



Glimpse

international centre for
diarrhoeal disease research, bangladesh
NEWSLETTER

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THE ICDDR,B DURING 1985: ACTIVITIES OF THE COMMUNITY SERVICES RESEARCH WORKING GROUP (CSRWG)

The main role of the Community Services Research Working Group is to provide selected health care inputs in the community mainly aiming at reducing diarrhoeal disease morbidity and mortality and total fertility. These activities have been pursued both in rural and urban Bangladesh. The combination of large-scale community work and a concern with population issues has led to a continuing interest in demographic research which has complemented studies relating to mortality. Two major resources for this work and for the ICDDR,B as a whole are the Field Stations at Teknaf and Matlab and the rapidly developing computer services at Dhaka; the latter two fall administratively within CSRWG. The scientific research and other related activities of CSRWG are highlighted below:

1. MATLAB MATERNAL AND CHILD HEALTH-FAMILY PLANNING (MCH-FP) ACTIVITIES: The current MCH-FP project delivers services to a population of approximately 94,000 aiming at an overall reduction in mother and child mortality rates and a sustained increase in the number of couples practising family planning. Aside from the direct benefits of improved health services to the 14,000 women of the

project area and their children, the Demographic Surveillance System (DSS), established in the 1960s makes it possible to conduct health care research, and to measure the impact of service activities on mortality and fertility. Underlying the

programme is the need to identify appropriate priorities and service strategies given the severe constraints that hamper the development of an effective primary health care (PHC) programme in rural Bangladesh, or other South Asian populations. A major feature of this programme is the strong outreach system providing health care in the home.

As well as consolidating the already
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An international course on the epidemiological aspects of diarrhoeal diseases took place at the ICDDR,B from March 2 to 13, 1986. Eight trainees from the People's Republic of China participated. They are being familiarised with laboratory examination procedures. Dr Maslemuddin Khan was the course director.

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very effective family planning component, selected aspects of the MCH component have been strengthened. This is timely, coming at a point when the Ministry of Health & Population Control (MOHPC, now the Ministry of Health and Family Planning) of the Government of Bangladesh has identified three priorities in this context: the expanded programme on immunisation, oral rehydration therapy, and safe birth practices.

Expanded programme on immunisation (EPI). Measles immunisation, previously delivered to a population of 45,000 with 87% coverage of children aged 9 months to 5 years, was extended to a neighbouring population of similar size, thus doubling the coverage (1,500 children in 1984). This will be completed early in 1986 prior to the annual seasonal epidemic of measles which occurs at the turn of the year.

Oral rehydration therapy (ORT). The mainstay of treatment continues to be the management of acute watery diarrhoea with oral rehydration solution (ORS). The case load at the Matlab Treatment Centre fell substantially in 1984 and again in 1985 with a corresponding increase at the three decentralised Community-Operated Treatment Centres, well run by volunteers trained by ICDDR,B. The changeover has been completed in the cottage industry preparation of WHO-ORS constituents from 1 litre to 0.5 litre packets in conformity with the present practice of the Government of Bangladesh. Distribution at clinic and household (bari) level was accompanied by necessary training of personnel and education of clients.

Safe birth practices: Neonatal and maternal mortality rates are still high in Matlab and show little improvement. This is mainly due to adverse aspects of home delivery and to the inadequacy of screening and referral of high risk pregnancies. Five hundred traditional birth attendants have been identified and training is scheduled for 1986.

Family planning activities An average of 175 tubectomies and a few vasectomies have been carried out each year in the Matlab Treatment Centre. The current domiciliary "cafeteria style" contraceptive service is being maintained as before, clients being offered a range from condoms to Copper-Ts (IUDs) in their homes. The current contraceptive acceptance rate has continued to rise, and, at 46% of eligible couples, is now more than twice the national average. Current service-oriented research activities include the screening and treatment of women using contraception for complications due to various infections.

The Matlab MCH-FP programme has achieved improvements in fertility and mortality roughly equal to Government of Bangladesh targets for the next five years. If official goals are to be met, in some sense replication of the Matlab experience will be required. Elements of the Matlab system have already been adapted to the MOHPC programme in the MCH-FP Extension Project.

2. FAMILY PLANNING-RELATED INFECTION: The aim of this project was to determine the nature and extent of morbidity due to reproductive tract infections, in relation to women adopting family planning measures. This has involved the training of national staff in the detection and management of family planning-related infections and the development of appropriate new microbiological techniques.

A period-prevalence study of family planning-related infections was carried out in the Matlab area starting in August 1985 in which 2,296 women (95% of those eligible) were screened by questionnaire in the household. Twenty-one percent had a history comparable with reproductive tract infection and were referred for further examination. Seventy-six percent of these symptomatic women were successfully investigated and approximately 80% of them needed antimicrobial therapy, approximately 10% of the population screened. Passive surveillance is also being continued.

During 1985, training manuals were developed both in English and Bangla,

and training was given to more than 100 medical officers, community health workers and other supervisory and para-medical staff. This has included epidemiology, pathophysiology, signs, diagnosis and treatment of female reproductive tract infections.

3. A new study on: A strategy for developing the nutrition component by estimation of the proportion of under-3 deaths associated with malnutrition by monthly measurement of arm circumference is to begin soon. The aim of this study is to estimate the proportion of deaths in children aged under three in the Matlab "comparison" area associated with malnutrition, which could be predicted by monthly measurements of arm circumference by health workers. This information is intended to help develop and improve simple evaluation techniques for future nutrition interventions aimed at reducing malnutrition-associated mortality in early childhood. For the treatment of severely malnourished children separate nutrition rehabilitation facilities will be introduced in Matlab Treatment Centre in 1986. No other facilities currently exist in the area either under non-governmental organisations or Government of Bangladesh.

4. THE MCH-FP EXTENSION PROGRAMME: The MCH-FP Extension Project was initiated in 1982 at the request of the Planning Commission, Government of Bangladesh as a collaborative project between the ICDDR,B and the MOHPC in two Upazilas, Abhoyanagar and Sirajganj. The primary objective of the project was to work with MOHPC staff at Upazila level to identify operational barriers to the national MCH-FP programme, to discuss strategies to overcome them and through the Government of Bangladesh structure to implement the interventions.

5. COST-EFFECTIVE ANALYSIS OF THE MCH-FP PROGRAMMES IN MATLAB, EXTENSION AND COMPARISON AREAS: The purpose of the cost-effectiveness analysis is to identify the optimal level of least expense and greatest effectiveness of the MCH-FP services in reducing population growth. A series of rates are

being calculated to provide information on the cost per unit of impact of different treatments and the way they change over time. This cost-effectiveness analysis was carried out initially in Matlab's "intensive" MCH-FP intervention area.

6. NATIONAL ORAL REHYDRATION PROGRAMME (NORP) EVALUATION : The NORP evaluation was completed at the end of 1985. Recommendations included a substantial increase in proposed production levels of ORS packets combined with improved record-keeping and service delivery. Integration with other health delivery services was considered essential. The need to recognise peak seasonal demands and an adequate distribution system from Upazila level to the household was stressed.

7. IMPACT OF MEASLES IMMUNISATION ON MORBIDITY AND GROWTH OF CHILDREN IN RURAL BANGLADESH : The aim of the study was to assess the impact of measles immunisation on diarrhoeal morbidity and growth of children in rural Bangladesh. The main aim was to compare the duration of diarrhoea between children who received measles immunisation and unvaccinated children who developed measles.

Field work was started in August 1984 and continued through 1985. Three hundred and fifty-six vaccinated children aged 9 to 24 months and 990 age- and sex-matched non-measles, non-vaccinated children were followed. Data collection included alternate-day morbidity surveillance for diarrhoea and other common illnesses, and monthly anthropometry. Blood samples were obtained at the completion of one year from 284 vaccinated children and 784 unvaccinated controls.

8. FIELD COMPARISON BETWEEN WHO-ORS AND RICE-SALT ORS: Data collection on this study was completed in 1985. Preliminary analyses have shown that rice-salt ORS users experienced shorter diarrhoeal episodes than WHO-ORS users and those using locally available treatment of whatever kind. Better growth in weight and height was also observed amongst the

rice-salt ORS user group.

9. MIRZAPUR HANDPUMP PROJECT : During the second half of 1984, 26 Tara handpumps were installed in 2 villages with a total population of around 5,000. In 1985, 713 two-pit, water-sealed latrines were installed, covering 80% of the target households. A health education programme based on the use of both of these interventions and using the services of 86 female volunteers drawn from approximately 1 in 10 of the study population households was introduced.

Three knowledge, attitude and practice (KAP) surveys were carried out in this intervention area and also in a similar-sized, neighbouring comparison area. These showed a marked increase in use of the tubewell in the intervention area.

Initial acceptance and use of latrines was slow but once the households were persuaded to install their own traditional screens, use rates rapidly increased and more than 80% are now in regular use by most household members. Personal hygiene practices such as maintenance of cleanliness of latrines, hand-washing following defaecation and the use of ash as a cleaning agent have shown steady improvement. Preliminary

analysis of diarrhoeal morbidity data derived from weekly household visits show a fall in diarrhoeal incidence rates particularly in children aged under 5 in the intervention area.

10. URBAN VOLUNTEER PROGRAMME (UVP) : Urban volunteers are illiterate women recruited and working in 16 of Dhaka's 18 districts. Some 1,200 volunteers are involved in the delivery of PHC services. Numbers range from 60 to 200 per district of which the average population is 250,000. Another 50 volunteers in seven districts carried out health care research, each one covering 38 families.

The UVP increased the scope and magnitude of its service and research activities in 1985. The service component included home and clinic-based work. The 1,200 active volunteers treated approximately 92,000 patients for dehydrating diarrhoea with 210,000 half-litre packets of ORS. Surveillance for Vitamin A status in a study population in the catchment area of the UVP revealed a prevalence rate of 1.9% of night blindness and 1.8% of Bitot spots. Thus nutrition education activities were augmented by the detection and treatment of 600 children with

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A field research officer of Urban Volunteer Program (UVP) is examining the Health Calendar maintained by a mother. This calendar shows records of diarrhoea episodes of children of urban households. Information on any scabies attack and eye problems of children are also entered in this calendar by mothers. Workers of the UVP assimilate these records for research purposes, and in the field, they teach mothers on aspects relating to management of diarrhoeal diseases with special emphasis on oral rehydration therapy.

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xerophthalmia with vitamin A capsules and the distribution of seeds for yard and roof-top vegetable gardens. Distribution of 27,000 bars of soap accompanied the hygiene education. All volunteers and their appropriately aged children were immunised against polio, diphtheria, pertussis and measles.

Two community-based clinics were established in cooperation with the UVP. Over 4,000 moderately and severely dehydrated patients were successfully treated in a diarrhoea clinic continuously staffed by urban volunteers. One hundred and fifteen moderately and severely malnourished children were treated in a UVP community-based day-care nutrition education and rehabilitation centre also staffed by urban volunteers. The children received 4 meals and their mothers 1 meal per day. Mothers actively participated in comprehensive nutrition education and demonstrations of food preparation. The nutritional status of the children improved while they were attending the centre. Evaluation of the long-term impact of this intervention on the nutritional status of these children compared with other children of similar nutritional status and age is now being carried out.

Research activities included the use of a case-control study to identify hygiene practices associated with reduced rates of childhood diarrhoea in the urban setting. These practices - washing hands before eating and handling food and excluding faeces and garbage from the family's living area - were the basis of a subsequent education intervention.

The impact of this intervention was evaluated from March through October 1985 by contrasting hygienic behaviour and childhood diarrhoeal rates of the 38 families living in 25 urban sites each of whom received the educational intervention with the rate and behaviour of the families living in 26 communities who did not. Hygienic practices were improved in the intervention area and diarrhoea rates were reduced by 25%. There

were 5.5 episodes per 100 child weeks in the non-intervention area, and 4.2 episodes in the intervention area, diarrhoea rates in the two areas were similar prior to the intervention.

Childhood diarrhoea rates in these urban slums were not strongly influenced by the socio-economic status of the family. But an analysis conducted from October 1984 through February 1985 showed that unhygienic use of the "sari" was correlated with higher rates of childhood diarrhoea (9.35 episodes per 100 weeks in families without frequent misuse versus 10.84 in families with frequent misuse).

Information from a home-maintained health calendar recording episodes of childhood diarrhoea and scabies correlated well with two-week recall (kappa 0.83). By contrast, when responses to a KAP questionnaire, and a one-day health recall were compared with direct observations of sanitation and hygienic practices the agreement was found to be low (kappa 0.39).

11. THE DEMOGRAPHIC SURVEILLANCE SYSTEM (DSS)— MATLAB AND TEKNAF :

Monitoring of demographic events continued in two areas of Bangladesh- a population of around 195,000 in Matlab and 65,000 in Teknaf. Upgrading of systems documentation relating to data collection in the field and to subsequent data management procedures is almost complete. This will take the form of an ICDDR,B internal publication and will facilitate the use of DSS data for future scientific research.

A new mainframe computer was installed under the auspices of the DSS. The completed database for the Matlab DSS will be ready by the end of 1986.

A recent analysis of Matlab data has focussed on sex differentials and socio-economic status (SES) in relation to childhood mortality. The case-fatality rate for measles was 2.7 times higher in girls than in boys, and the rate was 2.2 times higher in lower SES households than in the higher. The inverse relationship between SES and nutritional status in childhood was significant though it explained less than 10% of the variance. The relationship,

however, was much stronger in girls than in boys.

Teknaf data showed that overcrowding in the home and inadequate sanitation had a significant effect on early childhood mortality. The risk of post-neonatal death was 1.5 times higher than in smaller households and 3.1 times higher in households which did not use latrines compared with those which did.

An analysis of seasonality data from 1977 to 1983 showed excess child mortality during the monsoon months (June-July) in Teknaf and in the lean or "hungry" period (October-November) in Matlab. An analysis of the demographic consequences of marital disruption and of differences in nuptiality in Matlab and Teknaf is in progress in collaboration with Princeton University, USA.

Some other studies, which have been approved are about to be launched. These include work on "individual and community level variations in fertility and mortality in Matlab" and on the "impact of the Meghna-Dhono-goda Embankment Scheme on vital rates and migration in Matlab: implications for DSS operations".

Scientific Support Activities:

1. DATA MANAGEMENT BRANCH (DMB) AND BIOSTATISTICS CELL:

Besides providing support to scientific projects, the DMB prepared a description of archived material and 90% of all computerised data files have now been achieved. Medical records have also been maintained. Help with archives has been extended to other institutions including the Combined Military Hospital, Dhaka, the Institute of Statistical Research and Training (ISRT) of Dhaka University, the Bangladesh Medical Association, the Institute of Post-graduate Medicine and Research (IPGMR) and the Ministry of Planning, Government of Bangladesh.

The Biostatistics Cell carried out the following main functions. In-house training courses were provided in statistical methods and study design for scientists and support staff.

Statistical consultations were provided to ICDDR,B scientists, project

leaders and others such as analyst programmers involved in data analysis. Statistical reviews were also carried out of scientific papers submitted for publication in the Journal of Diarrhoeal Diseases Research.

Collaborative work was carried out with national institutions and NGOs, e.g. Dhaka University and the Bangladesh Rural Advancement Committee (BRAC).

2. COMPUTER INFORMATION SERVICES (CIS): CIS witnessed a major change in terms of hardware, software and personnel during the year. An IBM 4331-L02 mainframe computer with allied peripherals was installed under the VM/SP operating system. COBOL, FORTRAN and RPG as major language compilers, together with SQL/DS as DBMS and SPSS-X as a statistical package, were made operational to serve the Centre's data processing needs. DOS/VSE a guest operating system, is being installed to further enhance the data handling capabilities of the system. The upgraded computer, an IBM 4361-L05 with 2.5 GB of DASD space and 12 terminals, will meet the needs of all users for handling large complex data sets at six times the speed of the IBM 4331. This will facilitate both scientific and administrative activities. To improve accessibility to these enhanced mainframe capabilities an IBM 3274 Terminal Cluster Controller will be installed in the main IPH building providing mainframe linkages to various scientific working areas with modified IBM PCs which may still be used as stand-alone units.

CIS provided technical assistance to many major projects in advising on microcomputer configuration, software selection, systems and personnel selection and training and project management. A major commitment has been to the development of the DSS database involving data extraction, editing/conversion and completion of census files. This activity will be completed towards the end of 1986.

3. MATLAB FIELD STATION: Matlab Field Station activities are supervised and coordinated by the Head, Matlab Station, though overall

responsibility lies with the Associate Director in charge of Community Services Research. Nine research protocols were carried out in Matlab during 1985. Clinical services provide treatment for patients in the Matlab Diarrhoea Treatment Centre and support for the three Community-Operated Diarrhoea Treatment Centres as well as for various research protocols.

The ICDDR,B Diarrhoea Treatment Centre in Matlab adjoining the Upazila Health Complex has 50 beds. During

1985, 6,539 patients were treated there.

Nutritional rehabilitation has been carried out at Matlab Treatment Centre since 1983. Children admitted with 3rd degree malnutrition (less than 60% weight-for-age by the Harvard standard), received a special diet of frequent milk feeds and locally available, energy-dense foods ("süji" and "khichuri") containing rice, dal, oil and vegetables. One-ninety-two children were treated in 1985.

ACTIVITIES OF THE DISEASE TRANSMISSION WORKING GROUP (DTWG)

The Disease Transmission Working Group focuses on problems of preventing the transmission of enteric pathogens and preventing diarrhoeal disease. Disciplines within the group are primarily those of epidemiology and microbiology. The strength of the group comes from the interaction of these two disciplines which allows large-scale epidemiological studies to be undertaken with accurate and sophisticated laboratory support.

Scientific Activities

Although the major effort has been devoted to the vaccine trial, several other areas of research have continued and work on several "new" pathogens has been instituted.

1. FIELD TRIAL OF ORAL B SUBUNIT / WHOLE CELL AND WHOLE CELL CHOLERA VACCINE:

The major project of the group during 1985 was field testing of two new oral cholera vaccines in the Matlab area. The two vaccines consisted of (i) whole killed *Vibrio* cells in combination with the B subunit of cholera toxin (WC/B vaccine) and (ii) whole-killed cells without the B subunit (WC). The vaccines were given along with an antacid solution especially developed for the trial in 3 doses 6 weeks apart. The vaccine constituents, the dosages, dosing intervals and antacid were all based on the results of research at ICDDR,B and abroad which demon-

strated the likelihood for success of such a vaccine. Recent studies have shown that oral cholera vaccines are probably more active than injectable ones since the former stimulate intestinal immunity better. Secondly, the B subunit of cholera toxin is a safe and effective way to stimulate antitoxic immunity. Thirdly, if one stimulates antitoxic immunity and antibacterial immunity together, the two types of antibodies elicited are synergistically protective.

Based on these and other findings, the ICDDR,B, in cooperation with the World Health Organization and the Government of Bangladesh, is carrying out a field trial of the two vaccines in comparison with a heat-killed *E. coli* (K 12) placebo. Between January and May 1985 about 89,000 individuals received at least one dose, and about 63,000 received all three doses of their randomly-assigned vaccine. Surveillance for cholera will continue for at least one year after vaccination. Because of the current services provided, surveillance can continue for several years if the vaccine is effective.

2. SURVEILLANCE PROGRAMME — DHAKA HOSPITAL:

Appropriate treatment remains the most cost-effective intervention to prevent complications and death from diarrhoeal diseases. Through an analysis of a 4% systematic surveillance sample from the Dhaka Treatment Centre (DTC) several trends have been observed

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during the last 5 years. Though numbers of diarrhoea cases treated at the DTC have dropped from a high of over 100,000 cases to 75,000 cases annually, the drop has occurred only in mild cases suggesting that treatment for mild diarrhoea is now occurring more often in the home. The severe cases continue to seek care at the DTC.

Using conservative assumptions, it is estimated that the DTC has prevented the deaths of about 35,000 patients during the last 5 years. Most "deaths averted" represent patients who would have died from severe dehydration and who were saved mostly through simple rehydration therapy. By dividing the costs of the DTC by the deaths averted, it is estimated that it has cost about US\$ 90 per death prevented in the DTC during the last 5 years.

3. INTERVENTION OF TRANSMISSION OF CHOLERA BY HAND-WASHING: An analysis of a prospective village-based study in Nandipara has confirmed the effectiveness of handwashing in preventing shigellosis.

4. PREVENTING THE TRANSMISSION OF CHOLERA USING ALUM POTASH: The use of a alum potash (or "fitkuri" in Bangla) to cleanse contaminated water has been a folk practice in Bangladesh for centuries. With the increased use of tubewells and other clean water supplies, its practice has decreased markedly. Recent studies at ICDDR,B have shown that this practice has a sound scientific basis and could be a potentially useful and cost-effective way to purify water when clean water is not available. The alum clears water of suspended material by flocculation and kills within a few hours all vibrios, and most other enteric pathogens by lowering the pH.

Several studies are currently underway on ascertaining the pattern of incidence and health-related effects of *Cryptosporidium*-associated diarrhoea. This organism has been reported

to be a common cause of childhood diarrhoea in Dhaka city. The disease tends to be more prolonged and can be more severe.

Studies on *Campylobacter* and *Campylobacter*-like organisms are also being carried out. Besides, at Matlab work has been done on identifying the harmful effects of non-cholera *Vibrio*-*naceae*. As a group they represent the most commonly isolated "pathogens" from diarrhoea patients. Studies are underway to ascertain the pathogenic potential of these organisms.

Of special interest are studies on the virulence mechanism and antigens of the non-cholera *Vibrionaceae*.

Some antigens (e.g. cholera toxin, outer membrane proteins and H antigens) may be shared with the vaccine antigens; hence we may find that the vaccine protects against infection with these other bacteria as well as against cholera.

New Assays

1. RAPID ASSAY FOR *ESCHERICHIA COLI* HEAT-LABILE TOXIN (LT): In collaboration with Dr. A-M Svennerholm (University of Goteborg, Sweden), rapid monoclonal antibody ELISA has been established to detect LT which allows for an "overnight" diagnosis of LT-EPEC diarrhoea. With the rapid test, index patients are identified quickly and field workers can begin follow-up the next day. This procedure is expected to replace the traditional assays (CHO cell and Y1 adrenal cell assays) in routine tests for EPEC.

2. ELISA TEST FOR *ESCHERICHIA COLI* HEAT-STABLE TOXIN (ST): Also in collaboration with Dr. Svennerholm, a new ELISA assay for ST has been instituted. It is expected that this assay will become the "routine" assay for ST (to replace the current infant mouse assay) during 1986.

3. PHAGE TYPING OF *ESCHERICHIA COLI*: After several years of preliminary work, studies have shown that a phage typing scheme may be practicable to identify strains of *E. coli*. Based on susceptibility to 25 different phages, *E. coli* strains have a unique

pattern of susceptibility which can be used to identify individual strains. With further validation, the phage typing scheme will greatly aid the ability to track and identify strains of *E. coli*.

4. SHIGA TOXIN ELISA : In collaboration with Dr. G. Keusch, a monoclonal ELISA was set up to detect Shiga toxin in bacteria or stools of patients with diarrhoea. Toxin could be detected in stools of patients with shigellosis but not in stools of patients with cholera or EPEC diarrhoea. This assay should be useful for future studies on the pathogenesis of shigellosis.

5. RAPID DIAGNOSIS OF SHIGELLOSIS BY COAGGLUTINATION TECHNIQUE: Work was begun in an attempt to develop a rapid assay for *Shigella* species directly isolated from stool based on coagglutination with the Cowan strains of *S. aureus* coated with antibody. Preliminary experiments suggest that this procedure can be developed.

Epidemiological Trends

Through the "windows" of the Dhaka Treatment Centre surveillance system, the Matlab vaccine trial surveillance, and the epidemic preparedness programme, several trends of diarrhoeal disease have been apparent during 1985. Especially important has been the trends in antibiotic resistance among common enteric pathogens and the recognition of epidemics.

1. CHOLERA: Rates for cholera were higher than average during 1985 in Dhaka and Matlab, and outbreaks in other areas of Bangladesh suggest this was a widespread phenomenon. El Tor and classical strains continue to coexist though with somewhat different seasonal patterns. Strains of cholera resistant to multiple antibiotics were again seen in Dhaka. The multiple-resistant strains contained a plasmid (incompatibility Group C) and were resistant to ampicillin, cotrimoxazole, chloram-

phenicol, and furoxone but continued to be sensitive to tetracycline. Other strains, without a plasmid, were resistant only to furoxone.

2. SHIGELLOSIS: *S. dysenteriae* type 1 continued to be epidemic in Bangladesh. Especially worrisome was the acquisition by the epidemic strain of resistance to nearly all clinically useful antibiotics including tetracycline, ampicillin, trimethoprim, sulfonamides and chloramphenicol. Field studies have documented high case-fatality rates in children.

MICROBIOLOGY LABORATORIES: Upgrading and renovation of the microbiology laboratories was carried out during 1985 with the addition of several capital laboratory items. This was accompanied by a reorganisation of the microbiology branch. These improvements in the facilities and organisation should contribute to high quality research in microbiology in the future.

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Diploma in Health Education in Developing Countries

The Leeds Polytechnic provides a nine-month diploma-level training for experienced field personnel in both theoretical and practical aspects of education and communication methods applied to water, sanitation and health programmes. The course is designed for personnel, currently working in health education services, public health and nutrition departments, family planning services, training institutions and/or community and school health programmes who could benefit from a study of the theoretical and practical aspects of health education to help them to: (a) plan, implement and evaluate health education programmes within their service; (b) work with communities to identify influences on health behaviour and felt needs for health education; (c) select and use appro-

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ABSTRACTS from on-going research

1. Molecular epidemiology of human rotavirus in China. 2. Studies on a new rotavirus found initially in adults in China. (1984-87). * Dai Guo-zhen, Sun Mao-Sheng, Cheng Yuan-ding, Ding Xue-feng, Wang Lichun, Du Dan-ping. * Chief, Department of Central Laboratories, Institute of Medical Biology, Chinese Academy of Medical Science, Kunming, China.

1. Molecular epidemiology of human rotavirus in Kunming and Fuzhou, China as determined by electrophoresis in polyacrylamide gels of genome RNA was studied. The rotaviruses found in different hospitalised patients from 1979-1981 in Kunming, and from 1983 to early 1985 in Fuzhou, can be ascribed to either of two subgroups according to the electrophoretic pattern of their RNAs. The relative importance of each subgroup as a cause of hospitalisation was different. In Kunming, viruses of subgroup II were found to be associated with the outbreak of 1979-80, while rotaviruses of subgroup I were found to be the main aetiological agent during 1980-81. Seven different electropherotypes of rotavirus were observed. Of them, two belonged to subgroup I and 5 to subgroup II. In contrast, in Fuzhou, rotaviruses of subgroup I were the causative agent in 1983, while that of subgroup II were found responsible from 1984 to early 1985. Four electropherotypes were observed. Of them, one belonged to subgroup I and three to subgroup II.

Enterotoxigenic *Salmonella* in foods of animal origin and characterization of their enterotoxins. (April 1984-April 1987). Sharma VD. National Fellow. Department of Microbiology and Public Health, College of Veterinary Sciences, G.B. Pant University of Agriculture and Technology, Pantnagar, U.P. 263 145, India.

Five hundred and sixty-six samples from goat meat, buffalo meat, fresh pork, pork sausage, cocktail sausage, cooked ham, hot dog, ham garlic,

frank-furter, meat pie, bacon, kabab and milk, were examined for presence of *Salmonella*. Of them, 66 samples yielded *Salmonella* of 15 serotypes. Whole cultures of 34 isolates were tested for their enterotoxigenicity using rabbit ligated ileal loops. Of these, 16 were enterotoxic. In addition, enterotoxic activity was also detected in 6 of 14 cell-free supernatants. Purification and characterisation of enterotoxin of *Salmonella* of food origin are being undertaken.

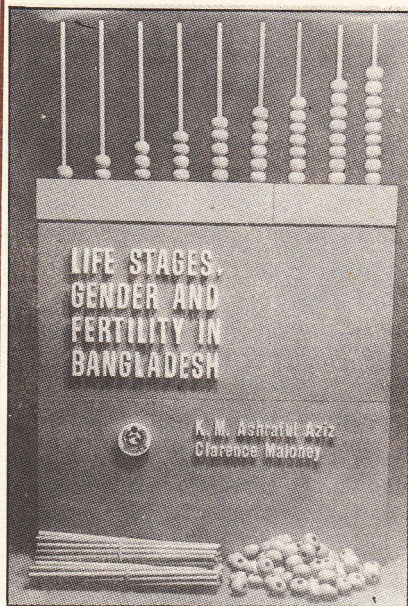
Comparison of oral electrolyte solutions of trisodium citrate and sodium bicarbonate in the treatment of acute severe infantile gastroenteritis and acidosis. (March 1985-February 1986). * Sharifi J, Ghavami F. * Bahrami Children's Hospital, Tehran, 16417, Iran.

A double-blind trial was undertaken to compare the results of oral fluid therapy with trisodium citrate and sodium bicarbonate in acidosis and acute infantile gastroenteritis in over 190 patients. The results indicate no significant differences in the rehydration rate and duration of diarrhoea within the two groups. Acidosis was corrected faster in patients receiving sodium bicarbonate during the first 6 hours of treatment. No marked differences in the correction of acidosis were observed after 24 and 72 hours.

Heat-stable enterotoxin of *Y. enterocolitica* and its function. (September 1978-September 1986). * Miyama A, Okamoto K, Inoue T, Hara S, Kobayashi T, Yukitake J. * Dept. of Microbiology, Fujita-Gakuen Health University School of Medicine, Kutsukake-cho, Toyoake, Aichi 470-11, Japan.

Yersinia enterocolitica ST has been proved to be a peptide with 30 amino acid residues in which the cystein-rich sequence was remarkable. Since synthetic toxic peptide is available, the investigators are testing the biochemical markers related to ST function using native and synthetic toxin and cultured L cells. ■

NEW ICDDR,B PUBLICATION



LIFE STAGES, GENDER AND FERTILITY IN BANGLADESH

Publication date: December 1985.

Total pages: 248 (offset printing with hard cover)

"Life Stages, Gender and Fertility in Bangladesh" by K.M. Ashraf Aziz and Clarence Maloney is an interesting work on sex socialisation. The various life stages of an individual in Bangladeshi culture are introduced through this book. The psychological development and gender role expectations in the different life stages are highlighted in relation to sexual and reproductive behaviour.

Chapters of the book include: Stages of Life, Childhood and Psychosexual Development, Adolescence and Gender Roles, Adulthood and Gender Roles, Sexual Relations Outside Marriage, Range of Sexual Behaviour Reciprocal

Responsibilities Within the Life Cycle, Cultural Factors and Fertility, Fertility Control and Stages of Life, Traditional Communication and Knowledge of Sex, and Family Life Education. A comprehensive reference list and an index are also appended.

Single Copy Price

In foreign offset paper — US\$ 35.00

In local paper — US\$ 25.00

These prices include the registered airmailing costs.

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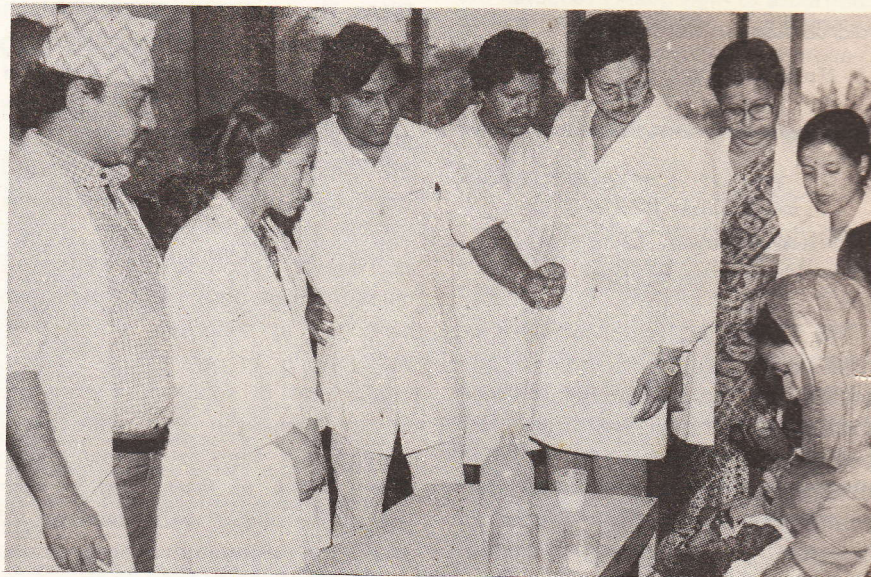
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Diploma in Health

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appropriate health education methods; (d) design and construct audio-visual learning materials; (e) plan and implement programmes of staff training in health education. Course participants are encouraged to specialise in water, sanitation and health within an overall context of health education and primary health care. This diploma course is entering its fifth year and has trained over sixty persons from a range of backgrounds including nursing, public health, nutrition, sanitation, population, dental health, and teaching, coming from over twenty countries.

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Participants of the international training course on clinical aspects of diarrhoeal diseases are seen examining samples of the rice-based ORS. Method of preparing the rice-based ORS is being explained and the constituents being exhibited. A mother is also being taught on various aspects of oral rehydration therapy. This course took place at the ICDDR,B from March 16 to 27, 1986 and was attended by 14 participants from Nepal. Dr. R.L. Akbar was the course director.

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