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EPIDEMIOLOGY OF ACUTE DIARRHOEAL DISEASES
OF INFANCY AND EARLY CHILDHOOD IN THE
EASTERN MEDITERRANEAN REGION

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1. Introduction

Inadequate, or lack of, surveillance of the diarrhoeal diseases in the developing world cloud our view of the magnitude of the problem in terms of morbidity, mortality and cost. Nevertheless, fragmentary data that are available provide a grim scenario - diarrhoeal diseases exact a formidable toll of lives and set the stage for a host of associated maladies that leave a lasting impact on the survivors. As shown in table 1 and from other data available, the current problem in the developing countries is comparable to that prevailing in the industrialized countries in the early part of this century.

2. Review of Data Available on the Magnitude of the Problem in the Eastern Mediterranean Region

- A. Data cited in a WHO publication indicate that the population of the 23 countries of the Region is about 240 million. The countries of the region vary greatly in size and population (200,000 to 73,000,000) and in levels of socio-economic development. In four countries infant mortality rates are below 50 per 1,000 live births; in seven, between 50 and 100; and, in twelve, between 100 and 200. Crude birth rates are between 30 and 50 per 1,000, crude death rates between 10 and 20 per 1,000, and life expectancy at birth from 30 to 50 years, in many closer to 50 years.

Children under five years constitute approximately 20 per cent of the population of the Region, and up to 15 years about 45 per cent. Their mothers represent another 5 to 10 per cent. However, children under five account usually for over one-third of all deaths, in 14 countries for 40 to 50 per cent.

In 1976 about 11 million children were born in the Region, of whom about 20 per cent will not reach the age of five years. Half of the children in the Region are inadequately nourished, and between 1 and 5 per cent are estimated to suffer from such severe malnutrition as to

seriously threaten their lives or impair their health if they survive.

In developing countries as a whole 30% or more of hospital beds are occupied by cases of severe diarrhoea.³ Unfortunately there is less information available in the scientific literature relative to the impact of the diarrhoeal diseases problem in the Eastern Mediterranean Region as compared to Latin America and South-East Asia, but there is every reason to believe the dimensions of the problem are equally grave. In South-East Asia the incidence varies from 1.5 to 12 per 1000 population of all ages, and in one study in Latin America these diseases account for 29% of 35,000 deaths due to all causes in children under age 5.

In the Eastern Mediterranean Region it has been estimated that out of eleven million children born each year approximately 2 million die. Of the 2 million deaths about 40%, clearly the leading cause, die of diarrhoeal diseases.⁴ Acute diarrhoeal diseases in infancy and early childhood are responsible for between 15 and 22 per cent of all mortality in the Region.

In Egypt in 1973, these diseases were the leading cause of death in children under three years of age accounting for 43% of all deaths in this age group. In all ages, diseases of the digestive system accounted for about a third of all deaths. Epidemiological studies showed that there were four episodes of acute diarrhoea per year in

children 6 to 36 months of age.

In Iran in 1973 diarrhoeal diseases were the second most prevalent diseases; the incidence was 22 per cent in the 0-5 years age group and 14 per cent in all age groups.

In Jordan, Saudi Arabia and Pakistan, these diseases are leading causes of hospitalization and deaths. In a survey conducted in two Pakistani villages, these diseases accounted for 80 per cent of morbidity and mortality of combined causes.

3. Etiologic Agents Responsible

The world's literature indicates that three diseases, cholera, shigellosis and typhoid, have had the focus of investigators' attention but in fact these collectively account for a very small fraction, perhaps 10 per cent, of all acute diarrhoeas. Recent etiologic studies in several countries have demonstrated pathogenic agents in about two thirds of cases of diarrhoea. This is a reverse of the previous situation in which pathogens were identified in only 20 per cent of studied cases. This is because several new agents have been incriminated as causes of diarrhoeal diseases in recent years. These include rotaviruses, now thought to be the single most important cause of diarrhoea in infancy, enterotoxigenic Escherichia coli, Vibrio parahaemolyticus, Yersinia enterocolitica, and Campylobacter species. The role these pathogens play in the cause of these diseases in this Region needs to be clarified by careful studies similar to those conducted in other areas.

Some species of salmonella, long recognized as leading enteric pathogens, are assuming increasingly important significance in this Region. Information from several countries of this Region shows a sharply rising incidence of salmonellosis particularly in the pediatric age group. In Kuwait there has been a striking rise in incidence of non-typhoid salmonellosis even as the incidence of typhoid fever decreases, suggesting this rise is not a laboratory artifact. The problem is serious in both community and hospital settings. Salmonellosis is becoming one of the leading

causes of hospital acquired infections. Particularly virulent and troublesome are strains of S. agona, S. wien, and S. typhimurium. The common finding of S. agona and S. typhimurium in poultry suggest there may be a causal relationship.

4. Mechanism of Transmission

Little information is available concerning the precise means of transmission of enteric pathogens in diseases that occur in the Region. It is probable that the chain of transmission is similar to that documented in other regions. Two primary transmission mechanisms appear to be operative, i.e., contact and common vehicle routes. The contact route is by faecal-oral contamination; it involves primarily the direct transport of enteric pathogens in faeces by hands to the mouth of the child or indirectly through fomites and insects. The common vehicle route is by contaminated food or water; it is similar to the contact mechanism in that faeces is the source but a vehicle of food or water conveys the infectious pathogen to the child. Both means of transmission are especially important in the weaning period. There is abundant documentation of the protective role of breast feeding in infancy. A 1978 study in the Region showed that Bahrain infants who were bottle fed were statistically at higher risk of acquiring cholera than control infants fed by breast. This study was important because of the unusually high attack rate in infancy in a disease that historically has spared infants. This is a result of an unfortunate social change, the abandonment of breast feeding by large numbers of women in the lower socio-economic group. In this group the opportunities for transmission of enteric pathogens are legion because of poor sanitary habits.

5. Clinical Implications

- a. Immediate - infants tolerate poorly fluid and electrolyte imbalances. The consequences of diarrhoea are far more serious than in older children and adults. This explains the urgent need for corrective treatment. Oral fluid rehydration in the context of primary health care is the practical approach for such treatment.

b. Short term sequelae

In early childhood the vicious cycle of infection and malnutrition has been dramatically documented in a study of children in Santa Maria Cauqué, a village in Guatemala.⁵

The conditions in that village were similar to those found in villages of all developing countries. The study showed that the lives of many young children consist of a series of acute illnesses superimposed on a chronic state of ill-health with the ominous ever-present threat of death. It has been persuasively shown that oral-fluid rehydration of these repeated episodes of diarrhoea in infancy can prevent malnutrition as well as the acute sequelae.

c. Long-term implications

Children who survive the repeated bouts of diarrhoea and the accompanying malnutrition may reach school age with compromised constitutions that predisposes to a variety of infectious diseases endemic in this Region, such as hookworm, ascariasis, schistosomiasis, tuberculosis, etc. Burdened by these diseases, the child's potential for education and preparation for adult citizenship are hampered. Loss of life of infants and young children has important implications for the family; it is clear that mothers are reluctant to accept family planning if the chances are small that a child will survive to adulthood.

6. The WHO Diarrhoeal Diseases Control Programme: a Rainbow after the Storm.

It has been well documented that, except in extreme cases, dehydration in all diarrhoeal diseases, regardless of etiology, can be safely and effectively treated and prevented at all ages simply by administering by mouth a single solution containing glucose (or sucrose) and salts. This same solution when combined with breast feeding contributes to better weight gain in infancy and thus reduces the ill effects of diarrhoea on nutritional status. Thus oral

fluid rehydration if adopted in the context of primary health care can prevent the awesome loss of life and the heavy burden of disease caused directly or indirectly by the diarrhoeal diseases.

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Table 1

Age-Specific Death Rates from Diarrhoea

Place and Year	Age-specific death rates per 100 000	
	0-11 months	1-4 years
New York 1900	5 603	398.7
New York 1961	45	2.4
Punjab 1959	3 466	312

From Gordon et al (1963) American Journal of Science, 245, 345