

Can mothers identify malnutrition in their children?

SWAPAN KUMAR ROY,¹ M MUJIBUR RAHMAN,¹ AMAL KRISHNA MITRA,¹
MOHAMMAD ALI,¹ AHMED NURUL ALAM¹ AND MUHAMMAD SERAJUL AKBAR²

¹International Centre for Diarrhoeal Disease Research, Bangladesh and ²Dhaka Shishu Hospital, Bangladesh

To assess mothers' perceptions about malnutrition and their ability to identify malnutrition in their own children, 339 children aged 3-35 months and their mothers were studied in two urban hospitals in Dhaka, Bangladesh, and in a community clinic. The weight, height, and mid-upper arm circumference of the children were measured, and their mothers were interviewed. Child nutritional status according to their mother's statement and anthropometrically assessed nutritional status were compared. Sixty per cent of the mothers correctly identified better nutritional status (weight/age >75% of NCHS median) and 67% mothers correctly identified malnutrition (weight/age ≤75% of NCHS median) in their children. Sixty-one per cent of mothers with less than 5 years of formal education correctly identified better nutrition (weight/age >75%) whereas 38% mothers with more than 5 years of education correctly identified better nutrition. Correct identification of malnutrition was made by 70% of mothers with less than 5 years of formal education, and 74% of educated mothers did the same.

As regards causes of malnutrition, 33% of mothers stated that lack of food at home resulted in undernutrition in their children (mean weight-for-age of these children was 65% of the NCHS median). Mothers' suggestions for improving child health were: better food in 31% cases; treatment of illnesses in 22% cases; and both in 42% cases. The results suggest that most of the mothers are able to identify malnutrition in their children, and 95% of them are aware of ways to improve it, and that the provision of adequate food and health care may improve child nutritional status.

Introduction

In developing countries, 30% of children under five suffer from a moderate degree of malnutrition, and about 5% from severe malnutrition.¹ A recent survey in Bangladesh showed that about 8% of children are severely malnourished (weight/age ≤60% of median NCHS standard) and 55% are severely to moderately malnourished (weight/age <75%).² Studies from the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) in Matlab, showed socioeconomic status (SES) as one of the major determinants of child nutrition.^{3,4} A multivariate analysis of 28 countries in the world fertility survey showed that after controlling for SES, maternal education had the most important influence on child mortality, especially after the first year of life.^{5,6} Mother's education has shown significant effect on child mortality.⁷ Higher mortality rates have been consistently reported in anthropometrically malnourished children in Bangladesh.⁸ In Bangladesh, morta-

lity increases on a logarithmic scale among malnourished children, even after their recovery from diarrhoea.⁹ A recent review shows that there has been a gradual deterioration of child nutritional status, with a decrease in food intake in Bangladeshi children since 1937.¹⁰

Strategies for child health policies aimed at better child survival would require recognition of the potential of the key person in a child's immediate environment. Health planners often prescribe ways of combating malnutrition, but less emphasis is given to tapping maternal perceptions or ability to achieve the level of health care necessary for children. Mothers are the primary caretakers who provide nutritional support and care during their children's illnesses. Hence, it is important to know whether mothers can recognize malnutrition in their children, or can understand the cause of malnutrition, and whether they have any suggestions to prevent malnutrition. To address these simple but logical

questions we carried out a knowledge, attitude, and practice (KAP) survey among the mothers, and obtained anthropometric measurements in children attending two urban hospitals in Dhaka (Bangladesh) and a community clinic.

Subjects and methods

Children aged 3–35 months were selected from two urban hospitals and a community clinic. The hospitals were the Dhaka hospital of ICDDR,B where 65% of patients are children who present with diarrhoeal illnesses, and the outpatients department of the Dhaka Shishu Hospital, which is a multidisciplinary children's hospital. The community clinic is situated in a peri-urban community, 10 km northeast of Dhaka city, where children living in that locality attend a weekly clinic for minor illness such as the common cold, fever, skin and ear infections, helminthiasis and diarrhoeal illnesses. The urban hospitals deal with infants and children from the city, including the slums and peri-urban communities, whose parents are labourers, rickshaw pullers, professionals and businessmen.

We wanted to ascertain whether mothers could recognize the state of malnutrition in their children and whether they noticed that their children were not growing well. Twenty mothers in the treatment centre of ICDDR,B, 20 mothers in the community clinic, and 20 mothers from Dhaka Shishu Hospital outpatients department were interviewed, using an open question format. The questions included some on the socio-economic status of parents, feeding practices, difficulty in feeding, history of a child's illnesses, access to medical care, and mother's explanation for the cause of the child's ill-health. We also asked for the reasons for any constraints on medical remedies. Our in-depth enquiries and the women's perceptions led to several clear and common aspects emerging concerning childcare practices and problems faced during illness, that were regarded as important variables. The degree of women's education, poverty, and powerlessness was related to access to medical care, and had a direct effect on the nutritional state of their children. The questionnaire for this study was developed on the basis of these interviews and previous studies on child nutrition. The pre-testing was done on separate groups of mothers by the investigators, and ambiguous and rare

events from answers were excluded. Questions were posed in the local language (Bangla) and answers written down verbatim. Where questions required complicated answers, they were split into separate sections to help obtain clear answers. When the questions seemed suitable for all the mothers, irrespective of their educational levels or socioeconomic status, the questionnaire was finalized.

Mothers were interviewed about the nutritional status of their children; whether their child was growing well in comparison to other normal children. In addition, the history of present and past illnesses of their child, feeding practices, the mother's opinion regarding possible remedies to improve the health of their child, and information on the family's socioeconomic condition were recorded. The child's weight, height and mid-upper arm circumference (MUAC) were recorded. Weight of the child (after rehydration in cases of diarrhoea) was obtained using a Salter scale with a precision of 100g; height was measured using a locally-made length board with a precision of 1 mm; and MUAC was measured using an insertion tape with a precision of 2 mm. The nutritional status of each child was determined as a per cent of the 50th centile NCHS standard.¹¹

Data analysis

The data were checked, verified, and then entered into a personal computer using the StatPac Gold Package and the analysis was carried out with the help of the SPSS/PC+ software package. Anthropometric calculations were done using the National Centre for Health Statistics Standards. The children's nutritional status as stated by the mothers was compared with the measured nutritional status for accuracy. The chi-square test was performed for comparison of proportions, and analysis of variance (ANOVA) was used to compare means of different groups. Statistical significance was accepted at a 5% probability level.

Results

Three hundred and thirty-nine mothers and their children were entered into the study. Table 1 shows the comparison of mothers who could identify the malnutrition ((weight/age) wt/age

Table 1. Characteristics of mothers who identified their children as malnourished ($N = 186$)

	Mothers who correctly identified malnutrition ¹	Mothers who could not identify malnutrition
	$N = 125$	$N = 61$
Age (years)	25 (16-36)	24 (16-36)
Body mass index	18 (13.8-27.5)	19 (15.4-25.0)*
No of children		
1-2	64 (51%)	40 (66%)
3-4	45 (36%)	19 (31%)
≥ 5	16 (13%)	2 (3%)
Mother's schooling years		
≤ 5 years	116 (93%)	39 (64%)**
> 5 years	9 (7%)	22 (36%)
Father's income: (Taka/month)***		
≤ 1500	74 (59%)	26 (43%)*
1501-3000	37 (29%)	14 (23%)
≥ 3001	14 (12%)	20 (33%)

Figures are in median (range) or number (%).

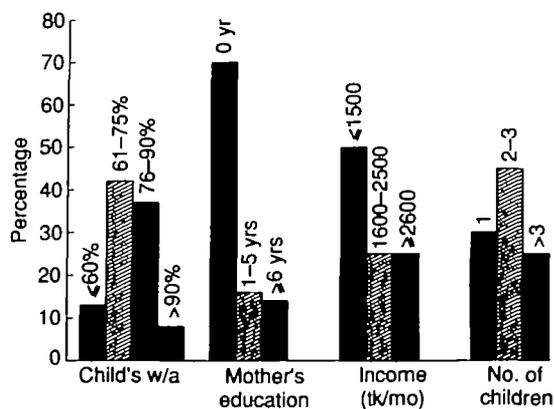
¹Malnutrition was taken as weight/age $< 75\%$.

* $P < 0.01$; ** $P < 0.001$

***1 taka = US\$0.025.

$< 75\%$) in their children with those who could not. The mothers who failed to identify malnutrition (wt/age $< 75\%$) were better-educated and economically better-off ($P < 0.01$).

Figure 1 shows the distribution of children and mothers. Fifteen per cent of the children were severely malnourished and 44% were moderately malnourished, according to Gomez classifica-

**Figure 1.** Distribution of mothers and children ($N = 339$)

tion.¹² Seventy per cent of the mothers had no formal education and 71% mothers had more than one child.

Nutritional status of the children as stated by their mothers is shown in Tables 2 and 3. In Table 2, out of 151 better-nourished children (wt/age $> 75\%$), 90 mothers correctly identified the state with a sensitivity of 60%: similarly, among 188 mothers of malnourished children (wt/age $\leq 75\%$), 125 (67%) identified their children's nutritional status correctly ($P < 0.001$). Using the weight/height index (wt/ht, median NCHS), the sensitivity and specificity figures in identifying better nutrition (wt/ht $> 80\%$) and wasting (wt/ht $< 80\%$) were 55% and 79% respectively (Table 3). Maternal education was classified as above and below five years of formal education (primary school, 1-5 years). Table 4 shows the precision of mothers' perception of child nutritional status using different nutritional indices (wt/age, wt/ht, ht/age and MUAC) and cut-off points. Using the wt/age cut-off point at 75%, the sensitivities to detect better nutrition were 67% in less, and

uneducated mothers, and 35% among the educated mothers, and the specificities to detect malnutrition were 67% and 69% respectively.

Using age-independent nutritional status indicator wt/ht, a cut-off point was taken at 80% to identify the wasted and non-wasted children:

Table 2. Accuracy of mothers' assessment of child nutrition compared with wt/age (as a per cent of NCHS median) using a cut-off point of 75% ($N = 339$)

Mothers' statement on nutritional status	Weight/age	
	>75%	<75%
Child is growing well	90	63
Child is not growing well	61	125

Sensitivity = 60%; Specificity = 67%
 $P < 0.001$; $\chi^2 = 23$.

Table 3. Accuracy of mothers' assessment of child growth as compared with weight/height (as a per cent of NCHS median) using a cut-off point of 80% ($N = 339$)

Mothers' statement	Weight/height	
	>80%	<80%
Child is growing well	132	21
Child is not growing well	109	77

Sensitivity = 55%; Specificity = 79%
 $P < 0.001$; $\chi^2 = 31$.

sensitivity was 57% in the case of less-educated or uneducated (0–5 years education) mothers and 41% in better-educated (>5 years of school) mothers, and specificity improved to 77% and 90% respectively. Sixty-six per cent of uneducated (0 year) mothers, 74% of less-educated (up to 5 years) and 69% of better educated mothers (>5 years of school) correctly detected undernutrition. In cases of detecting better nutrition, these figures were 69%, 62%, and 35% respectively (data not shown in tables). When MUAC was used with a cut-off point at 12.5 cm, specificity was 77% in both groups of mothers. Mothers of hospitalized children and those attending the community clinic were equally able to identify malnutrition in their children (data not shown in table).

Thirty-nine per cent of mothers identified lack of adequate and proper diet as a cause of malnutrition in their children, and children of this group of mothers were also found to be actually malnourished (mean wt/age 65%). Thirty-three per cent of mothers stated that enough foods were available, but their children did not eat enough which caused undernutrition. However, children in this group were not found to be severely undernourished, having a mean wt/age of 73% (Table 5).

Mothers' suggestions for improving their children's nutritional status are shown in Table 6. Twenty-two per cent of the mothers mentioned appropriate treatment of periodic illnesses, 31% cited dietary improvement, and 42% considered both diet and treatment as measures to improve

Table 4. Precision of mothers' perception in identifying the nutritional status of the child among mothers with education above and below five years of formal education ($N = 339$)

Child's nutrition indices	Cut-off points	Correctly identified better nutrition	Correctly identified malnutrition			
			Education of mothers			
			≤5 yrs	>5 yrs	≤5 yrs	>5 yrs
Weight/age	75%	67%	35%	67%	69%	
Weight/height	80%	57%	41%	77%	90%	
Height/age	95%	60%	38%	58%	58%	
MUAC	12.5 cm	59%	38%	77%	77%	
Average	-	61%	38%	70%	74%	

Table 5. Causes of ill health in children as stated by the mothers (*N* = 186*)

Reason	Number	%	Weight/age (mean \pm SD)
Not enough food at home	19	12.0	62 \pm 11
Lack of good food**	17	11.0	70 \pm 12
Not enough food/no good food	26	16.0	65 \pm 12
Child does not eat	61	38.0	73 \pm 12
Others (Infections, don't know, no reasons, etc.)	38	23.0	70 \pm 11

*186 mothers stated that their children were not growing well (total number of mothers was 339).

**Rich food like fish, meat, eggs, milk.

Table 6. Mothers' suggestions on improving child health (*N* = 339)

Measures	Number	%
Diet	96	31
Treatment	67	22
Diet and treatment	128	42
Don't know	16	5

their children's health. Overall, 95% of mothers identified proper diet and appropriate treatment as a precondition for improving their children's health. Only 5% of the mothers could not suggest any specific measure for their children.

Discussion

The study shows that the majority of the mothers could correctly identify protein energy malnutrition and its possible causes in their children, and could suggest how their child might be treated. The encouraging aspect about this finding is that mothers could identify child malnutrition correctly, irrespective of their educational background.

Educated and economically better-off mothers actually were less able to identify better nutritional status. This may be related to their expectations, as they might have considered their children as malnourished, even above the 75% wt/age of median NCHS standard. Their ability to identify a malnourished child was rather better; 69% on the same index. It is possible that some mothers might have made a mis-statement

of age, especially for infants above 2 years of age.¹³ Use of an age-independent nutritional indicator wt/ht, improved the correct identification of the wasted children with an average specificity of 88%. There was slight effect of better education, that is, 90% mothers with more than five years of formal education were correct compared to 77% of the mothers with no or less than five years of school.

Stunted children were identified as malnourished by about half of the mothers, which fact could be partly due to mothers being more concerned about children's thinness than height. Mothers, however, were less able to accurately identify malnutrition when ht/age was used, but were better with mid-upper arm circumference (MUAC), using a cut-off of 12.5 cm. Mid-upper arm circumference is an easy anthropometric measurement, and it has also been found to show higher sensitivity and specificity for predicting risk of mortality.^{8,14,15}

In this study, lack of adequate and appropriate food was identified as one of the causes of malnutrition by the mothers of malnourished children. Nutritional status of the children in this group was actually poor (mean wt/age 62% of median NCHS standard), whereas the nutritional status of the children whose mothers attributed malnutrition to a reduced appetite was not as bad (mean wt/age 73%). Whether exactly correct or not, 95% mothers thought adequate diet and proper treatment could improve their children's health. In reality, frequent attacks of infectious disease have been shown to be the common cause of growth faltering.^{16,17} The control of frequency

of infection is, however, dependent on measures such as immunization and sanitation.

A longitudinal study in rural Bangladesh showed that while maternal education was helpful in improving the nutritional status of the children of wealthier families, it did not have a significant impact on the prevention of child malnutrition in poor families. This was due to income constraints which did not allow translation of health care messages into reality.¹⁸ As frequently identified by policy planners, a nutrition education programme might be of benefit for improving child health in Bangladesh, but without a significant economic advancement of people there, such a programme is unlikely to be successful.

Since most of the mothers can accurately identify malnutrition in their children, and are well aware of the measures for prevention and cure of malnutrition, for developing countries like Bangladesh, food security and the availability of appropriate health care facilities are key ways to improve children's nutritional status.

We recommend that mothers' ability to identify malnutrition should be given high priority in child health and nutrition and food security programmes.

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Acknowledgements

This study was supported by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The ICDDR,B is supported by countries and agencies who share its concern about health problems of developing countries. Current donors include: the aid agencies of the Governments of Australia, Bangladesh, Belgium, Canada, Denmark, France, Japan, the Netherlands, Norway, Saudi Arabia, Sweden, Switzerland, the UK and the US, international organizations including the United Nations Development Programme, the United Nations Children's Fund and the World Health Organization; and private foundations including the Ford Foundation and the Sasakawa Foundation. We thank Mr MAR Patwary for his secretarial assistance.

Biographies

Swapan Kumar Roy, MBBS, MSc, PhD, is a Scientist in the Clinical Sciences Division of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), in Dhaka. Previously, he held posts as an Associate Scientist, and as a physician and then as a senior medical officer with ICDDR,B between 1976 and 1987.

M Mujibur Rahman, MBBS, is Medical Officer in the Clinical Research Centre at ICDDR,B, in Dhaka, where he has been working since 1987. Before that, he undertook a one-year training course at Dhaka Medical College Hospital.

Amal Krishna Mitra, BMS, DIH, is Senior Medical Officer in the Clinical Research Centre at ICDDR,B. He has been an assistant surgeon in Bhola, Bangladesh, and a medical officer and trainee physician in various departments of ICDDR,B, before taking up his present post in Dhaka.

Mohammad Ali, MBBS, is Medical Officer in the Clinical Research Centre of ICDDR,B, in Dhaka.

Ahmed Nurul Alam, MBBS, PhD, is head of the Clinical Research Centre in ICDDR,B in Dhaka.

Muhammad Serajul Akbar, MBBS, MRCP, FRCPI, is Consultant and Head of Department of Paediatric Medicine at Dhaka Shishu Hospital, and Professor of Child Life and Health at the Bangladesh Institute of Child Health.

Correspondence: Dr SK Roy, Scientist, International Centre for Diarrhoeal Disease Research, Bangladesh, GPO Box 128, Dhaka-1000, Bangladesh.