

INTESTINAL PARASITIC INFECTIONS IN PRIMARY SCHOOL CHILDREN IN PULAU PANGGANG AND PULAU PRAMUKA, KEPULAUAN SERIBU

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Abstrak

Pada survei ini telah dikumpulkan sejumlah sampel tinja untuk pemeriksaan terhadap cacing yang ditularkan melalui tanah dan terhadap Protozoa pada anak kelas 1 tiga sekolah dasar. Pemeriksaan tersebut merupakan bagian program penanggulangan cacing yang ditularkan melalui tanah. Ketiga sekolah berlokasi di dua pulau yaitu Pulau Panggang dan Pulau Pramuka, yang termasuk sekelompok pulau dekat pantai Utara Jakarta. Sekolah-sekolah ini belum pernah ikut serta dengan kegiatan program penanggulangan S-TH. Untuk pemeriksaan digunakan cara semi-kuantitatif Kato sediaan tebal dan cara sediaan langsung dengan larutan yodium 2%. Empat spesies cacing dan lima spesies Protozoa telah ditemukan pada 101 sampel tinja. Infeksi *Ascaris* dan *Trichuris* ditemukan sebanyak 68.8% atau lebih. Infeksi cacing tambang hanya ditemukan di satu sekolah (2.9%). Telur *Hymenolepis nana* ditemukan pada satu sampel. Diantara 101 sampel ini ditemukan 5% *Entamoeba histolytica* dan *Entamoeba coli*, sedangkan 2% *Endolimax nana* ditemukan pada 2.0% diantara sampel tinja ini. Tercatat prevalensi tinggi untuk *Blastocystis hominis* (36.0%) dan *Giardia lamblia* (30.0%). Kebanyakan infeksi *Ascaris* termasuk infeksi ringan di SD I (69.0%) dan tidak ditemukan infeksi berat di SD ini. Kebanyakan infeksi di SD II dan III merupakan infeksi sedang yaitu untuk masing-masing sekolah 51.4 dan 81.8%. Di SD II dan III juga ditemukan infeksi berat yaitu untuk masing-masing sekolah 11.4 dan 5.8%. Telur *Ascaris* yang dibuahi ditemukan pada 93.1%, 100% dan 95.5% berturut-turut di SD I, II dan III. Diantara 86 sampel yang positif 96.5% sampel mengandung telur yang dibuahi, sedangkan pada 3.5% sampel ditemukan telur yang tidak dibuahi. Prevalensi infeksi *Ascaris* dan *Trichuris* dapat diduga sebelumnya mengingat derajat hygiene lingkungan dan sanitasi yang rendah di daerah ini. Diantara infeksi Protozoa spesies yang dominan adalah *B. hominis* dan *G. lamblia*.

Abstract

Stool samples were collected and examined for soil-transmitted helminthic and protozoal infection in the first grade of three primary schools, located on Pulau Panggang and Pulau Pramuka, which are parts of a group of islands not far from the north coast of Jakarta. The stool examinations were part of activities during a control program on soil-transmitted helminthic infections. The schools have never participated with control programs on soil-transmitted helminthiases. For the examination of the samples a semi-quantitative Kato thick smear method was used and the direct smear with a 2% iodine solution. Four intestinal helminth species and five protozoa species were found in a total of 101 stool samples. *Ascaris* and *Trichuris* infections were found in 68.8% or more. Hookworm infection was only found in one school (2.9%). Eggs of *Hymenolepis nana* were detected in one sample. Cysts of *Entamoeba histolytica* and *Entamoeba coli* were both found in 5.0% of the samples, whereas *Endolimax nana* was recovered from 2.0% of the samples. High prevalence rates were detected for *Blastocystis hominis* (36.0%) and for *Giardia lamblia* it was 30.0%. Most of the *Ascaris* infections were categorized as light infections at School I (69.0%) and not a single heavy infection were found in this school. In School II and III most of the infections were moderate i.e. respectively 51.4 and 81.8%. Also in Schools II and III heavy infections were detected, respectively 11.4 and 5.8%. Fertilized *Ascaris* eggs were detected in 93.1%, 100% and 95.5% at School I, II and III respectively. As a whole among 86 positive samples 96.5% were recorded as samples with fertilized eggs, whereas 3.5% contained unfertilized eggs. The high prevalences of *Ascaris* and *Trichuris* infections in this area could be expected due to the low level of environmental hygiene and sanitation. Among the protozoal infections *B. hominis* and *G. lamblia* were the dominant species.

Keywords : Control program, soil-transmitted helminthic infection, protozoal infection, Pulau Seribu, Jakarta

Introduction

Surveys on soil-transmitted helminthiases (S-TH) have been done in several parts of Jakarta since the 1970th, especially among school children. In these surveys nearly almost high prevalence rates were found for *Ascaris lumbricoides* and *Trichuris trichiura* infections. Hookworm infection was detected more in the rural vicinity of Jakarta^{1,2,3}. However, results of recent time surveys showed that *Ascaris* and *Trichuris* prevalence rates are declining in school children in several parts of the city due to systematic and continuous efforts in controlling S-TH infections^{4,5}. Surveys on protozoal infections in Jakarta are rarely conducted.

A group of islands, called Kepulauan Seribu, near the north coast of Jakarta, has never participated with the control program on S-TH infections. Therefore, it was found to be necessary to implement limited control activities for primary schools. Samples from the first grade of three schools were collected and examined for S-TH as well as for protozoal infections.

Methods

The size of Kepulauan Seribu is 7,234.47 Ha, consisting of 236.87 Ha land, surrounded by the sea of 6,997.60 Ha. People are living on eleven of the 110 islands. This study was sited on two islands, Pulau Panggang and Pulau Pramuka in the sub-district of Pulau Panggang. School I and III were situated in Pulau Panggang, whereas School II was in Pulau Pramuka. Samples were from children of grade 1, who have never participated with S-TH control programs. The total number of stool samples was 103, however for protozoa in addition with helminth infections only 101 could be examined, due to insufficient stool material.

For the detection of helminth eggs the Kato method⁶, whereas for the protozoan infection the direct method was

used as follows: two slides were prepared with a cover glass of .1.2 cm and a drop of 2% iodine solution was added. The slides were examined with the 40 times magnification. Samples were categorized as belonging to children with light, moderate or heavy infection. This was determined by the detection of 10 eggs or less, 11 eggs – 100 eggs and 101 *Ascaris* as well as *Trichuris* eggs or more than 101, on one view field, with the light microscope, using the 40 times magnification, for light, moderate and heavy infection respectively. Samples with 100% or dominantly fertilized eggs and samples with 100% or dominantly unfertilized unfertilized *Ascaris* eggs were recorded.

Results and Discussion

Results

Four intestinal helminth species and five protozoa species were found in a total of 101 stool samples from the first grade of three schools. Very high prevalence rates of *Ascaris* and *Trichuris* infections were revealed (68.8% or more), however a low prevalence rate of hookworm infections was found in one school (2.9%) only. Eggs of *Hymenolepis nana* were detected in one sample from school III. Cysts of *Entamoeba histolytica* and *Entamoeba coli* were both found in 5.0% of the samples, whereas *Endolimax nana* was recovered from 2.0% of the samples. High prevalence rates were found for *Blastocystis hominis* (36.0%) and for *Giardia lamblia* it was 30.0% (Table 1).

Most of the *Ascaris* infections were categorized as light infections at School I (69.0%) and not a single heavy infection were found in this school. In both, School II and III most of the infections were moderate i.e. respectively 51.4 and 81.8% of the samples. Also in both schools (II and III) heavy infections were detected respectively 11.4 and 5.8% (Table 2). As shown in Table 2 moderate plus heavy infections were most found at school III (86.4%).

Table 1. Parasitic infections in 101 primary school children, grade 1, in Pulau Panggang in percentage (May 2001)

<p>Notes: School I (n=35); School II (n=34); School III (n=32); Total (n=101)</p>

Table 2. Intensity of *Ascaris* infections in 103 primary school children, grade 1, in Pulau Panggang (May 2001)

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Table 3. Number and percentage of samples, with fertilized and unfertilized *Ascaris* eggs, of 103 primary school children, grade 1, in Pulau Panggang (May 2001)

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Fertilized *Ascaris* eggs were detected in 93.1%, 100% and 95.5% at School I, II and III respectively. As a whole among 86 positive samples 96.5% were recorded as samples with fertilized eggs, whereas 3.5% contained unfertilized eggs. These findings are in accordance with the high prevalence rates found at the three schools (Table 3).

Discussion

Considering the low level of hygienic environmental conditions in the islands, high prevalence rates for intestinal parasites were not surprising. The high prevalences for intestinal helminthes are comparable with prevalences in many primary schools in Jakarta during the 1970th and at present in schools, which did not participate with the control program.

Among 270 stool specimens of residents from three villages in Bali high prevalences of *Ascaris* (91%), *Trichuris* (90%) and hookworm (59%) infections were recovered. In the age groups of 0-9 and 10-19 years prevalences were 94 and 93%, 94 and 93%, 35 and 65 % respectively for the *Ascaris* and *Trichuris* infections. This survey was reported in 198⁷. In comparison no hookworm was found in the recent survey, possibly due to differences of soil composition. The total prevalence of *Oxyuris vermicularis* infections reported in Bali was 3%; in the age groups of 0-9 and 10-19 years 0 and 1% were found respectively. *E. histolytica*, *E. coli*, *E. nana* and *Y. butschlii* were detected respectively in 5%, 22%, 7% and 5% of the samples. *G. lamblia* and *B. hominis* were not mentioned in this survey. Probably the detection of *B. hominis* was not recorded, because at that time it was regarded as a non-pathogenic parasite. In a routine laboratory examination, among 213 collected samples from children 20 (9.38%) were found to

be positive with *B. hominis*. Most of these children had gastro-intestinal complaints⁸. The survey in Bali reported that the lowest prevalence for *E. histolytica* was found in the age group of 0-9 years (2%) and the highest was detected in the age group of 40-49 years (10%). For *E. coli* the lowest prevalence rate was also found in the youngest age group (8%); in the age group of 10-19 years the rate was 24%. *E. nana* was recovered in 4 and 6%, whereas *Y. butschlii* in 4 and 7% in the two age groups mentioned above⁷. No *G. lamblia* infections were reported⁹, compared to the very high prevalence rate in the present study (30%) in school children. We should be aware for the possible association of high *G. lamblia* infections with diarrheal diseases in this recent survey. In another study in the rural district Sukaraja, West Java 348 stool samples were collected from children aged 8- 10 years. Soil-transmitted nematode infections were dominant: *Ascaris* was found in 44% and *Trichuris* in 76%, whereas hookworm in 9%. *O. vermicularis*, *H. nana* and *Hymenolepis diminuta* were rarely found. *Blastocystis hominis* (60%) was the most common species found among protozoal infections. Beside *B. hominis* 8 other protozoal species was found: *E. histolytica* (28 %), *E. hartmanni* (14%), *E. coli* (13%), *E. nana* (21%), *G. lamblia* (18%), *I. butschlii* (14%), *Chilomastix mesnili* (1%) and *Cyclospora sp.* (1%)⁹. Compared to our study lower prevalence rates were found for *Ascaris* and *Trichuris* infections. Hookworm infections are usually found in children in rural areas with cultivated soil. In two primary schools near a rubber plantation in South Sumatra, 38.8% and 39.7% were found for hookworm respectively in school 1 and 29. The total number of S-TH was 69.9% among 139 samples and 90.8% among 141 samples respectively in school 1 and 2¹⁰.

The intensity of *Ascaris* infections, which was mostly light (41.9%) and moderate (52.3%), as shown in Table 2, was

comparable with one school in South Sumatra with light/very light infections as much as 56%. The second school, examined in this previous study, had more light/very light infections (79%)¹⁰. The number of heavy and moderate infections usually decreased after treatment¹¹.

High numbers of samples with fertilized *Ascaris* eggs are mostly found synchronic with high prevalence rates, which is the case in the present study.

Conclusions

As predicted, very high prevalences of *Ascaris* and *Trichuris* infections were found among school children, grade 1 in Pulau Panggang and Pulau Pramuka, two islands near the coast of Jakarta. The first grades have never participated with a control program on S-TH infections. Most of the *Ascaris* infections were light (41.9%) and moderate (52.3%). Fertilized *Ascaris* eggs were found in a very high prevalence rate (96.5%) of the samples. Low level of environmental hygiene and sanitation was observed in both islands.

Among the protozoan infections *B. hominis* and *G. lamblia* were found as the dominant species. Both species could cause diarrheal diseases of the children.

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