated maternal knowledge and beliefs focused on an aspect of child nutrition such as breastfeeding (e.g. Armar-Klemesu, 2000).

Method

Study sites

Data for the present study were collected from urban and rural study sites located in the Volta Region of

Ghana: the regional capital Ho and five rural communities in the North Tongu district named Battor, Abuvienu, Dove, Devime and Dedukofe. Ho has a population of about 70 000 and ethnically most of the inhabitants are *Ewes*. The town has a modern hospital and several clinics and educational institutions. Christianity is the dominant religion, but Islam and African traditional religion are also practised. The five rural communities were located close together within a radius of about 20 km. Except for Battor, which is a small town, the other communities are villages lacking basic amenities such as good drinking water, electricity and good roads. Nurses from Battor Hospital visit the surrounding villages monthly to hold child welfare clinics for children under 5 years of age. Also in the rural study area the majority of the people are ethnically *Ewes* and the main religion is Christianity, but African traditional religion is also practised.

Participants

Participants in the present study were malnourished ($n = 55$) and well nourished ($n = 55$) children (age 10–36 months) and their mothers who were enrolled at child welfare clinics in the study sites. The protocol was reviewed by the review board appointed by the Research Council of Norway and informed consent was obtained from the children's mothers. The study samples were recruited from children and mothers who attended the clinics in October–November 2001, and all interview and child status data were collected during these 2 months. The children were weighed on the day of the interview and were selected on the basis of their past anthropometric history as indicated on their health cards and measurements obtained on the day of the interview.

A malnourished child was defined as a child having a weight below -2 SD of the median reference value for weight-for-age and gender (US NCHS/WHO for use in Africa) as well as showing the signs of protein energy malnutrition (PEM). For each of the malnourished children selected, a well nourished child who was closest to him/her in age was selected as a comparison child. All the comparison children included had body weights above -1 SD of the median refer-

ence value for weight-for-age and gender, none showing signs of PEM.

Questionnaire

A close and open ended questionnaire was used to collect data from the children's mothers. The questionnaire was translated into *Ewe* which was spoken and understood by all the mothers at the time of administration. It was designed to collect information on maternal attitudes, beliefs and practices known to be associated to child nutritional status as well as data on demographic and socio-economic characteristics of the family. Four health officers who had experience in data collection were recruited and trained to interview the mothers. The interview, which lasted for about 45 min, was carried out individually and in private at the health centres.

Mother's nutritional knowledge

This index was calculated on the basis of the mothers' responses to the eight items shown in Table 1. Shown in the table are typical responses given by the mothers when they were asked to tell what they

knew about colostrum, to give a description of a child suffering from kwashiorkor, and to tell what they knew about the causes of kwashiorkor. Mothers were also asked whether they have food beliefs (food taboos), that is whether they do not eat certain foods because of cultural/religious beliefs. Some of these variables, e.g. *type of complementary food or colostrum given*, may better be described as practices, but were conceptualized here as knowledge. For each mother a sum score ranging from 0 to 8 was calculated to define a nutritional knowledge variable which was used in logistic regression analyses to determine its association with child nutritional status.

Economic status

This index was calculated on the basis of household items possessed by the family, i.e. mothers were asked whether they had a functioning radio, cassette player, television, refrigerator, bicycle, motor bicycle and a sewing machine. Possession of an item was scored 1 and no possession was scored 0. For each participant a sum score ranging from 0 to 7 was calculated to define an economic status variable which was used in

Table 1. Scoring of questionnaire items measuring mother's nutritional knowledge

Item	Score = 0	Score = 1
Time of initiating breastfeeding	≥24 h after birth	soon after birth
Colostrum	not given	given
Complementary food introduced	age < 6 months	age ≥ 6 months
Type of complementary food	<i>kooko</i> [†]	<i>weanimix</i> [‡] /infant formula
Did mother have food taboos?	yes	no
Knowledge about importance of colostrum	<i>don't know</i> <i>not good for the child</i> <i>it smells</i> <i>gives child diarrhoea</i>	<i>good for the child</i> <i>contains all nutrients</i> <i>makes child healthy/strong</i>
Features of kwashiorkor	<i>don't know</i>	<i>child has big stomach</i> <i>big head, thin legs/arms</i> <i>looks sick and unhappy</i> <i>body and face swells</i>
Causes of kwashiorkor	<i>don't know</i> <i>evil spirits</i> <i>too close births</i> [§]	<i>lack of right type of food</i> <i>lack of food</i>

[†]A thin low energy, low protein gruel made from fermented maize dough; [‡]A locally formulated cereal-legume mixture; [§]The traditional belief here is that when a child is born too close after the previous one, the new born takes the 'soul' of the displaced child hence the displaced child is unable to thrive (displaying the symptoms of kwashiorkor).

regression analyses to determine its association with child nutritional status.

Marital status

This variable was recoded into a dichotomous variable as follows: Married = 1, Not married = 0 (made up of divorced, widowed, and never married).

Maternal education

This variable was recoded into a dichotomous variable as follows: Ever been to school = 1 (made up of primary, middle/junior secondary school, secondary, post secondary), Never been to school = 0.

Data analysis

Chi-square test was performed for categorical variables to determine the association between nutritional status and the individual variables. Logistic regression was conducted to examine the independent contribution of the variables of interest to child nutritional status. An alpha-level of 0.05 was considered statistically significant and SPSS version 12 was used.

Results

Table 2 provides information on the main child and maternal characteristics of both groups of children. The table shows that there were more malnourished girls than malnourished boys and that; malnourished children were slightly older than well nourished children. The z scores were deviations from the median of the reference value and the values shown in Table 2 were the means of the z scores for each group. Mother's age for both groups was similar but there were differences in their educational background and marital status. Thirty-four per cent of mothers of malnourished children but only 7% of mothers of well nourished children had never been to school. Furthermore, whereas 92% of mothers of well nourished children reported being married, only 54% of mothers of malnourished children were married.

Table 2. Mother and child characteristics

Variables	Well Nourished (<i>n</i> = 55)	Malnourished (<i>n</i> = 55)
<i>Child</i>		
Gender of child		
Boy	32	22
Girl	23	33
Mean age in months (SD)	20 (7.9)	22 (7.0)
Mean weight in kg (SD)	12 (1.5)	9 (1.2)
Mean z-score (SD)	0.72 (0.8)	-2.6 (0.9)
<i>Mother</i>		
Mean age in years	29	30
Educational background†		
Never been to school	4	19
Primary	6	8
Middle/JSS	32	24
Secondary	11	4
Post secondary	2	0
Marital status‡		
Married	51	30
Divorced	2	8
Widowed	0	5
Never married	2	12
Mean number of children	2.4	3.2
Mean Economic Status score	2.0	0.8

†Numbers represent frequencies.

Bivariate analyses indicated that maternal marital status and maternal education were significantly associated with child nutritional status. Marital status (married/not married) χ^2 (1, *n* = 110) = 20.65, *P* < 0.001; maternal education (ever been to school/never been to school) χ^2 (1, *n* = 110) = 10.45, *P* < 0.001.

Mother's nutritional knowledge, beliefs, attitudes and practices and child nutritional status

Chi square analyses were also conducted with the individual variables which made up the nutritional knowledge index to examine the association between these variables and child nutritional status. The results are presented in Table 3.

As can be seen from this table, time of initiation of breastfeeding after birth, knowledge of importance of colostrum, giving of colostrum, age at which complementary food was given, as well as knowledge of the cause of kwashiorkor were all found to be statis-

Table 3. Associations between maternal beliefs, knowledge and practices and child nutritional status

Variables	Malnourished	Well nourished	χ^2 -value
Time of introducing breast milk after delivery			
Soon after birth	38	47	
More than 1 day later	17	8	4.55*
Was colostrum given?			
Yes	41	54	
No	14	1	13.05***
Knowledge about importance of colostrum			
Correct	31	48	
In correct	24	7	13.1***
Age at which complementary food was introduced			
<6 months	19	3	
\geq 6 months	36	52	14.55***
Type of complementary food			
Koko	32	25	
Weanix/Infant formula	23	30	1.85
Mother's belief of cause of kwashiorkor			
Correct	39	49	
Wrong	16	6	5.82*
Mother had food taboos			
Yes	21	14	
No	34	41	2.05

*** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$.

Table 4. Summary of the standard logistic regression analysis for the variables predicting child nutritional status (well nourished)

Variables	B	SE	Wald	Significance	Odds ratio	95.0% CI
Maternal nutritional knowledge (score)	0.72	0.20	13.01	0.000	2.04	(1.39–3.02)
Marital status						
Married						
Not Married	-2.45	0.70	12.27	0.000	0.09	(0.02–0.34)
Maternal education						
Been to school						
Never to school	-1.11	0.70	2.84	0.091	0.31	(0.09–1.20)
Economic status (score)	0.41	0.21	4.00	0.046	1.51	(1.08–2.27)
Constant	-4.84	1.40	11.91	0.001	0.01	

tically significantly associated with child nutritional status. Other associations were not statistically significant.

Multivariate analyses

A standard logistic regression was conducted to examine the independent contribution of the vari-

ables of interest to child nutritional status. For this analysis, all the variables (maternal nutritional knowledge, mother's marital status, maternal education, and socio-economic status) were simultaneously entered in the model as predictor variables and child nutritional status as the outcome variable. The results are presented in Table 4 and show that the model is statistically significant, $\chi^2 (5, N = 110) = 58.44$,

$P < 0.001$. Included also in Table 4 are the regression coefficients (B), Wald statistics, odd ratios and 95% confidence intervals for odds ratios for each of the four predictors.

As can be seen from this table, maternal nutritional knowledge (as measured by the scale), marital status and socio-economic status predicted child nutritional status and therefore were the ones which were independently associated with child nutritional status after the effects of the other variables have been controlled for. Maternal education on the other hand was not found to be statistically significant (at 5% level) once the other variables have been controlled for.

Discussion

This study considered 110 children. A larger sample might have identified more complex associations (e.g. interactions between variables). Nonetheless, some important trends were found. Results of the present study have shown that mother's nutritional knowledge (as reflected in the scale of knowledge and practice) is positively associated with the nutritional status of their children. Mothers who had well nourished children had higher scores on the nutritional knowledge index indicating better nutritional knowledge, than mothers of malnourished children. Multivariate analyses further show that this nutritional knowledge had independent effect on child nutritional status after the effects of other relevant variables have been taken into account. The impact of nutritional knowledge on child nutritional status appeared to be greater than those of maternal formal education (or schooling) and economic status and similar to the impact of mother's marital status.

As stated earlier, the maternal nutritional knowledge scale includes items reflecting maternal practices as well and these practices may or may not be based on actual knowledge. A more inclusive assertion may therefore be that, better maternal nutritional knowledge and practices are associated with better child nutritional outcome.

As expected, most of the individual variables (measuring the attitudes, beliefs and practices of the mothers) which made up the nutritional knowledge

index were also found to be associated with nutritional status. These findings are discussed in the next few paragraphs. In interpreting the results, one should bear in mind that there is the possibility that the variables used in the bivariate analyses could be interrelated, meaning that their individual effects may not be as strong as it may first appear, and that the study may have been under-powered for some of the variables.

Breastfeeding is universal in Ghana and in this study almost all the mothers (97%) reported having breastfed or were breastfeeding their children. Despite this impressive breastfeeding rate, there are certain practices associated with breastfeeding that could be detrimental to the health and nutritional status of the child. In the present study, time of initiating breastfeeding and whether mother gave colostrum to child were significantly associated with nutritional status. More mothers of well nourished children than mothers of malnourished children initiated breastfeeding soon after delivery and gave colostrum to their infants. In fact, only 2% of mothers of well nourished child did not give colostrum as compared with 26% of mothers of malnourished children. The benefits of colostrum, the first milk that the mother produces after delivery are well documented, however, because of its distinct colour and consistency, mothers in many cultures do not consider it as 'real' milk but as something harmful to their newborns and therefore discard it. For example, *Balanta mothers* in Guinea Bissau described it as 'dirty, insufficient, and capable of causing any disease, in some cases even the death of the infant' (Gunnluagson & Einarsdottir, 1993). In the present study, some of the mothers believed colostrum is not good, it smells and it causes diarrhoea. Similar findings have been reported from previous studies from Ghana (e.g. UNICEF, 1990a; Armar-Klemesu, 2000). The use of prelacteal feeds was not investigated in this study but other studies from Ghana have shown that newborns are given prelacteal feeds such as water (Armar-Klemesu, 2000). These are given both as a substitute for breast milk during the time breast milk is withheld and also as a complement to breast milk later on. Most of the time, the prelacteal feeds are not hygienically handled and this may result in diseases such as

diarrhoea which may contribute to poor nutritional status of the child concerned.

Time of introduction and type of complementary food given to an infant are very important for the child's nutritional status. According to current recommendations (WHO 1995, 1998), complementary feeding should be introduced into child's diet starting around the age of 6 months. In the present study, a strong association was found between age of introduction of complementary feeding and child nutritional status. Significantly more mothers of malnourished children (34%) introduced complementary feeding before 6 months of age than mothers of well nourished children (5%). Similar findings have also been reported in other studies (e.g. Castle *et al.*, 2001).

Type of complementary food on the other hand was not found to be significantly associated with nutritional status in the present study even though the findings were in the expected direction, i.e. more mothers of the malnourished children than well nourished children gave *koko* to their children. This was an unexpected finding because, the two types of complementary food assessed have different nutritional compositions, with one of them '*weanimix*' being nutritionally superior to '*koko*' which has very low nutritional value. Negative associations between giving *koko* as a complementary food and child nutritional status have been reported in previous studies from Ghana (e.g. Appoh, 1995). *Koko* is the main weaning food in Ghana and efforts to discourage its use have proved largely unsuccessful (Maxwell *et al.*, 2000). The reason why no association was found in the present study is not clear, however, it might have something to do with the way the question was asked. *Koko* can be given on its own, which has little nutritional value, or together with a source of protein (milk, fish powder, etc.) which improves its nutritional value. The question did not differentiate between mothers who gave *koko* alone or added protein. Because mothers of the well nourished children engaged in other good child feeding practices, it can be speculated that they may also have known the importance of adding protein to *koko*. If this argument is correct, then it means that even though both groups of mothers gave *koko*, the quality given dif-

fered. An alternative explanation could be that the sample size was not large enough for the differences to reach significance level.

Significant differences were found between the two groups of mothers on what they perceived to be the cause of kwashiorkor. More mothers of the malnourished children had either the wrong perception or did not know what causes kwashiorkor. Findings from other studies have shown that in some cultures, some mothers do not associate malnutrition to lack of food but may believe that some social behaviour or animistic spirit in nature caused their children to be malnourished (Sivaranmaskrishnan & Patel, 1993; Appoh, 1999; Aboud, 2002). Several mothers in this study also attributed malnutrition to evil spirits. Mothers who do not associate malnutrition with lack of food are less likely to provide the required food to their children.

The variable 'mother having food taboos' was not found to be associated with child nutritional status. Similar finding was observed by Kikafunda *et al.* (1998), in Uganda where no impact of food taboos were found on child nutritional status. Also, Gittelsohn & Vastine (2003) in their review of the subject concluded that food prohibitions play a limited role in determining nutritional status. Food taboos have been associated with poor nutritional status in Ghana (e.g. UNICEF, 2002). Even though there is widespread food prohibitions in Ghana that are based on religious and cultural beliefs that deny children access to nutritious food such as eggs and meat, there is little empirical evidence associating food taboos with child nutritional status. The finding in the present study, although it did not reach significance level was in the expected direction, i.e. more mothers of the malnourished children than mothers of well nourished children reported having food taboos.

The evidence on the association between mother's nutritional knowledge and child nutritional status is not unanimous. Both significant associations (e.g. Ruel *et al.*, 1992; Saito *et al.*, 1997; Webb & Block, 2003) and lack of association (e.g. Walia & Gambhir, 1975; Grant & Stone, 1986) have been reported by previous studies. Caution is however, needed when comparing the findings from different studies because different studies used different variables to evaluate

nutritional knowledge, different anthropometric measures as well as different age groups. Webb and Block for example used mothers' understanding about the importance of good dietary sources for vitamin A as a proxy for maternal nutrition knowledge, whereas Grant and Stone used maternal comprehension of home based growth charts. Different studies also used different anthropometric measures and the evidence suggests that maternal nutritional knowledge may be related only to specific anthropometric measures. For example Webb & Block (2003) found that nutritional knowledge was associated with weight-for-height, which is a measure of short-term nutrition, but not height-for-age, a measure of long-term nutrition. Like the present study, Ruel *et al.* (1992) and Saito *et al.* (1997) found association between weight-for-age as a measure of nutritional status and maternal nutritional knowledge.

Mother's formal education (schooling) was also found to be associated with nutritional status in the bivariate analysis, which is in agreement with previous studies (e.g. Smith & Haddad, 2000; Borooah, 2002). However, maternal schooling ceased to be associated with nutritional status when the effects of nutritional knowledge, marital status and economic status were taken into account. This suggests that for this sample, maternal schooling primarily affected child nutritional status through its association with nutritional knowledge, higher economic status and marital status (being married). This finding corroborates findings from previous studies (e.g. Christian *et al.*, 1988; Penders *et al.*, 2000; Webb & Block, 2003). Webb and Block for example reported that maternal education did not contribute to child weight-for-height independently of its indirect contributions through its effect on nutrition knowledge.

Family economic status was as expected found to be related to child nutrition, however, its impact was less than that of nutrition education. Malnutrition has been regarded as a disease of poverty, however, as stated in the introduction, several studies have shown that impoverished mothers who have the correct nutritional knowledge can raise well nourished children. For example a study from Ghana has shown that good child care practices can mitigate the negative effects of poverty on child nutritional status

(Ruel *et al.*, 1999). Lack of association between economic status and child nutrition has also been reported (e.g. Maleta *et al.*, 2003). Caution is however, needed when explaining these findings because economic status is a difficult concept to measure in social science and different variables have been used as a proxy for economic status. Differences in findings could be attributed to the type of variables used. Findings from the present study however, indicated that, for this sample, poverty was not the major determinant of child nutritional status. As noted in the introduction, however, some studies (e.g. Ruel *et al.*, 1992; Reed *et al.*, 1996), have reported that the effects of maternal nutritional knowledge and maternal education on child nutritional outcome could be mediated by family socio-economic status and such an interaction effect cannot be ruled out in the present study.

Mother's marital status surprisingly came out as one of the main predictors of child nutritional status in the present study. Being married was positively associated with good nutritional status. Few studies on maternal nutrition knowledge and child nutrition status investigated the role of marital status. However, some studies on the determinants of child nutritional status used household headship (female or male) as a proxy of marital status and for these studies both significant association and lack of association have been reported. Borooah (2002), for example, reported positive associations between female headed household and child nutritional status whereas Ruel *et al.* (1999) did not find any association between household head and child nutritional status.

Conclusion and policy implications

The findings from this study give further support to the evidence that maternal nutrition education is very important in the fight against childhood malnutrition. It also shows that even though female schooling is important for both mother and child's health as has been extensively documented, formal education without explicit nutrition knowledge may not be very helpful. On the contrary, there is evidence that nutrition education is important even for those mothers who have no formal education. This has great policy

implications in developing countries where female literacy rate is generally low. For example in Ghana, female literacy rate is only 64%, leaving a good percentage of mothers without formal education. Nutrition education has been going on in the country and findings from this study may be an added motivation for nutrition educationist to direct nutrition education at both literate and illiterate mothers. The responses given by some of the mothers in the present study also show the existence of certain negative beliefs and practices which may be rooted in the culture of the people. It is therefore important that nutrition education be tailored to address such negative beliefs.

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