

Acute Diarrhoea: An Evaluation of Non-Host Factors in Children of Bangladesh

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Introduction

Diarrhoea is a major threat to child survival and adequate nutritional performance in the developing countries¹. The mortality due to acute diarrhoea is directly related to dehydration which has been rapidly reducing since the advent of ORS and parallel development in understanding of the disease. Although national diarrhoeal disease control programmes potentiated by public awareness for treatment of acute diarrhoeal attacks has reduced the mortality in children from diarrhoea, the incidence or severity has not been reported to be reduced in underdeveloped countries like Bangladesh. Since diarrhoea has also the most significant negative effect on nutrition of growing children, it is further imperative that reduction of diarrhoeal incidence and severity are of urgent priority. There has been no study reported from Bangladesh on the importance of socioeconomic and parental factors of children associated during diarrhoea. Seventy under five children in the department of child health of the Institute of Postgraduate Medicine and Research with acute diarrhoeal illness were studied.

Materials and methods

Thirty five male and equal number of female children with history of acute diarrhoea for less than 48 hours were selected for study. Informed consent were obtained from the parents according to the hospital ethical

review committee. Data were obtained in precoded forms by the investigators. After thorough physical examinations, patients were measured for accurate body weight upto 20 g sensitivity by NCC scale Bangladesh². Dehydration status was measured by weighing before and after rehydration and calculating percentage of weight loss. Treatment of diarrhoea was done according to WHO guidelines³. Through interview of patients were taken with a predesigned questionnaire. Information on birth weights of the children were available from the records of deliver. Nutritional Status was determined as per cent of 50th centile NCHS⁴ weight for age after rehydration.

Statistical methods

Data were entered into microcomputer from the records, cleaned and analyses were done using SPSS/PC+ soft were (SPSS Inc., USA). After examining the distribution, student's unpaired test was used for comparison of groups and Mann-whitney test for non-normal data. Chi-square (χ^2) test was used for comparison of proportion. Statistical significance was accepted at 5 percent probability level.

Results

Table 1 shows the socio-economic pattern of the patients. The occupations of fathers were service or business in 83 per cent. The

poorer group consisted of rickshaw pullers and sweepers, 10 percent and 4 per cent respectively. Most of the mothers (83%) were housewives conforming with the women status in this country. The remaining 17 per cent were engaged in small paid jobs. Living conditions of the children were almost equally distributed in buildings, tinshed houses and thatched houses. Among the diarrhoea patients, source of water for one fourth of them were from outside the house. Thirteen to seventeen per cent of the patients used unsafe water from ponds for either washing or drinking. About a half of the patients had access to tap water.

Similar to the water access, about a half of the families used sanitary toilets and the rest had no definite means of defecation in hygienic condition.

Table 2 shows the past events of the patients before admission from diarrhoea. Their birth records were examined, 88.6 percent had normal full time delivery, 2 children (2.8%) were prematurely delivered and six (8.6%) had complicated delivery. The profile of past illness reveals that forty one per cent had no significant illness, 21.1 per cent suffered from previous diarrhoea, 13 per cent suffered from respiratory tract illness and almost equal proportion suffered from measles. Among the supplementary foods given at home rice gruel was given to 20 (28.5%) patients, Suji made with rice and sugar to 21 (34.4%) patients and barely to one (1.4%). The remaining 35.7 per cent children received no cereals in their diet at home.

The message on the preparation and use of oral rehydration solution reached to all mothers through different media that varied significantly according to the education of

mothers. A classification of educational groups was done by the primary education upto 5 years in school (table 3). Most of this less educated group received the message from the radio and their neighbours while the better - educated group received message from television, physicians and their formal education ($P < 0.03$).

Table 4 shows that mother's education can make significant difference in factors related to health of the children suffering from acute diarrhoea. Age of the admitted patients did not vary by mothers' education but significant differences were found in birth-weight, and nutritional status (weight for age / % of 50th centile NCHS) of the children. The family factors like fathers' education, monthly income and number of siblings varied significantly according to mothers' education. The age of beginning of the supplementation seemed less among the patient from better educated mothers, although it did not reach statistical significance.

Further distribution of closely related non-host factors are shown in table 5. The education categories did not reflect any significant difference in mothers occupation, yet none of the mothers having secondary education was found to be a daily wager. The type of dwelling house varied significantly according to mothers' education which indicated that a higher proportion of the less educated category lived in thatched houses ($P < 0.0001$). Furthermore the source of water-supply was significantly different between the educational groups ($P < 0.006$) as none of the better educated mothers had to go outside their house to fetch water for any purpose.

Table 6 shows that facilities for toilet uses

were significantly less among the less educated mothers. While more than half of them had to use open fields and ditches ($P < 0.001$). The complication at child birth was significantly different between the education groups, which shows that the better educated groups had more complicated deliveries ($P < 0.007$). The knowledge about use of ORS was not different between the education group.

Discussion

At the beginning of comments on the results, we must be cautious about the limitations of our study, the first is the study was done on a cross sectional survey with each patient and would not permit to examine as a prospective community study. The second limitation was that there was no control subjects not having diarrhoea, but the purpose of the study is still served by evaluating the importance of immediate environmental factors related to the diarrhoea patients. The study has provided unique information from a city centre hospital that received patients from within reach who had opportunity to utilize the service.

The patients group represented mostly the offspring of service holdings and businessman and most mothers were housewives. There was a supporting evidence that most patients came from within the city and their parents were able to give adequate information required to fill out the pre-designed questionnaire. In view of mothers occupation, it seems that most children received adequate mothers' time for care in comparison to those children of working mothers. The type of housing reflects that only one third of them could afford to live in buildings and the housing of

the rest was similar to that of low socio-economic category which may face more problems of sanitation, water supply, crowding and other factors associated with diarrhoeal disease. Likewise the source of water supply for one fourth of the patients was outside the court-yard, the source of drinking water was the tap water in about a half of the cases. This indicates that children had to use unsafe water which in turn would pose a great risk for diarrhoea⁵. The indiscriminate defecation can be positively associated with transmission of diarrhoea that was present in almost half of the patients. The information on past illness shows that diarrhoea had the most frequent occurrence followed by respiratory tract illness and measles. The feeding pattern at home shows some similarity with a previous report from this urban area⁶; our study documented the use of rice gruel in 28.6 per cent patients as a supplementary feed compared to 24 per cent during the non-diarrhoea period.

This study demonstrates that all of the mothers are already aware of oral rehydration solution. The media used were significantly different when mothers' education were considered to be important for child rearing practice. This phenomenon can be due to socio-economic status which is strongly related to education of the mother⁷. In Bangladesh the marriage of educated women are often fixed to groom of better socio-economic status or the better-off families can educate their daughters better when it helps getting married to the better class. However, this study has been able to identify discriminative power of maternal education as an important factor of child health. Mothers' education above the

primary school showed that their children had better nutritional status, again nutritional status has been shown to determine the frequency of diarrhoeal attack, duration and severity of diarrhoea^{8,9,10}. It was revealed in our study that, income reflecting the economic status of the family was higher among the better educated mothers. The relationship of education and income is positively correlated⁷. Mothers' education was significantly related to fathers' education that supports our previous view. The effect of mothers' education is also revealed by the significantly less number of siblings in the family. This implies that better educated mothers can give more time for their children. It is known that educated mothers tend to reduce the period of breastfeeding and introduce supplementary feeds earlier which we have not been able to show (with statistical significance) but the trends is evident in our data. Since a large majority of mothers from both education groups were housewives, there was no remarkable difference in the pattern of their profession. Yet it is seen that none of the better educated group had to work as daily wagger. Our study shows a significant difference in type of housing between the education groups which can be a strong determinant of diarrhoea and malnutrition. Significant difference in the source of water supply existed between education groups, that 36 per cent of the less educated group had to depend on outside source of water. The difference in toilet facility could be of special value since 58 per cent of less educated group had no sanitary latrine to defecate or dispose the excreta, which is favourable for an easier transmission of diarrhoeal disease. A significantly more

number of better educated mothers had history of complicated delivery that could be either due to selection bias of optional caesarian section or attendance to private clinics. In perspective of the knowledge of oral rehydration solution there was none among the mothers of our patients who did not know it. The study thus highlights that the city dwellers are the major user of the post graduate hospital and that more service holders and business - families used the facility. That mother's education were negatively related to the factors more associated with diarrhoeal disease. We recommend further steps be taken to improve mothers education for a better child health and prevention of diarrhoeal disease.

Summary

Seventy children with acute diarrhoea admitted to the paediatric ward of IPGM&R were studied to evaluate the importance of associated factors related to their diarrhoeal episode. The fathers of 83 per cent of patients were in service or business while their mothers were housewives. Only about a third had buildings to live in and a quarter had no source of potable water in the premises of dwelling unit. Less than a half of the patients had tap water for drinking and washing. Fifty five per cent of the patients had sanitary toilets and the rest used indiscriminate means. Past illness of the patients ranked highest for diarrhoea followed by respiratory tract infection and measles. Supplementation at home was given with rice gruel to 29 per cent patients. All of the mothers had knowledge on the use of oral rehydration solution. Mother's education appeared as a strong determinant of birth weight ($p < 0.02$), nutritional status ($p < 0.05$), income ($p < 0.002$), father's

education ($p < 0.02$), siblings in their family ($p < 0.05$), type of dwelling house ($p < 0.001$) and water supply ($p < 0.006$). Further significant differences in toilet type and complicated birth events were revealed by the education of mothers ($p < 0.001$ and $p < 0.007$ respectively). The study clearly indicated that women's education has strong relevance to plan the strategies for control of diarrhoeal disease in children.

Table 1. *Percent distribution of Socio-economic profile of patients with acute diarrhoea in JPGMR (N= 70)*

Socio-Economic profile		Percent
Occupation of father		
Service		50.0
Business		32.9
Rickshaw puller		10.0
Sweeper		4.2
Farmer		2.9
Occupation of mother:		
Housewife		82.9
Service aya		10.0
		7.1
Types of housing:		
Building		34.3
Tin-shed		38.6
Thatched		27.1
Water supply :		
Inside courtyard		74.3
Outside		25.7
Source of water	Washing	Drinking
Pond	(17)	25.7
Tubewell	(23)	(13)
Tap	(60)	(47)
Toilet type :		
Indiscriminate		44.3
Sanitary		55.7

Table 2. *Percent distribution acute diarrhoeal patients (N=70) by their past history*

Past history	Percent
Birth history	
Normal delivery	88.6
Premature delivery	2.8
Complicated delivery	8.6
Past illness :	
Asphyxia	1.4
Measles	12.9
Tetanus	2.9
Diarrhoea	21.4
RTI	7.0
Others	7.0
No disease	41.4
Home feeding (before illness):	
Rice gruel	28.6
Barley	1.4
Suji cereal	34.3
None	35.7

Table 3. *Media through which knowledge on ORS was received by mothers and their level of schooling.*

Media	Years of schooling		Total	Per cent
	< 5 years	>5 years		
Radio	8	1	9	12.8
Television	4	6	10	14.2
Neighbour	18	1	19	27.2
Doctor	13	6	19	27.2
Health Worker	7	0	7	10.0
Education	0	6	6	8.6
Total	50	20	70	100.00

P <0.03 (Chi-square test)

Table 4. Characteristics of children (mean \pm SD) by mother's education.

Characteristics	Schooling of Mother's in years		Statistical significance
	< 5 (n=20)	<5 (n=20)	
Age (Months)	14.9 \pm 15.8	11.1. \pm 14.2	NS +
Birth weight (kg)	2.3 \pm 0.3	2.6+ 0.4	P<0.02 *
Wt. for age (% mediam NCSH)	70.9 \pm 19.3	79.0 \pm 13.4	P<0.05 *
Income of family (Tk/month)	2526.5 \pm 1912	6900 \pm 5362	P<0.002+
Fathers education (Years)	7.7 \pm 2.6	13.3 \pm 3.7	P<0.001*
Dehydration (number)	4.8 \pm 1.7	5.1 \pm 2.0	NS*
Supplementation age (month)	4.3 \pm 2.8	3.5 \pm 2.4	NS*

+ Mann-whitncy U test

* Unpaired Students' 't'- test.

Table 5. Profile of immediate environmental factors by education categories*A) Relationship of occupation with mothers education*

Occupation	Mother's education		Total
	< 5 years schooling	<5 years schooling	
Housewife	41	17	58
Service	4	3	7
Daily wager	5	0	5
Total	50	20	70

P = NS

B) Type of dwelling house of diarrhoea patients by mothers education

Type	Mothers' education		Total
	<5 years schooling	<5 year schooling	
Building	8	16	24
Tin-shed	24	3	27
Thatched	18	1	19
Total	50	20	70

P< 0.0001 (Chi Square test)

C) Relation of water supply with education

Source	Mothers' education		Total
	<5 years schooling	<5 years schooling	
Inside courtyard	32(64%)	20	52
Outside court yard	18(36%)	0	18
Total	50	20	70

P<0.006 (Chi square test)

Table 6 (A). Toilet type according to education groups

Type of toilet	Mother's education		Total
	< 5 years schooling	<5 years schooling	
Open/unspecified	29	2	31
Sanitary	21	18	39
Total	50	20	70

P = NS

B) Comparison of Children birth history among education group of mothers

Type of delivery	Mothers' education		Total
	<5 years schooling	<5 year schooling	
Full term	47(94%)	15(75%)	62
Normal			
Premature and complicated	3(6%)	5(25%)	8
Total	50	20	70

P < 0.007 (Chi Square test)

C) Knowledge of oral rehydration solution by education groups

Knows about Prep. & use of ORS	Mothers' education		Total
	<5 years schooling	<5 years schooling	
Yes	45	20	65
No	5	0	5
Total	50	20	70

P=NS Fisher's Exact test

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