

## Some epidemiological aspects of intestinal parasites in women workers before going abroad

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**Abstract.** A study was conducted in Jakarta on 903 women workers before going abroad through stool examination by Ritchie's technical method. Of the women workers studied, 640 subjects (70.87%) were found to be infected with intestinal parasites either helminthes, protozoa or combination. Out of those infected, 451 (70.47%) subjects were infected with intestinal helminthes, namely *Ascaris lumbricoides* (38.13%), *Trichuris trichiura* (28.13%), a combination of *Necator americanus* and *Ancylostoma duodenale* (13.59%) and *Enterobius vermicularis* (4.84%). In addition 319 (49.84%) subjects were infected with intestinal protozoa namely *Giardia lamblia* (22.03%), *Entamoeba histolytica* (14.53%), *Blastocystis hominis* (6.56%) and *Entamoeba coli* (6.72%). The youngest age to be affected was 14 years old (14.19% of the subjects studied). Majority (72.09%) of the study subjects received junior high school level of education. Home yard (46.51%) and ground under the trees (22.09%) were places favourable for the habits of defaecation, whereas garbage disposal took place in 52.33% home yards and 25.58% creeks. This study revealed that various life style habits and indiscriminate defaecation were the causes of the continuous transmission of intestinal parasitic infections. The different parasites that were found in women workers before going abroad relate to the various epidemiological aspects of intestinal parasites in women workers in Indonesia who came from different islands in the country and possessed different life style patterns, socio-economic status, geographical condition and cultures.

### INTRODUCTION

Public health is strongly influenced by some factors i.e personal hygiene, educational background, socio-economic status and environmental sanitation. Intestinal parasitic infections in Indonesia still pose public health problems, especially infections by parasites that may give rise to diarrhoea such as *Ascaris lumbricoides*, *Trichuris trichiura*, *Giardia lamblia*, *Entamoeba histolytica*, *Blastocystis hominis*, *Cryptosporidium parvum*, certain fungi and virus (Abidin 1993, Ismid *et al.*, 1978).

Several surveys on intestinal parasitic infections in Indonesia especially in relation to intestinal nematode infections showed high prevalence (50%-90%) as reported by Kodyat (1984) and Ismid *et al.* (1989). The high prevalence of helmin-

thiasis was due to the continuous transmission of the disease year round through contaminated environments such as soil and garbage (Margono *et al.*, 1980; Muthalib & Hug, 1983; Margono, 1984). The other common intestinal parasites reported with high prevalence were protozoan parasites namely *G. lamblia* and *E. histolytica*.

In 1969 Indonesia allowed women to be involved in the labour market. Although most activities of the women workers were limited to domestic jobs (taking care children, managing household and other outside home activities), women workers were ready to leave their domestic jobs in order to secure better income from abroad. Thus in the last ten years, large numbers of Indonesian women went abroad. The present study aims to highlight the epidemiological aspects of intestinal

parasites amongst the Indonesian women workers before going abroad.

## MATERIALS AND METHODS

### Stool Samples

A total of 903 stool sample were obtained from 4 different Indonesian Labourer Recruitment Enterprises in Jakarta that serve and manage women workers going abroad who came from various islands in Indonesia. Stool samples were kept in plastic vials, labeled and brought to the laboratory for stool examination.

Stool examination were processed according to Ritchie's technical method (Hadidjaja, 1990). Briefly the procedure was as follows: The stool specimens were emulsified with water to get a total volume of 10 ml and was centrifuged. The sediments were mixed with 10 ml of formalin and centrifuged after which 1-2 ml of ether was added. A drop of sediment was then placed on microscopic slide, covered with cover slip and examined under the microscope.

## RESULTS

Of the 903 women workers examined, 640 of them (70.87%) were positive for parasites. Many of them were only infected with single species of helminth followed by single species of protozoa and then mixed infections with helminths and protozoa (Table 1).

Of those positive, 451 (70.47%) were infected with intestinal helminths and 319 (49.84%) with intestinal protozoa. Among those infected with helminthiasis, 38.13% of the study subjects were infected with *A. lumbricoides*, 28.13% with *T. trichiura*, 13.59% with hookworm and 4.84% with *E. vermicularis* (Table 2).

Table 3 indicates that 39.25% of those with helminthiasis had single infection with *A. lumbricoides*, 24.30% with *T. trichiura*, 14.33% with hookworm and 5.61% with *E. vermicularis*. Infection with two species of helminths as shown in Table

3 revealed that the commonest multiple helminth infections in these women were between *A. lumbricoides* and *T. trichiura*.

Table 4 shows that among single infection by protozoa, infection with *G. lamblia* was the commonest type of infection among infected subjects followed by *E. histolytica*, *B. hominis* and *E. coli*.

It was also noted that mixed infection with helminths and protozoa were found in 20.31% of the infected subjects (Table 1). The most frequent was infection with *A. lumbricoides* and *E. histolytica* followed by infection with *A. lumbricoides* and *G. lamblia* (Table 5).

Table 1. Distribution of intestinal parasites in women workers before going abroad

Intestinal Parasites	Number Positive	(%)
Single helminth only	268	41.88
Multiple helminthes only	53	8.28
Single protozoa	189	29.53
Mixed helminth and protozoa	130	20.31
Total positive for intestinal parasites	640	100.00

Total number of subjects examined = 903

Table 2. Number of women workers infected with intestinal parasites by species

Intestinal Parasites	Number Positive	(%)
Helminth	451	70.47
<i>Ascaris lumbricoides</i>	244	38.13
<i>Trichuris trichiura</i>	180	28.13
Hookworm	87	13.59
<i>Enterobius vermicularis</i>	31	4.84
Protozoa	319	49.84
<i>Giardia lamblia</i>	141	22.03
<i>Entamoeba histolytica</i>	93	14.53
<i>Blastocystis hominis</i>	42	6.56
<i>Entamoeba coli</i>	43	6.72
Total positive for intestinal parasites	640	70.87

Total number of subjects examined = 903

Table 3. Women workers infected with intestinal helminthes only

Intestinal helminth	Number Positive	(%)
Single helminth		
<i>Ascaris lumbricoides</i>	126	39.25
<i>Trichuris trichiura</i>	78	24.30
Hookworm	46	14.33
<i>Enterobius vermicularis</i>	18	5.61
Multiple helminthes		
<i>A. lumbricoides</i> + <i>T. trichiura</i>	27	8.41
<i>A. lumbricoides</i> + Hookworm	9	2.80
<i>A. lumbricoides</i> + <i>E. vermicularis</i>	2	0.62
<i>T. trichiura</i> + Hookworm	6	1.87
<i>T. trichiura</i> + <i>E. vermicularis</i>	3	1.93
Hookworm + <i>E. vermicularis</i>	6	1.87
Total positive for intestinal helminthes only	321	100.00

Total number of subjects examined = 903

Table 4. Women workers infected with single intestinal protozoa only

Intestinal protozoa	Number Positive	(%)
<i>Giardia lamblia</i>	84	44.44
<i>Entamoeba histolytica</i>	45	23.81
<i>Blastocystis hominis</i>	39	20.63
<i>Entamoeba coli</i>	21	11.11
Total positive for intestinal protozoa only	189	100.00

Table 5. Women workers infected with both intestinal helminth and protozoa

Intestinal parasites	Number Positive
<i>A. lumbricoides</i> + <i>B. hominis</i>	1
<i>A. lumbricoides</i> + <i>E. coli</i>	8
<i>A. lumbricoides</i> + <i>E. histolytica</i>	23
<i>A. lumbricoides</i> + <i>G. lamblia</i>	21
<i>A. lumbricoides</i> + Hookworm + <i>E. histolytica</i>	3
<i>A. lumbricoides</i> + Hookworm + <i>G. lamblia</i>	4
<i>A. lumbricoides</i> + <i>T. trichiura</i> + <i>E. coli</i>	4
<i>A. lumbricoides</i> + <i>T. trichiura</i> + <i>E. histolytica</i>	4
<i>A. lumbricoides</i> + <i>T. trichiura</i> + <i>G. lamblia</i>	12
Hookworm + <i>E. coli</i>	1
Hookworm + <i>E. histolytica</i>	2
Hookworm + <i>G. lamblia</i>	1
<i>T. trichiura</i> + <i>B. hominis</i>	1
<i>T. trichiura</i> + <i>E. coli</i>	7
<i>T. trichiura</i> + <i>E. vermicularis</i> + <i>B. hominis</i>	1
<i>T. trichiura</i> + <i>E. vermicularis</i> + <i>E. histolytica</i>	1
<i>T. trichiura</i> + Hookworm + <i>E. coli</i>	2
<i>T. trichiura</i> + Hookworm + <i>E. histolytica</i>	5
<i>T. trichiura</i> + Hookworm + <i>G. lamblia</i>	2
<i>T. trichiura</i> + <i>E. histolytica</i>	17
<i>T. trichiura</i> + <i>G. lamblia</i>	10
Total	130

Table 6 shows the age distribution and number positive by age group. The age group of 26-39 years had the highest percentage positive (52.33%). Educational background of the women workers is shown in Table 7. Majority of the workers only had junior high school level of education (72.09%). Marital status of the women workers reflected that 52.33% of the positive subjects were unmarried workers, 31.39% were widows and 16.28% were married women workers (Table 8).

The survey results revealed that only 19.77% of the positive women used toilets for defaecation. The rest defaecated indiscriminately in their home yards, under

the trees and in creeks (Table 9). Only 16.28% disposed garbage in bins. The rest just dumped their garbage in their home yards, creeks and other places (Table 10). Before going abroad, most women worked as gardeners followed by farmers and merchants (Table 11).

## DISCUSSION

In the present study, 70.87 of the women workers were infected with intestinal parasites of which 70.47% by helminthes and 49.84% by protozoa. The intestinal helminths consisted of *A. lumbricoides*, *T.*

Table 6. Age distribution of women workers before going abroad

Age (Years)	Number Positive	(%)
14	91	14.19
17-25	186	29.07
26-39	335	52.33
40	28	4.42
Total Positive	640	

Table 7. Educational backgrounds of women workers before going abroad

Educational Level	Number Positive	(%)
Primary school	45	6.98
Junior high school	461	72.09
Senior high school	89	13.96
Diploma	30	4.65
Academy	15	2.32
Total Positive	640	

Table 8. Marital status of women workers before going abroad

Status	Number Positive	(%)
Unmarried	335	52.33
Widow	201	31.39
Married	104	16.28
Total Positive	640	

Table 9. Defaecation habits of women workers before going abroad

Status	Number Positive	(%)
Home yard	298	46.51
Ground under the tree	141	22.09
Creek	74	11.63
Toilet	127	19.77
Total Positive	640	

Table 10. Garbage disposal by women workers before going abroad

Types of Garbage Disposal	Number Positive	(%)
Home yard	335	52.33
Garbage bins	104	16.28
Creek	164	25.58
Others	37	5.81
Total Positive	640	

Table 11. Basic job of women workers before going abroad

Type of Job	Number Positive	(%)
Gardener	335	52.33
Farmer	253	39.53
Merchant	52	8.14
Total Positive	640	

*trichiura*, *E. vermicularis* and hookworm, the common parasites that were also reported by the previous investigators (Kan, 1982; Ismid *et al.*, 1989; Abidin, 1993). *A. lumbricoides* represented the highest percentage that infected the workers, similar to the findings of previous studies (Ismid *et al.*, 1978; Kan, 1982; Margono *et al.*, 1984; Rampen, 1986). Most study subjects had single infection with *A. lumbricoides*, whereas mixed helminthiasis i.e. (ascariasis-trichuriasis and ascariasis-hookworm infections) were found in smaller percentage of the workers. Single infection with *A. lumbricoides* as well as mixed helminthiasis were also reported by Kan (1982), who studied school children in the Ulu Langat, District of Selangor State, Malaysia. The presence of *E. vermicularis* is underestimated because the methods of examination used, were not suitable for *E. vermicularis* detection.

The intestinal protozoa detected in the study were common protozoa and has also been found in other studies (Ismid *et al.*, 1978). In this study *G. lamblia* was found to be the predominant protozoa compared to the other detected protozoa.

Mixed infections of helminth and protozoa were also quite common. This high degree of infections can be due to the poor sanitary conditions practiced by these women and is reflective of their educational background. Since most of the women workers came from different islands with different geographical conditions in Indonesia, derived from families with low socio-economic status, supplemented by various cultures that developed in their own islands, personal hygiene and environmental sanitation were not properly practised. In addition, although toilet facilities were appropriately provided, due to their limited health knowledge, poor custom for their defecation habits as well as manner of disposing garbage and rubbish became strong and these bad habits just remained. Home-yards and grounds under the trees were places favourable for the worker to defecate. The contaminated soil repre-

sented as the propitious factor for the development of nematode eggs to become embryonated eggs. Indirectly, contaminated soil may also influence the development of the protozoa's cyst as the workers used human excreta for fertilizing their crops grown in the back yard. These workers will be carrying infection to the receiving countries as they have low educational background and are from a younger age group.

This study concluded that the different developing life-style, socio-economic status, geographical condition and culture were the epidemiological aspects of intestinal parasites in women workers before going abroad.

It is recommended that before going abroad, women workers need health screening, stool examination and also health education. All positive subjects should be treated so as to be free of intestinal helminthes and intestinal protozoa.

*Acknowledgements.* The author thanks the staff of Department of Parasitology for their help in the project.

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