THE NIGERIAN ENVIRONMENT AND PARASITIC INFECTIONS

G. C. EJEZIE

National Institute for Medical Research, Yaba

Abstract. The influence of the Nigerian, and indeed tropical environment on the spread and maintenance of parasitic diseases is discussed with respect to malaria, schistosomiasis, dysentaries, and other soil-transmitted helminthic diseases. While it is accepted that the tropical climatic conditions favour the vectors of these diseases, man, through his unsanitary behaviour, communal associations and economic realities, has inadvertently aided and abetted the disease transmission. Apart from the provision of adequate and safe water supplies and efficient waste disposal system, public health education is advocated as a mean of reducing the menace of these pathogenic organisms.

The health status of a large proportion of Nigerians is not only unacceptable but also very poor and discouraging. The health services being provided by the authorities, for a good majority of them are grossly inadequate. Most of the deaths recorded here are due to preventable communicable diseases, often complicated by some form of malnutrition. In 1968/69, 20.7 % and 10.5 % of all deaths recorded in hospitals in Lagos State alone were due to parasitic diseases and nutritional, endocrine and blood diseases respectively (Table 1).

Table 1. Five main causes of hospital deaths by groups of diseases in Lagos State (1968/69)

<table>
<thead>
<tr>
<th>Group of diseases</th>
<th>Number of deaths</th>
<th>% of all deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infective and parasitic diseases</td>
<td>884</td>
<td>20.7</td>
</tr>
<tr>
<td>Diseases of respiratory system</td>
<td>847</td>
<td>19.8</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>553</td>
<td>13.0</td>
</tr>
<tr>
<td>Nutritional, endocrine and blood diseases</td>
<td>450</td>
<td>10.5</td>
</tr>
<tr>
<td>Diseases peculiar to infancy</td>
<td>398</td>
<td>9.3</td>
</tr>
</tbody>
</table>

The prevalent communicable diseases are mainly of three types: bacterial, e.g. diarrhoeas which caused 10.5 % of all deaths in Lagos State alone in 1969, viral, e.g., measles, responsible for 25.5 % of all deaths, and parasitic, e.g., malaria which caused 6.5 % of all deaths in Lagos State in 1969 (FMH Annual Report 1968/69). There is no doubt that these figures are under-estimated, the actual figures for the whole country would be astronomical indeed. A large proportion of the people consist of men and women who are ignorant of the rules of basic hygiene. These people are entraped by the worst manifestations of poverty, worsened by infectious tropical diseases, malnutrition, high birth and death rate. They are, as it were, caught in the so-called vicious circle — "they are sick because they are poor, they become poorer because they are sick and sicker because they are poorer" (Wernsdorfer 1976).
Health is a very important aspect of development, because healthy people are economically more effective. Any strategy for the development therefore must by the necessity to appreciate the inextricable relationship between health and development. Parasitic diseases influence every aspect of human life, from childhood to adolescence. If they do not kill outright, as in malaria, they debilitate, as in sleeping sickness, thereby preventing the affected individuals from vigorously pursuing their chosen source of livelihood. This also escalates the amount of effort required to remain alive.

The basic health problems of most Nigerians include those related to faecal-oral transmission, vector-borne and air-borne diseases, poor housing, hygiene, and malnutrition (Ejezie et al., in preparation). Implicit in each of these problems is an environmental component. Infective and parasitic diseases accounted for 106,841 outpatient visits, 4,382 admissions and 167 deaths in 1965 in Lagos State alone. (FMH Annual Report 1968/69). There is no reason to believe that the story is different in the other 18 states of Nigeria. It is no longer defensible in this space age to invest huge sums of money in curing patients suffering from diseases that could be prevented with a relatively modest investment in health education and environmental hygiene. It is very important to note that human faecal matter need not be responsible for the large-scale decimation of people and that the persistence of faecal-oral transmission is one of the commonest manifestations of under-development (Wolman 1980).

The transmission of parasitic diseases involves three factors: the source of infection, the mode of transmission and the presence of susceptible hosts. Man is the principal source of some parasitic diseases and since most of these infections tend to be chronic, with few or no symptoms, virtually every infected individual becomes a carrier, and consequently serves as a potential source of infection to others. The pathogens reach their susceptible hosts either through vectors or by a direct contact. Both methods involve the agency of food, water, soil, vector etc. and components of the environment. Natural tendencies of the parasite to infect the human host, are thus aided by the habits and communal associations of man, e.g. overcrowding, unplanned population movements, insanitary habits and customs. The role of the Nigerian environment in the spread and maintenance of parasitic diseases will be discussed with reference to malaria, schistosomiasis, dracunculiasis and soil-transmitted helminths, with recommendations on how the health problems they pose can be overcome.

Malaria

Malaria is easily the most important parasitic disease in Nigeria today, and was responsible for 11.9% of all the notified deaths in Nigeria in 1969 (FMH Annual Report 1968/69). Its morbidity is felt by the entire population, with a higher mortality rate among younger children. The climate and the abundance of anopheles mosquitoes have combined to stabilize the disease in this country. The Anopheles gambiae complex breeds in places like artificial water containers, temporary pools and blocked drains, all of which abound all over the country. The regular or haphazard population movements from the rural areas, where malaria is highly endemic, to the urban centres ensure a regular flow of malaria parasites into our towns and cities. Urbanization does have profound effects on mosquito-borne diseases (Surtess 1971). In areas where domestic water storage has been replaced by pipe-borne water, as in towns and cities, extensive new breeding places have been inadvertently provided by a litter of tin cans and motor tyres. Thus "man-made malarias" is the neglects of elementary and often well-tried precautions against the creation of innumerous breeding foci of Anopheles mosquitoes (Bruce-Chwatt 1970). The most important environmental factors — mean temperature, relative humidity and rainfall — influencing malaria transmission are found here.

A very specific case of a correlation between environment and malaria transmission is that between tropical dam sites and irrigation schemes and transmission. The profound changes in the ecosystems associated with dam construction, in the manipulation of water tables, the manipulation of water levels, and consequently the increase in malaria vectors (Surtess 1971). In Nigeria today, there are no less than thirteen dams and irrigation projects which were set up without adequate safeguards for their health implications. Man has thus been inadvertently aiding and abetting the very enemies he wants to destroy. It is not often recognized by our economic planners that the development activities which change the environment of a man and his man and his environment can alter the geography of disease (A. y. a. 1980). Despite the experience of Ricketts, Sudan, Ghana etc., in the development of water resources and its potential impact in the spread of parasitic diseases, no notice is taken of this possibility in our irrigation projects. As indicated earlier, the climate, mosquito vector density, frequency of man-vector contact, particularly in the rural areas, vector efficiency and the size of the parasite reservoirs are somehow products of the social and cultural patterns of the people, together with local, national politics and economic realities.

Therefore the knowledge required for implementing realistic antimalaria programmes in Nigeria can only be gained through in-depth studies of the full range of prevailing epidemiological situations. For example, in a recent study by Ejezie and Ade-Serrano (in press) higher gametocyte rates were observed in young children indicating that the gametocytes are probably produced before acquired immunity is developed. It was therefore believed that it is the young children in endemic areas that infect the local mosquitoes, thereby perpetuating the transmission of the disease. A consequence of this observation is that in malaria control measures this group of people should be concentrated upon by the use of chemotherapy. These authors also show that inadequate protection of the primary attack on the parasite conducive to gametocyte production. In Nigeria, where self-medication is almost the rule, at least with respect to malaria, clinical and radical cure is very important epidemiologically in preventing mosquitoes from becoming infected (Ejezie and Ade-Serrano, in press).

If malaria is to be effectively controlled in Nigeria, it is essential that the principle of community self-help is involved in the project be emphasized. The community-inspired malaria control methods would include personal protective measures and mosquito-proofing, environmental measures to eliminate vector breeding sites, and continuing community-based health education to ensure acceptance and involvement in other methods like chemoprophylaxis and the use of insecticides (Dunn 1979).

Schistosomiasis

Infections with S. haematobium and S. mansoni are found all over the country and the principal snail vectors (Cowper 1963, 1973). In Nigeria today, probably the most disturbing in this regard is the alarming rate and according rise in the incidence of peri-urban shanty towns are also doubling. In a recent study, in a new sub-urban community south of metropolitan Lagos, a heavy excretion of more than 500 S. haematobium ova/10 ml urine was found among children aged 9—13 years (Ejezie and Ade-Serrano 1980).

Children act as important human reservoirs of infection by urinating and defaecating indiscriminately in or around fresh water as a result of inadequate waste disposal facilities. Domestic, hygienic, recreational and religious customs also help bring the population into contact with infected water where transmission begins. A growing
soil-transmitted parasites

There is a high prevalence of various human intestinal parasites in Nigeria. These include infections of Ascaris, Trichuris, Angiostrongylus, Entamoeba etc. The diseases caused by these parasitic organisms are widely distributed on both rural and urban areas because of very low standards of communal sanitation. E. histolytica is known to exist in both males and females of all age groups in metabolically active cases, for example, in Lagos, Nigeria (Ezejie et al., 1981) and Ezejie and Onorovie (in preparation) found many cases of multiple infections with A. lumbricoides, hookworm and Strongyloides stercoralis among the inhabitants. The transmission of these parasitic diseases is believed by these workers to be closely related to the low level environmental hygiene and other personal habits of the victims. Similarly, hookworm transmission is usually caused by cultural factors and personal habits such as having barefoot to defecate in the bush, choices of time and place of defaecation which increase the contact with active larval population (Kocher et al., 1976).

Recent studies by Nwozu (in press) and Nwozu and Anya (1980) have shown that hookworm transmission and the manifestation of the disease appears to be a rainy season phenomenon, thus confirming earlier studies in Nigeria (Sprent, 1946; Hins 1968 and Okhia 1977) that the prevalence of the disease is seasonal and rainfall-related. In India, arrested hookworm development appears to be seasonal such that there is a reduction in egg output into the host environment and a marked increase in eggs entering the environment just before the monsoon rains begin (Sahal et al., 1973). In general, persons who regularly pass stools in early morning are more likely to have active hookworm larvae in the soil surface than those regularly defaecating during the midday when soil surface conditions are unfavourable for hookworm larvae (Kocher et al., 1976). Any social change therefore which is capable of altering the key elements of this socio-cultural setting will definitely affect this transmission-related parasite relationship.

There is evidence that parasitic infections are associated with iron deficiency anaemia through chronic blood loss from the gastrointestinal tract or the urinary system (Akin et al., 1969). Also of importance is the marked clinical malabsorption which is a potential cause of nutritional impairment in children infected with A. lumbricoides (Venkatachalam and Patwardhan, 1963, Tripathy et al., 1972). In this case, the very high prevalence of these diseases among Nigerian children (Ezejie 1981, Ezejie and Onorovie in preparation) makes it mandatory that something positive should be done for their control.

Control of parasitic diseases

The control of parasitic diseases will be of necessity involve a reduction of the sources of infection in man by treatment, effective control of reservoir hosts and vectors, sanitary control of water, food, living and working conditions of the population, waste disposal, and education in personal prophylaxis to prevent the spread of infection and to reduce the frequency of exposure. This brief review has shown that many kinds of human behaviour can and do influence the transmission of parasitic diseases. Some of these kinds of behaviour are highly disease-specific in their epidemiological impact while others can and do affect the transmission of a considerable variety of parasitic agents (Dun 1979). Any health education on the safe use of water, for example, must take into account the use of water in food, excretion and post-excretion absolutes in the water, bathing, swimming and laundring. The health education should single out the water contacts through changes in behaviour as well as technical efforts to provide alternatives, e.g. bridges, safe laundry sites and latrines and also in agricultural practices involving the use of water (Dun 1979). Adequate and safe water supplies constitute the most important single factor that determines the health of a settlement community. Each household should have its own exclusive water point.

Dracunculiasis

Guinea worm infection afflicts communities living in rural areas without adequate water supplies. Important foci of infection have been reported around Aboekuta, Ogbomosho, Oyo, NW, Akure, Agbor (Onabamiro, 1982), the outskirts of Ibadan (Kale 1977), Oyo, and Abakaliki in the eastern part of south east Nigeria (1980). There is no doubt that other foci exist all over the country where adequate water supplies are non-existent. Most infections are found among communities drinking water from artificial ponds.

The prevalence of dracunculiasis varies with the season because of Dirofilaria medinensis in the human body takes approximately one year to mature and release larvae into water to initiate the disease (Muller, 1973). Infection is caused by the ingestion of infective Cyclops in drinking water taken from stationary bodies of surface water, e.g. ponds, large open wells etc. There is a direct relationship between infection and the rainfall pattern similar to more cases of infection occurring after heavy rains from October to December (Muller 1973).

Dracunculiasis should be one of the earliest parasitic diseases to control because the period of infectivity is only a matter of weeks, there is no important animal reservoir and the transmission is limited to the defined foci. Once transmission is interrupted in an area for a single season, the infection ceases entirely unless reintroduced from outside (Muller 1979). Filtration of drinking water will remove any infected Cyclops but ultimate community-based control would involve improvement of the water supply and water treatment.
Most parasitic diseases can be prevented with little or no medical intervention if the people are adequately informed about them and if they are encouraged to take the necessary precautions in time. Apart from health education experts who may plan and help to implement various activities in cooperation with teachers, extensions agents, community development agents, religious leaders, youth groups, etc. can be very effective in educating the public particularly where illiteracy is prevalent. Health education can make a major impact by giving the people the self-importance from the fact that can prevent disease and thus change the course of their lives by their own efforts.

Although public health education is a slow process, particularly in areas with limited education facilities, in the long run it is required to educate the general public in personal prophylaxis and other precautions necessary to escape infection and to prevent the transmission of parasitic diseases. These would include sanitary methods of waste disposal, the installation of screened sanitary latrines, the prohibition of untreated night-soil as garden fertilizers and destruction or control of reservoir hosts and vectors. Food handlers, who may be carriers, require careful supervision and training in personal hygiene as well as regular medical examination.

Health education should make use of all sources of help everywhere in the community including adult educators and political groups. It should ensure the direct involvement of people as it will enable them to work in partnerships with people rather than doing something for them (Johnson 1977).

Sound planning and the involvement of the population should be encouraged as a means of reducing the incidence of parasitic diseases through health education. Responsible participation and self-reliance is an important cornerstone of modern health education practice. It is man himself who has provided the parasites the favorable environment for transmission. It also follows that man himself should create the means of controlling them through health education and other technical, social, political and economic resources available to him for this purpose.

ВНЕШНЯЯ СРЕДА И ПАРАЗИТИЧЕСКИЕ БОЛЕЗНИ В ИНДИИ

Г. Ч. Эджен

Резюме. Обсуждаются влияние тропических условий в Индии на распространение и клиническую картину паразитозов — мальрии, цистоцистицеркоза, трихинеллеза, гельминтов, распространяющихся через почву. Тропические климатические условия оказывают благоприятное влияние на воронкообразных этих заболеваний, тогда как климатические условия других стран представляют угрозу для развития этих заболеваний. Основными факторами, обусловливающими развитие этих заболеваний, являются: увлажнение почв, особенно в районах с повышенной влажностью, а также увлажнение почв, обусловленное микробными процессами. Среди угроз для населения, вызванных этими паразитами, особенно опасны трихинеллез и цистоцистицеркоз.

Список литературы


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