Status of Soil-Transmitted Helminthic Infection in Nepal

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A retrospective evaluation of the status of soil-transmitted helminthic infection in Nepal during the period from 1985 to 1992 was conducted at the Parasitology Laboratory, Department of Pathology, TU Teaching Hospital in Kathmandu. An average of 6,537 faecal samples were examined each year for the presence of various types of intestinal parasites. The annual rate of positivity of these samples for soil-transmitted helminthiasis ranged from 18.0 to 36.6%. The annual incidence decreased every successive calendar year in both adults and children, irrespective of sex. Among the various types of helminths, the most common was *Ascaris lumbricoides* (roundworm), followed by hookworm. The incidence of *A. lumbricoides* remained constant throughout the study period, while that of other parasites markedly decreased each year.

Introduction

Soil-transmitted helminthic infection is one of the major public health problem in the world, particularly in developing countries^{1,2)}. *A. lumbricoides* (roundworm), hookworm (*Ancylostoma duodenale* and *Necator americanus*) and *Trichuris trichiura* (whipworm) are the most common soil-transmitted helminths (STH) which infect man. Twenty-five percent of the world's population is estimated to have been infected by one or more species of these parasites³⁾. *A. lumbricoides*, hookworm, and *T. trichiura* have been estimated to parasitically infect 1 billion, 900 million, and 500 million people, respectively, in the world⁴⁾. These parasitic infections are the major cause of morbidity in developing countries⁵⁾ and are also responsible for mortality in areas with limited health care delivery¹⁾.

The reported incidence of STH infection in Nepal varies from one study to another^{5,6,7,8,9,10,11)}. *A. lumbricoides* is the most common STH, and children are more commonly infected than adults⁶⁾. However, no reports are available regarding the yearly change in the incidence of STH infection in Nepal. We therefore carried out a retrospective study to evaluate the status of STH in Nepal during the eight-year period from 1985 to 1992 using the hospital records maintained at the Parasitology Laboratory, Department of Pathology, TU Teaching Hospital, Kathmandu. Hospital records are increasingly popular method in finding out the incidence of intestinal parasites¹²⁾. The present report is the first of its kind from Nepal.

Materials and Methods

In this retrospective study, hospital records were used as the source of the data. The study population was defined as all who submitted their faecal samples for the detection of intestinal parasites during the 8

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year period from 1985 to 1992. The faecal samples had been examined both macroscopically and microscopically. The microscopic examination had been performed using saline and iodine preparations, and the concentration technique (Formal-Ether sedimentation) had been employed only in doubtful cases. Actively moving larvae were immobilised before identification. During this period, no individual submitted three consecutive samples. The data were analysed to determine the annual incidence of STH infection for adults (more than 15 years) and children (15 years or less) of each sex.

Results

The average number of faecal samples examined each year of the study period was 6,537. The over all annual rate of positivity for STH ranged from 18.0 to 36.6%, and a marked pattern of year-to-year decrease was observed (Fig. 1). The decrease was observed in adults and children of both sexes (Figs. 2, 3, and 4). However the incidence of STH in children was slightly higher than that in adults, although this difference

Fig. 1 Annual overall rate of soil-transmitted helminthic infection in Nepal.

Fig. 2 Annual rate of soil-transmitted helminthic infection in adults and children.

Fig. 3 Annual rate of soil-transmitted helminthic infection in male and female adults.

Fig. 4 Annual rate of soil-transmitted helminthic infection in male and female children.

was not significant. Throughout the study period, *A. lumbricoides* was the most commonly detected of the various types of STH, followed by hookworm and *T. trichiura* (Fig. 5). Interestingly, the incidence of *A. lumbricoides* infection remained constant throughout the study period, while that of other STH infection decreased every year. *Stroglyoides stercoralis* (threadworm) and other STH were very rarely detected, and accounted for less than 0.2% of the total.

Discussion

In the present study of the annual prevalence of STH infection in Nepal, a decrease from 36.6% in 1985 to 18.0% and 18.7% in 1991 and 1992, respectively, was noted. This decrease was due to the marked decrease in the hookworm and *T. trichiura* infection rate. The incidence was not related to age in any year except 1989; we are unable to account for latter finding. In both age groups and sexes, the incidence of STH infection showed yearly decrease, although female adults showed slightly higher incidence than male adults in the years 1986 and 1991. The present findings generally indicate that the incidence of STH in

Fig. 5 Annual distribution pattern of soil-transmitted helminthic infections in Nepal.

Nepal is declining regardless of age and sex.

Nevertheless, the incidence of *A. lumbricoides* infection was static throughout the study period, as has been found in other studies¹⁾. This finding is attributed to the widespread dispersion of *A. lumbricoides* within human communities^{3,13,14,15)} and to the heterogeneity of the social, behavioural, and spatial factors that influence the degree of exposure to the infectious organism^{14,15)}. To a certain degree, an increase in urbanization, may also have contributed to this constant rate of *A. lumbricoides* infection¹⁶⁾. The finding that *A. lumbricoides* was the most commonly detected STH in this study is in agreement with other reports regarding Nepal^{5,6,7,8,9,10,11)}. In certain localities of Nepal, the reported incidence of *A. lumbricoides* is as high as 90.0%^{6,9,10)}. This high incidence has been attributed mainly to poor hygiene, lack of sanitary facilities, and use of night-soil without pre-treatment as fertiliser. However, the rate of *A. lumbricoides*-associated morbidity and mortality is not well understood at present. It remains to be elucidated to what extent the situation in Nepal parallels that in Burma, where 55.0% of all admissions to a pediatric surgical ward were found to be due solely to *A. lumbricoides* infection¹⁷⁾.

As has been described in various other reports^{5,6,7,8,9,10,11)}, the rate of hookworm infection was found to rank second after that of *A. lumbricoides* infection. Hookworm infection is regarded to be the most common etiology of iron-deficiency anaemia in Nepal. The marked decreased incidence of infection with this parasite during the study period might be attributed to the recent widespread adoption of the custom of wearing shoes and/or slippers, which prevent skin penetration by hookworm filariform larvae. Since the species-specific incidence of hookworm infection in Nepal is unknown, we are presently conducting a study of this issue.

T. trichiura was found to be the third most commonly detected STH in Nepal, as has been described in previous reports regarding not only Nepal^{5,6,7,8,9,10,11)} but also other countries¹⁸⁾. The mode of infection of *T. trichiura* is similar to that of *A. lumbricoides* and the marked decrease in its incidence, which is like that in the case of hookworm is an unexpected finding. Moreover, in many instances, it is difficult to deworm completely with a single dose of albendazole, particularly in heavy infection. *Hymenolepis nana* (dwarf

tapeworm) was the fourth most commonly detected STH. This parasite is found mostly in Asia¹⁾. Once *H. nana* is localised inside the human host, internal auto-infection can occur leading to severe infection. This feature contributes to the persistence of this infection and its endemicity in the community. Moreover, in many times it is difficult to deworm with standard drug therapy, as the cysticeroid larvae living inside the villus remain unaffected by the drug. However, in the present study, we found a marked decrease in the incidence of this parasite similar to that for hookworm and *T. trichiura*, although we are not able to account for the decrease in either *T. trichiura* or *H. nana* infection. Other STH, such as *S. stercoralis*, were detected very rarely, and accounted for less than 0.2% of the total.

The present study is the first of its kind to examine the year-to-year incidence of STH in Nepal. The rate of detection of STH might have been higher, had the concentration technique been applied to each of the samples or had three consecutive samples from each subject been examined, although we consider the present findings to sufficiently demonstrate the status of STH infection in Nepal. In view of the various morbidities and mortality associated with STH, as well as various factors which affect the rate of infection by STH and other intestinal parasites, effective preventive measures are needed to combat STH-related health and socio-economic problems.

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ネパールにおける土壌媒介性蠕虫の感染状況

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要 旨

ネパールにおいて土壌媒介性蠕虫の感染状況を8年間(1985~1992)にわたり経年的に調査した。調査はネパールトリブワン教育病院の病理学教室寄生虫検査室により行われ、毎年平均6,573件の糞便検体からの種々の腸内寄生虫を検出した。その結果、土壌媒介性蠕虫全体の検出率は一様でな

く、18.0~36.6%の範囲で経年的に減少した。この傾向は性別に関係なく、成人・小児両方に見られた。検出された蠕虫の中では回虫(roundworm)の検出率が最も高く、続いて鉤虫、その他の順であった。本調査期間を通じて回虫の検出率が一定であったのに対し、他の寄生虫では検出率が低下するという注目すべき事実が認められた。