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PREFACE

The *Specialized Bibliography Series* is part of the larger effort to facilitate exchange of information and to establish an information network in the field of diarrhoeal diseases -- an effort being carried out by the International Diarrhoeal Disease Information Service and Documentation Centre (DISC) of the ICDDR,B. The present issue, the fourth of the Series, includes 114 papers (58 abstracted) on anthropological studies in diarrhoeal diseases. This is a subject of high current importance, and the reason for selecting the topic is explained in the introduction by Dr K M A Aziz, an anthropologist of the ICDDR,B.

This is not an exhaustive bibliography on the topic. The bibliography was compiled from the available resources, and it is possible that inadvertent omissions may have occurred.

We hope the present bibliography will contribute towards generating greater interest and awareness in this field, and will facilitate user access to existing knowledge. Copies of articles abstracted and cited in this bibliography are available from DISC to interested persons/organizations. We will consider this attempt successful if the bibliography helps diarrhoeal disease researchers and practitioners. Suggestions for improvement of a future edition will be appreciated.

M Shamsul Islam Khan
Head, Library, Publication
and Communications

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CONTENTS

Introduction	i
User's Guide	iv
Bibliography	1
Subject Section	
Attitudes, Beliefs, Practices and Knowledge	1
Cultural Practices	4
Ecological Factors	8
Race-Associated Differences	9
Socio-Economic and Cultural Correlates	10
Author Section	13

INTRODUCTION

The utility of anthropological concepts and methods in implementing the preventive measures of enteric disease in a home or at community level is well recognized. Prevention of diarrhoeal disease through behavioral intervention requires certain specific changes in socio-cultural, ecological and environmental aspects of everyday life, particularly concerning simple personal and domestic cleanliness procedures. The findings of anthropology relate to the fundamental question of people's needs and aspirations in relation to health. Anthropologists are eager to know the consequences in the community and its environment of the efforts made for the fulfilment of these aspirations.

The availability of appropriate water and sanitation technology, and the treatment of enteric diseases have led to a low incidence in many parts of the world of most of these diseases. Despite this, the expected decline in the incidence of such diseases has not occurred in many communities of the developing world. This was mainly due to slow diffusion of the changes in style of living and behavior required for the control of the diseases referred to above. The barriers of achievements of the desired changes include lack of sustained health education, low level of literacy, the prevailing folk beliefs and practices. Herein lies the importance of identifying not only the technological bottlenecks but also streamlining the process of changed forms of behavior at the community, group, and individual levels.

The present effort is undertaken as a step toward bringing to light the relevant literature in the field. In doing so an extensive search was made of pertinent anthropological literature in the field of diarrhoeal diseases, involving studies done during the past three decades. It documents how ethnographic knowledge and input can benefit diarrhoeal disease prevention programs. It contains a number of related case studies. Also cited are relevant epidemiological, clinical and laboratory-based findings which have anthropological bearing. The prevention and control of acute and chronic diarrhoeal diseases provide an important area of cooperation between the anthropologist and specialists interested in preventive measures.

Study of household and community behavior related to the occurrence, treatment and prevention of diarrhoeal diseases in rural settings has been a major concern for anthropologists. The citations in this issue clearly demonstrate the importance of understanding the cultural beliefs and social dynamics in relation to the efforts made for the prevention of diarrhoeal diseases. In the absence of any collection of anthropological studies on diarrhoeal diseases, the studies referred to in this bibliography are expected to contribute in a significant way in shaping community programs aimed at prevention and control of such diseases.

Anthropologists are concerned with problems of water hygiene and fecal-oral transmission diseases. Interventions like those of hand washing, use of alum in cleansing water, and use of sanitary latrines have been effective in preventing these diseases. Ethnographers have made significant contributions by identifying the benefits of such interventions through fact-revealing indepth studies on the relevant folk practices.

In a discussion generated over Glasse's paper on "Cultural aspects of the transmission of cholera" (see p. 24), the discussant, Black, made several comments on plausible reasons for the differences in the incidence of cholera among communities and among socio-economic classes (see p. 17). Black stated, that a number of observations in Glasse's paper based on fieldwork conducted during 1964 in rural Bangladesh might be relevant to differences in the incidence of cholera amongst members of different socio-economic classes. These include the use of alum precipitation of water, the use of soap for hand cleansing, the possession of latrines, and the stricter observance of Muslim laws by the rich pertaining to cleansing after defecation. These are rightly the items of possible significance put forward by the anthropologist for consideration by the epidemiologist.

Diarrhoeal diseases being largely caused by contaminated water, the treatment of household water before drinking, or making ORS with potash alum during epidemics in rural or urban areas could decrease diarrhoeal morbidity and mortality.

Ahmed *et al.*, and Khan *et al.* in their separate studies published in 1984 (see p. 13 and 30), stated findings on the effective usefulness of potash alum through laboratory experiment, and epidemiological study respectively. Khan in a study published in 1983 (see p. 29) reported on the impact of the simple intervention of hand washing with soap and water on the occurrence of secondary infection of clinical cases of *Shigella* within families. The overall secondary infection rate in the study group was 10.4% and the control group 32.4%. In another recent study done at the ICDDR,B, Rahman *et al.* found in a rural area of Bangladesh where diarrhoeal disease is the commonest illness that the possession of sanitary latrines led to a significant reduction of postneonatal mortality (Lancet, July 1985).

In short, the results of epidemiological studies in relation to use of alum precipitation of water, the use of soap for hand cleaning, the possession of latrines have confirmed the significance of the study of these topics as pointed out about two decades ago by anthropologists. Much of the existing acquired behavior can be viewed as problem solving in terms of water use and sanitation practices. However, certain important aspects among them may not be practiced as adequately as desired. For example, adequate hand washing after contact with feces is customarily recommended. But this is not practiced by many according to the expected standard mainly because of lack of awareness and lack of social pressure. Such a situation can be capitalized by the behavioral scientists and health educators by reminding the practice of the forefathers of the community members. The prevailing cultural requirement of adequate hand washing following contact with feces might be achieved through an acceptable easy method and increased emphasis on health education directed towards the community as well as the household.

In addition, some of the investigators of studies referred to in this issue have examined certain assumptions regarding the influence of age, education, ethnic background, occupation, income and religious affiliation of people on their acceptance of modern ways of prevention and treatment of diarrhoea. The anthropologists have also made efforts to learn why and where social and cultural considerations yield to public health measures in preventing diarrhoeal diseases.

It is evident that anthropologists can assist in striking a meaningful balance between beliefs and accommodating changes in such beliefs through demonstrated benefits of interventions aiming at preventing diarrhoeal diseases. This bibliography is expected to generate a useful dialogue amongst medical practitioners,

epidemiologists and behavioral scientists. This could result in effective and accelerated utilization of the available health technology and medical therapies for the benefit of the people living under resource constraints in many parts of the developing world.

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Disease Research, Bangladesh

USER'S GUIDE

The *Specialized Bibliography Series* includes papers and publications -- current as well as back materials -- from sources worldwide.

The bibliography is divided into subject and author sections. In the Subject Section, citations are arranged alphabetically by first author under specific headings. The sequential number in the Subject Section sometimes is followed by a sign (+), indicating that an abstract of the cited paper appears in the Author Section.

The Author Section contains citations arranged alphabetically by the first author and then by the title of paper. Co-authors' names also appear in alphabetical order along with a cross-reference to the first author (e.g. Achananuparp S see Sakdisiwasi O). This will facilitate a search by co-authors' names.

Efforts have been made to present abstracts with all available information regarding the study's nature and objective, methods used, and the major findings and conclusions.

The bibliography is in English. A title in parentheses indicates that the paper is in another language.

ANTHROPOLOGICAL STUDIES IN DIARRHOEAL DISEASES

ATTITUDES, BELIEFS, PRACTICES AND KNOWLEDGE

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AUTHOR SECTION

Achananuparp S see Sakdisiwasdi O

Afifi ZEM. Determinants of growth of infants in an Egyptian village. Boston, Massachusetts: Harvard School of Public Health, 1984. (Thesis)

This prospective longitudinal study examines the following: 1) description of the growth of infants (0-1 year) based on longitudinal observations; 2) assessment of the impact of maternal, socio-economic, environmental and dietary factors on growth during infancy; 3) investigation of the diarrhoea-malnutrition interrelationships among the studies cohort members.

Afonso E see Srinivasa DK

Aggarwal G see Kumar V

Ahmad K, Jahan K, Huq I. Decontamination of drinking water by alum for the preparation of oral rehydration solution. *Food Nutr Bull* 1984 Jun;6(2):54-7

This is the first report on the use of chemical agents in decontaminating potable water for the preparation of ORS. The study determines whether aluminium potassium sulphate (potash alum), used traditionally for purifying tank, reservoir and household drinking water, would have an antibacterial effect on the total bacterial count in ORS prepared with the piped-supply water and with pond water of high bacterial count. *Vibrio cholerae* at concentrations 10^3 and 10^4 per mL was killed between 1 and 2 h in 500 $\mu\text{g/mL}$ potash alum. Potash alum at a concentration of 1 mg/mL killed *V. cholerae* in water in less than 1 h. *Escherichia coli* from stool (10^3 and 10^4 per mL) had the same survival time in presence of 500 $\mu\text{g/mL}$ of potash alum. The pH of ORS fortified with 500 $\mu\text{g/mL}$ alum remained at 6.4. ORS made from well water or pond water, with or without potash alum, did not vary markedly in ionic concentration. Changes in NaHCO_3 level were within allowable limits. There were sharp decreases in the total bacterial counts in ORS made with water collected from different sources and when fortified with 500 $\mu\text{g/mL}$ of potash alum. Since diarrhoeal diseases are often caused by contaminated water, treating water before drinking or making ORS with potash alum during epidemics in rural or urban areas should decrease diarrhoeal morbidity and mortality.

Ahmed QS see Khan MU

Ahmed S see Martin AR

Ahmed SZ see Benenson AS

Akbar SMF see Faruque ASG

Alim ARMA see Black RE

Anthropological Studies

Alim ARMA see Boyce JM

Arrobio JO see Brandt CD

Ascoli W see Gordon JE

Aziz KMA, Hasan KZ, Aziz KMS, Rahaman MM. Behavioural changes in water use following health education in a rural area of Bangladesh. In: Programme and abstracts of the Second Asian Conference on Diarrhoeal Diseases, Calcutta, 21-24 Feb 1983. Calcutta: National Institute of Cholera & Enteric Diseases, 1983:63

* Aziz KMA, Hasan KZ, Hussain A, Patwary Y, Umra M, Aziz KMS, Rahaman MM. PARDĀ and some health practices in two conservative rural communities of Bangladesh. In: Rahaman MM, Aziz KMS, Rahman S, eds. Proceedings of the First Asian Conference on Diarrhoeal Disease, Dhaka, 16-20 Feb 1981. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1982:212-8

This article, based on field observation and in-depth interviews in two rural communities of Teknaf thānā in the coastal Bangladesh, focuses on pardā and some health practices with a special reference to habits of defecation and water use. Viewing defecation habits and water use pattern as an expression of social norms, both women and men are analysed from the point of view of health practices. This analysis has shown that the practice of pardā has been responsible for differential defecation habits and water use pattern among males and females. The study revealed that the males defecate after rising from the bed in the morning. The timing for such defecation may either be before sunrise or after; but, for the sake of the observance of pardā, women since their childhood, develop the habit of defecation following sunset or before sunrise. In-depth interviewing revealed certain unconventional practices of hasty defecation and cleaning of bottom, when the need for defecation by women arose during daytime. It was found that for the sake of observance of pardā, women mainly carried water from the tubewell following sunset and before sunrise. When there was need for water during the daytime women had to frequently depend on their minor children for carrying water. Observation indicated that the children were much less careful than the women in maintaining cleanliness of water during collection and transport from the collection point to their homes.

Aziz KMA, Curlin G. Role of learned behavior in the transmission of cholera. Paper presented at the post-plenary session of the 10th International Congress of Anthropological and Ethnological Sciences, Poona, India, 19-21 Dec 1978

In transmission of cholera and other diarrhoeal diseases learned behavior of social and hygienic customs plays an important role. A study was undertaken in a fishing and an agricultural village to elucidate patterns of learned behavior with regard to personal hygiene, with reference to the spread of cholera and other diarrhoeal diseases. Retrospective data offer a framework for discussion and future plans.

In the study villages, children of the age group 4-10 and their parents were interviewed in an effort to isolate the learned behavior factors which may be responsible for the transmission of cholera vibrios among the group members during the incubation period and in the acute phase of an index case. Data on the learned behavior among children included toilet practices, feeding practices, and

Anthropological Studies

group or individual activities done in the learning period according to age and sex. Information on the social and hygienic customs of parents followed particularly in connection with the care of children have been analyzed.

Retrospective data were collected according to age and sex on the cholera-positive cases who came from 132 villages of the vaccine trial area to the Matlab cholera hospital during 1966 to 1970.

The study showed that it may be possible to view learned behavior separately from strictly biological factors in the transmission of cholera. Ultimately there is need to quantify the learned behavior factors so that required intervention studies can be undertaken.

X Aziz KMA, Hasan KZ, Patwary Y, Rahaman MM, Aziz KMS. A study of the interpersonal spread of human faeces in rural Teknaf of Bangladesh. In: Rahaman MM, Greenough WB, III, Novak NR, Rahman S, eds. Shigellosis: a continuing global problem, proceedings of an international conference, Cox's Bazaar, Bangladesh, 15-20 Jun 1981. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1983:238-48

To develop health messages for community members aiming at promotion of water use following the cleaning of the anal region after defecation, this study identifies, the ways of transmission of human feces through fingers of the mothers of children aged under five, within the context of a household. Only willing mothers from 21 different households of Teknaf, Bangladesh were observed by two female field workers for more than 12 hours beginning before sunrise. Observations were limited to those aspects of hand movement which were likely to play an important role in transmitting feces among human beings. The findings of this study identified that contamination of feces is transmissible in the following ways: (1) handling of utensils; (2) serving of food; (3) serving of fruits; (4) feeding infants and children and sharing food; (5) carrying and storing water; (6) disposal of the feces of children; (7) preparation of boiled food; (8) preparation of betel leaf with betel-nut; and (9) certain personal habits of washing oneself and one's child.

This study emphasizes the need of proper hand washing after contact with feces, so that contamination does not occur through soiled fingers.

Aziz KMA see Boyce JM

Aziz KMA see Curlin GT

Aziz KMA see Shahid NS

Aziz KMS see Aziz KMA

Aziz KMS see Rahaman MM

Bakri A see Ismail R

Bari MA see Shahid NS

Barnyen L see Sakdisiwasdi O

Barrell RAE, Rowland MGM. Commercial milk products and indigenous weaning foods

Anthropological Studies

in a rural West African environment: a bacteriological perspective. *J Hyg* 1980 Apr;84(2):191-202

Barrell RAE, Rowland MGM. Infant foods as a potential source of diarrhoeal illness in rural West Africa. *Trans R Soc Trop Med Hyg* 1979;73(1):85-90

Barrell RAE, Rowland MGM. The relationship between rainfall and well water pollution in a West African (Gambian) village. *J Hyg (Camb)* 1979 Aug;83(1):143-50

Water pollution was monitored in six Gambian village wells over a period of 8 months spanning the 5-month monomodal rains and the pre- and post-rain dry periods. Fecal coliform (FC) and fecal streptococci (FS) counts were high throughout with a massive observed increase associated with the onset of the rains, maximum counts exceeding $5 \times 10^5/100$ mL. This pattern was sustained throughout the rainy season. Some individual variations in patterns of pollution could be ascribed to well design, in particular the lining of the shaft, but no well was protected from the seasonal increase in fecal pollution. The source of the increased pollution appeared to be a flushing-in of fecal material of indeterminate or mixed human and animal origin, probably over considerable distances. Peaks of pollution not associated with rainfall episodes could have resulted from the practice of communal laundering in the near vicinity of the wells. The individual use of ropes and buckets to extract water is a continual potential source of introduced contaminants. Specific pathogens including *Salmonella* spp. were isolated only intermittently. Attention has been drawn to a problem complicating the standard method for assessing FC counts.

Barrell RAE see Rowland MGM

Barton BW see Jephcott AE

Beasley RP see Rosenberg ML

Beck MD see Hollister AC Jr.

Becker S see Black RE

Benenson AS, Ahmed SZ, Oseasohn RO. Person-to-person transmission of cholera. In: Proceedings of the Cholera Research Symposium, Honolulu, Hawaii, 24-29 Jan 1965. Washington, DC: U S Government Printing Office, 1965:332-6

Transmission of cholera by contact has been tested in several ways in the hospital ward of the Cholera Research Laboratory (CRL), Dhaka, Bangladesh. The relationship between water use and intrafamilial infection was studied. Families of CRL-hospitalized patients living in Dhaka were selected for study within 2 days of onset of illness in bacteriologically positive index cases. The study showed that the precise manner in which the fecal-oral spread of cholera occurs probably varies from place to place and from time to time. Person-to-person spread has not occurred in the CRL-hospital environment. Drinking contaminated water has not appeared to be a significant factor in the study population. Preliminary findings are consistent with the hypothesis that endemic cholera in East Pakistan (now Bangladesh) is a variety of food infection in which water, fingers, or other factors may serve as vehicles to inoculate a widely consumed staple, such as rice. These findings point to the need for more studies of the culture and habit patterns of the populations affected by cholera.

Anthropological Studies

Benenson AS see McCormack WM

Bennett P see Forman MR

Beren R see Forman MR

Berkowitz FE see Schoub BD

Berry RJ, Gracey M. Diarrhoeal disease in aboriginal and non-aboriginal infants and young children in Western Australia. *Med J Aust* 1981 May 2;1(9):479-82

There were remarkable differences in the rates of admission to hospital for gastroenteritis of aboriginal and non-aboriginal infants and children in Western Australia during the eight-year period, 1971 to 1978. Although aborigines made up only 3.7% of the State's population in 1976 of under five years, they accounted for 42% of admissions to hospital for gastroenteritis and had 58% of the bed occupancy for that disease. The highest rates of admissions were for rural infants, whether they were aboriginal or not. There has been a steady decline in deaths from diarrhoeal diseases, particularly in young aborigines, in the period reviewed. Hospital admission rates also decreased for aborigines during the latter half of the study, with the largest fall occurring among metropolitan infants, but there remains a wide gap between the rates experienced by the aboriginal and non-aboriginal population of under five years of age.

Bertrand WE, Walms BF. Maternal knowledge, attitudes and practice as predictors of diarrhoeal disease in young children: *Int J Epidemiol* 1983 Jun;12(2):205-10

The authors assumed that a better description of the relationships between knowledge, attitude and practice, and socioeconomic and environmental factors will lead to an improved understanding of their relative importance in the transmission of diarrhoea. This paper presents findings describing the association for a number of these less documented variables to diarrhoea prevalence in children aged below 5. Using data from an experimental outreach health delivery program in Cali, Colombia, this study examines 583 randomly selected women with children aged 0-4 years representing a total population of approximately 70,000. Mothers were questioned on 11 attitude indicators of maternal knowledge and practice about diarrhoeal diseases, four indicators of individual socioeconomic status, three of crowding, three of housing quality and two of family sanitary conditions. Results indicate significant elevated prevalence (χ^2 analysis) with 11 variables including knowledge of cause of diarrhoea, where and how to treat diarrhoea, housing quality, mother's age, education and civil status, type of water supply, and where parents were born. Logistic regression performed on variables with significant and near-significant prevalence findings indicated that mothers' perception of malnutrition in child, age of mother, house appearance, birthplace of mother and mother's general knowledge of diarrhoea were the most important predictive variables in descending order.

Black RE, Brown KH, Becker S, Alim ARMA, Merson MH. Contamination of weaning foods and transmission of enterotoxigenic *Escherichia coli* diarrhoea in children in rural Bangladesh. *Trans R Soc Trop Med Hyg* 1982;76(2):259-64

Through longitudinal studies of infectious diseases and nutrition in Bangladesh, the degree of bacterial contamination of traditional weaning was determined. The role of these foods in the transmission of diarrhoeal diseases was also ascertained.

Anthropological Studies

In the study households, much of the food and water given to weaning-age children had fecal contamination, as indicated by the frequent recovery of *E. coli* in high counts from specimens. Consumption of such food and water is likely to increase the risk of acquisition of enteropathogens normally spread by the fecal-oral route. The number of *E. coli* in contaminated foods was generally ten times higher than that in contaminated water. There are many possible social and cultural reasons for these higher levels of contamination. The proportion of a child's food samples that contained *E. coli* was significantly related to the child's annual incidence of diarrhoea associated with enterotoxigenic *E. coli*. This study stressed the importance of locally available foods that are hygienic as well as nutritious, as supplements to offering breastfeeding children in developing countries.

Black RH. Invited discussion of Dr R M Glasse's paper. In: Proceedings of the Cholera Research Symposium, Honolulu, Hawaii, 24-29 Jan 1965. Washington, DC: U S Government Printing Office, 1965:340

In a discussion generated over Dr R M Glasse's paper on "Cultural aspects of the transmission of cholera" (cited elsewhere in this bibliography), the discussant, Dr R H Black, makes several comments on plausible reasons for the difference in the incidence of cholera among communities and among socio-economic classes. The role of the epidemiologist and that of an anthropologist are clearly defined and demarcated. Dr Black points out that if person-to-person contact in the spread of cholera is emphasized, then the low incidence of cholera at the height of the wet season might be explained by the relatively small amount of movement of people between the small but packed isolated communities. Dr Black agrees with Dr Glasse that in any anthropological or epidemiological study, the features of family size structure and their spatial distribution should be taken into account and these factors need to be appropriately differentiated from Western family structures. It is stated that a number of observations in Dr Glasse's paper may be relevant to differences in the incidence of cholera amongst members of different socio-economic classes. These include the use of alum precipitation of water, the use of soap for hand cleansing, the possession of "latrines," and the stricter observance of Muslim law by the rich regarding cleansing after defecation. These are rightly the items of possible significance put forward by the anthropologist for consideration by the epidemiologist. The casual defecatory behavior of children has been presented as a possible mechanism for the dissemination of the cholera vibrio. If direct contact with the feces of young children is significant in the transmission of cholera, the anthropological findings suggest that there should be a higher incidence in women and girls, who are more exposed to such contact than males. The discussant therefore emphasizes the need of looking at the problem of transmission of cholera from the point of view of the anthropologist, who is likely to have an assortment of field notes on the behavior of people in a cholera-stricken area. Dr Black lays particular emphasis on the findings of the anthropologist - who studies people in a society. The epidemiologist, later, examines the findings of the anthropologist in an attempt to locate those factors which may be of significance in the transmission of disease - in this case cholera.

Bollag U. Social and nutritional parameters of acute diarrhea. *Arch Dis Child* 1980 Sep;55(9):711-4

Bolton M see Gilman RH

Boonyaratapun P see Phijaisanit P

Boonyaratapun P see Sunakorn P

Anthropological Studies

Boyce JM, Hughes JM, Alim ARMA, Khan MU, Aziz KMA, Wells JG, Curlin GT. Patterns of *Shigella* infection in families in rural Bangladesh. *Am J Trop Med Hyg* 1982 Sep;31(5):1015-20

To assess the transmission mode of *Shigella* infection in rural Bangladesh, questionnaire and culture surveys were conducted in baris (neighborhoods) where people with *Shigella*-associated diarrhoea and index controls with non-*Shigella* diarrhoea lived. In *Shigella* baris 19% and in control baris 7% of people were infected during the survey periods ($p < 0.001$). *Shigella* infection prevalence was highest for children aged 1-9 and for females over age 39; and was unrelated to socio-economic status, family size or household crowding. Use of surface water for drinking was not a risk factor. In fact, use of river water was more frequent in control baris. Both household and bari contacts of *Shigella* index cases frequently excreted different serotypes from that excreted by the index case. In *Shigella* baris, families with infection were significantly more likely than uninfected families to have a history of an overnight stay away from home by a family member during the previous week. These observations suggest that there are multiple introductions of *Shigella* into some families; and that the epidemiology of *Shigella* infection for rural Bangladesh families differs from that observed for families living in more industrialized countries.

Brandt CD, Kim HW, Yolken RH, Kapikian AZ, Arrobio JO, Rodriguez WJ, Wyatt RG, Chanock RM, Parrott RH. Comparative epidemiology of two rotavirus serotypes and other viral agents associated with pediatric gastroenteritis. *Am J Epidemiol* 1979 Sep;110(3):243-54

Briesman MA. Knowledge and practice of New Zealand mothers in the treatment of infantile diarrhoea. *NZ Med J* 1984 Jan 25;97:39-42

One hundred and ninety-four mothers in the Christchurch area, New Zealand were questioned concerning their knowledge on treatment of infantile diarrhoea. Results showed that although traditional ideas have changed and there is some awareness of the need to use fluid replacement, there is a lack of appreciation of the importance of solutes in ORS. The study highlights the need for health education especially for mothers in a number of areas in treatment of childhood diarrhoea. Mothers should be made aware of the dehydration symptoms and, particularly primiparae should be told the potential seriousness of the condition. They should be made aware of part played by hygiene in food handling habits in preventing diarrhoea. It is the responsibility of all medical and nursing personnel to be involved in this educational process.

Brown KH see Black RE

Bunyarathapan P see Vathanophas K

Butler W see Mata L

Calubaquib R see Evangelista TA

Castle SP, Nims LJ, Lapham SC. Isolation of *Salmonella enteritidis*, serotype *horsa*, from three American Indian tribes. *J Clin Microbiol* 1983 Jul;18(1):219-21

Anthropological Studies

Chakraborty J, Zimicki S, Yunus M. Knowledge, attitudes and practices concerning diarrhoea in a rural area of Bangladesh. In: Rahaman MM, Aziz KMS, Rahman S, eds. Proceedings of the First Asian Conference on Diarrhoeal Disease, Dhaka, 16-20 Feb 1981. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1982:245

From January 1979 through December 1980, a field trial of home-delivered ORS was carried out at the ICDDR,B's Matlab field station. Three regions were selected for study: one comparison area, and two others, among which one was provided with glucose-electrolyte ORS packets, and in the other a simple salt (lobon) and crude sugar (gur) solution. At the beginning of the trial and a year later, a survey questionnaire on knowledge, attitudes and practices was administered to a sample of about 700 women from the 3 areas. The questionnaire covered three subjects-general information on diarrhoea, its treatment, and diet. Some of the major findings concerning treatment and diet, and the implication of these results for implementation of oral rehydration projects are discussed, while responses to the first part of the questionnaire have been analyzed in detail.

Chakraborty J see Khan MU

Chanock RM see Brandt CD

Chen PCY. Socio-cultural aspects of a cholera epidemic in Trengganu, Malaysia. *Trop Geogr Med* 1971 Sep;23(3):296-303

The El Tor cholera epidemic of 1964 that occurred in Trengganu, Malaysia, is examined in the context of indigenous rural Malay beliefs and practices. The epidemic was characterized by its size in relation to the estimated population of 346,046, its firm and prolonged hold on the population and the high rate of under-reporting of cases and deaths. It seems probable that these characteristics were associated with the possible contamination of common sources of water with human feces, to the locally believed concepts of cholera causation, treatment, prevention and control to the customary obligation of the group to render support at times of illness and bereavement, and to their practice of concealing cholera cases and deaths in order that custom may not be stifled by control measures requiring isolation, quarantine, surveillance of cases and carriers, and, minimum handling of the dead. The difficulty of control and possible alternatives in the context of such indigenous beliefs and practices is considered.

Chotisankasa S see Phurapradit P

Chuy M see Escobar GJ

Cicchini C see McNeilly J

Clark DS see Thatcher FS

Clements C see Kumar V

Cohen F see Schoub BD

Cohen J, Schwartz T, Klasmer R, Pridan D, Ghalayini H, Davies AM. Epidemiological aspects of cholera El Tor outbreak in a non-endemic area. *Lancet* 1971 Jul 10;2(7715):86-9

Anthropological Studies

Cripps A, Denny PJ, Fisher S, Green P, O'Conner BF. A health and social survey of a group of children from rural New South Wales. *Med J Aust* 1975 Aug 9;2(6): 214-8

Curlin GT, Aziz KMA, Khan MR. The influence of drinking tubewell water on diarrhoea rates in Matlab Thana, Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, Jun 1977. 18 p. (Working paper no. 1). Also published in: Fukumi H, Zinnaka Y, eds. Symposium on Cholera: proceedings of the 12th Joint Conference, U.S.-Japan Cooperative Medical Science Program, Sapporo 1976. Tokyo: National Institute of Health, 1977:48-54

This paper gives the first year results of a UNICEF-CRL study of the health impact of handpump tubewells as measured by diarrhoea rates in a rural population in Matlab, Bangladesh. During the first year, weekly household surveillance for diarrhoea among approximately 20,000 persons in 12 villages revealed striking patterns of seasonal and age specific rates. As expected, younger ages had higher rates; but the observed reduction in overall rates by 50% during the monsoon was not expected. Approximately 40% of the residents drank tubewell water although insignificant numbers used tubewell water for other domestic purposes. Drinking tubewell water was not associated with a reduction in overall diarrhoea rate or in the rates for those hospitalized or the out-patient rates of cholera or shigellosis. The preliminary conclusion, therefore, is that tubewells, as they are currently used, are not associated with a reduction in diarrhoea rates.

Curlin G see Aziz KMA

Curlin GT see Boyce JM

Cutting WA, Omer RI, McLean SJ. A worldwide survey on the treatment of diarrhoeal disease by oral rehydration in 1979. *Ann Trop Paediatr* 1981 Dec;1(4): 199-208

- ✓ Cutting WAM, Hawkins P. The role of water in relation to diarrhoeal disease. *J Trop Med Hyg* 1982 Feb;85(1):31-9

Behavioral and social factors are important in respect of the use of water for washing, and more relevant when considering the use of excreta disposal facilities. Obviously cultural, educational and economic considerations are closely related and important too. No community has reduced diarrhoea to a minor health problem without having adequate systems for sewage disposal, food hygiene and health education, as well as adequate water supplies. A whole package of inputs is required if better water is to benefit the community. Increased usage of water probably requires behavioral changes which are very difficult to introduce once an individual and family have adopted a particular pattern of bathing and water utilization. These changes cannot occur until their social and economic determinants change. Improvements in the quality of water, the quantity used and the mode of supply are unlikely to have beneficial effects unless they are part of a larger package of social and economic improvement.

Davies AM see Cohen J

Davis C see Gilman RH

Deb BC see Sircar BK

Anthropological Studies

De La Cruz E see Moore HA

Denny PJ see Cripps A

Diwedi P see Kumar V

Djalil T, Hartaman M, Rivai TA. Some social aspects of diarrheal disorders in newborns and children under 2 years of age at Ketjamatan Andir Garuda (a suburban area), Bandung. *Paediatr Indones* 1972 Jul;12:301-7

This study covers the community's understanding of diarrhoeal disorders in children, and their efforts to overcome them. Heads of 500 households having children below 2 years of age drawn from 110,000 people were interviewed. Most of the respondents were unskilled workers (53%) and the unemployed (21.2%) belonging to low socio-economic levels. The study concluded that, in general, the community believed that the doctor was the best healer. Due to their low income the majority did not visit the doctor.

Djamil H see Ismail R

Edmeades R see Halliday K

El-Mougi M, El-Tohamy K. Changing pattern of attitudes towards management of acute diarrhea. *Diarr Control Newslett* 1983 Fall;(1):8

El-Tohamy K see El-Mougi M

Epling PJ, Siliga N. Notes on infantile diarrhoea in American Samoa (a sketch in indigenous theory). *J Trop Pediatr* 1967 Sep;13:139-49

Escobar GJ, Salazar E, Chuy M. Beliefs regarding the etiology and treatment of infantile diarrhea in Lima, Peru. *Soc Sci Med* 1983;17(17):1257-69

Three groups of women in Lima, Peru, were interviewed regarding their beliefs about the etiology and treatment of infantile diarrhoea. The first group consisted of 91 mothers of children under the age of 2. They were interviewed at two locations: the pediatric emergency service of a teaching hospital serving northern Lima and a health center located in one of the rapidly growing shanty towns surrounding Lima. The second group consisted of 25 women interviewed in their homes in several shanty towns. Responses given by mothers in both groups, belonging to low socio-economic groups, were similar. The third group consisted of 23 adolescent girls and young women interviewed briefly at two schools in Lima.

Results of the interviews confirm that diarrhoea is not seen as an infectious disease. Instead, it is placed within the framework of the hot-cold dichotomy prevalent in Latin America; diarrhoea is believed to be caused by invasion of the body by cold or by ingestion of foods designated as being 'cold'. Mothers in the first group who believed that 'cold' was a cause of diarrhoea and who also thought that 'cold' could be passed via their breastmilk were more likely to have dehydrated children ($p < 0.03$) but not necessarily severely dehydrated children. More often, the terms 'hot' and 'cold' are semantic terms referring to qualities felt to be intrinsic in a given food or activity. In Lima, cinnamon, oregano, boiled water and pork are designated as being 'hot', while toma-

Anthropological Studies

toes, unboiled water and some types of bananas are designated as being 'cold'. The disease theory based on a hot-cold dichotomy may have had adaptive value in its original setting but, at least with respect to infantile diarrhoea, it has little, if any, survival value in a shanty town where nutrition is poor and breastfeeding is decreasing. This study has concluded with both practical and theoretical recommendations, including suggestions for future studies.

Escobar GJ. Social and cultural factors affecting infantile diarrhea in Lima, Peru. Yale University, 1982. (Thesis)

Eusof A see Faruque ASG

Evangelista TA, Mendoza O, Calubaquib R. Maternal beliefs, attitudes and practices concerning diarrhoeal diseases. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:282

Fahimuddin M see McCormack WM

Farooqi FA see Jalil F

Farooque ASG see Rahman ASMM

Faruque ASG, Rahman ASMM. Incidence of diarrhoea in young children of rural Bangladesh: role of mothers and village practitioners in treatment. In: Proceedings of the Second Asian Conference on Diarrhoeal Diseases, Calcutta, 21-24 Feb 1983. Calcutta: National Institute of Cholera & Enteric Diseases, 1983:64

This paper describes diarrhoeal morbidity pattern in under-five children and evaluates the role and success of trained mothers in providing rehydration in diarrhoea in rural Bangladesh. Mothers and village practitioners of 22 villages (population 28,000) were trained on diarrhoea management using home-made ORS. This was followed by a weekly diarrhoea surveillance. Male children were found to be more affected than females. Diarrhoea incidence was highest in under-1-year-olds. Infants had more watery episodes while older children had longer dysenteric episodes. One third of the watery episodes extended to the second week. Mothers treated a larger number of watery episode cases especially in infants, while the village practitioners mostly treated dysenteric episodes among older children. ORS use was significantly less in dysenteric infants. Compared to village practitioners, mothers had treated a significantly higher number of diarrhoea patients.

Faruque ASG, Eusof A, Akbar SMF, Sarker MAH. Study of diarrhoea management practices in rural Bangladesh. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:256

Faruque ASG see Shahid NS

Fernandez R see Mata L

Fisher S see Cripps A

Foote D see Kendall C

Anthropological Studies

Forman MR, Graubard BI, Hoffman HJ, Beren R, Harley EE, Bennett P. The Pima infant feeding study: breast feeding and gastroenteritis in the first year of life. *Am J Epidemiol* 1984 Mar;119(3):335-49

Gan E see Gilman RH

Gangarosa EJ see Rosenberg ML

Garcia B see Mata L

Gardner AJ. Gastroenteritis in Alice springs. *Med J Aust* 1977 Nov 26;2(4 Suppl):6-10

Ghalayini H see Cohen J

Ghosh S see Sircar BK

Gibbs KR. There is no safe water in rural Bangladesh: so what about the kids ? *Shishu Diganta* (Dhaka) 1980 Dec;(9):25-7

In Bangladesh there is one operational tubewell for every 160 persons. All the spot checks indicate that the tubewell gives totally uncontaminated water in virtually every case, while the pump does not. The reasons are: contaminated water is used for priming, and villagers (particularly children) will touch the spout, very often after defecation, thereby contaminating it and even assisting the spread of diarrhoeal disease during epidemics. Frequently, water containers add to the contamination of the water being carried. It is observed however, handpumps *can* and *do* give better health to children. There is a need to organize *how* they are used by informing everyone - men, women and children that: (i) small families are healthier; (ii) high water users from tubewells are healthier; (iii) women's privacy at the pump is healthier; (iv) washing clothes at the pump is healthier; (v) playing at the pump is healthier. There is a need to inform people *why* this is so.

Gilbert RJ see Jephcott AE

Gilman RH, Davis C, Gan E, Bolton M. Seroepidemiology of amebiasis in the Orang Asli (Western Malaysian aborigin) and other Malaysians. *Am J Trop Med Hyg* 1976 Sep;25(5):663-6

Gittlesohn AM see Hollister AC Jr

Glass RI, Khan MR, Svennerholm A-M, Holmgren J. Cholera in breast fed infants: is low prevalence of hospitalization due to behavioural vs biological factors? In: Abstracts of the Seventeenth Joint Conference on Cholera, U.S.-Japan Co-operative Medical Science Program, Baltimore, Md., 25-28 Oct 1981. Baltimore: National Institutes of Health, 1981:36

Glasse RM. Cultural aspects of the transmission of cholera. In: Proceedings of the Cholera Research Symposium, Honolulu, Hawaii, 24-29 Jan 1965. Washington, DC: U S Government Printing Office, 1965:337-9

This study investigates the cultural and environmental factors that could be

Anthropological Studies

important in cholera transmission. This report is a broad sketch of the ecological and cultural setting during 1964 for cholera in one village of East Pakistan (now Bangladesh) with a population of 13,612 people. Preliminary analysis of the composition of the joint and simple families suggests that these units may be useful in an epidemiological study. The mean size of a simple family is 4.53 individuals and that of the joint family 8.16. In both types, food is prepared at a common hearth; water for household use is usually stored in a clay jar, one to each house, so that people eating food from the same hearth may be drinking water from a different source, exposed to different possibilities of contamination. Such observations on a larger sample, may help the epidemiologist to construct meaningful hypotheses concerning the relationships between the incidence of cholera and the role of food and water in households. (See also: Black RH. Invited discussion of Dr R M Glasse's paper).

Gordon JE, Guzman MA, Ascoli W, Scrimshaw NS. Acute diarrhoeal disease in less developed countries. 2. Patterns of epidemiological behaviour in rural Guatemalan villages. *Bull WHO* 1964;31(1):9-10

Gordon JE see Mata LJ

Gracey M see Berry RJ

Gracey M see McNeilly J

Graubard BI see Forman MR

Green EC. Traditional healers, mothers and childhood diarrheal disease in Swaziland: the interface of anthropology and health education. *Soc Sci Med* 1985; 20(3):277-85

A study of beliefs and practices relating to childhood diarrhoea, relying primarily on traditional healers as informants and survey respondents, revealed an indigenous classification of childhood diarrhoea into three main types. Enemas are used as a treatment in two types of more serious diarrhoea regarded as due to unnatural causes. Most children with diarrhoea are taken to clinics only after home treatments and those prescribed by traditional healers have failed, by which time a child may be severely dehydrated. The role of oral rehydration and strategies for health education are discussed in the context of Swazi culture. Swazis believe that fluids, especially breast-milk, are necessary in order to maintain a child's strength. It is suggested that this belief and the resulting practice should be reinforced; nutrition and dehydration education could be presented in the context of keeping up a baby's strength. Encouragement of 'home remedies' such as use of sorghum or maize porridge may prove to be effective in preventing dehydration in children.

Green P see Cripps A

Gupta DN see Sircar BK

Gupte S, Sood SK, Smith R. Diarrhoeal disease and the mother. *Med Surg* 1976; 16:33-7

Gupte S, Sasan AS. Maternal beliefs and attitudes concerning diarrhoeal disease (letter). *J Diar Dis Res* 1983 Jun;1(2):109

This study was conducted at the government children's hospital at Jammu and

Anthropological Studies

sought to identify maternal beliefs and attitudes concerning diarrhoeal disease. The respondents were predominantly rural or periurban, illiterate slum mothers. Preliminary observations based on 600 case studies show that about 15% of the respondents did not understand the nature of diarrhoea. Almost half the mothers blamed diarrhoea and the child's associated pain and irritability on "teething". Except for well-educated urban mothers most women did not know that breast feeding, adequate nutrition, and good hygiene and sanitary conditions helped prevent and control diarrhoea. About 10% of the mothers regarded diarrhoea as the "curse of the devil". Milk (75% of respondents), routine foods (60%) and fluids (38%) were believed to aggravate diarrhoea. Many respondents believed highly diluted milk to be useful. About 70% of the mothers believed that curd-rice gruel or moong dal to be good for diarrhoea, but perhaps not for infant victims. Almost half the mothers restricted the foods, and/or fluid intake of children with diarrhoea before bringing them to a hospital. About 2% of mothers were aware of oral rehydration therapy, but a majority of them were ignorant of modern concepts concerning diarrhoeal disease.

Guzman MA see Gordon JE

Halliday K, Edmeades R, Shepherd R. Persistent post-enteritis diarrhoea in childhood: a prospective analysis of clinical features, predisposing factors and sequelae. *Med J Aust* 1982 Jan 9;1(1):18-20

Haque Z see Nalin DR

Harley EE see Forman MR

Hartaman M see Djalil T

Hasan KZ see Aziz KMA

Hawkins see Cutting WAM

Hemphill EC see Hollister AC Jr.

Hinrainer-Wilfing C see Prinz A

Hirschhorn N see Spivey GH

Hoffman HJ see Forman MR

Holdsworth D. Traditional medicinal plants used in the treatment of gastric ailments. *Papua New Guinea Med J* 1978 Jun;21(2):175-83

This paper summarizes the available information on over fifty plants used throughout Papua New Guinea to treat gastro-intestinal ailments, especially diarrhoea and dysentery. The survey was carried out in many rural areas of the country with the assistance of senior students from high schools in their home villages. All plants were freshly collected and identified by botanists. They were then tested for the presence of alkaloids; 15% of the plants used to treat gastric ailments were alkaloid-positive. This, however, is not a significant finding. Many of the species collected, as well as their related genera, are found to contain essential oils, saponins, sterols, tannins and resins. In western medicine

Anthropological Studies

essential oils are used to treat dyspepsia and abdominal distension; benzoin and other resins are prescribed for flatulence whilst tannic acid is used for diarrhoea.

Hollister AC Jr, Beck MD, Gittlesohn AM, Hemphill EC. Influence of water availability on *Shigella* prevalence in children of farm labor families. *Am J Public Health* 1955 Mar;45(3):354-62

Among several population groups with high diarrhoeal morbidity and mortality in Fresno County and San Joaquin Valley, California, USA, the etiology of the disease was studied. The study carried out in 1952-53 attempted to clearly define the relationship with *Shigella* prevalence and the availability of water for personal hygiene (laundry, bathing and hand washing). The major finding of this study was that shigellosis was an important health problem among the study populations and the most important mode of transmission was person-to-person contact. Another similar study, done in 1950, determined that a single environmental factor - water availability played an important role in determining the prevalence of *Shigella* infections. It is suggested that increased water availability preferably through piped supply, could be utilized as an efficient control mechanism over the occurrence of *Shigella* infections.

Holmes IH see Schnagl RD

Holmgren J see Glass RI

Hossain B see Khan MU

Hughes JM see Boyce JM

Huq I see Ahmad K

Huq I see Martin AR

Hussain A see Aziz KMA

Imperato PJ. Cholera in Mali and popular reactions to its first appearance. *J Trop Med Hyg* 1974 Dec;77(12):290-6

This study documents the developments of popular ideas about the cause, nature, prevention and treatment of cholera which was completely unknown to a general population, who possessed a firm and elaborate complex of traditional medical beliefs and practices. The observations were made in the latter half of 1970 and from 1971 to 1973 during the course of extensive cholera prevention and treatment programs throughout Mali. Information was gathered among various socio-economic and educational levels of society and among major ethnic groups. In November 1970, cholera first appeared in Mopti a town in central Mali, and later spread in epidemic proportions throughout the country. The Muslims believed that cholera epidemic occurred for not being fastidious enough in religious practices. The animists believed that cholera occurred due to the wrath of ancestors, spirits, supernatural beings, sorcerers and witches. Cholera vaccine was viewed by virtually all groups as the most effective preventive measure. This attitude was to a large degree attributable to the successful demonstration of measles and smallpox vaccines between 1967 and 1970. The seriousness of cholera, its high case-fatality ratio, high degree of communi-

Anthropological Studies

cability and the absence of proven traditional curative measures for treating it were strong incentives to individuals to go for vaccination. The traditional practitioners were not familiar with cholera and made little attempt to prevent and treat it until it appeared in an epidemic form.

Indrasuksri T see Vathanophas K

Islam MS. Socio-economic differentials of diarrhoea morbidity and mortality in selected villages of Bangladesh (abstract). In: Proceedings of the Second Asian Conference on Diarrhoeal Diseases, Calcutta, 21-24 Feb, 1983. Calcutta: National Institute of Cholera & Enteric Diseases, 1983:68

Socio-economic differentials of diarrhoea incidences and mortality were investigated in a population of 15,773 in Matlab study area, Bangladesh. Three separate data sources were utilized: (1) data of a UNICEF-CRL (Cholera Research Laboratory, now ICDDR,B) collaborative study on the impact of hand-pump tube-wells on health as measured by diarrhoea episodes in 11 of the 12 villages in 1975 (2) field diarrhoea death reports of the study area for the same year; and (3) the socio-economic data collected in a periodic census by ICDDR,B in 1974. The variables used include age, religion, education and occupation of heads of households, ownership and type of dwelling house, number of cows, goats and certain other articles, and receipt of remitted money. Significant variations were found in diarrhoea incidence and mortality rates with socio-economic status. The relationship between diarrhoea incidence rate and socio-economic status was not consistent. There was, however, an inverse relationship between diarrhoeal mortality rate and socio-economic status. This inverse relationship was evident in all the study age groups - 1-4, 5-14, 15-44 and 56 +.

Ismail R, Nazir M, Djamil H, Bakri A, Pardede N. Community practices in managing diarrhoea disease in rural area of south Sumatra, Indonesia. In: Program, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun, 1985. Bangkok: Mahidol University, 1985:254

Jahan K see Ahmad K

Jain NK see Kumar V

Jalil F, Kausar, Farooqi FA. Diarrhoea in a field situation and attitudes of mothers. *Pak Pediatr J* 1980 Mar;4(2-3):110-5

A re-assessment of the field situation, and attitude of parents towards diarrhoea amongst children aged under 5, 210 rural Pakistani mothers who had deliveries in the preceding 5 years were selected for study from 30 random clusters spread over a population of 45,000. These mothers were asked about the number of episodes of diarrhoea and diarrhoeal deaths in the preceding year, the feeding practices under ordinary circumstances and during diarrhoea, medical attention given, and their attitude towards diarrhoeal illness. Diarrhoea was found to be a major ailment, with an average of 1.15 episode per child lasting for more than 5 days in 40% of the cases. It was responsible for about 39% of deaths amongst children under 5 who also showed third degree malnutrition in 78% of the cases. Nearly 38% of mothers stopped all food during diarrhoea. Methods of keeping the bottle clean were unsatisfactory in nearly 100% of the cases. Greater field activities by pediatricians as part of the maternal and child health (MCH)

Anthropological Studies

program is recommended.

Jephcott AE, Barton BW, Gilbert RJ, Shearer CW. An unusual outbreak of food-poisoning associated with meals-on-wheels. *Lancet* 1977 Jul 16;2(8029):129-31

Johnson CA. Infant diarrhea and folk medicine in South Texas. *Texas Med* 1979 Jan;75:69-73

Diarrhoea is the most common clinical ailment among Mexican-American infants in South Texas; yet, few physicians are aware of the popular folk beliefs which provide both practical and supernatural explanations for causes and remedies of infant diarrhoea. This article narrates five main causes of infant diarrhoea, according to the folk medical system. They are illustrated in interviews with four knowledgeable and concerned Mexican-American mothers. In the folk system, the most common cause of diarrhoea is thought to be the hot-cold imbalance. As seen through the interviews, diarrhoea is a "cold" illness and must be balanced by "hot" treatments.

Kapikian AZ see Brandt CD

Kauser see Jalil F

Kaushal R see Kumar V

Kendall C, Foote D, Martorell R. Anthropology, communications, and health: the Mass Media and Health Practices Program in Honduras. *Hum Organ* 1983 Winter; 42(4):353-60

The Mass Media and Health Practices Project was designed to implement and evaluate cross-culturally a diarrhoeal disease control program using radio, print materials, and face-to-face contact. This paper describes Honduras' health problems and their initial program planning. The village ethnographic appraisal found that four major etiologies are often ascribed to diarrhoea by rural Honduran informants; (1) worms; (2) evil eye; (3) sunken fontanelles; (4) indigestion. It was observed that if folk etiologies of diarrhoea could be linked to dehydration, then a possibility existed for integrating ORT into folk medical treatment. Adopting an ethnomedical perspective, the paper discusses local-level resistance to ORT and demonstrates the way in which culturally appropriate materials were incorporated into program planning. The paper discussed the way in which this shift parallels recent changes in models of communication and health education. This paper does not imply that users are the major source of resistance to ORT or that all current local practices are necessarily harmful. In Honduras, as in other parts of the world, tea, rice water, and other hydrating solutions are used for many diarrhoeas. In addition, Hondurans make use of cosmopolitan health facilities when available. However, a number of apparently non-beneficial or harmful strategies for coping with diarrhoea also co-exist.

Khan M. Intervention of shigellosis by hand washing. In: Rahaman MM, Greenough WB, III, Novak NR, Rahman S, eds. *Shigellosis: a continuing global problem; proceedings of an international conference, Cox's Bazaar, Bangladesh, 15-20 Jun 1981*. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1983:227-37

A study reports on the impact of a simple intervention of hand washing with

Anthropological Studies

soap and water on the occurrence of secondary infection of clinical cases of *Shigella* within families of some neighborhoods in Dhaka, Bangladesh.

Culture-positive cases were selected from the hospital for a 10-day follow-up. Controls matched for age, socio-economic status and neighborhood were selected. The study families were provided with 2-4 pieces of soap and 2-3 earthen pitchers. Members of all the study families were advised to wash hands with soap and water after cleaning the anal region with water after defecation and before meals. Compliance was checked by observing size of the soap and extent of water use. Rectal swabs of family members were collected daily for culture.

The overall secondary infection rate in the study group was 10.4% and the control group 32.4%. The secondary case rate in the study group was 2.2% and in control group 14.2%. The results point out an important effect of a simple and inexpensive intervention that is easily understood and implemented by families, even in the unsanitary environments.

Khan M, Mosley WH. The role of boatman in the transmission of cholera. *East Pak Med J* 1967 Apr;11(2):61-5

Prospective studies were conducted in village "Rayer Bazar", in Bangladesh, to explore the possible sources and carriers of spread of cholera infection. After three years of cholera surveillance in this community, it was observed that all the reported cases occurred in areas adjacent to the canals in the community at points of heavy boat traffic. Almost all the cases used canal water. In 1966 a prospective bacteriological surveillance of boatmen entering this area detected 3 cases and 2 inapparent infections among 850 individuals. The diarrhoeal stools from the cases entered the canal used by the adjacent community and led to 65 additional cases.

This study showed that the canal was repeatedly inoculated by the visiting boatmen. These boatmen in turn again carried the infection to distant parts during the course of their journey. The boatman's views on cholera was noted by the authors. They opined that cholera was a curse from God which none could resist. If they contracted cholera, they visited first the local religious person or a homeopath. They considered the modern allopathic treatment as costly and painful. They disliked inoculation as it disabled them.

The role of boatman as contacts and carriers is indicated by the fact that there is less cholera in the non-riverine parts of North Bengal, and more in the riverine eastern and southern parts of the country.

Khan MR see Curlin GT

Khan MR see Glass RI

Khan MR see Khan MU

Khan MU, Khan MR, Hossain B, Ahmed QS. Alum potash in water to prevent cholera (letter). *Lancet* 1984 Nov 3;2(8410):1032

Since cholera is primarily transmitted by water, this ICDDR,B study carried out in Bangladesh, examines the efficacy of a traditional water purification practice used in the Indian subcontinent - namely, mixing a pinch of aluminium potassium sulphate (alum potash) into each pitcher of household water. Half the

Anthropological Studies

families of index cholera patients were randomized to an alum potash group to whom alum was supplied, teaching them how to use it (500 mg/L). Significantly fewer ($p < 0.05$) family contacts using alum became infected (23/238) than the controls (47/265). Alum potash flocculates suspended materials, but, the primary mechanism of alum's bactericidal activity appears to be acidification. *In vitro* experiments showed that alum treatment of pond water lowers its pH from 7.5 to 4.1 and kills all *Vibrio cholerae* O1 within 3 h. Killing of *Shigella* spp. and *Escherichia coli* takes longer. The study demonstrates that alum potash can significantly decrease secondary infection rates during cholera outbreaks. In Bangladesh, alum is cheap (1 US cent for 20 L water) and widely available. Decontamination of domestic water with alum during cholera epidemic is recommended.

Khan MU, Mosley WH, Chakraborty J, Sarder AM, Khan MR. The relationship of cholera to water source and use in rural Bangladesh. *Int J Epidemiol* 1981 Mar; 10(1):23-6

To identify the relationship between the water use pattern and the incidence of cholera, the cholera experience of a sample of families in Matlab, a rural area of Bangladesh, was studied in relation to water supply and use. The findings revealed large variations in the incidence of cholera according to the source of water and its use. Tanks were the primary source for 65% of families, canals for 20% and the river for 14%. The highest attack rate was associated with access to canal water (13%). Attack rates did not vary markedly according to the purpose for which a source was used. It was found that the risk of cholera was high if surface water was used for any purpose, confirming earlier observations in an urban setting. The importance of cultural patterns in water use was identified. The demonstration of close links between water use and the risk of cholera made it evident that in any setting, the only effective means of cholera control requires provision of a protected water supply for all household uses, and a change in practice so that water is not ingested from contaminated sources.

Khan MU, Shahidullah M. Role of water and sanitation in the incidence of cholera in refugee camps. *Trans R Soc Trop Med Hyg* 1982;76(3):373-6

To elucidate the possible roles in cholera transmission of open uncovered latrines, without pit, and the use of pond water, as compared to covered latrines and chlorinated pipe water, the authors followed the incidences of cholera in three major refugee camps during the cholera epidemics at Dhaka, Bangladesh, in 1974 and during 1975. The study population consisted of cholera cases admitted to the ICDDR,B hospital from three refugee camps. In the one camp with sanitation facilities, the cholera rate was 1.6 per 1,000, whereas in the two camps without these facilities the rates were 4.0 and 4.3 per 1,000. Following closure of the camps, the cholera rates decreased significantly in the camps' geographical zones. Cholera was not totally eliminated, even in the one camp with sanitation facilities, suggesting that health education, as well as proper sanitation, is necessary to eradicate cholera.

Khan MU see Boyce JM

Kim HW see Brandt CD

Klasmer R see Cohen J

Koornhof HJ see Schoub BD

Kronmal RA see Mata L

Kumar V, Clements C, Marwah K, Diwedi P. Beliefs and therapeutic preferences of mothers in management of acute diarrhoeal disease in children. *J Trop Pediatr* 1985 Apr;31(2):109-12

Maternal beliefs and therapeutic preferences in treatment of diarrhoeal diseases in rural and urban settings in North India were studied through a questionnaire and interviews. The impact of health education and ORT on existing beliefs and therapeutic preferences was also evaluated. The major findings from amongst 800 mothers were: (a) lack of concern for watery stools, (b) widespread restriction of fluids and foods, (c) preference for injections, and (d) the use of opium and purgatives for treatment of diarrhoea. Irrational beliefs and inappropriate therapeutic preferences were common amongst the rural mothers, illiterate women, and amongst those interviewed who resided in villages with no health center. ORT and health education were well accepted and understood in villages where they were introduced. Health education, highlighting the correct practices and discouraging those harmful could serve as important entry points in diarrhoea treatment in developing countries.

Kumar V, Kaushal R, Aggarwal G, Wadhwa SS. Impact of ORS on knowledge, attitudes and practices of mothers regarding management of acute diarrhoea in children. In: Programme and abstracts of the Second Asian Conference on Diarrhoeal Diseases, Calcutta, 21-24 Feb 1983. Calcutta: National Institute of Cholera & Enteric Diseases, 1983:61

Kumar V, Monga OP, Jain NK. The introduction of oral rehydration in a rural community in India. *World Health Forum* 1981;2(3):364-6

The Department of Community Medicine of the Postgraduate Institute of Medical Education and Research, Chandigarh, India, collaborating with a district primary health centre in Haryana State, successfully introduced oral rehydration therapy, combined with health education, in diarrhoeal disease treatment, as part of a rural area's health services. Teaching materials and a methodology were developed to increase acceptance and efficacy of ORT among 112,000 people in 158 villages. The standard WHO-recommended glucose-electrolyte mixture was used, pre-packaged at a central point into two polythene bags (one containing only bicarbonate), to prolong shelf-life. These were sent to village volunteers, along with smaller bags, plastic measures and a cheap (US \$ 2.50) sealing machine. Volunteers were able to prepare more than 100 packets daily, each costing about US 4 cents. Requirements varied with season, from 1,000 to 2,000 packets monthly. Trained in small groups were 350 community health workers who trained mothers, primary school teachers and community elders, in home management of diarrhoea. Folk media, such as fairs and puppet shows, were used to inform the public about ORS. The results: repeated health worker training is important. Rural mothers' attitudes about and hence treatment of diarrhoea improved, as well as knowledge among teachers and children. An indication was the finding that the diarrhoea fatality rate in six villages was 1:267, compared to 1:50 in villages where ORS had not been introduced. There also was a dramatic drop in diarrhoea referrals. Factors influencing these successes were use of the available health infrastructure; community involvement; simplification of ORS by using local volunteers to package and deliver; integration of the program into the available health care delivery system; repeated staff retraining; and use of folk media and existing educational facilities to inform about ORS. Still, many operational problems need to be solved, to find the best way of bringing such technical advances to the populations most in need.

Anthropological Studies

Kumar V, Monga OP, Walia IJ, Jain NK. Knowledge and attitudes of health workers in the community regarding treatment of acute diarrhoea in children. In: Rahaman MM, Aziz KMS, Rahman S, eds. Proceedings of the First Asian Conference on Diarrhoeal Disease, Dhaka, 16-20 Feb 1981. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1982:202-11

The knowledge and attitudes of health workers trained on various aspects of diarrhoea was assessed through interviews. As part of the outreach activities of the health care system, workers were assigned to a backward community development block in Haryana State, India, with a population of 112,000 in 158 villages. Knowledge of community health volunteers (CHV) who were trained repeatedly was better than those who received minimal training. The performance of male multipurpose health workers was poorer in comparison to female multipurpose health workers. There was considerable variation amongst different categories of health workers on their ability to diagnose malnutrition. In spite of repeated training, the health workers did not remember the signs of severe dehydration and a large number of them continued to restrict food and breast feeding during and after diarrhoea.

Kumar V, Clements C, Marwah K, Diwedi P. Maternal beliefs regarding diet during acute diarrhoea. *Indian J Pediatr* 1981 Sep-Oct;48(394):599-603

An attempt was made to learn prevalent maternal beliefs among rural and urban mothers in North India, regarding preferences and restrictions of foods and fluids during acute childhood diarrhoea. Used were six randomly chosen rural villages, from each of which 100 mothers with children below age 3 were randomly selected for interview. Also, 200 urban mothers with children below age 3 were chosen from among visitors to a medical research institute at Chandigarh. Although malnutrition was perceived as a diarrhoea complication by 68% of the mothers interviewed (no differences amongst urban and rural groups), food restriction was practiced by 98% of the 800 mothers. Harmful beliefs, such as lack of recognition of dehydration, were found in 89% of mothers. Commonly excluded foods were chapatis (bread), pulses (lentils), certain fruits and vegetables, meat and eggs. Milk administration was restricted by 70.8% of mothers, while tea was restricted by 25.1% and water by 4.5%. The mothers placed reliance on khichari (cooked rice/pulse combination) moong dal (a lentil), banana and wheat porridge. Fluids, such as herbal tea, were considered appropriate by 31.5% of mothers, mint water by 16.6% and buttermilk by 13.2%. Considered helpful were a number of home remedies, including such herb/spices as fennel, cardamon, harad and ajwain, boiled in water singly or in combination, and administered in small amounts in a concentrated form. Thus, it was found important to introduce an appropriate health education program concerning foods and fluids during treatment of diarrhoea, to prevent dehydration and malnutrition.

Kumar V see Real M

Kushlick E see Schoub BD

Lapham SC see Castle SP

Limsuwan A see Sakdisiwasdi O

Anthropological Studies

Lozaff BK. Infection & disease in South Indian families: beliefs about childhood diarrhoea. *Hum Organ* 1975;34:4,35,58

McCormack WM, Mosley WH, Fahimuddin M, Benenson AS. Endemic cholera in rural East Pakistan. *Am J Epidemiol* 1969 Apr;89(4):393-404

The pattern of cholera in an endemic area of rural East Pakistan (now Bangladesh) is described. Cholera has a definite season, with most cases occurring during December and January, with a second epidemic during May, June and July. The overall pattern was of widely scattered cases of clinical cholera. The attack rate was highest in children under five years and this declined with age. The attack rate was over 10 times greater in young children than in adults over age 30. The attack rates were higher among males than females in the 0-4 age group and higher among adult females than adult males. None of the differences are statistically significant. The attack rates were higher among Hindus than among Muslims during each season. Most adult male Hindus are fishermen. It is possible that the fishermen unduly risk infection with *V. cholerae* while living on their boats and that they bring the infection with them when they return to their villages. The secondary infection rate was highest among children under five years, and declined with increasing age. The fact that many of these younger children with cholera remain at home may be of importance in the transmission of the disease, since, of any age group, they would be the most potential spreaders. The role of women in the care of children, particularly of those who are ill, may contribute to the higher case rate among adult women.

MacKay-Scollay EM see Schnagl RD

McNeilly J, Cicchini C, Oliver D, Gracey M. Infectious disease in aboriginal infants and children in Western Australia. *Med J Aust* 1983 Nov 26;2(11):547-51

Mahadik VN, Mbomena J. Impact of health education programme on knowledge, attitude and practice (KAP) of people in cholera affected areas of Luapula province-Zambia. *Med J Zambia* 1983 Apr;17(2):32-8

Maina-Ahlberg B. Machakos Project Studies. Agents affecting health of mother and child in a rural area of Kenya. XII. Beliefs and practices concerning treatment of measles and acute diarrhoea among the Akamba. *Trop Geogr Med* 1979 Mar;31(1):139-48

This sociological investigation was conducted within the framework of a medical research project in a rural area of Kenya. It aimed at identifying what mothers believe about measles and diarrhoea and what they do when their children contract these diseases. Perceived etiological notations about measles and diarrhoea were found to influence beliefs held and this led to their being classified among 'God's diseases', a classification which influenced adherence to traditional practices as well as the degree of acceptability to seek modern treatment methods.

It was found that mothers used modern medical care exclusively in 50 percent of measles cases and 63 percent of diarrhoea cases. In 48 percent of measles cases and 28 percent of diarrhoea cases, mothers combined modern and indigenous care. Use of indigenous care only was rare. Withholding of water and milk from children with measles was practiced by 62 percent of the mothers in the total sample.

Anthropological Studies

Variables like age and education did not influence the type of medical care the mothers chose, but they did influence use of certain traditional practices. Younger and better educated mothers were found to follow these practices much less than those older and less educated. It has been pointed out that health education programmes should not only advocate the adoption of new practices, but should also try to find ways of minimizing the conflicts which may arise between traditional and modern practices.

Manderson L. Socio-economic and cultural correlates of gastroenteritis amongst infants and small children in Malaysia. *J Trop Pediatr* 1981 Jun;27(3):166-76

A number of socio-economic and cultural variables related to the hospitalization of infants and small children with acute diarrhoea in Malaysia are identified. Based on data recorded in patients' files, 346 cases were studied between July 1977 and June 1978. At times some data were incomplete. Education was recorded for the parents of 109 patients; 6% of fathers and 14% of mothers had received no formal education; 52% and 59% respectively had received a primary education only, 37% men and 27% of women had some secondary schooling. The majority of fathers for whom occupation was given were employed in service occupations, in laboring or odd jobs, or in industrial, transport, or sales occupations. Only a few men were working in professional or clerical occupations. Consistent with education and occupation, the majority of men (91% of 150 cases) earned M \$ 500 or less per month (=US \$ 230); 39% earned \$ 200 or less per month (of the mean rural income in 1976 of \$ 286 per month). The children hospitalized with acute gastroenteritis during the study period tended to come from lower socio-economic backgrounds. The majority of families had 1-3 children (76% of 267 known cases). Family size ranged from 1-11 children (mean 2.76, median 2).

Birthweight correlated with neonatal problems: the lower the birthweight, the higher the incidence of problems during the first month of life. 27% of infants with neonatal problems (14) were even less than 1 month old at time of admission to hospital and their neonatal problems had either contributed to or led to their hospitalization; infants with neonatal problems accounted for 74% of all neonates admitted to the gastroenteritis ward. Data on infant feeding practices were available for 244 patients. 29% had never been breast-fed, 20% were weaned within their first month of life, 9% were introduced to artificial milk within the first month although supplementary breast-feeding continued for up to 7 months. The significant variables identified in this study are demographic, economic, social and cultural.

Mangklasiri R, Pichipat V, Varavithya W. Effectiveness of diarrhoea diseases surveillance by village health volunteer. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:257

Martin AR, Mosley WH, Sau BB, Ahmed S, Huq I. Epidemiologic analysis of endemic cholera in urban East Pakistan, 1964-1966. *Am J Epidemiol* 1969 May;89(5):572-82

A combined retrospective and prospective analysis of 983 hospital patients with *Vibrio cholerae* infection was carried out in an urban cholera endemic area. The data indicate that despite the complexity of the urban population, certain patterns of infection are discernible. Cholera was sharply seasonal, the outbreaks reaching their peak in November and December and virtually disappearing during the summer monsoon. The larger epidemic curve was made up of many small, localized outbreaks, and there was a tendency for cholera to appear in a given area for a limited time. In each locality most of the cases occurred in a two-to three-

Anthropological Studies

month period. The outbreaks tended to localize in communities which shared facilities for water, food, and sanitation. Multiple members of families were often infected in what appeared to be common-source outbreaks. The secondary attack rate in the families was 4.2 per cent. Family outbreaks were seen in only six of 87 (6.9 per cent) families where adult males were the first cases; however, multiple cases occurred in 56 of 263 (21.3 per cent) families in which women or children were the first cases.

Martorell R see Kendall C

Marwah K see Kumar V

Mata LJ, Kronmal RA, Garcia B, Butler W, Urrutia JJ, Murillo S. Breast-feeding, weaning and the diarrhoeal syndrome in a Guatemalan Indian village. *Ciba Found Symp* 1976;42:311-38

Mata LJ, Urrutia JJ, Gordon JE. Diarrhoeal disease in a cohort of Guatemalan village children observed from birth to age two years. *Trop Geogr Med* 1967 Dec; 19:247-57

Mata L, Simhon A, Urrutia JJ, Kronmal RA, Fernandez R, Garcia B. Epidemiology of rotaviruses in a cohort of 45 Guatemalan Mayan Indian children observed from birth to the age of three years. *J Infect Dis* 1983 Sep;148(3):452-61

Mbomena J see Mahadik VJ

McClean SJ see Cutting WA

Menchaca FJ. [Economic, sociocultural and health aspects of acute diarrhea in children]. *Salud Pública Mex* 1973;15:337-60

Mendoza O see Evangelista TA

Merson MH see Black RE

Miliotis MD see Schoub BD

Miller S see Schoub BD

Mjlonas S. [Child health care among Turkish immigrants - an attempt to bridge cultural cleavages]. *Nord Med* 1978 Jun;93(5-6):126-8

Mondal S see Sircar BK

Monga OP see Kumar V

Moodie AD, Wittman W, Truswell AS, et al. Socio-economic factors in the aetiology of gastroenteritis and their relationship to the health services. *S Afr Med J* 1965 Jun 19;39:498-501

Moore HA, De La Cruz E, Vargas-Mendez O. Diarrhoeal disease studies in Costa Rica. IV. The influence of sanitation upon the prevalence of intestinal infection and diarrhoeal disease. *Am J Epidemiol* 1965 Sep;82(2):162-84

Anthropological Studies

Morris RJ. Religion and medicine: the cholera pamphlets of Oxford, 1832, 1849 and 1854. *Med Hist* 1975 Jul;19(3):256-70

Three great cholera epidemics of nineteenth-century Britain generated huge literature on the effects on individual towns and districts. The principal means of transmission of cholera was through water polluted by the excreta of affected patients. The low-lying parts of Oxford, UK, provided the ideal environment for the disease to spread. In 1832, eighty-six people died. In 1849, forty-four died, a reduction in part caused by the better drainage. The total rose in 1854 to seventy-eight, some of the increase being due to the occupation of houses on the poorest land. On each of these epidemics three cholera pamphlets were written. The first pamphlet displayed a blend of moral and physical explanation. The writer of this pamphlet advised the Board of Health to look "for moral and religious guidance as to various indulgences, imprudent negligences and generally as to things done or omitted either positively or probably injurious to health". After surveying the "peculiarities of the soil, sanitation, water and atmosphere" of the areas worst affected, he blamed the disease on bad drainage, crowded housing, lack of ventilation, dirty streets and "the destitute state of the poor". He recommended better street cleansing, improved sewers and water supply, and "the amelioration of the conditions of the poor". The second cholera pamphlet was a carefully tabulated statistical summary of the epidemic, and then a street-by-street account of the cases, with a description of the condition of the areas affected. The statistics were presented to make comparisons possible, 1832 with 1849. The authors of the Oxford report on the 1849 epidemic found little relationship between cholera and occupation, but a strong link between cholera and poverty; 122 out of 144 cases were "proper objects of charity," as were 140 out of 174 in 1832. The Oxford doctors then went on to use these local findings and their implications as part of a campaign for the improvement of drainage, cleansing, sewerage and water supply in Oxford. The memoir of the 1854 cholera at Oxford was published after the third epidemic, the author of which combined the religious and scientific factors and recognized the value of Snow's theory that cholera was communicated by water polluted by cholera patients' excreta. He viewed cholera as divine punishment. As long-term remedies, the author suggests sanitary reforms to be accompanied by a wide program of religious, educational and intellectual improvement.

Mosley WH see Khan M

Mosley WH see Khan MU

Mosley WH see McCormack WM

Mosley WH see Martin AR

Munshi MH see Rahaman MM

Murillo S see Mata L

Muthu PA see Yap KL

Nalin DR, Haque Z. Folk beliefs about cholera among Bengali Muslims and Mogh Buddhists in Chittagong, Bangladesh. *Med Anthropol* 1977 Summer;1(3):56-68

Anthropological Studies

Bengali Muslims and Mogh Buddhists in rural Chittagong, Bangladesh, believe that cholera is brought by supernatural beings, and have developed traditional methods of warding off the disease. The Bengali communities consist of a Muslim majority and Hindu and Buddhist minorities. Mogh tribespeople (Buddhist) are concentrated in specific localities along the coast. During interviews with villagers it was apparent that Bengalis and Mogh tribespeople were familiar with cholera as a disease associated with watery diarrhoea, cramps, thirst, cold, clammy skin, and vomiting. Comparison of traditional Muslim and Buddhist beliefs and practices regarding cholera suggests that empirical awareness of epidemiologic factors may reinforce and shape the traditions. The practice of protecting the home by visibly redefining its boundaries, posting consecrating signs, and temporarily restricting individual traffic into or out of homes was shared by the two cultural groups affected during the epidemic, and this suggested that they had borrowed traditions from one another. The Muslim and the Buddhist rites functioned as a quarantine by preventing contamination of the compound by sick patients and asymptomatic carriers from outside; but in comparison with the duration of cholera epidemics, the restrictions imposed were too brief to offer much protection from such contamination. Since cholera epidemics typically last only three months, institutions of traditional quarantine when one or two months have already elapsed may appear to "control" the epidemic, which wanes shortly thereafter. The authors observe that a similar explanation may account for the continuation of ineffective international cholera quarantine procedures into modern times, and for the persistent use of cholera vaccine, which is now known to be useless for control of epidemics.

Nanna P see Sakdisiwasdi O

Nanda M see Real M

Naumer SA see Rukmono B

Nazir M see Ismail R

Nims LJ see Castle SP

Noche ML Jr. Environmental factors in diarrhoeal diseases in the Philippines. *Southeast Asian J Trop Med Public Health* 1982 Sep;13(3):352-6

In 1977 in the Philippines, diarrhoea was the second highest cause of child morbidity and mortality, particularly among undernourished children aged under six. Poor personal hygiene; lack of supervision of food handlers; and poor maternal nutrition, coupled with unhygienic and poorly practiced shifts to bottle feeding, usually against a background of poverty, were identified as the major diarrhoea-causing factors. To reduce diarrhoeal morbidity and mortality in such developing countries, there must be joint private/government sector efforts, aimed at improving socio-economic conditions; integrating preventive and curative efforts into the health care delivery system; health education especially concerning personal cleanliness; and intensified efforts towards surveillance of environmental problems. Moreover, present health priorities must be reassessed, to give a meaningful direction to current efforts and resources. An adequate water supply was found to be critical for the maintenance of health and sanitation, and essential to solving diarrhoeal disease problems. Primary health care providers must be aware of the existing relationship between these environmental determinants and socio-cultural factors, educational levels and prevailing situations created by poverty. Education is needed for food handlers, food establishment managers and consumers, concerning simple personal cleanliness procedures and the importance

Anthropological Studies

of periodic health supervision. Accurate reporting and the immediate treatment of food handling personnel who are ill should be enforced. Intensification of efforts toward the surveillance and epidemiologic aspects of these environmental problems should be coordinated and collaborated with all government and non-governmental agencies, with full participation by the public. Such efforts should take into consideration local resource limitations.

O'Connor BF see Cripps A

Old HN. Sanitation problems of the American Indians. *Am J Public Health* 1953 Feb;43(2):210-5

The author in June, 1950, was assigned as a full-time sanitary engineer-consultant for the purpose of securing factual information and developing a sanitation program. Since then sanitary surveys have been made at all the larger reservations and many non-reservation installations - some 45 or 50 locations in the United States. The visual observations have been supplemented by discussions with agency and area (regional) staffs, tribal councils, and individual Indians as well as state and local health officials. The surveys confirmed the belief of the writer that sanitation services among the Indians must take into account primarily home and community conditions rather than stop at bureau installations. At a home within a Wisconsin reservation where one child had died and several others had been hospitalized due to dysentery, there was no well and no privy. In this instance good water was available at a depth of 30 or 40 feet. Very few Indian homes had water supply under pressure.

Oliver D see McNeilly J

Omer RI see Cutting WA

Oseasohn RO see Benenson AS

Pal SC see Sircar BK

Pardede N see Ismail R

Parrott RH see Brandt CD

Patwari (Patwary) Y see Rahaman MM

Patwary Y see Aziz KMA

Phijaisanit P, Teinchai S, Sunakorn P, Boonyaratapun P. Relationship of socio-economic status to severity and care of diarrhoeal diseases in infant. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:279

Phurapradit P, Chotisankasa S, Prapatpong S, Varavithya W. Changing maternal knowledge, attitude and practice in the management of infantile diarrhea. In: Diarrhoeal disease abstract. Bangkok: Mahidol University, 1983:33

Anthropological Studies

Pichipat V see Mangklasiri R

Prapatpong S see Phurapradit P

Premisrat S, Varavithya W. Language and diarrhoea diseases. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:259

Pridan D see Cohen J

Prinz A, Hinrainer-Wilfing C, Renoldner K. [Parasitological results of a medico-anthropological research work at the Azanda in northeast - Zaire (author's transl)]. *Wien Med Wochenschr* 1979 Dec 15;129(23):674-8

Rahaman MM, Aziz KMS, Munshi MH, Patwari Y, Rahman M. A diarrhea clinic in rural Bangladesh: influence of distance, age, and sex on attendance and diarrheal mortality. *Am J Public Health* 1982 Oct;72(10):1124-8

Attendance rates at a free service diarrhoea clinic were monitored in a defined population in rural Bangladesh. Weekly home visits were carried out to determine diarrhoeal attacks in communities within six miles of the clinic. Within the first one mile radius, 90 per cent of diarrhoeal cases came to the clinic for treatment. At two miles, the attendance fell to 70 per cent for males and 40 per cent for females. It is observed that certain cultural traits may explain the difference in attendance rate by males and females at the clinic during the infancy and early childhood. On an average, the greater the distance to the clinic, the more severe was the degree of dehydration on presentation, requiring more frequent use of intravenous fluid. Mortality secondary to diarrhoea was significantly reduced only within a two-mile radius of the clinic.

Rahaman MM see Aziz KMA

Rahman ASMM, Farooque ASG. Training the village practitioners as an intervention strategy for diarrhoeal diseases: report from a pilot project. In: Rahaman MM, Aziz KMS, Rahman S, eds. Proceedings of the First Asian Conference on Diarrhoeal Disease, Dhaka, 16-20 Feb 1981. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1982:244

Village practitioners, identified during a census in the project area, formed one of the groups who were selected for training on diarrhoeal management with particular stress on preparation and use of ORS prepared from locally available ingredients. This report describes some of the characteristics of these practitioners identified in a pre-training survey. The post-training effectiveness and the impact of the group in the project area, as regards diarrhoea management and ORS utilization, found through the surveillance system, is also reported. The project findings indicate that although most of the practitioners practice in allopathic medicine (83%), only about 12% have any medical education; more than 60% have practicing experience of 10 years or more, but only 40% of the practitioners have treated on an average 6-10 diarrhoea cases per month. The rest treated less than 5 diarrhoea cases a month. About 60% had no knowledge of oral rehydration and the rest had unacceptable ideas about its use. Within one year, after training, 109 trained practitioners treated 17% of the diarrhoea cases occurring within the project area. Of the patients treated by them, 84% were treated with ORS only.

Anthropological Studies

Hospital referral and case fatality were negligible.

Rahman ASMM see Faruque ASG

Rahman ASMM see Shahid NS

Rahman M see Rahaman MM

Rauyajin O see Varavithya W

Real M, Kumar V, Nanda M, Yanaja K. Beliefs and practices of urban mothers regarding "hot" and "cold" foods in childhood illnesses. *Ann Trop Paediatr* 1982 Jun;2(2):93-6

Beliefs and practices of 100 urban mothers regarding "hot" and "cold" foods during four common childhood illnesses were determined by using a pre-tested, partly-structured interview schedule. Diarrhoea was believed by 34% of mothers to be caused by excessive heat during summer, by 24% by excessive cold during winter and by 30% by overeating. During diarrhoeal disease 47% of mothers preferred to give "cold" foods and 32% restricted "hot" foods. All "cold" foods could be administered with the exception of melon and water melon which were thought to produce cholera. Prominent beliefs about "hot" and "cold" properties of various foods relate to food combinations and different methods of cooking and preserving which are believed to lead to a change in their properties. During illnesses, such beliefs assume a very important role because they lead to food restrictions and preferences, which if severely imposed, compromise the nutritional status of the child. It is important to understand the "hot" and "cold" effects of medicines commonly used and their interaction with foods in order to increase parental participation during therapy. The provision of dietary advice suitably modified in the local cultural context might help to reduce the widespread problem of malnutrition amongst children.

Reller LB see Rosenberg ML

Renoldner K see Prinz A

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Since 1974, the Medical Research Council (MRC), Dunn Nutrition Unit, has carried out a detailed epidemiological study of malnutrition in young children in Keneba of the Gambia, West Africa. It was demonstrated that in this community a major cause of morbidity and failure to thrive is diarrhoeal illness. The ecological factors bearing on the nature and spread of gastroenteritis fall into three broad categories; the physical environment, the social environment and host factors. In Keneba, humidity, rainfall, the availability of water, water pollution and the virtual absence of sanitation facilities appear to be the main components of the first group. Maternal deprivation seems to be a major social problem. The poor diet and nutritional status of the mothers impair lactation, so supplementary infant feeding is needed as early as the fourth month of age. The mothers lack knowledge and facilities for sterilizing feeds and for storing clean water, and the standards of child care and infant feeding are poor because of the exorbitant seasonal demands made upon them to work in the field; as a result, young children are repeatedly fed highly contaminated, poorly nutritious diets. The practice of breastfeeding well into the second year of life is a valuable support to children in such unhygienic surroundings, but the protection it gives declines or disappears during the second half of infancy. This probably results both because increasing quantities of contaminated material are consumed and because immunity is waning.

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The major factors determining the prevalence of salmonellosis and shigellosis are sanitary conditions and human carriers. Thus, a survey was done to determine the carrier rates of *Salmonella* and *Shigella*, as well as water use habits and sewage disposal, in two villages located along a canal in rural central Thailand. Stool or rectal swab samples collected from 931 individuals (45.4% children) were cultured for *Salmonella* and *Shigella*. The carrier rates in children under age 15 of *Salmonella* and *Shigella* were respectively, 4.9% and 1.2%; while the respective rates for the total population were 3.3% and 0.8%. Of the 8 *Shigella*-positive specimens, one was *Shigella sonnei* and the rest *Shigella flexneri*. Almost all *Salmonella* strains were sensitive to antibiotics commonly used. Only 6.4% were resistant to tetracycline, 3.2% to neomycin and nitrofurantoin. *Shigella* isolates were sensitive to colistin and nitrofurantoin; but all were resistant to chloramphenicol, 75% to tetracycline, and 25% to both ampicillin and a combination of trimethoprim-sulfamethoxazole. One-fourth of the families defecated in the river or canal or went to the field, and one-third dumped garbage in the river and canal. This contaminated water was used for drinking by 62.7% of all families, and only 28.1% treated the water by boiling. The disease vectors

Anthropological Studies

bothering the villagers - rats (58.8%), flies (12.7%), and cockroaches (32.0%) - served as important vehicles for cross-contamination. The diarrhoeal disease prevalence rate was 1,933 per 100,000. To treat diarrhoeal diseases, 61% used self-medication, 30% a village healer, and only 3% went to a district hospital. It was suggested that two things are important: identification and treatment with drugs of transient and chronic carriers; as well as sanitary disposal of human excreta and development of safe water supplies.

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Sarder AM see Khan MU

Sarker MAH see Faruque ASG

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Say BB see Martin AR

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This study identified and analyzes some beliefs and practices in diarrhoea associated with measles in rural Bangladesh. Eighty mothers whose children had measles in the past month were interviewed for beliefs and practices related to the management of measles and measles-associated diarrhoea. God's will rather than germs were believed to be the major cause of measles. Of the 60 mothers whose children had measles with associated diarrhoea, 48% believed that diarrhoea was caused by harmful wastes produced during measles and was therefore beneficial. Of the 126 children with diarrhoea 64 (51%) had watery and 62 (49%) had dysenteric

Anthropological Studies

diarrhoea; only 20 (16%) of the diarrhoea cases were treated with ORS. It was found that some mothers who would generally use ORS in diarrhoea were disinclined to do so for diarrhoea was associated with measles. The association of diarrhoea with measles is seen by the mothers as a process of cleansing and purification of the body and so no effort was made to treat such episodes. Rashes within and outside the body were believed to find their way out through mucus, blood and loose stool. Informing mothers that ORS will not stop diarrhoea, but will help in flushing out the wastes, could however, enhance ORS use. The prevalent belief, that measles patients must be kept in a clean environment, is useful and should be encouraged. Other beliefs and practices to hasten the eruption of measles rashes are neutral; since they encourage cleanliness and isolation, they too may be encouraged.

Shahid NS, Aziz KMA, Rahman ASMM, Faruque ASG, Bari MA. Beliefs and treatment related to diarrhoeal episodes reported in association with measles. In: Programme and abstracts of the Second Asian Conference on Diarrhoeal Diseases, Calcutta, 21-24 Feb 1983. Calcutta: National Institute of Cholera & Enteric Diseases, 1983:67

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Simhon A see Mata L

Sircar BK, Sengupta P, Mondal S, Gupta DN, Saha NC, Ghosh S, Deb BC, Pal SC. Effect of handwashing with soap and water on the incidence of diarrhoea in a Calcutta community. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:170

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Srinivasa DK, Afonso E. Community perception and practices in childhood diarrhoea. *Indian Pediatr* 1983 Nov;20(11):859-64

People's knowledge and beliefs of causes of diarrhoea in children, including feeding practices and treatment during diarrhoea was studied in 100 families having a child below five years of age selected randomly in an urban community of Goa, India. Mothers having children below 5 years of age were interviewed, using a specially prepared, pretested questionnaire. It was believed that consumption of certain food items by the child or their mother was responsible for diarrhoea. During diarrhoea, feeding was stopped by 83% of mothers as it was believed to increase diarrhoea. Initial treatment consisted of certain

Anthropological Studies

home made remedies. Younger and educated women preferred to consult a doctor or the local health facilities for treatment. There was lack of knowledge concerning fluid loss, dehydration and oral rehydration.

Still CS see Schoub BD

Sunakorn P see Phijalisanit P

Supasilapa S see Varavithya W

Suthienkul O see Vathanophas K

Svennerholm A-M see Glass RI

Talogo RW see Rukmono B

Teinchai S see Phijaisanit P

Teng PH. The role of foods in the transmission of cholera. In: Proceedings of the Cholera Research Symposium, Honolulu, Hawaii, 24-29 Jan 1965. Washington, DC: U S Government Printing Office, 1965:328-32

Cholera is stated as a disease of the intestinal tract of man only, the mouth being the portal; the epidemiology of cholera is basically, therefore, the various possible combinations of the four F's -- feces, fingers, fluids, and foods. There is a possibility that, at least in some instances, food assists in the onset of the disease by a change of the intestinal environment. This is observed more conspicuously during the increase in gastroenteritis and diarrhoeal diseases following festivals when more than the usual quantity and variety of foods are consumed. It is shown that generally food after cooking offers a more favorable medium for survival of the *Vibrio* than in the raw state, the main exceptions being leafy vegetables such as cabbage and spinach. This bears significance in an urban community where comparatively prolonged storage of prepared food is a common practice. In 1964, in Kowloon, Hongkong, the spread of diarrhoeal illness was traced to consumption of contaminated water from a restaurant's flushing well. Studies of possible connection between consumed water and foods which were contaminated and the spread of cholera vibrio, indicate that consumed food can act as a carrier of cholera vibrio and can transmit the disease. It is probable that the organism spreads widely following its introduction into the home by either a frank or an inapparent case, via food or utensils. The author notes that on occasions fish can be the vehicle of transmission and this has been referred to through an observation made in Hong Kong. It is concluded that cholera is mostly spread by water.

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Varavithya W, Rauyajin O, Supasilapa S. Socio-economic and cultural factors affecting diarrhoeal preventive and curative behaviors. In: Programme, papers and abstracts of the Third Asian Conference on Diarrhoeal Diseases, Bangkok, 10-14 Jun 1985. Bangkok: Mahidol University, 1985:286

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Walker SH. Race-associated differences in drinking behaviour. *Aust Paediatr J* 1983 Mar;19(1):165-7

An evaluation of the oral intake and the need for alternative therapy in aboriginal and white children hospitalized for diarrhoeal dehydration revealed significant differences in drinking behavior. Eighty-six white children and 34 Australian aboriginal children, who on admission were estimated to be more than 5% dehydrated, but did not require intravenous therapy, were studied. The study revealed significant differences in drinking behavior of these children, varying with racial and/or cultural backgrounds. In a prospective study, although treated by the same staff in the same manner, during the first eight hours after admission, white children had a mean oral intake of 2.9 mL/kg/hr (range 0.4-6.6, SD=1.6), whereas the aboriginal children had a mean oral intake of 6.1 mL/kg/hr (range 2.2-9.2, SD=2.1). Findings from this study can be useful in designing and administering rehydration solutions.

Anthropological Studies

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Yankauer A. Oral rehydration and social change: the control of diarrheal diseases in the third world. *Am J Public Health* 1982 Oct;72(10):1105-6

Yap KL, Sabil D, Muthu PA. Human rotavirus infection in Malaysia. II. A study on the influence of living standard on the prevalence of rotavirus-associated gastroenteritis in children hospitalized with diarrhoea. *J Trop Pediatr* 1984 Oct;30(10):269-71

The association between different living standards and the prevalence of rotavirus diarrhoea was examined in infants and children aged up to 6 years, hospitalized with diarrhoea in Kuala Lumpur, Malaysia. Stool specimens were tested for rotavirus by an enzyme-linked immunosorbent assay. Prevalence of rotavirus-associated gastroenteritis was higher in children from lower socio-economic classes. Disease prevalence was higher in large families. Hygienic home circumstances reduced the risk of rotavirus diarrhoea but the source of water supply used for drinking and washing and methods of human excreta disposal seemed not to be important factors in influencing the prevalence of the disease in this study.

Yolken RH see Brandt CD

Yunus M see Chakraborty J

Zimicki S see Chakraborty J

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