DIETARY MANAGEMENT DURING PREGNANCY, LACTATION AND COMMON CHILDHOOD ILLNESSES IN RURAL BANGLADESH

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Abstract. Data were collected on nutritional aspects of women in general and during special time frames such as pregnancy, lactation and common childhood illnesses (diarrhea, acute respiratory infections and measles) from rural areas in Bangladesh. A distinctive gender bias was evident regarding decision making and food allocation within the household. Inadequate feeding practices were observed during diarrhea with 22.2% of the mothers discontinuing breast-feeding. Breast-feeding and nutritional support were comparatively better during ARI and measles. When the children were ill, 97% of the mothers administered a special diet with a variety of food preferences, which were perceived to improve the symptoms of the respective illness. Maternal education influenced both the occurrence of diarrhea and the nutritional management of diarrhea and measles significantly. Therefore, community health education should focus on the importance of breast-feeding and continued nutritional support during illnesses. In order for this health education to be effective, traditional beliefs noted in this study have to be incorporated.

INTRODUCTION

The nutritional situation of women is of considerable concern in Bangladesh: 50% of Bangladeshi mothers can be considered acutely malnourished (BMI<18.5) and almost 20% are severely stunted (height<145cm) (Mitra *et al*, 1997).

As in most developing countries, the nutritional status of girls and women in Bangladesh is compromised by the cumulative and synergistic effects of many risk factors like limited availability of food, compounded by low income and high incidence of disease. Gender-specific factors that further undermine the nutritional status of women have been documented by other research and include a lack of control over resource allocation at household level, traditional food beliefs, and customs that limit women's consumption of certain energy or nutrient rich food items (Chen *et al*, 1981).

During pregnancy and lactation the maternal nutritional status is not only important to the health of the mother, but is also closely linked to the well being of the child (Leslie *et al*, 1997). The high proportion of low birth-weight babies is an outcome largely attributable to maternal malnutrition, both before and during pregnancy (Landman and Hall, 1989).

The high prevalence of common childhood illnesses such as diarrhea and acute respiratory infections (ARI) continues to be a major cause of infant and child morbidity and mortality in Bangladesh (Haq, 1997). Dehydration and malnutrition are among the major determinants that greatly contribute to the morbidity and mortality from these illnesses (Mitra *et al*, 1991). Infections in malnourished children last longer, are more severe, and are more likely to result in death (Malik *et al*, 1991). Some studies have used the analogy of a vicious downward spiral to explain the recurring bouts of childhood illness precipitated by malnutrition, which in turn, cause a worsening nutritional status (WHO, 1989).

Proper dietary management plays an important role in determining the health and survival of the population, especially in the case of diarrhea. Besides, knowledge about infant feeding practices during childhood illnesses and identification of food items preferred or avoided, together with their explanatory models, are imperative for developing culture-sensitive health education strategies. Several studies have shown better acceptability (Martinez *et al*, 1989) and clinical outcome (Lifschitz and Shulman, 1990) from interventions that used diets based on traditional foods rather than using prescribed atypical diets. This study attempted to examine the feeding pattern of women during pregnancy and lactation and the dietary management of children suffering from diarrhea, ARI and measles by their mothers. This involved an evaluation of the attitude towards pregnancy, lactation and breast-feeding during childhood illnesses. The habit of with-

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holding food and/or fluids and the collection of baseline data on the preference or avoidance of individual food items as practiced by carers was also investigated.

MATERIAL AND METHODS

The information reported in this article was collected as part of a larger survey of concepts, attitudes and behavior concerning food among rural women in Bogra district, Bangladesh. It was conducted in the area of the 'Integrated Community Family Health Development Program', a project implemented by the Ministry of Health and Family Welfare of Bangladesh in collaboration with the German Technical Cooperation (GTZ).

The study was carried out in May/June 1997 in rural areas of Bogra district. No previous intervention programs focusing on nutrition had taken place in either of the sample villages. Data for this cross-sectional study were obtained from 496 households by female interviewers using structured open-ended questionnaires. Topics covered background data on the community, food allocation patterns within the household, dietary habits in general and food perceptions and practices during pregnancy and lactation with reference to individual food items. Data were also gathered on the occurrence of diarrhea in the two weeks prior to the interview, feeding patterns (detailed food preferences and food avoidance) during common childhood illnesses and awareness of diarrhea management. Additional detailed background data on the socio-economic status of the family as well as the educational level of the mother and head of the family was collected as part of the main study.

After rigorous training of field personnel, a pilot survey was conducted to standardize the technic further and minimize errors. Field managers validated each collection form before it was transferred onto a computerized database file. These database files were verified and analyzed by the Statistical Unit of Dhaka University. Further data analysis was carried out using the statistical package STATA (1997) on personal computers.

RESULTS

Rice formed the mainstay of the adult diet and was consumed daily by 96.1% of the respondents. What another regional staple also formed part of the daily diet of 30.6% of the adults. The consumption of potatoes was particularly high with 97.3% of households including them in their daily diet.

Fish was consumed by 56.6% of the adults several times in the week prior to the interview. Dairy products, eggs, meat and poultry were rarely consumed and neither were pulses. Vegetables were consumed daily or several times a week in 68.2% of the households. A marked preference for non-leafy vegetables, with a daily consumption by 58.0% of households was seen. In contrast, only 3.6% of respondents reported eating leafy vegetables daily. The intake of fruits was inadequate with 70.5% of the respondents not having eaten any fruits in the week prior to the interview.

The use of iodized salt as the major preventive measure for iodine deficiency disorders (IDD) was not adequate. Most of the interviewees (91%) had heard about iodized salt but only 28% of households reported its use as a dietary supplement. Price was the limiting factor in 96% of the cases.

Women have no control over the household budget, and it was usually (73.4%) the man's responsibility to decide what food to buy for the family. A gender bias was also manifest in other forms. The head of the family usually received the largest share of food (80.8%) followed by the next dominant male adult (8.8%). Both of them had clear preference over female adults (1.6%). A lactating woman would have received the biggest share of the family food in only 0.8% of the families. Similarly, greater proportional food allocation to boys compared to girls was expressed by 47.8% of the respondents, of whom, most reasoned that the boy would be the future income earner.

Food perceptions and practices of women during pregnancy and lactation

Only 52.0% of women were aware of their need to increase food consumption during pregnancy. Of these, 90.7% rightly perceived an increased dietary intake to be positive for the health of both the mother and child. In practice, however, 53.1% of women ate less during pregnancy than usually. 67.7% of the women who actually restricted their dietary intake during pregnancy did so because of nausea and only 10.2% in order to restrict the size of the baby and to avoid complications during childbirth.

Both, perception and practice of whether to eat more or less during pregnancy and lactation were significantly influenced by the education of the mother (Table 1). This correlation was stronger between maternal education and perception. Mothers who

Table 1
Perception and practice of dietary intake by women during pregnancy and lactation according to years of schooling.

Food intake during	Perception		Practice	
	Years of school More/Less*	Adjusted Wald test (p-value)	Years of school More/Less*	Adjusted Wald test (p-value)
Pregnancy	2.8/0.8	p = 0.00	2.3/1.5	p = 0.03
Lactation	1.9/0.6	p = 0.02	1.8/2.6	p = 0.29

* Average years of schooling in mothers eating more or less food.

Table 2
Selected data on food preferences of women during pregnancy and lactation.

Pregnancy	Lactation	Reasons (only the most important is listed)
Chicken meat/eggs	Chicken meat	Increases blood of mothers
Cat fish	Cat fish	Increases blood of mothers
Pulses	Lentils	Increases energy/milk of mother and child
Cow milk	Cow milk	Good health of mother
Apple	Apple	Child will get vitamins
Orange	Orange	Child will get vitamins
Papaya		Keeps body of the mother cold
Grapes		Fetus will get vitamins
Mango		Fetus will get vitamins
Guava		Fetus will get vitamins
	Banana	Mother and child remain healthy

thought that they should eat more during pregnancy had about two years more schooling on average than the women who thought it better to decrease their dietary intake during pregnancy.

The same food items were believed to be beneficial for both pregnant and lactating women. The benign properties attributed to these food items were identical regardless of the circumstances (pre/post-natal). A summary of the most important food preferences is listed in Table 2.

Cravings for unusual food items that would usually not form part of the daily diet but were selected during pregnancy and lactation were also noted. 87.1% of the women perceived tamarind (*Tamarandus indica*) to be beneficial during pregnancy for its appetite increasing qualities and 39.7% favored burnt mud/coal which was considered to be tasty. Similarly, 89.5% of the mothers thought black cumin should form an important part of a lactating woman's diet, as it was believed to increase the quantity of breastmilk.

Some food items were perceived to be harmful for both pregnant and lactating women, but were supposed to have different harmful effects depending on the condition of the woman (pregnancy/lactation). For example 'Hilsha' fish was supposed to cause abdominal discomfort and loose motions if consumed during pregnancy, while during lactation, it was thought to cause symptoms similar to that of a cold.

Dietary management during common childhood illnesses

Twenty-two percent of women would not continue to breastfeed if their child were suffering from a bout of diarrhea, 7% of mothers would do so in the case of measles or ARI (Table 3). The child's diet was modified during diarrhea, ARI and measles by the large majority of mothers (98%, 93.2% and 74.7% respectively).

Diarrhea

91.5% of the mothers continued to administer fluids of some type to a child suffering from diarrhea; only 0.8% refrained from giving any fluids at

Table 3
Summary data on the administration of fluid and food during illnesses (%).

	Diarrhea % (SE)*	ARI % (SE)	Measles % (SE)
Discontinuation of breastfeeding			
Yes	22.2(1.8)	7.3(1.1)	7.7(1.1)
Fluid restriction			
Yes	87.0(0.4)	14.8(1.5)	8.3(1.2)
Less than 24 hours	75.0	21.6	20.0
24 - 48 hours	25.0	10.1	10.0
Until recovery	0.0	65.2	40.0
Food restriction			
Yes	59.1(2.2)	22.4(1.9)	35.1(2.3)
Less than 24 hours	48.3	36.7	30.1
24 - 48 hours	26.5	23.5	23.5
Until recovery	15.5	19.8	10.9
Administration of a special diet	98.0(0.6)	93.2(1.1)	74.7(2.1)

*(SE) Standard error

all. A significant proportion of mothers (54.6%) not only restricted, but completely withheld food. Furthermore, more than 30% of the mothers who discontinued feeding their child did so for longer than 24 hours. The need for food during diarrhea was recognized by only 37.7% of women.

Nutritious foods like fish, meat, milk or even vegetables were avoided by almost all mothers. These products were believed to increase the frequency of loose motions in the child suffering from diarrhea. Conversely and depending on their availability, special foods were prepared to relieve diarrhea. Besides continuing giving the usual family diet based on rice, the preferred products were green banana and coconut. These items were believed to decrease abdominal discomfort and diminish the frequency of stools.

ARI

Fluid administration during ARI was restricted by 14.8% of the mothers, of whom, 65.2% did so until the child made a full recovery. 22.4% restricted food during ARI. Of them, about 60% recommenced normal feeding again after 24 hours.

During episodes of ARI in children, over 90% of mothers tend to avoid particular foods, which they believe aggravate the symptoms of the cold, such as 'Hilsha' fish, duck or pigeon meat. In addition, mothers relate fruits like banana and green coconut with the appearance of danger signs (fast breathing and chest undrawing). Almost all mothers gave their children a special diet to cure the symptoms of a cold. The preferred items were warm milk and syrup of 'Tulshi' leaves.

Measles

35.1% of mothers imposed feeding and 8.3% fluid restrictions on their children. Of them, about 11% maintained this restriction until the recovery of the child. The food most avoided was meat of any kind. All the explanatory models for food preferences were related to the skin lesions associated with measles. Special foods given to children with measles were mostly fruits (green banana, green papaya and green coconut) and some vegetables (bitter corolla).

Determinants of feeding behavior

The results of single correlation matrices between various dietary practices and several socioeconomic variables (income, size of cropland, household size, etc) and maternal education are summarized in Table 4.

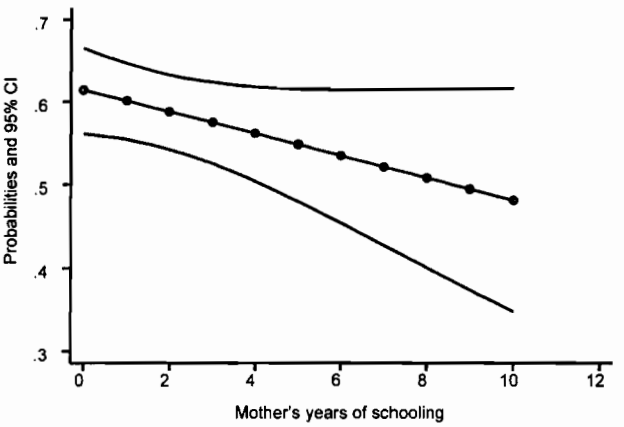
Maternal education was found to have a significant influence on dietary behavior during episodes of diarrhea and measles. Better-educated mothers discontinued feeding less often and for shorter periods. They were also found more inclined to administer a special diet to a child suffering from measles. The practice of withholding fluids was not correlated to any of the independent variables. The role of maternal education in restricting food during diarrhea can be better appreciated in a multi-

Table 4
Values of explanatory variables of dietary behavior during common childhood illnesses.

	Restricting breastfeeding		Restricting food		Duration of food restriction		Giving a special diet	
	OR	p-value	OR	p-value	Coef	p-value	OR	p-value
Diarrhea								
Maternal education	0.97	0.11	0.84	0.04	-0.14	0.002	1.03	0.66
Income	0.99	0.90	0.99	0.03	-0.01	0.08	0.99	0.10
Size of cropland	0.99	0.10	1.00	0.40	0.02	0.16	1.00	0.74
Number of under five	0.50	0.001	0.71	0.03	0.07	0.60	0.56	0.059
Measles								
Maternal education	1.01	0.87	0.90	0.02	-0.11	0.03	0.90	0.01
Income	0.98	0.29	0.99	0.92	-0.00	0.76	1.01	0.058
Size of cropland	0.99	0.46	1.00	0.12	-0.01	0.02	1.00	0.87
Number of under five	0.97	0.91	0.87	0.45	0.93	0.57	0.65	0.02
ARI								
Maternal education	1.02	0.97	0.94	0.08	0.06	0.14	0.99	0.91
Income	0.99	0.39	1.00	0.96	0.00	0.61	1.00	0.30
Size of cropland	0.99	0.75	0.99	0.33	0.00	0.56	0.99	0.80
Number of under five	1.18	0.48	1.53	0.01	-0.48	0.003	0.81	0.45

OR = Odds ratio; Coef = Coefficient value

variate analysis. Fig 1 displays the predicted probability that a mother will restrict food in the case of diarrhea according to the number of years of schooling she has had, while keeping co-variates like income, size of landholding, number of children under five, etc at their means.



Fige 1–Predicted probabilities of restricting food during diarrhea according to years of schooling of mothers.

DISCUSSION

Recent studies show that low energy intake is common among poor women in Bangladesh. With over 80% of the diet energy from grain, the women's diet is already of very low cost with little room for substitution by other lower-cost foods to increase energy intake (Brown *et al*, 1993).

The nutritional situation worsens under physiological circumstances with increased energy requirements such as pregnancy and lactation. During these periods the diet not only contributes significantly to women's long-term nutritional status, but is also crucial to the well-being of the child (Hassan and Ahmad, 1984). An additional 350 kcal/day in the second and third trimester is required to avoid continuous depletion of the energy stores and to compensate for the inadequate dietary intake (Leslie *et al*, 1997). It was found that pregnant and lactating women in Bangladesh consumed only 70% of their energy requirement and 65% of their estimated protein requirement (Ahmad and Hassan, 1986) and that intake levels of less than 1,500 kcal/day had a significant effect on the outcome of the pregnancy (Prentice *et al*, 1983).

In our study only 52% of the women knew that they should eat more during pregnancy and, worse, 53.1% of the women actually ate less during pregnancy than usual. The main reasons for this decline in consumption were decreased appetite and nausea, but also, in 10% of the women, the wish to

restrict the size of the baby and to avoid a difficult childbirth. Better-educated women were more aware of the increased energy requirements during pregnancy and lactation, but the influence of maternal education on actual practice was less prominent.

In this study, certain nutritious foods were selected by the women although 63.8% were illiterate and had never received any formal education. Some of their explanatory models were in agreement with the scientific facts. The presence of vitamins in fruit, for example, and its significance during pregnancy was well understood and practiced. There was also the awareness that diet affects breast milk and influences the health of the infant *eg* lentils and black cumin were supposed to increase the production of breast milk.

Craving for items usually not eaten was widespread confirming the findings of other studies (Landman and Hall, 1989). The consumption of burnt mud/coal by some pregnant women might be an indicator of mineral deficiency, as suggested by Begum *et al* (1979). Similarly, the craving for sour/astringent fruits like tamarind might attest to the need for vitamin C. Landman and Hall (1989) suggested this to be a benign dietary practice since dietary cravings appeared to exert little adverse influence on maternal dietary intake or birth weight.

The avoidance of some highly nutritious food items during pregnancy and lactation like certain fish species, which are widely available and usually form a substantial part of the daily diet, is of particular concern. These restrictions might be one of the causes of the women's inadequate protein intake.

The cultural norm for intra-familial food distribution within the study group seemed to be biased towards the male members of the household, who received the largest portions of food. These deep-rooted cultural practices of decision making regarding the purchase of food items and intra-household food allocation may be amenable to change only in the long term.

In the medium term, information and education may enable women to reconsider food choices during pregnancy and lactation. Nevertheless, it is doubtful that nutrition education alone can improve maternal diet under conditions of discrimination against women in intra-household food distribution and of extreme poverty. Brown and Zeitlin (1991) noted that to fill the lactating mother's energy gap would cost an additional 21% of the daily wage, or almost double the mother's food costs.

These financial barriers led Brown *et al* (1994) to the conclusion that nutrition education campaigns should not be conducted in isolation of support that would make these improvements affordable to women. Examples of such programs might include promotion of women's saving or credit groups, of household level income generating projects, of home gardening, and subsidized or donated food programs.

Thus, simplistic policy prescriptions, such as increased female education, are not likely to remedy the fundamental problems of poverty and gender discrimination. It would be preferable to improve the economic situation of families and structural changes in the role, status, and economic value of women in society will be required, especially in rural areas of Bangladesh.

Concerning childhood diseases, this study concurs with other research findings that the prevalence of diarrhea is a function of the level of maternal education (Becker *et al*, 1986). This study shows that the pervasive influence of low education is not just limited to the prevalence of diarrhea but extends to its treatment and to infant feeding practices during other illnesses.

Improper dietary management may induce, precipitate and intensify protein-energy and micronutrient malnutrition due to common childhood illnesses, in particular, diarrhea and measles. Three main elements seem to determine nutritional care of the sick child at home: advice from health care service providers, the mother's beliefs and the social support network which includes cultural traditions and societal pressures.

Epidemiological studies show that breast-feeding not only prevents nutritional deterioration, but also reduces the severity and duration of diseases (Briend *et al*, 1988). Research (Clemens *et al*, 1988), concludes that interruption of breast-feeding during diarrhea happens in only 2% of the studied population and therefore is not a priority problem in Bangladesh. In our study, however, the proportion of mothers who discontinued breast-feeding their children if they were suffering from diarrhea was alarmingly high (22.2%). The reasons for avoiding breast milk and animal milk substitutes during diarrhea could be mother's belief the fluids cannot be absorbed in the acute diarrhea stage and are harmful (Gupte and Sasan, 1983; Kumar *et al*, 1985) or because of the apparent improvement seen by diminution in the volume of stools. 54.6%, 18.7% and 29% of mothers withheld food completely for a certain time during diarrhea, ARI and measles respectively.

Mothers may withhold food because of medical advice, because of their own conception of 'keeping the bowels at rest', especially in the case of diarrhea, and because of the child's poor appetite, seen particularly during measles.

The practice of giving a special diet during illness to a child was widespread. 97% of the women gave a special diet to their ill child, avoiding certain food items and showing a preference for others. Some food items were considered bad across the board and were avoided in the case of diarrhea, as well as ARI and measles. These included fish, meat and vegetables because they were assumed to increase loose motions in diarrhea and to prolong the effects of ARI and measles.

In our study as well as in others, maternal education was significantly correlated to the practice and duration of withholding food from sick children. This may suggest that not only malnutrition of pregnant and lactating women can be prevented, but also the vicious cycle of disease and malnutrition in children under five can be broken by interventions aimed at improving maternal education supplemented by economic improvements and the enhancement of the status of women.

The understanding of diet as a means of personal illness control should be further elaborated and built upon. The probability that mothers will follow the advice provided will be greater if it conforms to the cultural norms and their own explanatory models of disease. Specific food items that were preferred or avoided have been identified in this study, and will help incorporate traditional beliefs and practices into a culture-sensitive education program on nutrition for women. In line with our study results this program will be complemented by measures for poverty alleviation (assistance to women's groups for income generation, credits and home gardening) and by collaboration with NGOs promoting the enhancement of the role of women in Bangladesh society.

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