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SPECIAL ARTICLE

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# The Problem of Diarrhoeal Disease in Children\*

by

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## Abstract

*In Western Australia, diarrheal disease in Aboriginal children found in half cases of malnutrition, sugar intolerance in 25% of patients and approximately 50% showed high rates of infection and infestation. The most commonly isolated are Giardia lamblia, Enteropathogenic E. Coli, Salmonellaea and Shigellae.*

*The mortality rate of diarrhoeal disease is more than 5%, which is several times than white children. The cause of death are hypokalemia, hypoglycaemia, delayed rehydration treatment, the high incidence of malnutrition and sugar intolerance.*

*To improve and solving the problem the prime aim should be prevention by upgrading many factors including maternal nutrition, promotion of breast feeding, standard of living, nutritional and hygiene education and related socio-economic condition, the availability of skilled medical and nursing facilities.*

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In the tropics, the 'Big Three' killers of infants and children are diarrhoeal disease, respiratory infection and malnutrition (Jelliffe, 1970). Many gastrointestinal diseases still important in these children have been virtually eradicated from the now industrialized Western world where they were once rife, even up to the second half of last century. For example, Wharton (1975) has recently reminded us that the graveyards in Dudley, near Birmingham, U.K., were closed in 1832 because of an epidemic of cholera at the time.

Apart from specific gastrointestinal diseases such as typhoid, cholera and amoebiasis which are commoner in tropical regions, most gastrointestinal diseases seen there in infants and children are due to the synergistic effects of malnutrition and infection (Scrimshaw et al., 1968).

It is significant that the burden of gastrointestinal disease in children still seen in many countries was a feature of life in Australia and many similar countries, such as Britain and Western Europe, in the second half of the nineteenth century. In 1860 the Infant Mortality Rate in Australia was more than 150/1000. It is now less than 20/1000. Most of the improvement was due to upgrading of standards of living and hygiene, not to spectacular technological advances in medicine which are more recent.

In the new and struggling Swan River Colony (now Western Australia)

there were 1052 deaths in the British settlers from 1829 — 1855; 379 of them were children under six years of age and 88 of their deaths were due to gastrointestinal diseases, mainly dysentery. With improvements in standards of living such deaths are now rare in Australia except in the disadvantaged Aboriginal minority.

Similar improvements occurred in other countries. 'The development of cities in the middle ages had ill effects on health. Sanitation was primitive ... Intestinal diseases were endemic ... the mortality of the inhabitants declined as a result of a rising standard of living.

The general yearly death rate in London was 42/1000 from 1681 — 1690. It dropped to 35 in the 18th century, 25 in the period from 1846 — 1855 and about 12/1000 to-day. In this decline of the mortality of city dwellers, sanitation, the construction of new water supplies and sewerage systems played an important part (Sigerist, 1945). Lord Amulree (1973) has stated 'It was not until the cholera outbreaks of the 1850's that contaminated water was finally proved to be a source of much human disease. From this began the general improvement in water supplies for the metropolis ... (so that) in 1902 ... London had a public water supply which could compare with that of Ancient Rome, if not in quantity, at least in quality. However, Max von Pettenkofer has stressed that clean water and good sewerage are not all that is required ... 'It has become the fashion

city are determined exclusively by good sewerage, abundant water supply, and toilets ... (in applying the measures), we solve not even one-third of our problems .....

Our health is also determined, to a large extent, by nutrition ... housing conditions are also extremely important ... political and social conditions are also influential upon the health and mortality of a population.'

Despite the well known affluence of Australia and its high overall standards of living and health, a similar problem exists there. Over the past few years the patterns of disease, particularly gastrointestinal disease, seen in infants and children of the Aboriginal minority have been clearly shown to resemble those of children in the Third World rather than those of healthy, well fed white Australian children.

*Health standards in Aboriginal and white Australian children :*

The following are some examples illustrating the discrepancies in health standards between Aboriginal and white Australian infants and children;

(i) In Western Australia, Aborigines constitute about 2.5% of the population but account for much more than that proportion of the community's medical problems (Edmonds et al., 1970),

(ii) Their infant mortality rate is probably 5 or 6 times higher (about 100 - 120/1000 compared with 16 - 20/1000) than that of the white population (MacDonald, 1971),

(iii) The death rate of Aboriginal children aged 1 - 4 years is 10 times that of white children of the same age (Edmonds et al., 1970),

(iv) They are hospitalized more than 10 times as often as white children for nutritional anaemia, 8 times as often for gut infestations and more than twice as often for gastrointestinal infections (Forbes et al., 1973).

*Diarrhoeal disease in Australian Aboriginal children*

The pattern of gastrointestinal disease in infants and children of Aboriginal descent shows the following features (Gracey, 1973) :

(a) It is associated in almost half the cases with clinical evidence of malnutrition. Although florid kwashiorkor and marasmus are uncommon, lesser degrees of undernutrition are very common.

(b) More than one-third of patients are anaemic, mostly due to iron deficiency,

(c) Sugar intolerance occurs in approximately 25% of patients; in most instances this is due to secondary lactase deficiency although temporary intolerance to all sugars occurs in some,

(d) They show high rates of infections and infestations with enteric pathogens (approximately 50%). The following are commonly isolated from their stools; *Giardia lamblia*, enteropathogenic *E. coli*, *Salmonellae* and *Shigellae*,

(e) In most patients, serious co-existing disease complicates the clinical picture and medical management. The commonest serious complications include bronchitis, pneumonia, septicaemia, osteomyelitis, abscesses, measles and moniliasis. Multiple infections in individual patients are common.

*High death rates in Aboriginal children with diarrhoea*

The mortality rate in these children is more than 5% (Gracey, 1973; Walker and Harry, 1972), which is several times the death rate from gastroenteritis in wellnourished white Australian children treated with good facilities in the same hospital. The unfavourable death rate and high morbidity in these patients are contributed to by the following factors;

(i) A high rate of metabolic complications such as hypokalaemia and hypoglycaemia in the early stage of management,

(ii) The severity of dehydration. Delays in management due to long distances patients have to travel sometimes lead to severe dehydration and hypothermia,

(iii) The presence of complicating co-existing diseases as mentioned above,

(iv) The high incidence of sugar intolerance which if unrecognized will lead to nutritional complications and may be lifethreatening. This is associated with histological damage to the small

intestinal mucosa which complicates and prolongs nutritional rehabilitation,

(v) The high incidence of enteropathogenic infections,

(vi) Underlying malnutrition which often results in a long period of hospital management,

(vii) The background of socio-economic problems which make long term management difficult and the rate of recurrence of diarrhoeal episodes high.

*Strategies to improve diarrhoeal disease in children*

The problem of diarrhoeal disease in such children should not be considered in isolation as a purely medical one which will be solved by advances in medical technology, patient care, hospital or local medical and nursing facilities or earlier referral and rapid rehydration although many of these factors may help. The prime aim should be prevention. Government and other agencies in Australia are attempting to improve the situation there by upgrading many factors including the following; maternal nutrition, the rate and duration of breast feeding, nutrition and hygiene education, improved education and job opportunities and improved housing and food supplies for Aboriginal and part-Aboriginal communities. Attention is also being paid to the provision of adequate water supplies and sewerage and increasing the availability of skilled medical and nursing facilities to Aboriginal communities which are often situated great distances from centres of population.

Clearly, the problem of diarrhoeal disease is a complex multifactorial one to which there is no single solution and which will require different approaches in different places. Could I suggest that in communities where malnutrition remains a problem the following will help improve the pattern of childhood diarrhoeal disease ?

(i) Documentation of the patterns of diarrhoeal disorders and factors involved in their production. Central to any effective initiative is the need for basic information,

(ii) Recognition of diarrhoeal disease as a major health problem in young children,

(iii) Short-term and long-term goals in the management of children with diarrhoea,

(iv) Prevention of diarrhoeal disease by appropriate attention to such factors as breast-feeding, standards of living, hygiene and nutrition and related socio-economic conditions.

I hope these comments have made it clear that in a wealthy and technologically advanced country such as Australia the health problems of children in at least one of our minority groups, the Aborigines, resemble those seen commonly in South-East Asia. These problems are closely related to standards of living, hygiene, nutrition and community achievement which are shared by disadvantaged groups around the world.

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