



Prof. M A Matin, Minister for Health & Population Control, Government of the People's Republic of Bangladesh addressing the closing session of the workshop.

## WORKSHOP NEWS

A weeklong workshop on Medical Education on Diarrhoeal Diseases was sponsored by the ICDDR,B and held in Dacca from November 15-21. Professor M A Matin, Minister for Health and Population Control, Government of the People's Republic of Bangladesh, at the closing ceremony of the workshop said that the views of the Ministry coincides with that of the workshop recommendations. He announced that the Government has introduced a "Teaching Cell" for training teachers which will improve the quality of teachers and teaching in the field of medical education. He emphasised the integrated approach for the deliv-

ery of health services for achieving better health for the rural people.

While inaugurating the workshop, Begum Mabud Fatema Kabir, Deputy Minister for Health and Population Control, observed that the focus of medical and paramedical education should be based on the major health problems of the country. She also said that almost 40% of the child deaths in this country are due to diarrhoeal diseases. She regretted the lack of attention to these diseases in the medical curriculum. In order to reduce diarrhoeal diseases she felt that people must be motivated with better knowledge of personal hygiene and sanitation. The curriculum for both medical and

paramedical education should be designed in such a way so that diarrhoeal diseases which is a major health problem in this country receive the appropriate share of attention. She expressed satisfaction over the role that the International Centre for Diarrhoeal Disease Research, Bangladesh has played in this workshop.

The speakers at the inaugural session include the Director General of Health Services, Government of Bangladesh, Director of the ICDDR,B, WHO and UNICEF representatives to Bangladesh.

The workshop was attended by Principals and senior faculty members of different Medical Colleges of Bangladesh, WHO and other organisations. The participants examined in detail the necessity and feasibility of the inclusion of management of diarrhoeal diseases in the curriculum. Basically the workshop recommended that the following groups of people would be trained in the epidemiology and management of diarrhoea:

1. Medical undergraduates
2. Paramedics
3. Medical auxiliaries

ICDDR,B would assist in training trainers and teachers of the above mentioned groups. Emphasis was given on the teaching of environmental hygiene and nutrition.



Control of diarrhoeal diseases require consideration of specific aetiologies and their modes of transmission. It not only involves the specific "parasite" (the causative organism) and the susceptible "host" or individuals but also the vehicle of transmission. Furthermore, the habits and behavioral patterns of children and those who take care of them are also important in the spread (and control) of diarrhoeal infections.

#### Aetiological agents of childhood diarrhoea :

Studies in Bangladesh indicate that it is now possible to determine the aetiology of diarrhoea in as many as 80% of symptomatic cases. Improvement and relative simplification of the new diagnostic tools, particularly for detecting strains of enterotoxigenic *E. coli* and rotavirus, have helped to extend our knowledge about previously unknown causes of diarrhoea. However, this dramatic development in diagnosing the causes of diarrhoea has been limited to those few centres where special laboratory facilities are available, since the techniques employed are still too specialised to be commonly used.

The principal known causes of diarrhoea in Bangladesh are as follows :

#### Aetiological agents

Rotavirus  
Enterotoxigenic *E. coli*  
Shigella  
*Vibrio cholerae*  
Salmonella  
*Entamebia histolytica*  
*Giardia lamblia*

#### Mode of transmission

Air and water  
Water and food  
Person to person, water & food  
Water  
Water and food  
Food and water  
Water

**Shigellosis** is one of the most dangerous infections during the early childhood, particularly in the malnourished group. In contrast to acute watery diarrhoeas, shigellosis may not appear to be serious to the mothers. Frequently, it causes prolonged illness resulting in severe malnutrition due to loss of serum protein through the gut. *Shigella flexneri*, the most common organism of this species isolated in Bangladeshi children, has been

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### PART—I

found to be frequently associated with malnutrition. Other strains such as *Shigella dysenteriae* type I or Shiga bacillus cause very high attack rates and mortality, particularly during epidemics. An adult usually introduces the disease in the family resulting in intra-family spread. During community-wide epidemics of shigellosis, playmates of small children may be responsible for interfamily spread. Communal sources of water (e.g. tanks or ponds) may help spread the disease if they become contaminated during bathing or cleaning of the anal areas after defaecation. A lowering of hygienic standards from scarcity of

the vehicle responsible. The reservoir for salmonella (other than *S. typhi*) are animals, particularly poultry. Wherever food processing industry is well developed, salmonella is a dominant cause of diarrhoea. In countries like Bangladesh, where food is traditionally eaten well-cooked and still hot, salmonella is an uncommon cause of diarrhoea.

*Vibrio cholerae* is spread almost exclusively by water. Man is the only reservoir. Indiscriminate defaecation in canals and rivers by carriers or active cases and washing of clothes soiled by cholera patients are responsible for the contamination of water. Infants who are exclusively breastfed, usually have a very low attack rate. Like other enteric infections, children are particularly vulnerable to cholera.

Enterotoxigenic *E. coli* (ETEC) diarrhoeas have been identified by recently developed techniques. Cell-line assays using tissue cultures have become acceptable and important tools in the diagnosis of enterotoxigenic *E. coli*. Somewhat older techniques like rabbit ileal loop assays, rabbit skin tests and infant mouse assay help to distinguish LT (heat labile toxin producer) from ST (heat stable toxin producer) organisms.

The enterotoxigenic strains are known to produce the following types of diarrhoea :

1. Acute cholera-like disease clinically indistinguishable from cholera in all age groups.
2. Traveller's diarrhoea
3. Nursery outbreak diarrhoea
4. Common-source waterborne outbreaks.

A number of reports have suggested that ETEC behaves epidemiologically very much like cholera. Impure water supply, poor sanitation and personal hygiene promote their spread. In traveller's diarrhoea the contamination of food is another mode of transmission. As in cholera, ETEC also requires a fairly high dose to cause a clinical

water may indirectly help the spread of shigellosis. As few as 10 Shiga bacillus or 200 *S. flexneri* have been known to cause clinical attacks in US volunteers. Thus the Shigella species of enteropathogens are probably one of the most virulent organisms known.

*Salmonella* generally infects man via contaminated food or water. In *Salmonella typhi* infection however, contaminated water is usually



attack. This is in sharp contrast to the highly efficient shigella species which can cause illness with very few organisms.

Enteropathogenic *E. coli* (EPEC) infection is one of the causes of diarrhoea in children below 2 years of age in nursery outbreaks. Human faeces is considered to be the principal source of EPEC. The disease has an incubation period of 2-6 days and is manifested by fever, vomiting, loose watery and foul smelling yellow or green stools.

Rotavirus is now recognized to be a major cause of diarrhoea in children under three years of age. The diagnosis of rotavirus formerly required the use of electron microscopes. This allowed a limited number of specimens to be processed. However, the new enzyme-linked immunoabsorbent assay (ELISA) has paved the way for mass diagnosis even in field conditions.

It may take a while to establish the mode of transmission of rotavirus. It is clear from the available information that (a) rotavirus has the highest incidence between six to twenty-four months of age (*i.e.* during the weaning period), (b) it peaks in winter in contrast to other bacteriological causes of diarrhoea, (c) there is little difference in its prevalence between developed and developing countries. All these suggests that water and hygienic standards may have little to do with the transmission. Peak incidence in winter suggests that crowding may be a factor. Over one-third of the parents of infected children showed a four-fold rise in rotavirus antibody titre, suggesting that one of the parents may have been responsible for the transmission. Measurement of antibody titer in new-born babies show an initial high titer, which decreases until 6 months of age. Then starts to rise until 24 months of age, when it levels off.

( To be continued )

## PUBLICATIONS

1. Utilisation of A Diarrhoea Clinic in Rural Bangladesh: Influence of Distance, Age and Sex on Attendance and Diarrhoeal Mortality/*M. Mujibur Rahaman, K. M. S. Aziz, M. H. Munshi, Yakub Patwari, Mizanur Rahman, June 1980. (Scientific Report No. 37)*

Attendance rates at a diarrhoea clinic were monitored in a defined population in rural Bangladesh. Communities within seven miles of the clinic were followed. Within the first one mile radius, 90% of diarrhoeal cases came to the clinic for treatment. At three miles the attendance fell to 70% for males and 40% for females. On an average, greater the distance to the clinic, more severe was the degree of dehydration on presentation. Mortality secondary to diarrhoea was significantly reduced within four mile radius of the clinic. (Reference GLIMPSE July 1980)

2. Birth Care practice and Neonatal Tetanus in A Rural Area of Bangladesh/*M. Shafiqul Islam, M. Mujibur Rahaman, K. M. S. Aziz, M. H. Munshi, Mizanur Rahman, Yakub Patwari, July 1980. (Scientific Report No. 38)*

The types of birth attendants, methods of cutting and dressing the umbilical cords and their relationship with the incidence of neonatal tetanus for a cohort of 1351 live births occurring between July 1976 and June 1977 in Teknaf, Bangladesh was evaluated. The births were attended by relations of the mother, neighbours or dais (traditional births attendants) in equal proportion. A few births were unattended; trained midwives or physicians attended a negligible number of births.

Bamboo-splits (78%) and razor blades (22%) were most frequently used tools to cut the umbilical

cords. There was no significant difference in mortality rate of neonatal tetanus between the groups using bamboo-splits (29 deaths per 1000 live births) or razor blades (21 deaths per 1000 live births). Mortality rate due to neonatal tetanus was 24 deaths per 1000 live births when umbilical cords were tied with a thread with or without application of ash or burnt earth. In a smaller number of cases when the umbilical cords were left untied, the mortality rate of neonatal tetanus was 111 deaths per 1000 live birth. This difference was statistically significant ( $P < 0.01$ ). It appears that leaving the umbilical cords untied predisposes the development of neonatal tetanus. (Reference GLIMPSE December 1979)

3. Proceedings of the Consultative Group Meeting of the International Centre for Diarrhoeal Disease Research, Bangladesh. November 1980. (*Special Publication No. 10*).

The first meeting of the Consultative Group of ICDDR,B sponsored by UNDP and hosted by WHO was held on June 6, 1980 in Geneva, Switzerland. The purpose of the meeting was to bring together representatives of interested countries and agencies from around the world to consider the programme and progress of the Centre during its first year of life.

The proceedings of the Consultative Group meeting have been edited from transcripts of taped recordings to present an overall picture of the meeting.

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## PUBLICATION

4. A Review of Findings on the Impact of Health Intervention Programmes in Two Rural Areas of Bangladesh/*Makhlisur Rahman* and *Stan D'Souza* November 1980. (*Special Publication No.11*).

This paper provides an overview of major health problems in Bangladesh with a detailed analysis of the findings of some selected intervention programmes currently being developed by the ICDDR,B in its two field stations at Matlab and Teknaf.

One major health problem in Bangladesh is diarrhoeal disease, which accounts for about a third of all deaths. At present vaccines are only partially effective and the maintenance and supervision of a net-work of treatment centres would be beyond the immediate capacity of a developing country like Bangladesh, a cost-effective approach to prevent deaths from diarrhoea may be a household programme for oral therapy in homes. The findings of the ICDDR,B's village-based and domiciliary oral therapy distribution programmes have shown that, not only such an effort will ensure wider service coverage, as evident from over 80% use-rate, but also substantially reduce the case-fatality rate.

A second priority health problem in Bangladesh is tetanus neonatorum, accounting for about 40% of all neonatal deaths. The findings of the Matlab maternal tetanus immunization study clearly demonstrated the impact on neonatal mortality of active immunization of pregnant women with two tetanus injections. However, given the present low acceptance rate by pregnant women (33%), the impact of such a programme on the overall neonatal mortality rate in the community may not be significant. In the rural Bangladesh setting, our recommendations from the Matlab experience

would be to carry out campaigns to vaccinate all pregnant women.

Another important health problem in Bangladesh is high fertility. About one-third of all adult female deaths between the age of 15 and 44 years are related to pregnancy and child birth. The results of the ICDDR,B maternal-child health and family planning programme suggest that substantial demand for family planning services exist, provided such demand is satisfied with a full range of contraceptive methods to meet the needs of individual woman.

## AN ANNOUNCEMENT

An International Symposium on Shigellosis covering the recent advances in its epidemiology, management and control will be held in ICDDR,B from June 15-20. This symposium will bring together scientists, clinicians and public health experts working with the treatment and control of shigellosis (dysentery) and diarrhoeal diseases in various geo-cultural settings.

Emphasis would be laid on identifying the role of shigellosis as a cause of morbidity and mortality in the developing countries. Recent scientific developments in the field will be highlighted to stimulate further research for better management and control.

Topics identified for discussion are, Bacteriology, Epidemiology, Clinical presentation complications and management, Antibiotic resistance, Immunology and Vaccine Development, Control and Future research. The proceedings will be published. Interested persons should contact

Dr. Mujibur Rahaman  
Deputy Director  
ICDDR,B  
P.O. Box 128  
Dacca-2  
BANGLADESH

## NUTRITIONAL STATUS AND THE RISK OF DIARRHOEAL DISEASES AMONG CHILDREN

Diarrhoea as an infection has high prevalence of protein-calorie malnutrition and exerts a significant influence on childhood morbidity, retardation of growth and mortality in the developing countries. A recent study examined the effect of malnutrition on the subsequent risk of diarrhoea among children under 5 years in a rural area of Bangladesh.

A comparison of the distribution of nutritional status (weight for age) of 811 children attending the diarrhoea treatment centre, with 882 comparable children residing in the community, showed that the children attending the treatment centre were nutritionally poorer than the village children.

A 2-year follow-up of 2019 children failed to establish a relationship of hospitalization rates according to nutritional status. It was found that 207 children visited the Matlab diarrhoea treatment centre during the 2 years of observation. During the follow-up, these children averaged 4.1 episodes of diarrhoea. There was no difference in diarrhoeal attack rates between the wellnourished and poorly nourished group of children.

The results of the study suggest that the existing association between diarrhoea and malnutrition do not appear to exert effect on the subsequent risk of diarrhoeal attacks. It is postulated that the predominant effect of malnutrition on diarrhoea is through the duration of illness, its severity and mortality outcome, rather than on disease incidence. The nutritional interventions alone may not succeed in preventing subsequent attacks.

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