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CENTRE
FOR HEALTH AND
POPULATION RESEARCH

Fifth Annual Scientific Conference ASCON V



Dhaka, 13-14 January 1996
Sasakawa International Training Centre
International Centre for Diarrhoeal Disease Research, Bangladesh

Programme and Abstracts

Activities Currently Underway at ICDDR,B The Centre for Health and Population Research



The Centre is a unique global resource dedicated to the highest attainable level of scientific research concerning the problems of health, population and development from a multidisciplinary perspective. There is no other institution in the world with similar capabilities and similar opportunities for community-based longitudinal field research. The Centre is in an exceptional position to conduct research within the socio-geographical environment of Bangladesh, where the problems of poverty, mortality from readily preventable or treatable causes, and rapid population growth are well-documented and similar to those in many other developing countries of the world. The Centre currently has over 200 researchers and medical staff from 10 countries participating in research activities. The Centre's staff also provide care at its hospital facilities in Dhaka and Matlab to more than 100,000 patients a year and community-based maternal/child health and family planning services for a population of 100,000 in the rural Matlab area of Bangladesh. In addition, the Centre works closely with the Government of Bangladesh in both urban and rural extension projects, which aim at improving the planning and implementation of reproductive and child health services.

The Centre is governed by a distinguished multinational Board of Trustees. The research activities of the Centre are undertaken by four scientific divisions: Clinical Sciences Division, Community Health Division, Laboratory Sciences Division, and Health and Population Extension Division. Administrative functions are undertaken by two divisions, namely Finance and Administration & Personnel.

The Centre is an independent, non-profit international organization, funded by donor governments, multilateral organizations and international private agencies, all of which share a concern for the health problems of developing countries. The Centre has a rich tradition of research on topics relating to diarrhoea, nutrition, maternal and child health, family planning and population problems. Recently, the Centre has become involved in the broader social, economic and environmental dimensions of health and development, particularly with respect to women's reproductive health, sexually transmitted diseases, and community involvement in rural and urban health care. This year's conference highlights some of this broad-based research, but lack of time and space makes it impossible to provide a complete update on all the research works of the Centre at this conference.

One of the central aims of the Centre is to share its research findings with those who are concerned about the health problems of developing countries, other scientists participating in similar research, policy-makers, students, health professionals, programme leaders and managers, as well as local, national, regional, and international leaders. The Centre is proud to present its research findings to those who share its concerns and common goal of improving the health and well-being of people in the developing world including Bangladesh.

(Contd...inside of the Back Cover)

Fifth Annual Scientific Conference ASCON V

Dhaka, 13-14 January 1996
Sasakawa International Training Centre

"Health and Development: Social and Biomedical Perspectives"

Programme and Abstracts



Mission Statement

"The fundamental mission of the Centre is to develop and disseminate solutions to major health and population problems facing the world, with emphasis on simple and cost-effective methods of prevention and management."

Editors
Firdausi Qadri
GH Rabbani
MA Rahim
Cris Tunon

Managing Editor
M Shamsul Islam Khan

Desktop, Lay-out,
Printing and Publication
MA Rahim

Cover Design
GH Rabbani
MA Rahim

Cover Photographs
Asem Ansari
Shezad Noorani

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International Centre for Diarrhoeal Disease Research, Bangladesh
Mohakhali, Dhaka 1212 (GPO Box 128, Dhaka 1000), Bangladesh
Tel: 600171-8, 600271-2,; Cable: CHOLERA DHAKA
Telex: 675612 ICDD BJ; Fax: 880-2-883116, 880-2-886050
E-mail: msik%cholera@external.ait.ac.th

C O N T E N T S

ASCON V Organizing Committee	iv
Acknowledgements	v
A Brief History of ICDDR,B	vi
Introduction	vii
Programme Summary	ix
Programme Details	xi
ASCON V Oral Presentations	1-50
Reproductive Health: Social Perspectives	1
Educational and Environmental Interventions	8
Rural Health Care Services	14
Urban Health Care Services	21
Development and Human Well-being: Part I	27
Biomedical Perspectives: Clinical Aspects	33
Development and Human Well-being: Part II	40
Biomedical Perspectives: Laboratory Aspects	45
Poster Presentations	51-73
Index	74

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Demissie Habte, Director, ICDDR,B

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Sandra L Laston, CHD: Organizing Secretary

Members:

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M Shamsul Islam Khan, DISC; Taqsem A Khan, A&P; Ishtiaque A Zaman, ER&ID

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Acknowledgements

The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) is supported by countries and agencies which share its concern for the health problems of developing countries. Current donors providing core support include: the aid agencies of the governments of Australia, Bangladesh, Belgium, Canada, China, Denmark, Japan, Saudi Arabia, Sri Lanka, Sweden, Switzerland, Thailand, the United Kingdom, and the United States; international organizations, including Arab Gulf Fund, Asian Development Bank, European Union, United Nations Children's Fund (UNICEF), United Nations Development Programme (UNDP), United Nations Population Fund (UNFPA), and World Health Organization (WHO).

A BRIEF HISTORY OF ICDDR,B

- 1960 Pakistan-SEATO Cholera Research Laboratory established
- 1963 Matlab field station started
First of a series of cholera vaccine trials launched
- 1966 Demographic Surveillance System established
- 1968 First successful clinical trials of Oral Rehydration Solution
- 1969 Relationship between stopping breast-feeding and resumption of menstruation demonstrated
- 1971 Independence of Bangladesh
- 1973 Shift from Classical to El Tor cholera identified
- 1977 Maternal Child Health and Family Planning interventions began in Matlab
- 1978 Government of Bangladesh Ordinance establishing ICDDR,B signed
- 1981 New Dhaka hospital built
Urban Volunteer Programme initiated
- 1982 Classical cholera returned
Field testing of cereal Oral Rehydration Solution began
MCH-FP Extension Project began
- 1983 First issue of the Journal of Diarrhoeal Diseases Research published
- 1984 ICDDR,B received UNICEF's Maurice Pate Award
- 1985 Full Expanded Programme of Immunization activities tested in Matlab
WC/BS cholera vaccine trial launched
- 1987 ICDDR,B received USAID's "Science and Technology for Development" Award
- 1988 Treatment of and research on Acute Respiratory Infection began
- 1989 The Matlab record-keeping system, specially adapted for government use, extended to the national family planning programme
- 1990 The new Matlab Health and Research Centre opened
- 1991 ICDDR,B scientists assist in response to the diarrhoeal disease epidemics after the cyclone in southern Bangladesh, and the cholera epidemic in South America
- 1992 ICDDR,B-Bangladesh Rural Advancement Committee (BRAC) study commenced
New Sasakawa International Training Centre built
- 1993 New laboratories built and equipped
New *Vibrio cholerae* O139 Bengal identified and characterized
- 1994 ICDDR,B celebrated the 25th anniversary of the first successful clinical trial of ORS
ICDDR,B team helped slash mortality in Rwandan refugee camps in Goma, Zaire

Fifth Annual Scientific Conference (ASCON V)

Introduction

ICDDR,B, the Centre for Health and Population Research, takes pride in sharing the results of its current research relating to **Health and Development: Social and Biomedical Perspectives**. For some time the Centre has recognized the importance of both social and biomedical aspects of health problems of developing countries, and ASCON V examines the outcome of its collaboration among social and biomedical scientists. The Centre is involved in a vast array of research and training concerned with the many social and biomedical issues faced by countries in the economically developing world -- from studies of the national demographic impact of family planning programmes to studies of the molecular biology of *Vibrio cholerae*, the agent responsible for cholera. This year's conference is also particularly notable because of the involvement of one of the world's leading NGOs working in health and development: the Bangladesh Rural Advancement Committee (BRAC).

Although the Centre has received its greatest acclaim for the development of oral rehydration fluid for the treatment of dehydration caused by diarrhoea, a tradition in social science research has been important since the founding of the Centre and has been increasing gradually. More than 30 investigators with graduate-level research training in one of the social sciences work at the Centre, and many others are also involved in research concerning the broader issues of health and development from social science perspectives. The demographic and socioeconomic information collected at the Centre's various field sites, most notably the Matlab field area, have provided, and continue to provide, unparalleled opportunities for community-based research concerning health and development. Presently, with the introduction of BRAC's social and economic development programme, Matlab provides a unique opportunity to study the joint and independent impacts of health and non-health interventions on human well-being. The Centre now also has a Social and Behavioural Sciences Programme which will be increasingly involved in issues relating to women and development. Community-based research concerning sexually transmitted diseases, reproductive tract infections, geographical information systems (GIS) for the spatial distribution of diseases, and environmental health issues are all new research activities at the Centre. Research on community participation aimed at promoting self-help for health is being carried out in the new field site in Chakoria, using social science methodologies.

Conference Objectives

ASCON is one of many efforts at the Centre to share the results of its research activities. It is our hope that this forum will provide an opportunity to discuss ways in which the complex interactions between health and development, particularly from a social as well as from a biomedical perspective, can be better understood for everyone's benefit. Considering the multidimensional and multisectoral nature of these issues, the conference will be enriched by the diverse perspectives provided by the invited guest lecturers, by the scientific presentations and also by the comments of the session leaders and participants.

Programme Highlights

The Annual Lecture by Mr. Fazle Hasan Abed, the founder and Executive Director of BRAC will no doubt provide insights into the conference theme. The scheduled Panel Discussion by three eminent speakers is expected to stimulate policy-oriented valuable responses from the audience.

The conference will have the following ten sessions:

1. Inauguration Ceremony
2. Reproductive Health: Social Perspectives
3. Effects of Educational and Environmental Interventions on Health and Development
4. Organization and Delivery of Basic Rural Health Care Services
5. Organization and Delivery of Basic Urban Health Care Services
6. Development and Human Well-being: Part I
7. Biomedical Perspectives on Health and Development: Clinical Aspects
8. Development and Human Well-being: Part II
9. Biomedical Perspectives on Health and Development: Laboratory Aspects
10. Concluding Session.

Conference posters are displayed that describe additional research underway at the Centre. During the Concluding Session, we will review the recurrent themes that have been raised and their relevance for future health policies, programme developments and international research.

Purpose of This Document

This document, which contains abstracts of the concurrent oral presentations and the posters for the conference, is intended to help the participants in allocating their time. Please feel free to share this information with any other persons who might have an interest in the topics described here.

We hope that the research papers and the posters presented at ASCON V and as described in this programme will provide some useful insights into the interrelationships between health and development, as well as the potential contributions of both social and biomedical sciences to improving our understanding of these issues.

PROGRAMME SUMMARY
Fifth Annual Scientific Conference (ASCON V)

Dhaka, 13-14 January 1996

Sasakawa International Training Centre
International Centre for Diarrhoeal Disease Research, Bangladesh
Mohakhali, Dhaka 1212

Day 1: Saturday, 13 January 1996

8:30-9:00 a.m. Venue	Registration of Delegates Lobby, Ground Floor
9:00-12:00 noon Venue	Session I. Inauguration Ceremony Auditorium
9:00 a.m.	Welcome, Addresses, and Vote of Thanks
10:15 a.m.	Tea (2nd Floor)
10:45 a.m.	Annual Lecture
12:00-1:00 p.m.	Lunch (2nd Floor)
1:00-3:00 p.m. Venue	Session II. Reproductive Health: Social Perspectives Auditorium
1:00-3:00 p.m. Venue	Session III. Effects of Educational and Environmental Interventions on Health and Development Seminar Room
3:00 p.m.	Tea (2nd Floor)
3:15-5:15 p.m. Venue	Session IV. Organization and Delivery of Basic Rural Health Care Services Auditorium
3:15-5:15 p.m. Venue	Session V. Organization and Delivery of Basic Urban Health Care Services Seminar Room

ASCON V

Day 2: Sunday, 14 January 1996

8:30-9:30 a.m.	Panel Discussion: Reproductive Health After Cairo: What Are the Implications for Bangladesh?
Venue	Auditorium
9:30 a.m.	Tea (2nd Floor)
10:00-12:00 noon	Session VI. Development and Human Well-being: Part I
Venue	Auditorium
10:00-12:00 noon	Session VII. Biomedical Perspectives on Health and Development: Clinical Aspects
Venue	Seminar Room
12:00 noon	Lunch (2nd Floor)
1:00-3:00 p.m.	Session VIII. Development and Human Well-being: Part II
Venue	Auditorium
1:00-3:00 p.m.	Session IX. Biomedical Perspectives on Health and Development: Laboratory Aspects
Venue	Seminar Room
3:00 p.m.	Tea (2nd Floor)
3:30-5.00 p.m.	Session X. Concluding Session
Venue	Auditorium

PROGRAMME DETAILS

Day 1: Saturday, 13 January 1996

8.30-9.00 a.m. Venue	Registration of Delegates Lobby, Ground Floor
9:00-12.00 noon Venue	Session I. Inauguration Ceremony Auditorium
1:1	Address of welcome: Dr. KMA Aziz, Convener, ASCON V
1:2	An overview of ICDDR,B: Prof. Patrick Vaughan, Acting Director, ICDDR,B
1:3	Address by the representative of donor agencies: Ms Gabrielle Ross, Program Officer, Ford Foundation, Dhaka
1.4	Address by the representative of international agencies: Dr. Witjaksono Hardjotanojo, WHO Representative, Bangladesh
1.5	Vote of thanks by Dr. Sandra Laston, Organizing Secretary, ASCON V
10:15 a.m.	Tea (2nd Floor)
10:45 a.m. Venue	Annual Lecture. Health and Development: Lessons from the Grassroots Speaker: Mr. Fazle Hasan Abed Executive Director, BRAC Auditorium
12:00 noon	Lunch (2nd Floor)

1:00-3:00 p.m.
Venue

Session II. Reproductive Health: Social Perspectives
Auditorium

Chairperson: Dr. Halida Hanum Akhter
Director, Bangladesh Institute of Research for Promotion of
Essential & Reproductive Health Technology (BIRPERHT)

Co-chairperson: Dr. Md. Yunus, ICDDR,B

- 2:1 Women's Health Priorities: Cultural Perspectives on Illnesses in a Rural Area of Bangladesh
Kamrun Nahar, Papreen Nahar, Lazeena Muna, Taufika Hafiz, J Ross, P Pelto and Sandra L Laston
- 2:2 An Explanatory Model of Vaginal Discharge among Women in Rural Bangladesh
Lazeena Muna, Kamrun Nahar, Papreen Nahar, J Ross, P Pelto and Sandra L Laston
- 2:3 The Establishment of Reproductive Health Clinics for Men: Preliminary Results
S Hawkes, J Chakraborty and A de Francisco
- 2:4 Urban Men and Their Participation in Family Planning
Shamim Ara Jahan, Aye Aye Thwin, Sanjida Nasreen and Riti Ibrahim Ahsan
- 2:5 Management of Reproductive Tract Infections in the Government Family Planning Programme
Mohsinuddin Ahmed, Tanjina Mirza, Shameem Ahmed, Parveen Akhter, Mehrab Ali Khan and Mobarak Hussain
- 2:6 Reproductive Health of Women: Management of Contraceptive Side-effects in Rural Bangladesh
Tanjina Mirza, Afzal Hussain, Mehrab Ali Khan and Mizanur Rahman
- 2:7 Women's Status and Reproductive Behaviour in Bangladesh
Mian Bazle Hossain, Barkat-e-Khuda and James F Phillips

1:00-3:00 p.m.

**Session III. Effects of Educational and
Environmental Interventions on Health and
Development**
Seminar Room

Venue

Chairperson: Prof. Anwarullah Chowdhury
Member, University Grants Commission of Bangladesh

Co-chairperson: Dr. Bilqis Amin Hoque, ICDDR,B

3:1 Feeding Green Vegetables to the Young Children in Rural Bangladesh:
An Analysis of Intake Following Education to the Caregivers
Md. Yunus, KMA Aziz, AI Chowdhury and RB Sack

3:2 Change in the Food Items in the Meals of Mothers
in Rural Bangladesh Following Education on Green Vegetables in Diet
KMA Aziz, Md. Yunus, AI Chowdhury and RB Sack

3:3 Hygiene Behaviour Change Programme: Sustainability,
Outreach Methodology and Impact on Diarrhoea
*Raquiba A Jahan, Sandra L Laston, O Masee Bateman,
Sumana Brahman and Florence Durandin*

3:4 Flood Control Programmes Contribute to the Improvement of
Children's Health Status in Rural Bangladesh
J Myaux, M Ali, J Chakraborty and A de Francisco

3:5 Family Size and Accumulation of Wealth and Child's
Education in Matlab, Bangladesh
A Razzaque, A Datta and R Bairagi

3:6 Neonatal Mortality by Religious and Socioeconomic
Covariates in Rural Bangladesh
AI Chowdhury, KMA Aziz, A de Francisco and MA Khan

3:00 p.m.

Tea (2nd Floor)

3:15-5:15 p.m.

**Session IV. Organization and Delivery of
Basic Rural Health Care Services**

Venue

Auditorium

Chairperson: Dr. AM Zakir Hussain
Director, Primary Health Care and Disease Control
Directorate General of Health Services, Govt. of Bangladesh

Co-chairperson: Dr. PK Bardhan, ICDDR,B

- 4:1 Rethinking on Community Participation: Prospects of Health Initiatives by Indigenous Self-help Organizations in Rural Bangladesh
Abbas Bhuiya
- 4:2 People's Participatory Planning: A Process to Achieve Community Participation in Health Activities
Mozammel Haque Neogi, Peter Eppler, Abbas Bhuiya, Quamrul Islam and Moazzem Hossain
- 4:3 Process-oriented Approach for the Establishment of Community-based Village Health Posts
Peter Eppler, Abbas Bhuiya and Moazzem Hossain
- 4:4 Toward Better Health of Women:
Emergency Obstetric Care at the Thana Level
Shameem Ahmed, Dipak Mitra, Indrani Haque, Parveen Akhter, Nikhil Roy, Mohsinuddin Ahmed and Barkat-e-Khuda
- 4:5 The Field Workers' Role in Emergency Obstetric Care
T Juncker, P Khanum, Jasim Uddin and Subhash C Das
- 4:6 Why Do Women Refuse Referral to Professional Health Providers for Pregnancy and Delivery Complications?
M Bremmer, G Van den Broek and A Vanneste
- 4:7 Characteristics and Follow-up of Menstrual Regulation Clients: Analysis of Performance of Village-based Family Planning Programme
J Chakraborty, A de Francisco and F Ahmed

3:15-5:15 p.m.

**Session V. Organization and Delivery of
Basic Urban Health Care Services**

Venue

Seminar Room

Chairperson: Dr. Nazrul Islam
Professor of Geography, University of Dhaka
and Director, Centre for Urban Studies, Dhaka, Bangladesh

Co-chairperson: Dr. Nigar S Shahid, ICDDR,B

- 5:1 Equity in Health Care Forgotten for the Urban Poor in Bangladesh
M Desmet, I Bashir, N Sohel, Sushila Zeitlyn, J Myaux and R Rowshan
- 5:2 Situation Analysis of Clinic-based FP and MCH Services in Dhaka City:
Service Availability and Quality
*Shams El Arifeen, Thomas Kane, Selina Amin, Sangeeta Mookherji,
Henry Perry and Anwara Begum*
- 5:3 Socioeconomic and Demographic Differentials in Payment for Different
Contraception Methods in Dhaka City: Implications for Pricing Strategies
Subrata Routh, Aye Aye Thwin, Thomas Kane and AH Baqui
- 5:4 Cost of the MCH-FP Service Delivery in Urban Dhaka:
Analysis of Concerned Women for Family Planning (CWFP) Units in Zone 3
of Dhaka City
Ann Levin, Aye Aye Thwin, Zahidul Quayyum and Anwara Begum
- 5:5 Rapid Appraisal of Health Needs and Priorities in the Urban Areas of Dhaka
Aye Aye Thwin and Shamim Ara Jahan
- 5:6 Assessment of the Quality of Urban Field Worker Services
*Henry Perry, Suraiya Begum, AH Baqui, Anwara Begum,
Abdul Quayyum and Thomas Kane*

Day 2: Sunday, 14 January 1996

8:30-9:30 a.m.

**Panel Discussion: Reproductive Health After Cairo:
What Are the Implications for Bangladesh?**

Chairperson: To be announced during the session

Speakers: 1. Dr. James L Ross, ICDDR,B
2. Dr. Sarah Hawkes, ICDDR,B
3. Dr. Halida Hanum Akhter, BIRPERHT

Venue

Auditorium

9:30 a.m.

Tea (2nd Floor)

10:00-12:00 noon

**Session VI. Development and Human
Well-being: Part I**

Venue

Auditorium

Chairperson: Dr. Wahiduddin Mahmud
Professor, Department of Economics
University of Dhaka, Dhaka, Bangladesh

Co-chairperson: Dr. Barkat-e-Khuda, ICDDR,B

- 6:1 Socioeconomic Development and Human Well-being:
Exploring Pathways to Change: Phase II of the BRAC-ICDDR,B
Joint Project in Matlab
Mushtaque Chowdhury and Abbas Bhuiya
- 6:2 Impact of BRAC's Socioeconomic Development Programme on Fertility
and Mortality in Matlab
Abbas Bhuiya, Mushtaque Chowdhury and Shahriar Reza Khan
- 6:3 Impact of BRAC's Programme on Literacy and Enrollment of
Children in School in Matlab
Mushtaque Chowdhury, Samir Nath and Abbas Bhuiya
- 6:4 Effect of BRAC's Development Inputs on Women's Lives
Samiha Huda, Shahriar Reza Khan and Simeen Mahmud
- 6:5 Vulnerability of Divorced and Abandoned Women
and the Role of BRAC's Socioeconomic Development Programme in Matlab
Mehnaaz Momen, Abbas Bhuiya and Mushtaque Chowdhury
- 6:6 A Standard of Living Index for Matlab
Hassan Zaman, Gazi Mahmud Hasan and Shahed Husain

10:00-12:00 noon

**Session VII. Biomedical Perspectives on Health
and Development: Clinical Aspects**

Venue

Seminar Room

Chairperson: Dr. MQK Talukder
Professor, Institute of Child and Mother Health, Dhaka, Bangladesh

Co-chairperson: Dr. AN Alam, ICDDR,B

- 7:1 Double-blind, Randomized Clinical Trial of Single-dose Antimicrobial Therapy for Cholera
Wasif Ali Khan, Ujjwal Dhar, Eradul H Khan, MA Salam, Carlos Seas, A Ronan, W Busch and Michael L Bennish
- 7:2 Clinical and Laboratory Features of Cholera Due to *Vibrio cholerae* O1 and *Vibrio cholerae* O139
Ujjwal Dhar, Wasif Ali Khan, Carlos Seas, Eradul H Khan, MJ Albert, MA Salam and Michael L Bennish
- 7:3 Efficacy of Cefixime in the Treatment of Shigellosis in Adults
MA Salam, Carlos Seas, Wasif Ali Khan and Michael L Bennish
- 7:4 Relationship between Serum Vitamin A and Intestinal Permeability in Children With Acute Diarrhoea
SK Roy, SM Akramuzzaman, R Haider, Dilip Mahalanabis, MA Wahed, AM Tomkins and R Behrens
- 7:5 Magnitude and Determinants of Repeated Episodes of Tachypnoea (Fast Breathing) for ALRI Control Programmes
A de Francisco and J Chakraborty
- 7:6 Acute Lower Respiratory Infections in Rural Bangladeshi Children: Patterns of Treatment and Identification of Barriers
K Zaman, Sushila Zeitlyn, J Chakraborty, A de Francisco and Md. Yunus
- 7:7 Comparative Efficacy of Amylase-treated Energy-dense Wheat Porridge and Standard Diet on Growth and Lean Body Mass of Severely Malnourished Children
M Aminul Islam, M Mujibur Rahman, Dilip Mahalanabis, MA Khaled, Stacy McDonald and George J Fuchs

12:00 noon

Lunch (2nd Floor)

1:00-3:00 p.m.

**Session VIII. Development and Human
Well-being: Part II**

Venue

Auditorium

Chairperson: Dr. Mehtabunisa Currey, Health and Population Adviser
ODA Aid Management Office (AMOD)
British High Commission, Dhaka

Co-chairperson: Dr. Salehuddin Ahmed, Director (Programmes), BRAC

- 8:1 Quality of Life and Psychological Well-being of Rural Women
*Nasreen Wadud, Abbas Bhuiya, Mushtaque Chowdhury
and Mohsina Khatun*
- 8:2 Health Care-seeking Behaviour of Individuals from the BRAC-Member and
Non-member Households
Syed Masud Ahmed, Mushtaque Chowdhury and Abbas Bhuiya
- 8:3 Cultural Construction of Health and Institutional Measures of
Change in Rural Bangladesh: Cases of BRAC's Village Organization
and ICDDR,B's MCH-FP Programmes
Monirul I Khan, Abbas Bhuiya and Mushtaque Chowdhury
- 8:4 Impact of the Grameen Bank on Childhood Mortality in Bangladesh
Mizanur Rahman, Julie DeVanzo and Santosh Chandra Sutradhar
- 8:5 Risk Factors for Low Birth Weight Among the Urban Poor in Dhaka
Gretchen Antelman, Shams El Arifeen and AH Baqui

1:00-3:00 p.m.

**Session IX: Biomedical Perspectives on Health
and Development: Laboratory Aspects**

Venue

Seminar Room

Chairperson: Major General MR Choudhury (Retd.)

Co-chairperson: Dr. Mahbubur Rahman, ICDDR,B

- 9:1 Role of Rotavirus Vaccines in Bangladesh: New Estimates of the Disease Burden and Implications of Strain Variation
Leanne E Unicom, Paul E Kilgore, ASG Faruque, MJ Albert, Jon R Gentsch, George J Fuchs and Roger I Glass
- 9:2 Pathologic Findings in Fatal Hospitalized Cases of Persistent Diarrhoea in Bangladesh
AK Azad, Rafiqul Islam, MA Salam and AN Alam
- 9:3 Cryptosporidiosis in the Families of Milkmen Following an Outbreak of Calf Diarrhoea in a Dairy Farm in Bangladesh
ASM Hamidur Rahman, KA Al-Mahmud, KMN Islam, KM Shafiullah, AWMS Islam and MMH Mondal
- 9:4 Intestinal Transport of Water, Sodium, and Glucose From an Electrolyte Solution With and Without Bicarbonate
Sufia Islam, Dilip Mahalanabis, Abul Kalam Azad Chowdhury, Shafiqul Alam Sarker, MA Wahed and ASM Hamidur Rahman
- 9:5 Faecal Contamination of a Fish Culture Farm Where Duckweeds Grown in Hospital Wastewater Are Used as Fish-feed
MS Islam, MJ Alam, Nigar S Shahid, KZ Hasan, M Ekramullah, RB Sack and MJ Albert
- 9:6 Relative Abundance of *Aeromonas* spp. in Wastewater and Non-wastewater Areas of a Duckweed-based Fish-culture Project
Z Rahim, MS Islam, MJ Alam, Nigar S Shahid, KZ Hasan, M Ekramullah, RB Sack and MJ Albert

3:00 p.m.

Tea (2nd Floor)

3:30-5:00 p.m.

Session X: Concluding Session

Venue

Auditorium

Chairperson: Prof. Patrick Vaughan, Acting Director, ICDDR,B

Summary and Conclusions: Dr. Henry Perry, ICDDR,B

Concluding Remarks

Credentials of external authors who contributed to the research papers and posters for ASCON V presentations are marked with asterisks.

Authors not marked with any signs are members of the ICDDR,B staff. However, Syed Masud Ahmed, Mushtaque Chowdhury, Shekhar Ghosh, Gazi Mahmud Hasan, Samiha Huda, Shahed Husain, Shahriar Reza Khan, Sharmin Mahbub, Simeen Mahmud, Manzurul Mannan, Samir Nath, Sabina Rashid, AKM Masud Rana, and Hassan Zaman of BRAC are involved with the BRAC-ICDDR,B Joint Research Project in Matlab.

Reproductive Health: Social Perspectives

Women's Health Priorities: Cultural Perspectives on Illnesses in a Rural Area of Bangladesh

*Kamrun Nahar, Papreen Nahar, Lazeena Muna, Taufika Hafiz,
J Ross, P Pelto and Sandra L Laston*

Objective: The study attempts to identify the vocabulary of "salient" illness categories, and perceptions of "severity" of illnesses among women in a rural Bangladesh community.

Methods: Data were gathered using the techniques of freelist, pilesorting, and severity ratings in samples of women in a village in the "comparison area" on the Dhonagoda river banks near Matlab Bazaar. In-depth interviews were also used for collecting examples of illness episodes, and for exploring explanations for illness causation. Data collection took place during the period from November 1994 to October 1995. Sample sizes in the various operations are: sixty-eight respondents for freelist, thirty-three for pilesorting, thirty for the severity rating, fifty in-depth interviews for different purposes, including concepts of sexual health, cases of *meho/promeho*, and interviews with the indigenous practitioners.

Results: Women's reproductive tract illnesses are among the more "salient" and serious health problems for which women seek health care. Data gathered through pilesorting demonstrate that women in this rural community have quite clear conceptions of illness groups and categories, with different concepts of treatment for the various categories.

Conclusion: These preliminary results from analysis of the qualitative explorations of women's illness suggest that new initiatives concerning women's reproductive health are needed in this rural region.

An Explanatory Model of Vaginal Discharge among Women in Rural Bangladesh

*Lazeena Muna, Kamrun Nahar, Papreen Nahar, J Ross,
P Pelto and Sandra L Laston*

Objective: The study was undertaken to provide a preliminary scenario of the cultural perceptions (explanatory model) and health care-seeking behaviour concerning vaginal discharge in the rural Matlab area.

Methods: Data were gathered through in-depth key informant interviewing, as well as freelist, pilesorting, and other structured interviews from women in Matlab. Case reports of reproductive illness as well as vocabularies concerning the varieties of symptoms and illness categories were collected. Data collection took place during the period from November 1994 to October 1995. Sample sizes in the various operations are: sixty-eight respondents for freelist, thirty-three for pilesorting, thirty for the severity rating, forty in-depth interviews for different purposes, including concept of sexual health, cases of *meho/promeho*, and interviews with the indigenous practitioners.

Results: Women recognize vaginal discharge as a common, relatively non-threatening reproductive health problem. They are also aware that its severe form can adversely affect sexual health.

Conclusion: Women have concepts of sexual transmission in their "explanatory models" of illness. They also indicate that concerns about sexual and reproductive health are of considerable importance in the region, although none of the available health facilities seems particularly attuned to providing treatment for related illness. These preliminary results from the qualitative explorations point to a need for developing health care service that could also be of importance for reducing the spread of RTI /STD infections in the rural Matlab region.

The Establishment of Reproductive Health Clinics for Men: Preliminary Results

S Hawkes, J Chakraborty and A de Francisco

Objective: The International Conference on Population and Development held in Cairo in September 1994 called for action to involve men in the reproductive health programmes, and for men to take equal responsibility for child-bearing. From this perspective, male reproductive health clinics have been established in the Matlab treatment area. The aims of this study are to determine the population-based prevalence of sexually transmitted diseases (STDs) in men, and to train health workers in STD/RTI management in men.

Methods: Men have been included from the beginning of the ongoing study of reproductive tract infections (RTIs) in the Matlab area. For treatment of men identified as being infected, male reproductive health clinics have been established at the sub-centres. These clinics have open access for any man in the community who believes he has a problem or requests a check-up. Clinics are run by trained male medical assistants and are currently open for a limited number of hours each week.

Results: The clinics have so far been well-attended by men from the RTI study, open access clients, and the partners of infected women (identified through another arm of the RTI study or in the general MCH-FP clinics). Data on the number of clients and their clinical presentation will be available.

Conclusion: Men have been neglected in many reproductive health programmes so far. RTIs/STDs in men are easier to diagnose and treat, and men are far less likely to be asymptomatic than women. We have shown that reproductive health clinics for men are attended by a variety of male clients, and provide a unique opportunity not only to diagnose and treat infections, but also for health education on STD/HIV prevention and to increase men's awareness of their role in issues of contraception and reproductive health.

Urban Men and Their Participation in Family Planning

Shamim Ara Jahan, Aye Aye Thwin, Sanjida Nasreen
and Riti Ibrahim Ahsan*

Objective: The study explores the issues relating to family planning method use by males in the urban areas.

Methods: Key informant interviews were held with men and women residing in selected wards of four randomly chosen zones in the Dhaka City Corporation, representing both slum and non-slum areas. Ward commissioners and a sample of health and family planning service providers in the Government, NGOs, and private sector in these wards were also interviewed in two phases in June-July 1995 and October 1995.

Results: The urban population in Dhaka seemed supportive of male contraceptive use in general. However, certain factors interplay that prevent men from assuming responsibility toward actual male method use, even when they approve and support spacing and limiting family size. The discomfort from condom use, their unreliability in providing protection from pregnancy together with misconceptions and perceptions relating to the fear of losing energy and productivity from using condoms and from being vasectomized were reported. Recommendations to use the media for motivation, and to provide privacy and individual counselling measures were given.

Conclusion: The perspectives of the key informants highlight the need to understand urban men and their attitudes, that may pave the way toward developing motivational strategies. An informed public in the urban areas represent a setting conducive toward motivating men to improve achievements of a programme that largely attributes its past and present success to targeting women. The findings justify exploring ways to expand choices for the urban couple to achieve reproductive health goals.

**Department of International Health, School of Hygiene and Public Health,
Johns Hopkins University, USA*

Management of Reproductive Tract Infections in the Government Family Planning Programme

*Mohsinuddin Ahmed, Tanjina Mirza, Shameem Ahmed, Parveen Akhter,
Mehrab Ali Khan and Mobarak Hussain*

Objective: The study attempts to identify the existing treatment practices for RTIs among the union-level government family planning service providers, and to identify the knowledge and clients' perspectives regarding RTIs.

Methods: This is a descriptive study. Data on treatment practices were collected from the service registers of two family welfare centres (FWC) and satellite clinics (SC) of Abhoynagar thana from January to December 1994 to determine the RTI treatment pattern provided by the paramedics. Exit interviews of 100 RTI patients who attended the same SCs and FWCs were conducted during June-October 1995.

Results: Family planning paramedics are managing complaints suggestive of RTIs. During 1994, five percent of the total patients attending FWCs and SCs had chief complaints of white vaginal discharge. Paramedics are using multiple drugs such as metronidazole, cotrimoxazole, ampicillin, gentian violet, mycostatin, etc. for treating RTIs. However, the treatment pattern is not the same for FWC and SC because the drugs allocated are different for the two service centres. Data from service users of FWCs and SCs show that husbands of more than 25% respondents have some kind of genital problems. About 75% respondents do not know that RTIs can be transmitted through sexual contact.

Conclusion: The findings indicate that vaginal discharge suggestive of RTIs is being managed by paramedics. The providers' knowledge and skills in detection and treatment of RTIs, including partner treatment, can be further strengthened within family planning service structure. This would also increase constellation of services of reproductive health for rural women.

**Reproductive Health of Women:
Management of Contraceptive Side-effects in Rural Bangladesh**

Tanjina Mirza, Afzal Hussain, Mehrab Ali Khan and Mizanur Rahman

Objective: Family planning services, including management of side-effects of contraceptives, are an essential element of reproductive health. Since half of the contraceptive users in Bangladesh stop using the method within twelve months due to side-effects, a study was planned with an objective to determine the types of contraceptive side-effects among women and to identify the factors related to the management of these side-effects.

Methods: An in-depth cross-sectional survey was conducted in six rural thanas of Bangladesh. A simple random sampling procedure was used for selecting the unions and systematic sampling for selection of households. A total of 11,803 eligible women of reproductive age was interviewed.

Results: Among the 3,417 never-users of contraceptives, a quarter mentioned fear of side-effects as a reason for not adopting contraceptive. Of the 2,335 past users, over 70% mentioned side-effects as a reason for discontinuation. Among the 5,428 current users, almost a half complained of having difficulty, especially those using injectables and IUDs. Problems reported include menstrual disturbances, nausea, headache, weakness, etc. which varied with age and parity of the users. The mean durations of IUD and injectable use without side-effects are 30 and 19 months respectively. The durations are reduced to 23 months and 16 months respectively among IUD and injectable users having excessive bleeding. The problems were more when the providers were field workers compared to services received from static clinics. Although the field workers were likely to be available to provide care for these problems, only 39% of the clients were satisfied with the management.

Conclusion: The findings indicate poor management of side-effects by the service providers. The study recommends strengthening side-effects management for different cadres of service providers in the National Programme, which is expected to increase continuation rate, client satisfaction and well-being.

Women's Status and Reproductive Behaviour in Bangladesh

Mian Bazle Hossain, Barkat-e-Khuda and James F Phillips

Objective: The analysis provides empirical evidence on the issue of relationship between women's status and their reproductive behaviour in Bangladesh.

Methods: The data for this study are drawn from Women's Status Survey conducted in the MCH-FP Extension field sites in 1988. The study includes 3,164 married women of reproductive age (MWRA) from Sirajganj and Abhoynagar thanas. Four categories of factor indices of women's status are generated using factor analysis. These are: leniency, authority, attitude, and mobility. Analysis has been carried out at three stages. Four indicators of women's status have been predicted using multiple regression, predicted contraceptive use, using logistic regression and predicted contraceptive adoption in the four-year period after the survey, using Proportional Hazard regressions.

Results: Results show that all covariates, including women's education and age, have positive and significant association with the four indicators of women's status. The children ever-born covariate shows negative and significant association with these indicators. All four indicators of women's status show positive and significant association with modern contraceptive method use, even after controlling for the effect of other covariates. The insignificant positive association is seen in the case of adopting a modern method by non-users, except for the leniency and the attitudinal indices.

Conclusion: The four indicators of women's status show positive association with contraceptive use and adoption. Since indicators of women's status have positive relationship with contraceptive use, the Government of Bangladesh should attach greater priority to further raising the status of women through its various development activities, which will eventually bring about the desired reproductive changes.

Educational and Environmental Interventions

Feeding Green Vegetables to the Young Children in Rural Bangladesh: An Analysis of Intake Following Education to the Caregivers

Md. Yunus, KMA Aziz, AI Chowdhury and RB Sack

Objective: The study was undertaken to increase the intake of vegetables rich in beta-carotene by young children through nutrition education to their caregivers.

Methods: One hundred and fifty-six children aged 6-59 months were selected from households of very poor socioeconomic status in the comparison area of Matlab MCH-FP Project. Nutrition education intervention was provided to the caregivers of these children on the importance of feeding vegetables rich in beta-carotene. This education included verbal communication and cooking demonstrations. It was provided by trained female community health workers once every 2 months over a period of 12 months from April 1994 to March 1995. Information on the consumption of green leafy vegetables by the children for the preceding 3 days was collected at baseline and after the 12-month intervention by interviewing the caregivers. The green leafy vegetables were categorized into high, medium and low contents of beta-carotene.

Results: The proportion of children who consumed vegetables with high content of beta-carotene increased from 28% at the baseline to 96% after the intervention, showing a highly significant increase ($p < .000$). The mean frequency of intake of vegetables rose from 0.65 per 3 days at baseline to 4.33 after the intervention. This increase in intake was also highly significant ($p < 0.000$).

Conclusion: The significant increase in the consumption of vegetables was achieved within a period of one year of intervention. This shows that changes in the feeding practices of young children were feasible through education and motivation which can develop confidence among the caregivers regarding the beneficial outcome of the recommended foods.

**Change in the Food Items in the Meals of
Mothers in Rural Bangladesh Following Education on
Green Vegetables in Diet**

KMA Aziz, Md. Yunus, Al Chowdhury and RB Sack

Objective: The study attempts to identify the changes in the composition of noon and evening meals taken by the mothers of young children following nutrition education toward increasing the consumption of vegetables rich in beta-carotene.

Methods: One hundred and fifty-six mothers having children aged 6 to 59 months were selected from the very poor socioeconomic level of the community from 8 villages in the comparison area of Matlab MCH-FP Project. Nutrition education emphasizing intake of green leafy vegetables was provided to these mothers by trained female community health workers once in every 2 months for a 12-month period beginning April 1994. Information on the consumption of vegetables rich in beta-carotene within the context of meals taken during the preceding 3 days was collected at the baseline and after the 12-month intervention by interviewing the mothers. Data for this analysis were obtained from 44 mothers from two randomly selected villages.

Results: The proportion of intake of either leafy or fleshy vegetables with rice increased from 4.5% at the baseline to 29.5% and 34.1% respectively after the intervention. Similarly, the proportion of intake of leafy vegetables with rice and fish increased from 22.7% to 47.7%, and in respect to fleshy vegetables, such increase was from 18.2% to 65.9%. The intake of several combinations of meals without vegetables, such as rice and fish; rice and lentils; rice, fish and lentils; and rice and salt, decreased strikingly after the intervention. The meal having rice and fish decreased from 86.4% to 18.2%.

Conclusion: A change in the age-old concept of rice and fish menu affording a place for vegetables was possible through nutrition education.

Hygiene Behaviour Change Programme: Sustainability, Outreach Methodology and Impact on Diarrhoea

*Raquiba A Jahan**, *Sandra L Laston*, *O Masee Bateman*,
*Sumana Brahman*** and *Florence Durandin**

Objective: The work evaluates the sustainability of hygiene behaviour change following implementation of the Sanitation and Family Education (SAFE) Pilot Project in rural Chittagong by CARE-Bangladesh.

Methods: The intervention focused on diarrhoea prevention by improving hygiene behaviours related to water and sanitation. Priority interventions of the SAFE Project were based on initial qualitative and quantitative studies and addressed a small number of key behaviours associated with diarrhoea transmission. For intervention dissemination, SAFE used the "multiple channel approach," including children, tubewell caretakers and community opinion leaders. During May 1993, the baseline survey of 720 households was performed. The final survey of the Pilot Project was conducted in May 1994 after nine months of intervention implementation, and the sustainability survey was done in May 1995, one year after the withdrawal of intervention dissemination.

Results: The findings of the three surveys were compared and showed interesting trends of sustainable improvements in some key behaviours. Ash or soap was observed to be available for handwashing in the households: 3% in the baseline, 96% in the final, and 79% in the sustainability survey. Similarly, households where no faeces were observed to be lying inside the latrine or in the yard remained at high levels. For a few of the intervention indicators, results showed a negative trend in the sustainability survey. Access to a hygienic latrine and children (3-5 years of age) defecating in a latrine or fixed place dropped to low levels during the sustainability survey. Still, two-week diarrhoea prevalence in the households with at least one child aged less than 5 years remained low (47%-baseline, 22%-final, and 28%-sustainability survey).

Conclusion: The SAFE approach to hygiene behaviour change demonstrated sustainability in certain behaviours and lower diarrhoea prevalence one year after conclusion of the intervention that could be transferred to other organizations working in hygiene education programmes.

**CARE Bangladesh, **CARE Guatemala*

**Flood Control Programmes Contribute to the
Improvement of Children's Health Status
in Rural Bangladesh**

J Myaux, M Ali, J Chakraborty and A de Francisco

Objective: The work was undertaken to assess the effect of a flood control programme on the health status of children aged less than 5 years in the Matlab study area, and to corroborate the benefits of the existing health interventions.

Methods: The study reports death incidence in children aged less than 5 years in the Matlab study area between January 1989 and December 1992. Mortality rates were analyzed in two neighbouring populations differing by their locations in relevance to the flood control embankment (inside versus outside). Baseline information was collected during a four-year period before the completion of the flood control programme (1983-1986). Given that the health intervention area lay unevenly on both sides of the embankment, mortality rates were adjusted according to the presence or absence of health intervention, and according to age groups by indirect standardization. Similarly, mortality rates were compared between intervention and comparison areas, adjusting for the presence of the flood control programme.

Results: Between 1983-1986 and 1989-1992, overall mortality in children aged less than 5 years, dropped from 185.9 live births per thousand to 114.1 per thousand. In this context of general improvement, death rates outside the embankment were up to 29% higher in 1 to 4-year old children, and 9% in all age groups compared to the flood-protected area ($p < 0.001$). Simultaneously, health interventions contributed to a 40% reduction in mortality of the study children in all causes of deaths ($p < 0.001$).

Conclusion: Mortality is an appropriate indicator for assessing the health status of populations, and measuring or monitoring the effect of health and development programmes. From this analysis, it is concluded that if there were adverse effects of the presence of the embankment, these were largely compensated for by the benefits. However, mortality and morbidity indicators need to be monitored for a longer period to assess the real impact of flood control programmes in Bangladesh. Further studies on morbidity and socioeconomic changes are needed to understand the mechanisms involved.

Family Size and Accumulation of Wealth and Child's Education in Matlab, Bangladesh

A Razzaque, A Datta and R Bairagi

Objective: The study examines whether fertility decline has resulted in the improvement of household socioeconomic status. More specifically, the study examines the effect of family size on accumulation of household wealth and child's education from secondary data.

Methods: Two data sets from the Matlab study area were used: Demographic and Health Survey validation study of 1994 and Census and Socioeconomic Survey of 1974. From the Demographic and Health Survey, households with one eligible woman (wife or head) were selected and matched subsequently with data of the 1974 Census and Socioeconomic Survey to obtain individual and household-level information. The dependent variables were possession of household items, structure of the dwelling houses and child's education (aged 6-14 years). Analyses were performed both by cross tabulation and multiple regression.

Results: Although the levels of wealth accumulation (possession of household items and structure of dwelling houses) were similar in the "treatment" and the "comparison" areas both in 1994 and 1974, wealth accumulation improved greatly over the period. Household wealth of 1994 was not found to be significantly associated with the number of living children after controlling for socioeconomic status of 1974. Child's education was similar in the two areas in 1974 but became significantly higher in the treatment area than in the comparison area in 1994. After controlling for all the variables, the number of living children was found to be negatively associated with child's education, particularly in 1994; sex differential in child's education was more prominent in the past than in recent years.

Conclusion: Fertility decline in the treatment area did not help accumulate wealth at household level but it helped improve child's education.

Neonatal Mortality by Religious and Socioeconomic Covariates in Rural Bangladesh

Al Chowdhury, KMA Aziz, A de Francisco and MA Khan

Objective: The study investigates the difference in neonatal mortality among offspring of the Muslim and the Hindu mothers in the ICDDR,B's MCH-FP intervention and comparison areas at Matlab, Bangladesh, due to varied socioeconomic criteria.

Methods: A cohort of 7,304 live births in 1983 was linked with death records until January 1984. Socioeconomic data were matched with the 1982 Census through the Demographic Surveillance System of Matlab.

Results: Significantly low neonatal mortality was observed in the MCH-FP intervention area. Neonatal mortality, including deaths due to tetanus, was significantly lower among the Muslims compared to the Hindus. Multivariate analysis revealed that the risk of death in terms of odds ratio for all sociodemographic and economic covariates was higher for the Hindus compared to the Muslims.

Conclusion: It is hypothesized that if MCH services include a motivational campaign for exclusion of cowdung from the environment of birth rooms and caring practices among the Hindus, the chance of survival of the newborn may increase.

Rural Health Care Services

Rethinking on Community Participation: Prospects of Health Initiatives by Indigenous Self-help Organizations in Rural Bangladesh

Abbas Bhuiya

Objective: The work was undertaken to study the prospects and problems of taking health initiatives by the indigenous self-help organizations in rural Bangladesh.

Methods: This is an ongoing study carried out in three unions of Chakoria thana under Cox's Bazaar district. Quantitative and qualitative research methods were applied.

Results: The self-help organizations are keen to take initiatives for the improvement of health. They came forward to know about the causes, transmission, and prevention of major health problems. They have also been disseminating the knowledge among community members in various fora on a voluntary basis. They are also taking initiatives to establish village health posts by using their own resources.

Conclusion: It is possible to bring health on the agenda of the traditional self-help organizations. Health education can be imparted by these organizations through their volunteers. The organizations are also likely to be able to mobilize local resources to establish and manage village health posts for the promotion of community health. Government outreach health activities can be linked with these health posts, which is likely to ensure an effective community participation in health matters.

People's Participatory Planning: A Process to Achieve Community Participation in Health Activities

*Mozammel Haque Neogi, Peter Eppler, Abbas Bhuiya,
Quamrul Islam and Moazzem Hossain*

Objective: The work was undertaken to study the strengths and weaknesses of people's participatory planning (PPP) in initiating community health interventions.

Methods: The study has been carried out in three unions of Chakoria thana under Cox's Bazaar district in Bangladesh. This paper reports results from experiences gained during 1994-1995. A number of PPP sessions have been conducted with the members of the existing self-help organizations, and the process documentation and the outcomes have been recorded. Outcome of the PPP sessions in relation to level of the people's participation, planning action, and subsequent initiatives taken by the self-help organizations to improve the health status of the community members was recorded.

Results: Most of the PPP sessions were attended by representatives from the self-help organizations. Participation is dependent on the strength of the organizations, clarity of the objectives of the sessions, and timing of the sessions. It is quite difficult to involve women in the PPPs. Most PPPs could draw an action plan mostly for dissemination of health education. The decisions made in the PPP sessions get support from the community for implementation.

Conclusion: PPP is an effective tool to initiate community actions for the improvement of health.

Process-oriented Approach for the Establishment of Community-based Village Health Posts

Peter Eppler, Abbas Bhuiya, Moazzem Hossain

Objective: Through participatory planning with local organizations or village communities, facilitated by Chakoria Community Health Project (CCHP), the establishment of so called 'Village Health Posts' (VHP) will be initiated to respond to the need of improved basic health care at village level and to build up a platform for the dissemination of preventive health care. Local resource mobilization and management will be complemented by technical support, provided by CCHP, to run the VHPs on a sustainable basis.

Methods: On the basis of a participatory approach the process leading to self-help for basic health care will be initiated and monitored. As local organizations or village communities are the main actors in establishing and managing the VHPs, research is carried out in a participatory manner and results are shared with the concerned committee members. Matters relating to VHPs can also be taken up by the Self-Help Promotion Committee - a kind of project steering committee, which comprises local representatives and scientists of ICDDR,B

Expected Results: Local organizations or village health committees will be able to manage community based VHPs on a sustainable basis. Regarding organizational structure, necessary skills and infrastructure the responsible community will have the capacity to ensure the required quality standard. Necessary work force and resources will be arranged from the community, except relevant inputs that can be requested from NGOs and GOB. So far six local organizations or village communities have started to set up a VHP.

Conclusion: In three unions of Chakoria thana the "self-help for health" approach has already led to newly established VHPs. The development, capacity and standard of the VHPs will largely depend on available local resources and the commitment and capability of the concerned communities. Eventually, this project activity will lead to the identification of an adequate strategy to improve the poor situation of health care delivery services in rural Bangladesh.

**Toward Better Health of Women:
Emergency Obstetric Care at the Thana Level**

*Shameem Ahmed, Dipak Mitra, Indrani Haque, Parveen Akhter, Nikhil Roy,
Mohsinuddin Ahmed and Barkat-e-Khuda*

Objective: The present study was undertaken to assess the care-seeking behaviour of pregnant women with complications with the aim of improving the quality of maternal services in rural Bangladesh.

Methods: Information was obtained from 145 patients who came with an obstetric complication to the Mirsarai Thana Health Complex (THC) during October 1994-August 1995. A structured questionnaire was used for collecting relevant data from the respondents in their homes. The diagnosis and treatment were cross-checked with the THC register.

Results: Four-fifths of those interviewed were admitted at the THC. Three-fifths had received some antenatal care. Over two-fifths came from a distance of more than 10 km. The decision to visit the THC was mostly made by the husbands and the health providers. Two-thirds of the patients came within 48 hours of the problem. Over four-fifths consulted 1 to 3 persons before coming to the THC, and almost all were examined internally. One-fifth of the patients had to be referred to a higher centre because of lack of services like blood transfusion and Caesarean section.

Conclusion: This study recommends that facilities at the THC be strengthened and that a functional linkage from the grassroots to the highest health care facility is essential. Based on the need to improve maternity care, the MCH-FP Extension Project (Rural), in close collaboration with the MOHFW, has instituted comprehensive Emergency Obstetric Care (EOC) services at the Mirsarai THC, focusing on linkages at all levels.

The Field Workers' Role in Emergency Obstetric Care

T Juncker, P Khanum, Jasim Uddin and Subhash C Das

Objective: An intervention was initiated in April 1994 in Abhoyanagar to test a new approach in antenatal care provided by the fieldworkers (FWAs). The intervention aimed at creating awareness about signs of obstetric complications among pregnant women.

Methods: Instead of performing verbal screening for detection of high-risk pregnancies as before, the FWAs informed the pregnant women about the signs of obstetric complications and motivated them to go to the hospital when such signs had appeared. FWAs gave the women a card depicting the symptoms of the major complications in order to enhance comprehension and conveyed the message to their decision makers. FWAs also issued an antenatal card and motivated their clients for checkups at the clinic. This intervention was monitored for 12 months. FWAs' and pregnant women's attitudes, knowledge and practices were evaluated through qualitative and quantitative methods in the intervention area and were compared to those in a non-intervention area.

Results: FWAs have gained credibility in the community by giving concrete services. The pictorial card is appreciated by the providers and the clients. All pregnant women retained their home-based cards. Three-quarters of them understood the purpose of the pictorial card. However, comprehension of the illustrations of the card was related to the level of women's education. About 60% of the women had shown the pictorial card to their husbands and their mothers-in-law. There has been a significant increase in antenatal checkups at the clinic level after the intervention started.

Conclusion: It is recommended to further study the impact of this intervention in terms of awareness and referrals to emergency obstetric care. Changes should be made on several pictures to enhance comprehension. The antenatal card should be issued by FWAs and retained by the clients.

Why Do Women Refuse Referral to Professional Health Providers for Pregnancy and Delivery Complications?

M Bremmer, G Van den Broek, A Vanneste

Objective: The study investigates why women identified to be at risk at lower levels of the Safe Motherhood Programme refuse further professional assistance.

Methods: Since the introduction of the Safe Motherhood Programme in 1987 in the Matlab MCH-FP area, 78% of all maternal deaths had no professional assistance at the time of death. Between July 1993 and July 1994, fifty-two (20%) of the women advised for referral refused to comply. All women and other decision-makers in the family were interviewed from August 1994 to October 1994. The interview had both open-ended and closed questions.

Results: Although there were always several reasons for non-compliance with the advice, absence of the husband or refusal by other decision-makers was the most important reason in one-third of the cases. Decision-makers considered the hospital cost as the main reason to refuse the referral. Women greatly underestimated the cost of a Caesarean section. All but 8 women were aware of the seriousness of their condition at the time of the referral. However, other considerations were more decisive. Nine women did not want to be transported because they were too ill to move or in labor. Other main reasons for non-compliance were of practical or of cultural origin, such as child care, workload, security of the house, shame, and fear of medical interventions.

Conclusion: Apart from affordable emergency obstetric care to be guaranteed by the health sector, all other constraints to compliance with referral advice are to be addressed by campaigning for more awareness of the dangers of pregnancy and for preparedness in case of an emergency.

**Characteristics and Follow-up of
Menstrual Regulation Clients: Analysis of Performance of
Village-based Family Planning Programme**

J Chakraborty, A de Francisco and F Ahmed

Objective: The paper describes the sociodemographic characteristics, subsequent reproductive and contraceptive use status of women who opted for menstrual regulation (MR) in between the period from February 1978 to July 1984.

Methods: Information for this report has come from a village-based family planning programme introduced along with certain selected maternal and child care services in a thana in the southern part of Bangladesh. The programme provided both a wide range of contraceptive methods and menstrual regulation services. MR was available at four sub-centre clinics dispersed in the community and in a central clinic in Matlab. Data on age, parity, contraceptive use and subsequent pregnancy history of 469 women of reproductive age who underwent MR were collected from the clinic record. The service record books of community health workers were included in the study.

Results: The mean age at MR performance was 29.7 years with a standard deviation of 7.6 (15% between 17 and 21 years and 27% above 35 years). Mean parity at MR was 3.3 children (sd 2.1), and 12% women were in their first gestation, 27% were in 2-3 gestation, 31% in 4-5 and 30% were above 5 gestations. Mean parity or age did not change over calendar years. High contraceptive use was recorded within six months after MR procedure (74% of the women used a method) being higher in older women with higher parities. Within two years of MR, 27% women delivered, mostly after dropping the contraceptive.

Conclusion: Introduction of MR as a part of the integrated village-based MCH-FP programme may be viewed as having been an effective addition to the options offered. It has not only provided women with a safe and simple solution to undesired pregnancies but has also served to educate and motivate women to prevent such pregnancies by using effective modern contraceptive methods. Expressed demand calls for further expansion and improvement of MR services in rural areas.

Urban Health Care Services

Equity in Health Care Forgotten for the Urban Poor in Bangladesh

M Desmet, I Bashir, N Sohel, Sushila Zeitlyn, J Myaux and R Rowshan

Objective: The study compares the inequalities with differentials in health care utilization among the urban poor.

Methods: Between June and November 1993, a survey was conducted in a sample of 924 households (4,343 individuals) selected from a 1991 database on the slum population of Dhaka City by multi-stage sampling. The households were visited biweekly, and information was collected on socioeconomic status, self-reported morbidity and health care use. Respondents were mainly spouses of the household heads. Data presented here are on severe illness cases.

Results: The severe illness burden was high (1.7 episodes per person-year). It was greater for females, and inversely associated with household income, age until adolescence; and for childhood illnesses, with the educational levels of the father and mother. Considering these inequalities, this paper investigates the use of health care options. First, there was substantial "option shopping" with "modern" formal care, more appropriate for severe illness cases, only representing 17% of the contacts. Second, there was less use of "modern" public and private health care services and slightly more use of NGO facilities when households were poorer, less educated, and the patient was young or a female adult. Third, the average user expenditure per contact for each health care option and illness episode was lower for these sub-groups. Cost was the predominant stated reason for non-use of modern public and private health care.

Conclusion: A review of the existing modern health care services is needed if the health needs of the slum population, particularly the specific vulnerable groups, are to be properly met.

Situation Analysis of Clinic-based FP and MCH Services in Dhaka City: Service Availability and Quality

Shams El Arifeen, Thomas Kane, Selina Amin, Sangeeta Mookherji*,
Henry Perry and Anwara Begum***

Objective: The study was undertaken to assess the availability and quality of family planning and MCH services provided through Government and NGO facilities in an area of Dhaka City.

Methods: A survey of all Government and NGO family planning and health facilities in Zone 3 of Dhaka City was conducted during November-December 1994. A modification of the situation analysis approach was used. Four different data collection instruments were used: (i) inventory, (ii) provider interviews, (iii) observations of client-provider interactions, and (iv) client exit interviews. Information was collected mainly on: physical facilities, supplies, range and volume of services, staff availability and training, providers' knowledge and skills, quality of services, and client knowledge, perceptions, practices, and satisfaction.

Results: No data were available for one of the clinics. Information on 35 facilities and 33 providers has been obtained (providers from the main clinics also conducted the satellite clinics). In addition, 165 client-provider interactions were observed and the clients (n=165) interviewed. The facilities generally provide a rather narrow range of services which increases the cost of service delivery and affects utilization. The quality of most services was unacceptably low. For example, none of the 13 clients whose acceptance of a contraceptive method at a clinic was observed, was screened or counselled appropriately; only 10 of the 17 clients complaining of method-related side-effects received provider attention; and none of the 25 children with diarrhoea and/or cough received an appropriate clinical assessment.

Conclusion: There is a need to work toward a more rational and efficient distribution of urban FP and MCH facilities providing a package of essential services and appropriate referral. Facilities should also focus efforts on improving the quality of their services to become more cost-effective.

* *Johns Hopkins University, USA*

***Concerned Women for Family Planning, Bangladesh*

**Socioeconomic and Demographic Differentials
in Payment for Different Contraception Methods in
Dhaka City: Implications for Pricing Strategies**

Subrata Routh, Aye Aye Thwin, Thomas Kane* and AH Baqui*

Objective: The study examines the current trends and factors in payment for contraceptive methods and analyzes their implications in developing effective pricing strategies.

Methods: Data for the study were generated from the baseline survey conducted during October-December 1994 on around 2,900 married women of reproductive age (10-49 years) currently using a contraception method within the sample frame of the Urban Panel Survey (UPS). The UPS is a 3-month round-wise data collection system maintained by the ICDDR,B Urban Extension Project to track demographic and service indicators in a sample of its catchment population in Zone 3 of Dhaka City having an estimated population of 400,000, out of which about 20 percent live in slums.

Results: Seventy percent of the injectable users, 80% of the pill users and 88% of the condom users paid users' fees for the supplies. These payments ranged from Tk 2.00 to Tk 20.00 with a mean of Tk 3.50 and median of Tk 4.00 for each injection, Tk 1.00 to Tk 70.00 with a mean of Tk 12.00 and median of Tk 7.00 for each cycle of pills, and Tk 1.00 to Tk 20.00 with a mean of Tk 3.00 and median of Tk 2.00 for one dozen condoms. Multivariate logistic regression analysis indicates that location of households (slum/non-slum) and education of the client-women were important determinants in the process of making payments for the contraceptives; while employment status of the husbands, age and number of living children of the client-women were found to be the influencing factors.

Conclusion: Behaviours of the clients relating to payment are evident from the analysis. There is scope for introducing a differential pricing system for contraceptive methods in the urban areas based on socio-economic and demographic characteristics of the clients like location of households, employment status of the husbands, age and number of living children of the client-women.

**Johns Hopkins University, USA*

**Cost of the MCH-FP Service Delivery in Urban Dhaka:
Analysis of Concerned Women for Family Planning (CWFP) Units in
Zone 3 of Dhaka City**

Ann Levin, Aye Aye Thwin, Zahidul Quayyum and Anwara Begum***

Objective: The study attempts to determine the time use patterns of personnel and the unit cost of services provided by CWFP in Zone 3 of Dhaka City, which would provide a basis for reallocating resources toward improvements in cost-effectiveness and efficiency of service outputs.

Methods: Time and motion studies were conducted to determine the actual time that the staff spent in the provision of various services at three units of Concerned Women for Family Planning in Zone 3 of Dhaka City. Other information on the costs of labour, equipment, utilities, and supply was also collected. The analyses permitted the calculation of the cost per service and effectiveness indicators such as cost per couple year protection (CYP) for each family planning method. The field observation was conducted in July 1995, and the collection of the other cost information took place during the 4-month period from July through September 1995. The outcome measure of the analysis is the cost per family planning service provided by method, and place of provision.

Results: The results indicate that paramedics spent approximately 50% of their time providing services, health workers a third of their time, and field workers 25%. Record-keeping responsibilities took up a third to a half of the staff time and need to be streamlined. In the comparison of methods, the cost per CYP was the highest for injectables and the lowest for IUDs, confirming findings from earlier national-level studies.

Conclusion: The findings provide a basis for more efficient reallocation of resources conducive toward programme expansion and improved service delivery toward addressing clients needs more effectively. The usefulness of cost analysis in planning is discussed in the context of improving programme sustainability.

* *Department of International Health, Johns Hopkins School of Hygiene and Public Health, USA*

***Concerned Women for Family Planning, Bangladesh*

Rapid Appraisal of Health Needs and Priorities in the Urban Areas of Dhaka

Aye Aye Thwin and Shamim Ara Jahan*

Objective: The study outlines the problems and priorities of the urban population regarding basic needs, provision of services, and access to primary health care services from consumers' perspectives.

Methods: Key informant interviews were held with men and women residing in selected wards of four zones of Dhaka City Corporation (DCC). The sample also included ward commissioners and some health and family service providers in the Government, NGOs, and private sector in these wards. Two wards each from Zone 2, 4, 6 and 8 of DCC were randomly selected to represent urban Dhaka, and further stratified into slum and non-slum areas, and data were collected in June-July 1995. Analysis included identification of primary health care needs, access, perceptions of quality, and the capacity of urban residents to pay for services.

Results: Water supply, garbage disposal, drainage, food, housing and adequate medical treatment were specified as some of the most urgent needs in Dhaka, especially for the poor and slum populations. The popularity of pharmacies as a source of supply for basic medical care and of the family planning methods such as pills and condoms was reported. The findings also indicated the occurrences of unwanted pregnancies and a high demand for safe and affordable abortion services. Most urban residents specified the need to promote access to family planning services, particularly for men.

Conclusion: The perspectives obtained from urban residents, local leaders and service providers indicate the need to address basic needs, and provision of services for a rapidly expanding city populace. The role of local government in coordinating the resources of the private sector and the community is discussed, taking into account the awareness and choices taken by an informed consumer population. The study also indicates that the rapid appraisal methodology can be effective in identifying priorities from consumers' perspectives.

**Department of International Health, Johns Hopkins School of Hygiene and Public Health, USA*

Assessment of the Quality of Urban Field Worker Services

Henry Perry, Suraiya Begum, AH Baqui, Anwara Begum,
Abdul Quaiyum and Thomas Kane*

Objective: In response to the general perception that quality of care is an increasing problem for MCH-FP programmes in Bangladesh, the Urban MCH-FP Initiative (a collaborative venture of ICDDR,B with Concerned Women for Family Planning and the Government of Bangladesh) assessed the quality of MCH-FP services provided by field workers (FWs) in Zone 3 of Dhaka City.

Methods: Information relating to the quality of services was obtained from interviews with 5,399 married women of reproductive age, 57 FWs, and 114 FW clients. Observations of 114 FW-client encounters were also recorded. All data collection activities took place in the Lalbagh area of Dhaka City during 1994.

Results: The major quality problems relating to the delivery of basic child survival services include lack of exclusive breastfeeding promotion, lack of promotion of continued feeding among children with diarrhoea, and failure to use standard WHO guidelines when assessing the severity of childhood respiratory symptoms. The major quality problems relating to the provision of family planning services were that only in about half of the visits FWs assess client reproductive goals or ask users about method-related problems. Educating new acceptors about method use, side-effects, and warning signs is quite limited. Furthermore, almost half (44%) of the clients said that the FWs' visits are not useful or helpful.

Conclusion: The findings underscore the need for improvement in the quality of FW services. Clarification of the FWs' specific responsibilities, closer monitoring of FW activities, provision of further need-based training, and utilization of visual materials for client education would facilitate quality improvements. More research is needed to clarify why many clients feel FWs' visits are not beneficial.

**Concerned Women for Family Planning, Bangladesh*

Development and Human Well-being: Part I

Socioeconomic Development and Human Well-being: Exploring Pathways to Change: Phase II of the BRAC-ICDDR,B Joint Project in Matlab

Mushtaque Chowdhury and Abbas Bhuiya

Objective: This paper presents the study objectives, design and methodologies adopted by the BRAC-ICDDR,B Joint Project in Matlab.

Methods: The Matlab DSS area of ICDDR,B has been divided into four study cells. One of the cells contains both MCH-FP intervention of ICDDR,B and socioeconomic development programme of BRAC. The two other cells have either ICDDR,B or BRAC programme. The fourth cell does not have anything from BRAC or ICDDR,B. Joint and independent impact of ICDDR,B and BRAC programmes on various dimensions of human well-being are being measured. A conceptual framework has been developed to study the impact. The macro level impacts are being measured by quantitative data gathered through DSS and other special studies. The mechanisms of impact are being studied through small scale quantitative and qualitative studies.

Expected Results: The project will contribute significantly in the field of development studies. It will help in better understanding of the interactions between development inputs and their impacts in relation to poverty alleviation and empowerment of women.

Conclusion: Understanding of the mechanisms of the impact will help fine-tune programme inputs and strategy toward improved and effective programming.

Impact of BRAC's Socioeconomic Development Programme on Fertility and Mortality in Matlab

Abbas Bhuiya, Mushtaque Chowdhury and Shahriar Reza Khan

Objective: The work was undertaken to assess whether participation in BRAC's development programme induce fertility control initiatives among women and enhance chance of child survival.

Methods: Around 10,000 currently married women of reproductive age, of whom 3,000 are BRAC members, have been continuously followed up for their demographic events through the Demographic Surveillance System of ICDDR,B since 1993. Children born alive to these women have also been followed up for survival and migration. The study has been carried out in Matlab and covers all four cells of the BRAC-ICDDR,B study. This paper reports results from experiences gained during 1992-1994. Probability of live birth and death of children was examined.

Results: The analysis revealed that the crude birth and death rates in the BRAC-ICDDR,B intervention cells are yet to show any impact of the development programme. However, an analysis of the probability of live birth during 1993-94 among the BRAC members and non-members showed lower probability among the BRAC members. The risk of death of children of BRAC member and non-member households was also found not to be different within the study period. Further follow-up and analysis are being carried out to understand the impact and its mechanisms.

Conclusion: Women's participation in income-generating activities in Matlab has started to show impact on fertility, however, the impact on mortality is yet to be seen.

Impact of BRAC's Programme on Literacy and Enrollment of Children in School in Matlab

Mushtaque Chowdhury, Samir Nath and Abbas Bhuiya

Objective: The study evaluates the impact of BRAC's programme on basic competence of children.

Methods: Data were collected in 1992 and 1995 from villages in the four study cells of the BRAC-ICDDR,B Joint Project in Matlab. Instruments developed earlier by BRAC to assess the basic competence were used for studying the impact of BRAC's programme introduced during the latter half of 1992. The paper assesses the change in the performance of children in 1995 over 1992.

Results: The pre-intervention survey revealed that 12% children from the BRAC-eligible households and 24% from the non-eligible households passed the test. A subsequent post-intervention survey revealed a positive impact of BRAC's programme on school enrollment and basic competence in both the groups.

Conclusion: The evaluation reveals that participation in the BRAC programme results in improved basic competence among children in the study area.

Effect of BRAC's Development Inputs on Women's Lives

Samiha Huda, Shahriar Reza Khan and Simeen Mahmud

Objective: This study aims at exploring the changes in poor women's lives that are brought about by being involved with BRAC's development interventions. More specifically, it will examine how RDP inputs are helping women from BRAC-eligible households in improving their lives compared to those who are not involved with BRAC. It is expected that BRAC-eligible women's access to credit-related income-earning will improve their socioeconomic condition and BRAC has the potential to help these poor women through different programmes.

Methods: Around 3,500 households were surveyed using pre-tested structured questionnaire in 14 selected villages of Matlab DSS area in the second phase of the Matlab study. Besides sociodemographic information, data were collected on different aspects of women's lives, such as mobility, household decision making, credit and income, personal assets, etc. During analysis, comparison was made between two groups of poor women (VO members and non-members). Appropriate statistical tests were done where needed. SPSS for Windows statistical package was used for data analysis.

Results: Preliminary analysis showed some differences in mobility, decision making, assets owned and income contributed to household between the two groups. The utilization of loans for income-earning activities was more for the VO members than the others. The differences were significant for mobility and assets owned, but not for decision making.

Conclusion: Involvement of poor women in the development activities results in tangible changes in some aspects of their lives.

**Vulnerability of Divorced and Abandoned Women
and the Role of BRAC's Socioeconomic
Development Programme in Matlab**

Mehnaaz Momen, Abbas Bhuiya and Mushtaque Chowdhury

Objective: The study attempts to understand the factors responsible for divorce and abandonment, the consequences of the above on women's lives, coping strategy adopted, and the effectiveness of the BRAC's development programme.

Methods: Qualitative and quantitative methodologies were used in carrying out the study. A sample of abandoned, divorced, widowed, and separated women were the study subjects. The study was carried out in selected villages in Matlab during 1994-95.

Results: Most of the divorced and abandoned women were initially married off quickly by their parents without knowing the groom because the involvement of dowry was less. After divorce or abandonment they did not receive any support from the husbands, and quite often the due claim of the women from their husbands could not be realized. After marital disruption most women returned to their natal home and became dependent on parents or brothers. Some women participated in BRAC's programme and are benefitted. Some women are apprehensive of taking a loan from BRAC for lack of confidence in their ability to return the money through a self-initiated income-generating project.

Conclusion: Divorced and abandoned women are very vulnerable in every aspect of life. The nature of their problems are different than other groups. The general women development programmes are likely to be inadequate to cater to their needs.

A Standard of Living Index for Matlab

Hassan Zaman, Gazi Mahmud Hasan and Shahed Husain

Objective: The study aims at developing an alternative methodological framework for detecting changes in the household living standard in Matlab.

Methods: A two-stage random sampling technique was used for selecting the villages from the four research cells (of the second phase of BRAC-ICDDR,B Joint Research Project), and then the households were randomly chosen from the pre-selected villages. Data on 11 consumption items (price per unit consumed) during the previous 7 days were collected from 240 households using a pre-tested structured questionnaire in two phases: the first phase from 15 January 1994 to 31 January 1994, and the second phase from 15 January 1995 to 31 January 1995.

Results: An index was constructed from the prices of the 11 items as the standard of living index. Then comparison was done between different cells over the two periods. The results suggest that there has been a rise in living standards in the BRAC only cell, a fall in the ICDDR,B cell and indeterminate results in the BRAC-ICDDR,B and Comparison (neither BRAC nor ICDDR,B) cells.

Conclusion: These results need to be interpreted with caution since credible comments on changes in living standards should be made only with a longer stream of panel data as well as with a larger sample size, and certainly not only on two years of observation. This is only the first step designed to establish the methodological framework for further time series work.

Biomedical Perspectives: Clinical Aspects

Double-blind, Randomized Clinical Trial of Single-dose Antimicrobial Therapy for Cholera

Wasif Ali Khan, Ujjwal Dhar, Eradul H Khan, MA Salam,
Carlos Seas*, A Ronan**, W Busch*** and Michael L Bennish****

Objective: In this randomized clinical trial, we compared the efficacy of a single, 1 g oral dose of ciprofloxacin with a single, 300 mg dose of doxycycline in the treatment of cholera due to *V. cholerae* O1 and *V. cholerae* O139.

Methods: Patients selected for the study were males, 18 to 60 years of age, who had watery diarrhoea ≤ 24 hours and were moderately or severely dehydrated. Of these initially selected patients, those who had *V. cholerae* identified on dark-field microscopy and who had a volume of watery stool >5 ml/kg body weight/h during the observation period were finally enrolled in the study.

Results: Of the 260 evaluable patients, 130 were infected with *V. cholerae* O1; 66 of them received ciprofloxacin and 64 doxycycline. One hundred thirty were infected with *V. cholerae* O139; 59 of them received ciprofloxacin and 71 doxycycline. Among the *V. cholerae* O1-infected patients, clinical success was observed in 94% of the patients treated with ciprofloxacin and in 73% patients treated with doxycycline ($p=0.003$). Similarly, bacteriological success occurred in 95% patients treated with ciprofloxacin and in 69% patients treated with doxycycline ($p<0.001$). In the *V. cholerae* O139-infected patients, clinical success occurred in 92% of patients in both ciprofloxacin and doxycycline-treated groups ($p=NS$). However, bacteriological success occurred in 98% and 79% of patients when treated with ciprofloxacin and doxycycline respectively ($p=0.002$).

Conclusion: We conclude that the efficacy of a single 1 g oral dose of ciprofloxacin is better than that of a single 300 mg oral dose of doxycycline in the treatment of cholera in adults.

* Universidad Peruana Cayetano Heredia, Lima, Peru

** Centre for Clinical Epidemiology and Biostatistics, University of Newcastle, Australia

*** Bayer AG Pharma Research Center, Wuppertal, Germany

****New England Medical Center, Tufts University, Boston, MA, USA

Clinical and Laboratory Features of Cholera Due to *Vibrio cholerae* O1 and *Vibrio cholerae* O139

Ujjwal Dhar, Wasif Ali Khan, Carlos Seas*, Eradul H Khan, MJ Albert, MA Salam and Michael L Bennish**

Objective: The study compared the clinical and laboratory features of severe cholera in male adults infected with *Vibrio cholerae* O1 (Vc O1) and *V. cholerae* O139 (Vc O139), and *in vitro* production of cholera toxin and antimicrobial susceptibility of the pathogens.

Methods: Patients aged 18 to 60 years, with watery stool of ≤ 24 h, and stool dark-field positive for vibrios were enrolled. They were fully rehydrated and then observed for another 4 hours after hydration. Their stool, urine, and vomit, intake of intravenous and oral fluids were measured.

Results: The admission clinical features of patients infected with Vc O1 (n=110) and Vc O139 (n=132) were almost similar. Patients with infected Vc O1 had initially higher median volumes of stool (31 ml/kg body weight/h vs. 27 ml/kg.h, p=0.05) and vomit (1 ml/kg/h vs. 0 ml/kg/h, p=0.04), and their requirements of total rehydration fluids were also higher (79 ml/kg/h vs. 73 ml/kg/h, p=0.03) compared to Vc O139 patients. Patients in both groups had similar serum electrolyte concentrations on admission. However, Vc O1-infected patients had a lower stool chloride concentration than had Vc O139 patients (94 mmol/l vs 103 mmol/l, p=0.02) and higher proportion of patients with Vc O1 had faecal leukocyte >50 /high power field (40% vs. 12%, p<0.01). The quantities of cholera toxin produced *in vitro* by strains of Vc O1 and Vc O139 were similar. Higher proportion of Vc O1 isolates was resistant to tetracycline (42% vs. 0%, p<0.01) and furazolidone (73% vs. 7%, p<0.01), and most isolates were resistant to co-trimoxazole. All isolates were susceptible to ciprofloxacin, and all but one in both groups were susceptible to doxycycline and erythromycin.

Conclusion: The clinical features of Vc O1 and Vc O139 infections are similar. The serogroups differ in their antimicrobial susceptibility patterns, for which monitoring of their antimicrobial susceptibility is necessary to determine empiric antimicrobial therapy.

* Universidad Peruana Cayetano Heredia, Lima, Peru

**New England Medical Center, Tufts University, Boston, MA, USA

Efficacy of Cefixime in the Treatment of Shigellosis in Adults

MA Salam, Carlos Seas*, Wasif Ali Khan
and Michael L Bennish**

Objective: The objective of this study was to compare the efficacy of cefixime with that of amdinocillin pivoxil in the treatment of adults with acute dysentery due to infections with *Shigella* spp.

Methods: This was a randomized, double-blind clinical trial. Patients were males aged 18-60 years who had a history of bloody-mucoid diarrhoea of ≤ 72 h duration but no other concomitant illness, and did not receive any antimicrobial therapy. Written consents were obtained, and the protocol was approved by the ICDDR,B Ethical Review Committee. Medical history was obtained, and physical examinations performed on admission, then daily during the study, and at follow-up seven days after discharge. Patients were treated either with cefixime 400 mg daily or amdinocillin pivoxil 400 mg 6 hourly. Both drugs were administered orally for 5 days. Clinical failure was defined as persistence of symptoms for >72 h after starting treatment; or if the patients had a total of ≥ 6 stools, or one bloody-mucoid or watery stool, or an oral temperature of $>37.8^\circ\text{C}$ on the 5th day. Isolation of *Shigella* spp. on day 3 or on any subsequent days was defined as bacteriologic failure.

Results: A total of 30 eligible patients--15 in each treatment group--were studied. Cefixime failed in seven (40%) patients, but failure of amdinocillin pivoxil therapy was nil ($p=0.006$). Patients in the cefixime group had longer median duration of fever (6 h vs 0 h; $p=0.019$), longer median duration of dysenteric stools (4 d vs 1 d; $p=0.001$), and higher median number of total stools during the study (65 vs 28; $p=0.002$) than the patients in the amdinocillin pivoxil group. Bacteriologic failures occurred in nine (60%) patients in the cefixime group but in only two (13%) patients in the amdinocillin pivoxil group ($p=0.009$).

Conclusion: It is concluded that cefixime is ineffective in the treatment of shigellosis in adults when used in the standard recommended dosage.

* Universidad Peruana Cayetano Heredia, Lima, Peru

** New England Medical Center, Boston, MA, USA

Relationship Between Serum Vitamin A and Intestinal Permeability in Children With Acute Diarrhoea

SK Roy, SM Akramuzzaman, R Haider, Dilip Mahalanabis, MA Wahed, AM Tomkins and R Behrens**

Objective: The study examines whether vitamin A status has any relationships with intestinal mucosal integrity as measured by the levels of permeability.

Methods: Two hundred nine subjects, aged 4 to 24 months with acute diarrhoeal illness, were studied at the Clinical Research & Service Centre of ICDDR,B. Their serum retinol levels were determined on admission with high-performance liquid chromatography (HPLC). Small intestinal permeability was determined using 5 g lactulose and 1 g mannitol in 20 ml water fed after rehydration and recovery of sugars from 5-hour collection of urine using Cobas-Bio. Proportion recovered and ratio of the sugars were calculated to determine small intestinal permeability.

Results: Recovery of lactulose was correlated with serum vitamin A levels ($p < 0.08$), nutritional status ($p < 0.004$), and type of diarrhoeal pathogens ($p < 0.03$). Recovery of mannitol was dependent on vitamin A levels and nutritional status ($p < 0.05$, $p < 0.02$). Serum vitamin A and serum zinc levels had significant correlations ($p < 0.01$). Quartiles of serum vitamin A levels showed significant variations in lactulose excretion ($p < 0.024$) and lactulose/mannitol excretion ratio ($p < 0.04$) of young children with acute diarrhoeal illness. Nutritional status appeared to have independent effect on lactulose excretion ($p < 0.016$).

Conclusion: The study reveals that intestinal mucosal permeability, an indicator of mucosal integrity, has relationship with serum vitamin A levels suggesting clinical implications for recovery from diarrhoea.

**Institute of Child Health, London, UK*

Magnitude and Determinants of Repeated Episodes of Tachypnoea (Fast Breathing) for ALRI Control Programmes

A de Francisco and J Chakraborty

Objective: The study estimates the magnitude and risk factors for acquiring multiple ALRI episodes in rural Bangladesh.

Methods: Community health workers (CHWs) record, detect and treat tachypnoea cases fortnightly. Surveillance data were linked to health posts, out- and in-patient records, and subsequently to mortality and sociodemographic variables. Incidence of repeat disease was calculated. Each child was classified as either having had a "single" or "multiple" episodes during the study period, and those who died after the first episode were excluded. Relative risks and confidence intervals were calculated for each variable in turn and examined for significance. A logistic regression analysis was performed by fitting a model containing those variables that were identified as significant from the univariate analysis. A step-wise approach was applied using the number of episodes experienced by a child during the study period as the dependent, dichotomous variable (1 or more).

Results: A total of 6,187 episodes of ALRI was recorded over a period of 30 months in 4,000 children, of whom 1,312 (33%) had repeated episodes. A significant decrease in the number of children who experienced episodes is recorded over time. The logistic regression analysis showed that child-level variables associated with a higher risk of repeated disease were having been seen at a higher referral level, probably indicating the severity of the first episode; a lower risk was documented in those older than one year of age and for those who referred themselves to a higher health care level, probably indicating a better knowledge of ALRI symptoms for infants followed by early treatment of incipient symptoms.

Conclusion: Repeated disease contributes significantly to the burden of ALRI morbidity in rural Bangladesh, particularly in infants. Aetiological studies are required to determine the cause of illness for appropriate management.

**Acute Lower Respiratory Infections in Rural Bangladeshi
Children: Patterns of Treatment and Identification
of Barriers**

K Zaman, Sushila Zeitlyn, J Chakraborty, A de Francisco and Md. Yunus

Objective: The study examines the patterns of health care-seeking behaviour, mothers' recognition of symptoms, the perceived causes and barriers to timely treatment of acute lower respiratory infections (ALRI).

Methods: Between February 1993 and July 1994 one hundred ninety-four children aged less than 5 years, suffering from ALRI in the Matlab MCH-FP area, were prospectively followed up.

Results: About 62% of the mothers sought allopathic treatment for their children within 24 hours of case detection. No treatment of any kind was sought in 45 (23.2%) cases. Most mothers could recognize the different symptoms of ALRI. Cold was reported as the most common cause of ALRI. No significant difference was observed in the reported symptoms or perceived cause of the disease between those who sought no treatment and those who sought allopathic, homeopathic, spiritual or combined treatments. Failure to recognize severity followed by work loss was the most common reason identified for not seeking any medical care. Whether or not a mother sought allopathic treatment was not associated with child's age, sex, mother's age, mother's education, duration of illness, birth order, housing type or distance from the health centre.

Conclusion: The study indicates the potential value of giving parents clear guidelines on recognition of severity of symptoms of ALRI and motivating them to seek treatment quickly when these symptoms show up. Health service providers should be aware of the heavy work loads which rural women have and the severe time constraints which deter them from seeking timely treatment from the appropriate sources.

Comparative Efficacy of Amylase-treated Energy-dense Wheat Porridge and Standard Diet on Growth and Lean Body Mass of Severely Malnourished Children

M Aminul Islam, M Mujibur Rahman, Dilip Mahalanabis, MA Khaled, Stacy McDonald and George J Fuchs*

Objective: The study evaluates the effect of an energy-dense diet liquefied with amylase-rich flour from germinated wheat (ARF) on changes in growth and lean body mass in severely malnourished infants and young children.

Methods: It was a randomized, controlled clinical trial with two sets of controls. The study was conducted at the Nutrition Rehabilitation Unit of ICDDR,B's Clinical Service & Research Centre, where mothers stay with their malnourished children. Forty severely malnourished children (weight-for-age <60%), aged 5-18 months, who had recovered from diarrhoea were the subjects for the study. Children were randomly assigned to receive either an energy-dense porridge liquefied by adding ARF (test diet) or an unaltered thick porridge of similar energy density (control 1 diet), or porridge made liquid with addition of water to have the same viscosity as the test diet but of lower energy (control 2 diet). These diets were given daily for two weeks in four major meals, and total intake was measured. Breastmilk was allowed, and intake was measured by test weighing.

Results: The increase (mean±SD) in body weight in two weeks was 281±253 g in the test diet group compared to 207±248 g and 218±158 g in the control group 1 and 2 respectively ($p>0.05$). Gain in weight persisted when children were followed up once after 30 days (mean±SD values in gram: 736±339, 494±484 and 596±472 in the test, control 1 and control 2 diets respectively, $p>0.05$). Gain in weight was also reflected in an increase in lean body mass as measured by Bioelectrical Impedance Assay. Changes (mean±SD) in lean body mass were: 260±250 g in the test diet group, 60±220 g ($p=0.06$) in control 1, and 200±200 g ($p>0.05$) in control 2 groups. The calorie (mean±SD) obtained from the test diet was 91±25 kcal/kg body weight/day while those for the control 1 and control 2 diets were: 75±33 kcal/kg/day ($p>0.05$) and 69±19 kcal/kg/day ($p=0.02$).

Conclusion: Treating severely malnourished children with energy-dense ARF-treated liquefied porridge results in an increase in body weight as also reflected in an increase in lean body mass.

**Louisiana State University Medical Center, USA*

Development and Human Well-being: Part II

Quality of Life and Psychological Well-being of Rural Women

*Nasreen Wadud, Abbas Bhuiya, Mushtaque Chowdhury
and Mohsina Khatun*

Objective: The study was undertaken to: (a) develop a scale to measure the quality of life and psychological well-being of rural women and (b) measure the impact of socioeconomic interventions of different institutions on these aspects in rural women's lives. The study aimed at exploring the area of psychological well-being as an indicator of the quality of life.

Methods: Five independent factors emerged that were formed by an overall 103 items. These are: self-confidence, self-esteem, conscious thinking, knowledge about environment, and life satisfaction. This study was confined to the women of Matlab, ranging in age from 18 to 54 years. Stratified random sampling procedure was adopted for selecting samples. The scale was developed in three phases, where the items were constructed in the first phase on the basis of observation of the subjects, interviewing them, studying the literature, and items of other tests. A pilot study was carried out in the second phase, and the reliability and validity of tests were determined in the final phase. Sampling was based on a four-cell design and consisted of 40 respondents with 10 from each cell.

Results: In scale construction, taking 0.5 D.L. as an index, 60% items were retained. Participation in the BRAC and ICDDR,B's programmes has an impact on various aspects of well-being. Validity and reliability scores were found to be high.

Conclusion: Women's participation in income-generation and development activities improve the quality of their lives.

Health Care-seeking Behaviour of Individuals from the BRAC-Member and Non-member Households

Syed Masud Ahmed, Mushtaque Chowdhury and Abbas Bhuiya

Objective: To explore the association between development interventions and management of morbidity in the rural area, this study aims at seeing whether individuals from poor households having a member in BRAC's Village Organization (VO) receive more effective and rational treatment (use of home remedies for minor illnesses and early contact with 'modern' health care providers for serious illnesses) compared to those from similar households not involved with BRAC.

Methods: About 3,500 households were surveyed using a pre-tested structured questionnaire in 14 selected villages of the Matlab DSS area in the second phase of the Matlab study. Besides sociodemographic information, data on illness during the last 15 days, types of illness, types of health care provider (HCP) contacted and mode of contact, cost of treatment, and duration of illness were collected. During analysis, comparison was done between ill individuals according to the involvement of their particular household with BRAC's Village Organizations (VO). Appropriate statistical tests were done where needed. SPSS for Windows statistical package was used for data analysis.

Results: Preliminary analysis showed the major categories of illnesses to be fever, gastrointestinal diseases and pain/aches in the body for which no treatment or home remedy was administered. Ailing individuals who received treatment outside were found to use 'allopathic' treatment more frequently, especially in case of those having a VO member in the household, compared to the other group. Health practitioners contacted include both qualified and unqualified physicians of allopathic medicine. Sociodemographic differentials existed between the two groups regarding types of treatment received and management of illness.

Conclusion: Involvement of households in socioeconomic development activities leads to more effective and rational management of morbidity.

**Cultural Construction of Health and Institutional
Measures of Change in Rural Bangladesh: Cases of BRAC's
Village Organization and ICDDR,B's MCH-FP Programmes**

Monirul I Khan, Abbas Bhuiya and Mushtaque Chowdhury

Objective: The study aims at examining the perceptions, causes and treatment of diseases among the people of a few selected villages in Matlab and their relation to traditional culture and interventions made by BRAC and ICDDR,B in the form of rural development programme (RDP) and MCH-FP programmes.

Methods: Four sets of villages were chosen purposively -- two DSS and the other two non-DSS. In one of the DSS villages, the MCH-FP programme is underway while the other does not have such programmes. Likewise, one of the non-DSS villages has the rural development programme of BRAC while the other does not have any. From each village 10 respondents were selected purposively to gather information.

Results: The perception of disease is mostly defined in terms of the functions of the body. In very few occasions it is defined in terms of the action rendered by germs or the pathological condition of the body organs. The difference between the meaning and the actual diseases is often blurred. While identifying the causes often the reference is made to invisible spirits, locally known as *alga batash*. The modes of treatment combine both modern and traditional elements. However, the health teaching educates them about the perception, causes and treatment of certain diseases. In society the elderly people, religious preachers and traditional healers play important roles to influence the mind of the people. Sometimes, gender relations and other structural features also bear on the minds of the illiterate poor. The difference between the intervention and non-intervention villages is expressed in the fact that the people of the intervention villages are constantly exposed to the agents making changes while in the non-intervention villages it is intermittent.

Conclusion: Traditional culture still plays an important role in the construction of disease perception and the choice of treatment while modern approaches are combined with it. The intervention procedures widen modern approaches but could not eliminate the traditional notions altogether.

Impact of the Grameen Bank on Childhood Mortality in Bangladesh

Mizanur Rahman, Julie DaVanzo and Santosh Chandra Sutradhar*

Objective: The Grameen Bank (GB) is a highly innovative and well-supervised credit programme for the rural poor in Bangladesh. About 95% of over two million participants are women. GB can positively affect child survival among its participants through its income-generation and consciousness-raising activities. The study examines if GB influences childhood mortality of its participants.

Methods: An integrated family life survey was carried out during 1993-1994 among about 2,500 married women in landless households, who are eligible for membership in GB. The survey was carried out among randomly selected married women regardless of GB membership in three thanas of Tangail district and one thana of Mymensingh district. The study permits an analysis in a "before-after" and "treatment-comparison" framework for measuring the impact of GB on childhood mortality. Estimation was done in Proportional Hazards models where the effects of confounding factors, like calendar year, maternal age, parity, maternal education, economic conditions, and areal variation, were controlled for.

Results: There was a 34% and significant reduction in childhood (under-five) mortality after the mothers joined the GB. Similar effects of other NGOs on childhood mortality were also observed. Childhood mortality was similar between the GB members before joining the Bank and never-members, indicating that the GB members were not from a selective group. Childhood mortality was 21% and significantly lower among women who worked for income-generation than those women who did not work.

Conclusion: Income-generation and social development programmes modelled after the Grameen Bank and other NGOs can reduce childhood mortality in Bangladesh and similar settings.

**RAND Corporation, Santa Monica, CA, USA*

Risk Factors for Low Birth Weight Among the Urban Poor in Dhaka

Gretchen Antelman, Shams El Arifeen and AH Baqui

Objective: The study attempts to identify risk factors for low birth weight (LBW) due to intrauterine growth retardation among the urban poor in Dhaka. An estimated 46% of all infants in the community weigh <2500 g at birth, and 17% of LBW infants are pre-term.

Methods: In a community-based longitudinal study on pregnancy outcomes (November 1993-January 1995) in selected slum clusters of five thanas, birth weights were measured using a scale accurate to 10 g. Most infants (70%) were measured within 72 hours, but all singleton infants weighed up to 6 days after birth were included in this analysis (n=1,264).

Results: Using multivariate logistic regression and controlling for the effect of gestational age and pre-term delivery, women with low weight or height were more likely to have LBW infants compared to women who weighed ≥ 50 kg and were ≥ 150 cm tall (≤ 35 kg, OR 11.20; 35-39.9 kg, OR 3.20; 40-44.9 kg, OR 2.25; 45-49.9 kg, OR 2.09; 140-144.9 cm, OR 1.72). Women who smoked cigarettes or were exposed to passive tobacco smoke were twice as likely to have LBW infants compared to women with no exposure to tobacco smoke (95% c.i.: 0.95,3.87; $p < 0.07$). Women who received antenatal care with some health education were 22% less likely to have LBW infants (OR 0.78, 95% c.i.: 0.59, 1.04; $p < 0.09$), but there was no significant protective effect of antenatal care without health education (OR 1.06, 95% c.i. 0.67, 1.66, $p < 0.81$). Primiparous women (OR 2.16) and women from households with low monthly income (Tk <3000; OR 1.41) were significantly more likely to have LBW infants.

Conclusion: The high prevalence of poor nutritional status among women and girls is a major risk factor for intrauterine growth retardation among the urban poor. Efforts to decrease exposure to tobacco smoke (direct and indirect), and to increase access to quality antenatal care might contribute to a reduced rate of LBW.

Biomedical Perspectives: Laboratory Aspects

Role of Rotavirus Vaccines in Bangladesh: New Estimates of the Disease Burden and Implications of Strain Variation

Leanne E Unicomb, Paul E Kilgore, ASG Faruque, MJ Albert,
Jon R Gentsch*, George J Fuchs and Roger I Glass**

Objective: The study attempts to assess the potential of rotavirus vaccines which are about to be licensed to reduce the morbidity and mortality of rotavirus diarrhoea in Bangladesh.

Methods: Data from the surveillance system of the Clinical Research & Service Centre (CRSC) of ICDDR,B and national census were reviewed for estimation of rotavirus disease burden. Rotaviruses were detected using an enzyme immunoassay and were characterized using a combination of enzyme immunoassay and PCR at the Virology Laboratory of the Laboratory Sciences Division of ICDDR,B during 1990-1994. Rotavirus disease burden (the number of diarrhoeal episodes and the number of deaths) and variation in rotavirus strains were examined.

Results: Rotavirus infection accounted for 12% of the hospitalizations for diarrhoea among children aged less than 5 years, representing nearly 3,000 hospitalizations at the CRSC per year. It has been estimated that between 220,000 and 10 million episodes of diarrhoea are due to rotavirus and that approximately 37,000 rotavirus-associated deaths occur annually in Bangladesh. The median age for the incidence of rotavirus diarrhoea is 10 months of life suggesting that vaccination should take place in the first 3-6 months of life. The study evaluated the circulating rotavirus strains and has shown that the four common G serotypes appear to be important pathogens among children with rotavirus. Serotype P6 has been detected in asymptotically infected neonates.

Conclusion: Currently available tetravalent rotavirus vaccine evaluated in US children provides protection against the four common G serotypes and may possibly be efficacious in Bangladesh. Further strain characterization is required to ascertain the contribution of unusual rotaviruses to disease burden.

**Viral Gastroenterology Unit, Centers for Disease Control and Prevention,
Atlanta, USA*

Pathologic Findings in Fatal Hospitalized Cases of Persistent Diarrhoea in Bangladesh

AK Azad, Rafiqul Islam, MA Salam and AN Alam

Objective: This study was undertaken to evaluate the pathophysiology and complications of persistent diarrhoea.

Methods: From May 1982 through June 1994, autopsies were carried out on 270 fatal cases of diarrhoeal illness. Of the 270 cases, 17 fatal malnourished infants and young children manifested the criterion of persistent diarrhoea. For comparison of small bowel mucosal morphology, 17 malnourished infants and young children with acute diarrhoeal illness and fatal outcome were chosen from those 270 cases to serve as control. Jejunal sections immediately beyond the ligament of Treitz were used for studying the villous morphology in 14 cases and 17 controls.

Results: Cases with persistent diarrhoea had significantly higher proportion of villous atrophy ($p < 0.0005$). This type of villous atrophy is expected to be associated with variable reduction of disaccharidase activities, particularly lactase. The aetiologic agents for persistent diarrhoea were *Cryptosporidium* in 4 cases and enteroadherent Gram-negative rods in 2 cases, thus comprising 35% of the total number of cases. Cryptosporidial infection had heavy infestation and villous atrophy was noted in three of them (75%), including enterocolitis in one of them. Two of these four cases had lymphoid atrophy. Enteroadherent Gram-negative rods induced both microvillus damage and villous atrophy. One case had PAS(+) macrophages in the small bowel mucosa and draining mesenteric lymph nodes with light microscopic suggestion of Whipple's disease. In addition to villous atrophy, colitis associated with different diarrhoeal agents was noted in 6 cases. In one case of colitis and 2 cases of caecitis, no diarrhoeal pathogens could be incriminated. Nearly one-fourth of the cases (23.5%) had septicaemia; 53% of cases had alveolar pneumonia; 2 cases (12%) had *Pneumocystis carinii* pneumonia; and one case had adenoviral pneumonia.

Conclusion: Appropriate dietary intervention and appropriate antibiotics for enteric pathogens, sepsis and pneumonia should be instituted for these cases.

Cryptosporidiosis in the Families of Milkmen Following an Outbreak of Calf Diarrhoea in a Dairy Farm in Bangladesh

*ASM Hamidur Rahman, KA Al-Mahmud, KMN Islam, KM Shafiullah,
AWMS Islam* and MMH Mondal**

Objective: The study attempts to: (1) determine the prevalence of cryptosporidiosis in neonatal dairy calves (both diarrhoeal and non-diarrhoeal) and their attendants (milkmen); (2) ascertain the seasonal influence of the infection in both the subjects; and (3) comment on the mode of transmission.

Methods: Five hundred forty-five calves, aged 1-28 days, both diarrhoeal and non-diarrhoeal, were sampled round the year. Two hundred ninety specimens from animal attendants and their family members were screened only for 6 months after a sudden occurrence of diarrhoea in them. Modified Ziehl-Neelsen stain was used for identification of the oocysts.

Results: *Cryptosporidium* oocysts were detected in 45 (8.3%) of the 545 calves examined. Forty-three (13.73%) of the 313 calves with diarrhoea excreted oocysts in comparison to 2 (0.84%) of the 232 calves without diarrhoea ($p < 0.01$). The oocysts were detected throughout the year in calves with diarrhoea, the highest incidence (22.58%) being observed in the warm and wet months of August-September and the lowest (5.25%) in the cool and dry months of December-January. The oocysts were detected during the first four weeks of life with a peak in the 2nd week. Thirteen of the 84 animal attendants along with 66 family members who had diarrhoea were positive for *Cryptosporidium* oocysts in the stool specimens (8.68%), whereas none of the 140 non-diarrhoeal family members was positive ($p < 0.01$). Seven of the 13 positive specimens were from milkmen themselves, and the remaining six from two members of the families of positive milkmen.

Conclusion: The study demonstrates that *Cryptosporidium* is prevalent in the neonatal dairy calves and the milkmen who take care of the calves during parturition, nursing and milking of the cows. The protozoa play an important role in the aetiology of diarrhoea in calves and their attendants, particularly the milkmen. The study indicated animal-to-man as well as man-to-man transmission.

**Bangladesh Agricultural University, Mymensingh*

Intestinal Transport of Water, Sodium, and Glucose From an Electrolyte Solution With and Without Bicarbonate

Sufia Islam, Dilip Mahalanabis, Abul Kalam Azad Chowdhury,
Shafiqul Alam Sarker, MA Wahed and ASM Hamidur Rahman*

Objective: Bicarbonate has been included in oral rehydration solution (ORS) to correct the acidosis associated with diarrhoea. Bicarbonate promotes water and sodium absorption from normal small intestine. Controversy exists regarding the ideal composition of oral rehydration solution, particularly the role of bicarbonate. In this study we have evaluated the role of bicarbonate on water and sodium transport in normal and secreting small intestine of rabbits.

Methods: After anaesthetizing the rabbit, a mid-line incision was made and six ileal loops were constructed from distal to the proximal end of the intestine. Five ml of an electrolyte solution, with and without bicarbonate, was injected into ileal loops of normal and cholera toxin-treated rabbits. Body temperature was maintained at 37°C during the experiment by using a lamp.

Results: The mean±SE of water and sodium absorption, with bicarbonate versus without bicarbonate, was -1.4 ± 0.1 vs. -1.1 ± 0.3 ml/10 cm/h, ($p=0.18$), and -340.8 ± 23.0 vs. -308.4 ± 35.6 mmol/10 cm/h, ($p=0.44$) respectively from secreting rabbit ilea. A similar effect was observed in normal ilea.

Conclusion: It is concluded that bicarbonate containing electrolyte solution has no additional promoting effect on water and sodium absorption in normal or secreting intestines of rabbits.

**Department of Pharmacy, University of Dhaka, Dhaka 1000, Bangladesh*

**Faecal Contamination of a Fish-culture Farm Where
Duckweeds Grown in Hospital Wastewater
Are Used as Fish-feed**

MS Islam, MJ Alam, Nigar S Shahid, KZ Hasan, M Ekramullah,
RB Sack and MJ Albert*

Objective: Duckweeds are a group of tiny free floating plants belonging to the family *Lemnaceae*. Duckweeds have long been recognized as a potential source of high-protein feed for animals. The reproduction of duckweeds occurs by vegetative means and can double their mass in two days. A project on *Lemnaceae*-based wastewater treatment is going on in Tangail, Bangladesh. The duckweeds are grown in wastewater collected from the Kumudini Hospital Complex in a series of wastewater lagoons. These duckweeds grown in wastewater are used as feed in the fish-culture ponds. Fish is regularly harvested and sold in the market. No data are available on the bacteriological quality of fish, duckweeds, and water of this fish-culture farm. Therefore, a bacteriological study was carried out to assess the quality of duckweeds, water in which these are grown, and the fish to which these are fed.

Methods: Eleven sites were selected for this study -- five from wastewater area and six from non-wastewater area. Water, duckweeds and fish samples were collected from both these areas once a month for one year (May 1994 to April 1995) and processed for estimation of faecal coliform concentrations following standard procedures.

Results: The faecal coliform concentrations in water, duckweeds and fish were similar in both wastewater and non-wastewater sources except in raw wastewater. The mean faecal coliform count in raw wastewater was 4.57×10^4 /ml which was reduced to $<10^2$ /ml after treatment with duckweeds.

Conclusion: The study demonstrated that the bacteriological quality of fish, duckweeds and water in both wastewater and non-wastewater samples is similar. Therefore, the chances for transmission of diseases from both the sources may also be similar.

**PRISM Bangladesh, Mirzapur, Tangail, Bangladesh*

**Relative Abundance of *Aeromonas* spp. in Wastewater and
Non-wastewater Areas of a Duckweed-based
Fish-culture Project**

Z Rahim, MS Islam, MJ Alam, Nigar S Shahid, KZ Hasan, M Ekramullah,
RB Sack and MJ Albert*

Objective: *Aeromonas* is an autochthonous bacterium of the aquatic environment. It is one of the pathogenic members of the family *Vibrionaceae* and has been reported to be associated with the infection of a diverse group of animals including humans. To evaluate the microbial hazards of wastewater-grown duckweeds as fish-feed, the abundance of aeromonads in duckweeds, water, gills and intestinal contents of fish collected from both wastewater and non-wastewater areas of a fish-culture project was compared.

Methods: Samples were collected monthly from August 1994 through July 1995 from the Tangail district of Bangladesh. Duckweeds grown in wastewater were used as fish-feed in the ponds of wastewater area, and that grown by chemical fertilizer was used as fish-feed in the ponds of non-wastewater area. A conventional bacteriological culture technique was followed to isolate aeromonads on MacConkey agar plate.

Results: The average counts of aeromonads in duckweeds were similar in both wastewater and non-wastewater areas. No fish disease was observed in any of the ponds of either area. Moreover, none of the duckweed handlers showed any sign of enteric infection.

Conclusion: Duckweeds cultivated for wastewater treatment could be used as fish-feed without any adverse effects on pisciculture and handlers of duckweeds.

**PRISM Bangladesh, Mirzapur, Tangail, Bangladesh*

Poster Presentations

Reproductive Health Care-seeking in a Rural Community

*Papreen Nahar, Victor Gomes, Hasanur Rahman, G Nazrul Islam Faisal,
J Ross, P Pelto and Sandra L Laston*

Objective: The study aims at constructing a preliminary "matrix" showing people's preferences for specific health providers and resources in relation to some of the more salient reproductive illnesses among women in the rural population of Matlab.

Methods: Data for the study were collected using a "matrix" format after extensive lists of illnesses and providers had been gathered in a community in the "comparison area" along the Dhonagoda river, less than an hour upstream from Matlab Bazaar. In-depth interviews were also used for collecting data concerning the explanation of women's choices of health care providers. The data were gathered during November 1994-October 1995. The sample for the "structured matrix interviewing" included 43 women from the study village.

Results: The results of the "matrix analysis" demonstrate that a large share of health care-seeking is directed to the medicine shops, and the practitioners in a nearby rural bazaar, as well as Matlab Bazaar. The practitioners in those locations include MBBS (cosmopolitan) doctors, homeopaths, and others. Certain illnesses, notably *Meho*, are referred to local indigenous healers (*kobiraj*) specialized in their treatments.

Conclusion: The results from the "matrix analysis" indicate that health care initiatives of all types in the Matlab region should take into account the complex mix of the indigenous and cosmopolitan health resources that the rural people are using.

Role of Pharmacies in Providing Health Services to Urban Populations

Sangeeta Mookherji, Thomas Kane**, Shams El Arifeen and AH Baqui*

Objective: The study was undertaken to determine the role of pharmacies in providing family planning and selected health services.

Methods: A 1994 ICDDR,B survey of 6,000 households in one zone of Dhaka City indicated that 42% of current pill and condom users obtained their last supply from pharmacies, despite an extensive system of doorstep delivery of these contraceptives by field workers. In November 1994, one hundred forty-four of these users were systematically selected for a survey of use of pharmacies for family planning and MCH services. A cross-sectional survey of 83 randomly selected pharmacists from the same zone was also conducted to assess knowledge and reported practices.

Results: 83.3% of the pill users reported that their husbands regularly buy supplies for them. Only 40% of the pharmacists mentioned the three major contra-indications of pill use. Breastfeeding was not mentioned as a contra-indication. 69% of the pill users reported that they had obtained the first supply from the pharmacy. 37% of the pill users were unable to name any side-effects; 78% were unable to name any warning signs. 35.4% mothers of children aged less than 5 years said they always took their children to the pharmacy for treatment of diarrhoea; an additional 18.6% took their children to the pharmacy if the diarrhoea had become severe. 45.8% mothers said they always took their children to the pharmacy for cough or difficult breathing; an additional 20.8% took their children to the pharmacy if the problem had become severe. Knowledge of pharmacists does not coincide with the recommended management practices of diarrhoea and ARI episodes.

Conclusion: Pharmacies play a large role in the provision of services relating to family planning and children's health care among the urban population. Resource constraints faced by international donors, governments, and NGO service providers demand the consideration of pharmacies as an important and sustainable component in the urban service delivery system.

* *Johns Hopkins School of Hygiene and Public Health,
Department of International Health, USA*

***Johns Hopkins School of Hygiene and Public Health,*

Food Consumption Patterns among Infants of Less Than Nine Months in Matlab: An Emphasis on Vitamin A-rich Foods

Amy Rice*, J Chakraborty, A de Francisco, C Kjolhede* and R Stoltzfus*

Objective: The study attempts to assess the vitamin A intake from dietary and non-dietary sources among infants participating in a trial on vitamin A supplementation in non-pregnant lactating women.

Methods: 24-hour recall and food frequency interviews were conducted with the infants' mothers at 3, 6, and 9 months (± 1 week) postpartum. Food composition tables from Bangladesh were used for assigning the vitamin A content to specific food items. Two hundred twenty-two infants born in the Matlab MCH-FP intervention area during June-August 1994 were enrolled in the study and followed up (95% successfully) until May 1995. Food frequency interviews were used for generating lists of the foods eaten by infants. Quantitative measures of vitamin A intake in retinol equivalents per day (RE/day) were calculated from the 24-hour recall interviews.

Results: Only 2 of the infants were completely weaned at 9 months with 54%, 91%, and 94% reporting supplemental feeding on the day before interview at 3, 6, and 9 months. Before 6 months of age, a few infants (2% at 3, 33% at 6, and 85% at 9 months) ever consumed a vitamin A-rich food (>100 RE/100 g food). Eggs and green leafy vegetables were the vitamin A-rich foods most often given to infants with sweet pumpkin, ripe papaya and mango being fed much less frequently. Although the practice was not recommended, 13% of mothers gave their <6 month-old infants some type of locally purchased pharmacologic vitamin syrup containing vitamin A, with total reported doses as high as 300,000 IU retinol.

Conclusion: This study demonstrates that breastmilk (which contains ~ 45 RE/100 ml) is the major dietary source of vitamin A among infants in Matlab. Promoting interventions aimed at increasing the vitamin A content of breastmilk appears to be a promising strategy for improving the vitamin A status of very young infants.

*Johns Hopkins University, USA

Comparison of Enzyme Immunoassay with Indirect Immunofluorescence Method for the Detection of Respiratory Viruses

G Podder, Leanne E Unicomb, M Rahman and S Erny

Objective: The study was undertaken to compare an enzyme immunoassay (EIA) with an indirect immunofluorescence test (IFAT) for the detection of respiratory viruses in nasopharyngeal aspirates (NPA).

Methods: NPA were collected from 442 children aged less than 5 years, with acute lower respiratory tract infection (ALRI) at the Matlab Health and Research Centre from January to December 1994. Samples were initially processed and stored at -20°C at Matlab Microbiology Laboratory, and EIA and IFAT were performed for respiratory viruses at the Virology Laboratory in Dhaka.

Results: Viruses were found in 53.5% of the NPA samples, respiratory syncytial virus (RSV) being the most common (32%). Influenza A was found in 2% of the samples, influenza B in 2%, parainfluenza 1 in 0.5%, parainfluenza 2 in 9%, parainfluenza 3 in 4% and adenoviruses in 4% using a combination of the two methods. Results for RSV detection were compared, and EIA was found to be less sensitive. The two tests use different sample types, and lower sensitivity of EIA may be due to background reactivities from mucus in samples and the fact that the antisera used were raised to a group B strain compared to monoclonal antibodies used in IFAT. RSV strains prevalent in Bangladesh may have less antigenic homology to group B strains than RSVs found elsewhere.

Conclusion: RSV was the most prevalent virus associated with ALRI among children aged less than 5 years in rural Bangladesh. IFAT and EIA should both be used for optimal detection of this virus.

Spatial Autocorrelation Test Applied on Cause-specific Mortality Rates in Matlab: Ways to Validate Visual Impression from Maps

M Ali, A de Francisco and J Myaux

Objective: Spatial analysis of health-related data in research and service management areas requires appropriate and valid statistical tools. This paper explores a spatial autocorrelation test developed elsewhere to analyze geographical variation of regional aggregated data from the Matlab study area.

Methods: The demographic surveillance data for the period 1989-1992 were used, cumulating a population of 817,432 and 7,231 deaths. The rank adjacency D -statistic was used in summarizing spatial autocorrelation on cause-specific death rates at the village level. The mean and variance were derived for D , including general weighting for adjacent pairs (1 if the villages are adjacent, 0 otherwise). Given the approximate Normal Distribution of D , Z-score is calculated for testing significance. Geographic information system (GIS) was used for computing adjacent village matrices and to plot choropleth maps on mortality rates.

Results: In the Matlab study area, 362 adjacent regional pairs were computed in 142 villages. The mean and variance of the D -distribution were 47.67 and 2.96 respectively. A strong regional pattern was observed for deaths caused by all types of diarrhoea, acute respiratory infections (ARI) and malnutrition ($p < 0.0001$), but not for organic diseases or accidental deaths. By considering the 70 villages of the health intervention area only, D becomes 23.68 (variance: 1.53). A significant pattern was observed only for the death caused by ARI ($p < 0.001$).

Conclusion: Cartographic representation of health-related data at the village levels allows a quick and general view of the health situation. This study demonstrates that in case of apparent clustering of health events, this type of statistics will give to the reader an objective measure to confirm or invalidate the visual impression.

**MCH-FP Intervention and Familial Susceptibility to Death
in Matlab, Bangladesh**

Nurul Alam

Objective: This study examines whether the association of mortality of two adjacent siblings diminished as the siblings grew older, and whether MCH-FP intervention was associated with siblings' mortality risks.

Methods: The 1977-78 and the 1988-90 birth cohorts from the Matlab MCH-FP and the comparison areas were followed to ascertain their survival status. Mortality of index births in the neonatal, post-neonatal and toddler (12-35 months) periods was examined by age at death of preceding sibling and MCH-FP programme status controlling for preceding birth interval, maternal age and education, birth order and sex of the index child.

Results: Association of two adjacent siblings' mortality risks was significant (odds ratio was 1.6 in the 1977-78 birth cohort and 1.8 in the 1988-90 birth cohort) in the neonatal period only. Siblings' neonatal mortality risks were not lower in the MCH-FP area though the overall mortality level was lower in this area than in the comparison area. Preceding birth intervals of less than 18 months were associated with higher mortality, particularly in the post-neonatal and toddler groups if the older sibling had survived infancy in the latter cohort. Toddler mortality was higher among girls than boys, and among children of mothers with no education than their peers in both cohorts. Higher order births in the treatment area were at a "selective" high mortality risk.

Conclusion: Siblings' mortality risks were higher in the neonatal period only and were neither affected by MCH-FP services nor by recent fertility and mortality declines. Mothers whose children died as neonates may be identified for future medical interventions.

A Preventive Programme Against Drowning Could Lead to Further Reduction in Mortality of Young Children in Rural Bangladesh

A Iqbal, J Chakraborty, M Ali, M Hossain and J Myaux

Objective: The paper reviews the contribution of accidental drowning to mortality of 1 to 4-year old children during the last decade.

Methods: From the demographic surveillance system of Matlab between 1984 and 1994, cases of death caused by drowning were examined and compared to the overall mortality rate over time. The geographic information system (GIS) was used for locating the cases retrospectively in both sides of the embankment to look at the possible effect of the flood control programme since 1989.

Results: Between 1984 and 1994, the overall death rate among 1 to 4-year old children dropped from 32 per thousand to 6 per thousand. Among all causes of death, drowning represented 17% of the cases (547/3,316). 73% of the drowning cases occurred in 1 to 4-year old children; 5% in infants, and 24% in older children and adults. The contribution of drowning to overall causes of death rose progressively from 7.5% in 1984 to 22.2% in 1994 (X^2 for trend=63, $p<0.001$). During the four-year period following completion of the flood control programme, although death rates were similar in both sides of the embankment, specific mortality rate by drowning was significantly higher outside, 2.0‰ vs 1.4‰ ($p<0.05$). Similarly, the incidence of drowning is significantly higher during the summer flood season with 69% of the cases occurring between April and September.

Conclusion: In the context of rapid decrease in child mortality over the past decade, this study highlights the importance of accidental drowning as an emerging priority in Matlab. Further investigations are needed to assess the mechanisms and risk factors and to develop specific interventions based on parents' education.

Malaria Management Practices and Community Response to Malaria Control Measures in Chakoria

Moazzem Hossain, Abbas Bhuiya and Peter Eppler

Objective: The work was undertaken to study the nature of malaria management practices and to assess the extent of community participation in the Insecticide-treated Bed Net (ITBN) programme.

Methods: The study was carried out in three villages of Chakoria under Cox's Bazaar district during the second half of 1995. A cross-sectional survey was undertaken to assess the practices, and focus group discussions (FGDs) were carried out to ascertain the reasons for non-participation in the ITBN programme. All household heads in the survey, males in public gathering, females in clusters for FGDs, and village doctors were also interviewed. The main outcome measures were the recent history of self-reported malaria, home remedies, contact with the local health care providers, compliance with the prescriptions, practice of the local health care providers, and participation in the ITBN programme.

Results: 15% of the people suffered from an attack of malaria within the last two months preceding the survey. 90% of the sufferers visited doctors, and more than half delayed at least three days before consulting a local health care provider. Only 50% of the patients completed the total duration of recommended treatment. About 20% of the patients were treated with Quinine injection and one-fifth of them had infusion. Almost all the village doctors could say the names of the antimalarial drugs correctly. However, they did not prescribe recommended modern therapy. About half of the households participated in the Insecticide-treated Bed Net programme of GOB, and the participation was more in the hilly areas. The major reason for non-participation was wrong beliefs about the programme.

Conclusion: Local health care providers need to be updated regarding modern treatment of malaria, and the community be made aware of the effect of non-compliance of any treatments. Rumors and misinformation are great barriers to success in the community programmes.

Compliance With Treatment for Reproductive Tract Infections (RTIs) in Rural Bangladesh

S Begum, S Hawkes, J Chakraborty and A de Francisco

Objective: The study evaluates the compliance with treatment for RTIs in males and females.

Methods: Women with RTIs diagnosed clinically at the sub-centre were given treatment for themselves and their partners. CHWs follow up women at home within one month of diagnosis and applied a questionnaire enquiring on treatment compliance and their reasons. This was analyzed with information on the diagnosis and treatments given.

Results: In total 4,267 women with RTIs were followed up at a mean (SD) of 30.52 (23.08) days after initiating treatment mainly for trichomonas (60%), candida (34%), and others. Treatment given included metronidazole (60%), Gyno-Peveryl/Micostatyn vaginal tablets (34%), and others. In total 92% of the women completed the treatment course, 6% were absent on follow up. Only 2% did not complete, from which 36% reported fear of using vaginal medicine, 13% did not believe in the treatment, 11% did not use due to husbands' opposition, 6% forgot to take the full course and mentioned other causes. At the sub-centre, 60% husbands were given treatment, and 36% were not. A total of 79% husbands completed treatment, 18% did not and 2% only partially. Of those who did not take treatment, 24% reported that they were living far away, 21% disliked taking medicines, 20% reported RTIs as women's problems, and only women should be treated, 6% reported fear to take all tablets at a time, and 5% reported that they were not feeling good, and the rest gave other various responses. Of those receiving only partial treatment, 23% reported fear to take all tablets at a time, 16% believed RTIs are women's problems, 12% reported having side-effects, and the rest had other minor complaints.

Conclusion: Rate of women's compliance with treatment is high in the study population, but husbands' compliance is poor in contrast. Educational message for couple treatment for RTIs has to be part of an RTI control programme.

**Trends, Determinants, and Causes of Death of
Elderly People in Matlab, Bangladesh**

Golam Mostafa and Mizanur Rahman

Objective: The study examines the trends, determinants, and causes of death of old people (60 years or over).

Methods: Data of the Demographic Surveillance System (DSS) of Matlab are used for analyzing mortality of elderly people (60 years and over) during 1983-1992. Proportional Hazards models are used for examining the determinants of mortality of over 10,000 elderly persons in a period of ten years.

Results: Old-age (60 years and over) mortality rate is high in Matlab, about 1.5 times that of Sri Lanka and about 2.0 times that of Swedish elderly in a comparable period. Our analysis, based on a standardization approach, indicates that elderly females are relatively disadvantageous than males in Matlab, Bangladesh. We do not find any definite trends in decline of old-age mortality during the study period. Causes of three out of ten deaths were either unknown or remained unclassified. The cause of slightly more than one-third of deaths was classified as "senility." Among the rest, diarrhoea or gastroenteritis (12%), cardiovascular diseases (10%), respiratory diseases (8%), tuberculosis (2%), and malignant neoplasms (2%) were the primary causes of death. Senility was higher among females than males but other causes were higher among males than females.

Conclusion: Poor socioeconomic conditions, illiteracy, large size of the family, and widowhood are risk factors of mortality. Non-Muslims or those from households headed by other persons are at higher risk of mortality. Findings can help develop public health policies for the improvement of health of elderly people of Bangladesh and similar settings.

Determinants of the Use of Services of the Health and Family Welfare Centres in Bangladesh

Md. Mafizur Rahman, Barkat-e-Khuda, ABM Khorshed Alam Mozumder, Afzal Hossain and Md. Shahidul Alam

Objective: Health and Family Welfare Centres (HFWCs) are the major providers of maternal and child health services in the rural areas of Bangladesh. One HFWC is located in each union, and serves approximately 25,000 people. The services of these centres remain under-used. This study examines the association of use of services of these centres with various socioeconomic, cultural, and demographic factors.

Methods: Data for this study were drawn from a cross-sectional survey conducted in 1993. The sample comprised 11,803 currently married women of reproductive age.

Results: Data show that the use of services of the HFWCs is poor. Only one-half of the women reported to have ever visited HFWCs. Among them, for more than half of the cases, the visit took place before the previous 6 months. Regarding reasons for not visiting HFWCs, 61% women stated that they did not require the services, while 13% mentioned unavailability of medicine at HFWC. The results of logistic regression show that the older and high-parity women are more likely to visit HFWCs. Women who work for family income have higher probability of visiting HFWCs than those who are housewives. Size of landholdings and husbands' education have negative association with visit to HFWCs. The women currently using contraceptives as well as the Muslim women are more likely to visit HFWCs.

Conclusion: The results suggest the need for undertaking Information, Education and Communication (IEC) activities to educate the rural women about the availability of services at the HFWCs. Female employment for income should be promoted. Necessary measures should also be taken to ensure availability of drugs as well as quality of services provided from HFWCs.

**Maternal Health Care Practices in Rural Bangladesh:
Some Policy Implications**

*Md. Mafizur Rahman, Barkat-e-Khuda,
ABM Khorshed Alam Mozumder and Md. Shahidul Alam*

Objective: This study investigates the maternal health care practices and their policy implications in rural areas of Bangladesh.

Methods: The observations are based on data collected in a cross-sectional survey conducted in 6 rural thanas in 1993. The sample size comprised 11,803 currently married women of reproductive age.

Results: Data show that 41% of the women did not seek antenatal care during their last pregnancies. Among those who did, 14% consulted qualified professionals, such as doctors, nurses, and FWVs. Three-fourths of the delivery cases took place at homes; only 1% of the delivery cases was conducted at hospitals and family welfare centres. Most deliveries (87%) were conducted by untrained traditional birth attendants (*dais*) and relatives. More than one-third of the women suffered from some types of delivery-related complications. The major reported complications included prolonged labor (71%), haemorrhage (18%), retained placenta (15%), eclampsia (7%), and laceration/tear (6%). For treatment of these complications, the majority of them (55%) went to quacks or homeopathic practitioners.

Conclusion: The findings of this study suggest the need for measures to be undertaken to increase the use of health care facilities, such as thana health complexes, family welfare centres, and satellite clinics. Emphasis should be given on Information, Education and Communication (IEC) activities to educate the community on the need for regular antenatal checkup and safe delivery by health personnel. To ensure better use of the trained TBAs, their activities should be linked with the health and family planning service delivery system at different levels.

Demographic Determinants of Malnutrition in Children

*ABM Khorshed Alam Mozumder, Shameem Ahmed,
Barkat-e-Khuda and Ann Levin*

Objective: The study investigates the independent effect of birth interval on malnutrition of children, aged 6-36 months.

Methods: The data for this study are drawn from a post-flood survey conducted during October-December 1988. The survey collected data on weight of 1,887 children aged 6-36 months. The weight-for-age is calculated as a ratio of the child weight to an age-sex adjusted standard (NCHS). Cross tabulation and logistic regression procedures have been applied to analyze the data. The proportion of children whose weight-for-age were below 60% has been tabulated against different categories of previous and subsequent birth interval. The odds of being moderately or severely malnourished are computed for different lengths of birth interval, controlling for number of older and younger siblings, maternal education, age, and housing area.

Results: Proportion of children who were under 60% weight-for-age decreases with an increase in subsequent birth interval, maternal education, and housing space. The proportion increases with the number of older surviving children. Children are at higher risk of malnourishment if they are female, and if their mothers are less educated, if they have several siblings and if their siblings are born within 24 months. They are moderately malnourished (weight-for-age <70%), if they have any surviving sibling, if their mothers are less educated, if they come from poor family and if their siblings are born within short birth interval.

Conclusion: Spacing between two births plays an important role in determining the health of children. Nutritional status of children can be improved by increasing the birth interval.

Health Problems and Care-seeking Behaviour During Pregnancy and Childbirth in Matlab

T Sharmin, S Islam, F Ahmed, E Haque, Sandra L Laston and KMA Aziz

Objective: The work was undertaken to provide a description of the health problems and care-seeking patterns among rural women during pregnancy, delivery and the postpartum period.

Methods: This longitudinal study enlisted all pregnant women (n=70) in 6 villages selected from the comparison area of Matlab. The women were interviewed once during the antenatal period and twice after delivery, and their husbands were interviewed once. The study was conducted from November 1994 through September 1995.

Results: One woman was taken to the hospital where a Caesarean-section was performed with the outcome of a stillbirth. Other women in the study were delivered almost exclusively by untrained *dais* or a relative in the village (>94%). Reported practices by *dais* that could be detrimental to health of the women and infant included cutting the umbilical cord with a bamboo sliver, application of clay on the umbilical cord, swallowing kerosene to induce gagging for expulsion of the placenta, and the *dai* placing her foot on the woman's perineum to prevent tears. Twenty percent of the husbands were working outside the area during the study period. Women felt that decisions regarding their problems and health care-seeking were not in their control. Traditional healers were the first line of resort, followed by private homeopath and allopathic pharmacies. Most women felt it was best to deliver in the home unless there was a serious delivery problem like prolonged labor.

Conclusion: This study demonstrated the lack of quality services in the villages for health care to pregnant women. There was strong reluctance to use hospital services due to financial constraints and shame. Informing women of the type and quality of delivery services available may encourage increased use of services in obstetric complications.

**The Use of Family Planning Methods and
Reasons for Method Discontinuation in Urban Dhaka:
A Baseline Survey**

*AH Baqui, Riti Ibrahim Ahsan, Rafiqul Islam, Nazma Begum,
Sufia Nurani and Shams El Arifeen*

Objective: The objectives of the study are to: (a) determine the sociodemographic differentials in contraceptive prevalence rates (CPR) and method-mix in urban Dhaka, (b) identify reasons for contraceptive discontinuation, and (c) make recommendations for improvements in CPR and continuation rate.

Methods: A household survey of currently married women of reproductive age (MWRA) was conducted during September-December 1994 in Zone 3 of Dhaka City through observations and assessment of the quality of services provided by field workers (FWs) and clinic paramedics. The participants included 5,399 MWRA, 114 field worker-client interactions, and 68 paramedic-client interactions. Data on CPR, contraceptive method-mix, and method discontinuation rates were collected.

Results: 79% of the women reported having ever used a method of contraception and 70% reported having ever used a modern method at some point in their lives. The CPR was 54%. However, ever-use rate was 10% lower and CPR was 12% lower in the slum population than in the non-slum population. About a third of the ever-users is not currently using a method; the drop-out was particularly high in the slum population (38%). Among the past users, about half experienced a side-effect and about a third discontinued due to side-effects. Most of the reported side-effects are minor. Counselling about side-effects and warning signs by FWs were inadequate. Similarly, the screening and counselling about contraceptive side-effects in the clinics were inadequate.

Conclusion: The CPR is lower and discontinuation rate is higher in the slum population indicating the need for special strategies for this population. The high contraceptive discontinuation rate due to side-effects underscores the need to improve the quality of FW and clinic services.

Early Neonatal Weight Change and Implications for Assessing the Incidence of Low Birth Weight in the Community

Shams El Arifeen and Gretchen Antelman

Objective: The study examines the distribution of weights of newborns by age at measurement (0-13 days after birth) and to assess whether these are valid measures of birth weights.

Methods: Three data sets collected from a sample of the slum population in five thanas of Dhaka City during 1993-1994 were used for this analysis. These data sets include the following:

- (i) Cross-sectional weight measurements of 1,495 newborns were taken on different days after birth.
- (ii) Repeated daily measurements of weight of 39 newborns till 14 days after birth were examined for changes in weight after birth. Regression equations were developed to estimate the 24-hour birth weight from weights measured later.
- (iii) Data from 111 newborns measured 1, 3, 7, and 14 days after birth. The equations developed in (ii) above were validated using this data.

Results: (i) The distribution of weights was fairly stable in the first 6 days of life (n=1495). Most changes were observed in the top-third of the distribution but was less than 100 g (mean weight); (ii) Though the change in mean weight after birth was minimal in the first 6 days of life (n=39), the percentage classified as low birth weight (<2,500 g) was 30% and 29% with weights on 6 and 7 days after birth, compared to 44-45% with weights in the first 3 days; (iii) The sensitivity and specificity of the 7-day weight for categorizing newborns into low and normal birth weight were 62 and 98% (gold standard: measured 24-hour weight, n=111). This changed to 78% and 94% when the 7-day weights were adjusted using the regression equations.

Conclusion: In this population weights taken in the first 3 days after birth give valid measures of birth weight. Equations can be used for improving the validity of later measurements.

Measles Vaccine Failures Not Associated with Vitamin A Supplementation Given Around Vaccination Time

A de Francisco and F Ahmed

Objective: The study evaluates the possible association of measles vaccine failures with vitamin A supplementation during the period close to vaccination in Matlab.

Methods: The vitamin A supplementation team provides 100,000 IU retinol capsules to all children after the age of six months. A separate vaccination team applies Schwarz vaccine at nine months of age to all children. This strategy enabled comparison of children supplemented during the period close to vaccination (Group A, i.e. 4 weeks prior to or 2 weeks post-vaccination, when high vitamin A levels are expected following previous supplementation, and within the incubation period of the live attenuated vaccine respectively) with Group B, those who received supplementation following periods outside that specified for Group A (i.e. greater than 4 weeks pre- and 2 weeks post-vaccination). Vaccine failure rates (i.e. cases of rash compatible with measles and either coryza, conjunctivitis or cough reported more than 14 days after vaccination occurring in children vaccinated at 9-15 months of age) were compared between the groups. Further analysis was conducted by matching each child in Group A with 4 children in Group B on vaccination age and duration of follow-up.

Results: Group A was constituted by 193 children and Group B by 3,721 children. Vaccine failures occurred in 68 children (1.7%). Children of Group A demonstrated a vaccine failure rate of 4.95 per 1,000 children months at risk (3/606), while those of Group B had an incidence of 6.06 per 1,000 children months at risk (65/10,729) ($p>0.1$). Neither of the 2 categories of children supplemented and vaccinated simultaneously had measles in 36 months of follow-up. Further, the matched analysis indicated no difference in vaccine failure rates.

Conclusion: Vitamin A supplementation during the period close to measles vaccination appears not to be associated with increased vaccine failures.

**BRAC's Development Inputs
At Matlab, Bangladesh**

Shekhar Ghosh and AKM Masud Rana

Objective: This paper describes the different development interventions operating at Matlab since early 1992.

Methods: BRAC started its Rural Development Programme in Matlab during March 1992. It is an integrated, multisectoral initiative involving institution building, functional education, savings and credit operations, training in income and employment generation activities, and non-formal primary education. At present, the Area Office has an Area Manager, an Accountant, 5 Programme Organizers, 19 Programme Assistants, and a Cook.

Results: Till September 1995, one hundred and twenty-two Village Organizations (VOs) with 4,929 members in 122 villages have been formed. There are 70 NFPE and 29 KK schools with 2,637 students and 90 teachers in Matlab. Loan disbursement started in December 1992, and an amount of taka 73,70,500 has been disbursed to 2,533 loanees. The loans are being used for various income-generating projects, like poultry rearing, cow and goat fattening, buying rickshaws and nets, running rural shops and restaurants, etc. There are 26 chick-rearing units, 3 poultry hatcheries, 4 fish nurseries among others. So far 50 poultry workers, 1,164 key rearers, 10 para-vets, and 40 Shasthya Sebikas have been trained from among the VO members to help them develop income-earning capacity.

Conclusion: Currently, different RDP interventions, in their 4th year of operation, are going on.

An Inside Look into Two BRAC Schools in Matlab, Bangladesh

Sabina Rashid and Mushtaque Chowdhury

Objective: This paper presents the dynamics of the initial set-up of schools that offer non-formal primary education (NFPE) and the intervening factors which may affect the operation of such schools.

Methods: This is a case study of two BRAC schools A and B, in a village of Matlab, Bangladesh, conducted during the first quarter of 1994. Information was collected by key-informant interview with parents, teachers, and POs; direct observations of class-room sessions; collecting historical data about the school set-up; relevant review of literature. However, it is the study of a single village and is not representative of all BRAC schools.

Results: The two schools were set up during the same period. Due to inadequate resources and shortage of staff, a local girl helped PO to recruit students of both the schools. Ultimately, she was not hired which created a conflict in the village and resulted in high dropouts from school B. Other factors affecting school B more than school A were: lack of parental involvement and motivation of the teachers, frequent transfer of the PO hampering rapport building and teaching style. Repetition of lessons for the newcomers caused school B always to lag behind school A. A common factor which affected both the schools was a rumour purposively spread by the religious leaders that BRAC wanted to convert the students into Christianity.

Conclusion: Rural life has its own life style and social organization that leans more toward conservatism. Entering a local community with a development programme is a delicate task. We need to have people's participation in this task. Increasing the staff, effective coordination between field and office, intensive field supervision, better rapport building with the parents and the community, motivation of the teachers and appropriate incentives for them may improve the situation.

**Use of Antenatal Care Services
in a Rural Bangladesh Community**

*Kh. Zahid Hasan, KMA Aziz, AK Siddique, E Roy,
MN Rahman, M Ali, F Haque and RB Sack*

Objective: The study was undertaken to identify and follow up the pregnant women in rural Bangladesh and to assess the use of antenatal care services following educational and motivational inputs.

Methods: To study a cohort of newborn children for respiratory and diarrhoeal diseases, a census was conducted in 10 villages of Mirzapur in the Tangail district. Over 2,475 prospective mothers were listed during 1993. Pregnant women were identified and followed up by female community health workers. Arrangements were made to provide antenatal care by using a 500-bed hospital located at the thana headquarters. Several group meetings with expectant mothers, pregnant women, and traditional birth attendants were held in different locations in the villages. Women were encouraged to have antenatal checkups, and all women were given health cards which allowed them easy access to the hospital for antenatal checkups and hospital deliveries.

Results: About 13% of the women (312) were pregnant between October 1993 and September 1994 ; 33% and 20% of the women of 15-19 years and 20-24 years age groups were pregnant during the study period. About 15% of the pregnancies were wasted (abortion/still-birth) in the 15-19 and 30-34 years age groups. Thirty-seven percent of the pregnant women never visited the hospital for antenatal care. Only three women visited the hospital during the first trimester of their pregnancy. The women were not aware of the common pregnancy-related ailments, such as anaemia and signs of toxemia. When questioned about their awareness on common pregnancy-associated ailments, 16% of the women knew about anaemia, 11% knew about hypertension, only 3% knew about oedema and none about toxemia. Seventy-eight percent of the women had some knowledge about tetanus toxoid and had been immunized. Most women (60%) had to perform heavy household activities during pregnancy which included husking rice and fetching water from the source to the household. Women residing at a great distance from the hospital had less compliance with antenatal checkups.

Conclusion: Lack of knowledge of common ailments relating to pregnancy and distance from hospital were reported to be the main reasons for poor compliance. These data have policy implications with reference to the use of improved antenatal care services that are available in centralized facilities.

Family Size Preferences among the Matlab Couples

Shahriar Reza Khan, Mushtaque Chowdhury and Abbas Bhuiya

Objective: This study is designed to explore similarities and differences between husbands' and wives' responses to family size formation and preferences before BRAC's intervention.

Methods: We used data on 5,453 couples from the BRAC-ICDDR,B Joint Research Baseline Survey conducted in 1992. The baseline survey was administered in 60 villages of Matlab, and the respondents were currently married women aged between 15 years and 49 years, and their husbands. Both bivariate and multivariate analyses were applied.

Results: Keeping in mind the BRAC's intervention interest, we have analyzed the data by BRAC eligibility criterion and found that BRAC's non-eligible sample had reported slightly higher desired and actual family size than did BRAC-eligible sample. The study has also found significant difference in family size preferences between husband and wife for both BRAC samples. The multivariate analysis revealed that among a set of selected socioeconomic and background variables, age difference between husband and wife, multiple marriages, education, religion and geographic location, such as MCH-FP vs. Comparison and BRAC village vs. non-BRAC village, demonstrated a significant variation in family size preferences for both samples.

Conclusion: The analysis has shown that both husbands and wives report around two children to be an ideal family size which may have proved to be an optimum family size already comprehended by rural couples. However, in reality, the actual and preferred family size is always significantly higher irrespective of their social and economic status. This poses challenges to researchers to determining why the desired level of fertility is higher than the reported ideal family size. This paper does not adequately address this issue since it is beyond the scope of the present investigation.

Capacity Development and the Dynamics of Village Organizations

Sharmin Mahbub, Manzurul Mannan and AKM Masud Rana

Objective: This study intends to explore the role of capacity development of beneficiaries in measuring the growth of village organizations by examining the nature and extent of transaction between BRAC and its beneficiaries.

Methods: This is an exploratory study conducted in three village organizations (VO) in Uddamdi village of Matlab, during the latter half of 1995. Information was collected by using both qualitative and quantitative methods. Key informants, members of the VO management committee, present members (including members who received various capacity development training and members who did not get any training), members who dropped out and RDP Area Office staff were interviewed.

Results: Group members who were provided with various inputs for capacity development, such as training, credit and employment opportunities, are better off socially and economically than those who did not get this opportunity. Marital status, age, and education were important factors in describing the condition of trained members. In general, effective skill development has a positive impact on group members' lives. Therefore, it can be said that endurance of VOs can be achieved from various tools of capacity development.

Conclusion: The study shows that members perceive VO as a mechanism of receiving services and inputs from BRAC and of creating pressure on BRAC staff to provide them with these inputs. However, VO members and BRAC staff pursue for increased interdependency to protect the interest of VOs from external pressures and incursions. Skill development training is only one among many factors for the growth of a viable grassroots organization.

Beneficial Effects of EPI on Nutrition of Children: Experiences from Rural Matlab

Syed Masud Ahmed, Abbas Bhuiya and Mushtaque Chowdhury

Objective: This study was done to explore the effect of EPI immunization on nutritional status of children aged less than 5 years in a rural area of Bangladesh.

Methods: These data formed a sub-sample of a baseline survey conducted in DSS villages of Matlab thana in 1992. MUAC, height, and weight of 992 children between the age of one and five years were measured using standard techniques, and socioeconomic information was collected from their mothers using a set of pretested structured questionnaire. The level "-2 Z-score" was taken as the cut-off point for "stunting", and the value of less than 125 mm MUAC as "severely malnourished" children.

Results: Both bivariate and multivariate analyses revealed significant role of immunization in affecting the MUAC of children from poorer households. However, completely immunized children from well-off households had significantly better anthropometric indices than their counterparts. Mothers' education and number of dwellings in the household were important factors for height/age of poorer children. It appeared that immunization is only one link in a chain of many biosocial factors that influence nutrition of children in the developing countries.

Conclusion: EPI immunization has made some beneficial, if only marginal, impact on the acute nutritional status of the poor children.

Index to Authors and Subjects

- Acidosis 48
Aeromonas 50
 Aged 60
 Ahmed F 20, 64, 67
 Ahmed M 17, 5
 Ahmed S 5, 17, 63
 Ahmed SM 41, 73
 Ahsan RI 4, 65
 Akhter P 5, 17
 Akramuzzaman SM 36
 Alam AN 46
 Alam MJ 49, 50
 Alam MS 61, 62
 Alam N 56
 Albert MJ 34, 45, 49, 50
 Ali M 11, 55, 57, 70
 Al-Mahmud KA 47
 Amdimocillin pivoxil 35
 Amin S 22
 Antelman G 44, 66
 Antenatal care 18, 70
 Anthropology, Cultural 42
 Anthropometry 39, 63
 Autocorrelation test 55
 Azad AK 46
 Aziz KMA 8, 9, 13, 64, 70
- Bairagi R 12
 Baqui AH 23, 26, 44, 52, 65
 Barkat-e-Khuda 7, 17, 61, 62, 63
 Bashir I 21
 Bateman OM 10
 Begum A 22, 24, 26
 Begum N 65
 Begum S 26, 59
 Behrens R 36
 Bennish ML 33, 34, 35
 Bhuiya A 14, 15, 16, 27, 28, 29, 31, 40, 41, 42, 58, 71, 73
 Bicarbonate 48
 Birth intervals 63
 Birth weights 66
 Brahman S 10
 Bremmer M 19
 Busch W 33
- Caloric intake 8, 53
 Capacity building 72
 Carotene 8, 9
 Cause of death 60
 Cefixime 35
 Chakraborty J 3, 11, 20, 37, 38, 53, 57, 59
 Child development 29
 Child growth 39
 Child health 8, 11
 Child mortality 43, 57
 Child nutrition 8, 73
 Child nutrition disorders 39
 Child nutritional status 63, 73
 Child survival 13, 28
 Child welfare 12
 Cholera 33, 34
 Cholera toxin 34
 Chowdhury AI 8, 9, 13
 Chowdhury AKA 48
 Chowdhury M 27, 28, 29, 31, 40, 41, 42, 69, 71, 73
 Ciprofloxacin 33
 Community health centres 3, 14, 16, 22
 Community health services 14, 15, 16
 Community participation 14, 15, 16, 58, 69
 Contraception behaviour 6
 Contraceptive methods 6, 23
 Contraceptive prevalence 65
 Contraceptive usage 6, 7, 20, 65
 Cost-benefit analysis 23, 24
 Costs and cost analysis 23, 24
 Credits
 see Loans
 Cryptosporidiosis 47
Cryptosporidium 47
- Das SC 18
 Datta A 12
 DaVanzo J 43
- de Francisco A 3, 11, 13, 20, 37, 38, 53, 55, 67
 Delivery 19, 64
 Delivery of health care 17, 21, 24, 26, 41, 62
 Demographic factors 23
 Desmet M 21
 Dhar U 33, 34
 Diagnosis, Laboratory 34
 Diarrhoea 10, 48
 Diarrhoea, Acute 36
 Diarrhoea, Infantile 36, 45, 46
 Diarrhoea, Persistent 46
 Diarrhoea, Veterinary 47
 Diet 9, 39
 Disease 1, 42
 Disease outbreaks 47
 Disease reservoirs 49, 50
 Disease transmission 49, 50
 Divorce 31
 Doxycycline 33
 Drowning 57
 Duckweeds 49, 50
 Durandin F 10
 Dysentery, Bacillary 35
- Economic assistance 68
 Education 12
 Education, Non-formal 69
 Ekramullah M 49, 50
 El Arifeen S 22, 44, 52, 65, 66
 Emergency care 19
 Emergency nursing 17, 18
 Enzyme immunoassays 54
 Eppler P 15, 16, 58
 Erny S 54
- Faisal GNI 51
 Family planning 4, 5, 20, 22, 24, 52, 56, 65
 Family planning programme 5, 20
 Family size 12, 71
 Faruque ASG 45
 Fee-based services 23

- Fertility 28, 71
 Fertility decline 12
 Field workers 18, 26
 Flood control 11
 Foetal growth retardation 44
 Follow-up studies 28, 70
 Fuchs GJ 39, 45
- Gentsch JR 45
 Geographic information system 55
 Ghosh S 68
 Glass RI 45
 Gomes V 51
 Grameen Bank 43
- Hafiz T 1
 Haider R 36
 Haque E 64
 Haque F 70
 Haque I 17
 Hasan GM 32
 Hasan KZ 49, 50, 70
 Hawkes S 3, 59
 Health behaviour 2, 10
 Health care facilities 14, 16, 23, 61, 62
 Health care-seeking behaviour 2, 17, 38, 51, 64
 Health planning 15, 16
 Health problems 64
 Health services 3, 14, 15, 16, 21, 25, 42, 52, 61, 70
 Health status 11
 Hossain A 61
 Hossain M 15, 16, 57, 58
 Hossain MB 7
 Huda S 30
 Human welfare 27
 Husain S 32
 Hussain A 6
 Hussain M 5
 Hygiene 10
- Illness behaviour 1, 41
 Impact studies 27, 28, 29, 30, 43
 Immunity 45
 Immunization 73
- Immunofluorescence technique 54
 Infant feeding practices 8, 9, 53
 Infant foods 53
 Infants, Low birth weight 44, 66
 Infant mortality 45, 46, 56, 57
 Infant nutrition 53, 67, 73
 Infant nutrition disorders 63
 Infant nutritional status 73
 Information, education and communication 62
 Interventions 10, 11, 15, 18, 30, 41, 42, 56, 68, 69
 Intestinal absorption 48
 Intestinal permeability 36
 Iqbal A 57
 Islam AWMS 47
 Islam KMN 47
 Islam MA 39
 Isalm R 46, 65
 Islam MS 49, 50
 Islam Q 15
 Islam S 48, 64
- Jahan RA 10
 Jahan SA 4, 25
 Jasim Uddin 18
 Juncker T 18
- Kane T 22, 23, 26, 52
 KAP 2, 5, 62, 71
 Khaled MA 39
 Khan EH 33, 34
 Khan MA 5, 6, 13
 Khan MI 42
 Khan SR 28, 30, 71
 Khan WA 33, 34, 35
 Khanum P 18
 Khatun M 40
 Kilgore PE 45
 Kjolhede C 53
- Laston SL 1, 10, 51, 64
 Levin A 24, 63
 Literacy 29
- Living arrangements 32
 Loans 68
 Longitudinal studies 64
 Low-income population 21, 25, 44
- McDonald S 39
 Mahalanabis D 36, 39, 48
 Mahub S 72
 Mahmud S 30
 Malaria 58
 Male contraception 4
 Mannan M 72
 Maternal-child health services 22, 24, 26, 27, 56, 61
 Maternal health services 17, 18, 62
 Measles 67
 Measles vaccine 67
 Menstrual regulation 20
 Metronidazole 59
 Micostatyn 59
 Microbial sensitivity tests 34
 Milk, Human 53
 Mirza T 5, 6
 Mitra D 17
 Momen M 31
 Mondal MMH 47
 Mookherji S 22, 52
 Morbidity 41, 45
 Mortality 28, 55, 60
 Mortality, Neonatal see Neonatal mortality
 Mostafa G 60
 Mozumder ABMKA 61, 62, 63
 Muna L 1, 2
 Myaux J 11, 21, 55, 57
- Nahar K 1, 2
 Nahar P 1, 2, 51
 Nasreen S 4
 Nath S 29
 Neogi MH 15
 Natural disasters 11
 Neonatal mortality 13
 Nurani S 65
 Nutrition education 8, 9

- Obstetric care 17, 18,
19, 64, 70
- Oral rehydration solutions 48
- Pelto P 1, 2, 51
- Performance appraisal 20,
26
- Perry H 22, 26
- Pharmacy 52
- Phillips JF 7
- Podder G 54
- Poverty 44
- Pregnancy 19, 64, 70
- Primary health care 25
- Prospective studies 38
- Quaiyum A 26
- Quality of health care 22, 26
- Quality of life 32, 40
- Quayyum Z 24
- Quinine 58
- Rahim Z 50
- Rahman ASMH 47, 48
- Rahman H 51
- Rahman M 6, 43, 54, 60
- Rahman MM 39, 61, 62
- Rahman MN 70
- Rana AKMM 68, 72
- Randomized controlled
trials 33, 35, 39
- Rashid S 69
- Razzaque A 12
- Reinfections 37
- Religious aspects 13
- Reproductive behaviour 7
- Reproductive health 1,
2, 3, 6, 51, 59
- Reproductive tract
infections 1, 2, 3, 5,
54, 59
- Respiratory tract
infections 37, 38
- Rice A 53
- Risk factors 37, 44, 60
- Ronan A 33
- Ross J 1, 2, 51
- Rotavirus 45
- Routh S 23
- Rowshan R 21
- Roy E 70
- Roy N 17
- Roy SK 36
- Sack RB 8, 9, 49, 50, 70
- Safe motherhood
programme 19
- Salam MA 33, 34, 35, 46
- Sanitation 10
- Sarker SA 48
- School enrollment 29
- Seas C 33, 34, 35
- Self-help organizations 14,
15, 16
- Sexually transmitted
diseases 3
- Shafiullah KM 47
- Shahid NS 49, 50
- Sharmin T 64
- Shigella* 35
- Sick role 1, 41
- Siddique AK 70
- Skills development 72
- Socioeconomic development
27, 28, 30, 31, 40, 41, 68
- Socioeconomic factors 12,
23, 27, 28, 31, 60, 61
- Socioeconomic status 12, 13,
27, 28, 30
- Sohel N 21
- Spatial autocorrelation test
55
- Standard of living 32
- Stoltzfus R 53
- Sutradhar SC 43
- Tachypnoea 37
- Thwin AA 4, 23, 24, 25
- Tomkins AM 36
- Urban health 25, 26
- Unicomb LE 45, 54
- Vaccination 45
- Vanneste A 19
- Vaginal abnormalities 2, 5
- van den Broek 19
- Vegetables 8, 9
- Vibrio cholerae* 33, 34
- Village organizations 16,
42, 72
- Vitamin A 36, 53
- Vitamin A supplementation
53, 67
- Wahed MA 48, 36
- Water-electrolyte balance 48
- Water microbiology 49, 50
- Water pollution 49
- Water supply 10
- Wheat 39
- Women's health 1, 6, 17
- Women's right 31
- Women's role 40
- Women's status 7, 30, 31
- Women's welfare 30, 31, 40
- Yunus M 8, 9, 38
- Zaman H 32
- Zaman K 38
- Zeitlyn S 38, 21

(Contd...from the Second Cover)

Training Activities

Training in "areas of the Centre's competence" is a stated objective of ICDDR,B. As a part of this mandate the Centre provides training to Bangladeshi and other nationals in its areas of competence in collaboration with national and international institutions. The Centre also provides training to disseminate the knowledge and information gained at the Centre to health practitioners and researchers throughout the world, with a view to developing improved methods for health care and for the prevention and control of communicable diseases, particularly in the developing countries of Asia, Africa, and Latin America. Since 1978 the Centre has shared knowledge gained through research by training more than 15,000 health professionals from different parts of the world, including Bangladesh. Various courses are provided in hospital, laboratory or field settings, as well as advanced training in research techniques and data analysis. The Centre has a worldwide network of eminent scientists that helps disseminate new research findings quickly to where it is needed most.

Dissemination Activities

The Centre conducts many conferences and workshops throughout the year in order to share its research findings and to provide a forum for discussion of issues concerning health, population and development. In addition, the Centre's Dissemination and Information Services Centre (DISC) provides access to the scientific literature on diarrhoeal diseases, nutrition, population studies, and health in general through its CD-ROM databases on current biomedical and social science information from global sources, through the 254 journals to which it subscribes, and its extensive collection of books and documents. DISC also publishes the Journal of Diarrhoeal Diseases Research, a Current Awareness Bulletin, a bimonthly newsletter (GLIMPSE) distributed to 5,000 persons around the world, a bimonthly newsletter in Bangla ("Shasthya Sanglap") distributed to 25,000 grassroot health workers throughout Bangladesh, and occasional monographs.

Institutional Collaborations

The Centre and its staff collaborate with many organizations around the world concerned with health, population and development issues. The Centre has long-standing relationships with many research centres and universities in North America, Europe, and the Far East. Many new links and collaborative activities are developing with other countries, particularly in South and South-east Asia. The Centre has links with Johns Hopkins University, Australian National University, London School of Hygiene & Tropical Medicine, Harvard University, Karolinska Institute, and many other well-known research institutions. Such collaborations are also taking place with many Bangladeshi institutions, including academic, government, and non-governmental agencies.