ORIGINAL ARTICLE

The Current Prevalence Rate of Soil-transmitted Helminthiasis in Indonesia

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Abstract

Surveys on the prevalence rate of soil-transmitted helminthiasis had been done in Indonesia among 12.100 people in 10 provinces at 15 locations in 1990 and 1991. The surveys were meant to obtain data on the recent prevalence rate of soil-transmitted helminthiasis among primary schoolchildren, population in vital productive areas and general community. The results showed that the prevalence rate of Ascaris lumbricoides ranged from 5.7% to 69.5%, Trichuris trichiura from 0.8% to 53.0% and hookworm from 0% to 24.7%. The overall prevalence rate of the respective species were 30.4%, 21.2% and 6.5%. In general, the data of the prevalence rate of soil-transmitted helminthiasis obtained from the recent surveys were lower than those of the surveys done before 1985.

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Introduction

The prevalence rate of soil-transmitted helminthiasis in Indonesia is still high. Three specia commonly found in Indonesia are *Ascaris Lumbricoides, Trichuris trichiura and Necator americanus.* The government has been implementing soil-transmitted, helminthiasis control since the year of 1975. However, due to the limited available resources, only very limited area can be covered by the programme. From 1987 through 1989 the total budget for the control programme was less because of the drop of oil price in the world market and the change of the health policy

which gave high priority to the reduction of infant mortality rate. In the implementation of the fifth Five-Year National Development Plan from 1989 through 1994, more money is available for conducting soil-transmitted helminthiasis control and some activities can be considered to be resumed. Two main activities are being conducted during this period, namely surveys to identify the recent prevalence rate and mass treatment. The results of the surveys were meant to be used as base line data for evaluation and were done in 1990 and 1991.

The surveys were conducted among primary schoolchildren, population of vital productive areas and general community. The terminologi *vital productive* areas is referred to mining, plantation, tourist and transmigration areas. The population of the vital productive areas and primary schoolchildren were the target group of the control programme during the period of 1975 through 1986. The surveys in 1990 and 1991 were conducted in 10 provinces at 15 locations with a total sample of 12,100.

Materials and Methods

Stool specimen were taken from 10% (of all age group) of the respected target population in the locations of the surveys. A total of 12,100 stool samples were collected throughout the locations of surveys. The stool specimens were put in stool containers and brought to the local laboratory for examination. Modified Kato-Katz Method was used for stool examination and soil-transmitted helminth eggs were identified using microscopes. Only data on *Ascaris lubricoides, Trichuris trichiura* and hookworm were reported. Egg counting were done in 5 locations to know the intensity of infection.

Data processing was done either at the Provincial Health Office or the Central Office the Directorate General of CDC & EH.

The personel of the survey consisted of staff of CDC Provincial Health Office or Provincial Health Services and members of the Indonesian Parasite Control Association (IPCA) Local Chapters. These surveys were funded by the Ministry of Health and were supervised by staff of the Subdirectorate of Diarrhoea, Helminthiasis and Intestinal Parasites, Directorate General of CDC & EH.

Results

Prevalence rate among the whole sample

The prevalence rate among the 12,100 people which were selected as sample are 30.4% for *Ascaris lumbricoides, 21.2% for Trichuris trichiura* and 6.5% for hookworm (Table Ia).

Table Ia. *Prevalence rate of soil-transmitted helminthiasis among 12,100 people in 10 Provinces in Indonesia in 1990 - 1991.*

Samples	(+) Specimen			(+) Rate (%)		
	Al	Tt	Hw.	Al.	Tt.	Hw.
12,100	3687	2570	791	30.4	21.2	6.5

Note : Al = *Ascaris lumbricoides*
Tt = *Trichuris trichiura,* Hw = Hookworm

Table Ib. *Intensity of infection soil-transmitted helminthiasis among 12,100 people in 10 provinces in Indonesia in 1990 - 1991.*

Provinces	Locations	Samples	Average of eggs/gram of stool		
			Al.	Tt.	Hw.
N. Sumatra	Timbang-Deli	82	3,305.0	395.0	398.0)*
	(Plantation)		3.305.0	443.0	760.0)**
W. Java	Cisarua	120	8,782.0	1,014.0	36.0)*
	(Tourist Area)	-	-	-	-
	Ciparay	116	130,228.6	79.1	61.9)*
	(G. Community)		145,225.0	6,351.0	3,120.0)**
S. Sulawesi	Mamuja	109	766.9	82.6	135.8)*
	(Transmigration)		2,090.0	264.7	592.0)**
Bali	Ubud	132	4,233.2	569.2	252.9)*
	(Tourist Area)		5,271.6	716.6	758.7)**

Note : N = North, W = West, S = South, G = General, Hw = Hookworm, Al = *Ascaris lumbricoides,* Tt = *Trichuris trichiura,*)* = Eggs per gram per person)** = Eggs per gram per positive case

Intensity of infections

Egg counting to identify the intensity of infections were conducted in 5 locations. The results showed that the average of eggs per gram of stool (AEPG) ranged from 766,9 to 130,228.62 eggs per person and from 2.090 to 145,225 eggs per positive case for Ascaris lumbricoides, from 79.1 to 2,021.7 eggs per person and from 264.7 to 6,351 eggs per positive case for *Trichuris trichiura,* from 36 to 398 eggs per person and from 592.9 to 3,120 eggs per positive case (Table Ib).

Prevalence rate among primary schoolchildren

Survey among primary schoolchildren were conducted in 3 provinces with a total sample of 2,403 children. Prevalence rate of *Trichuris trichiura* seems to be highest among the sample group of Jakarta and Yogyakarta, while the prevalence rate of *Ascaris lumbricoides* was the highest among the sample group in North Sulawe-

Table IIa. *Prevalence rate of soil-transmitted helminthiasis among primary schoolchildren in some provinces in Indonesia 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen			(+) Rate (%)		
			Al	Tt.	Hw.	Al.	Tt.	Hw.
Jakarta	E. Jakarta	91	40	47	0	43.9	51.6	0
Yogyakarta	Nanggulan	1153	125	340	160	10.8	29.4	13.8
N. Sulawesi	Tomohon	1199	147	89	28	12.2	7.4	2.3

Note : N = North, E = East
Al = *Ascaris lumbricoides,* Tt = *Trichuris trichiura,*
Hw = Hookworm

Table IIb. *Prevalence rate of soil-transmitted helminthiasis among primary schoolchildren in some provinces in Indonesia 1977 and 1982*

Provinces	Locations	Samples	(+) Rate (%)			Year
			Al.	Tt.	Hw.	
Jakarta	Condet	269	60.2	50.9	2.2	1977
Jakarta	Cakung	354	58.5	31.4	2.5	1977
Yogyakarta	Sewon	358	75.9	91.6	15.7	1982
Yogyakarta	Pengasih	513	47.4	65.6	53.2	1982

Note : Al = *Ascaris lumbricoides* Tt = *Trichuris trichiura*
Hw = Hookworm

Table IIc. *Prevalence rate of soil-transmitted helminthiasis among primary schoolchildren in Jakarta based on stool examination by Yayasan Kusuma Buana in 1987.*

Municipality	(+) Rate (%) sth	(+) Rate (%)		
		Al.	Tt.	Hw.
North Jakarta	86.3	71.7	71.5	0.1
East Jakarta	73.2	52.3	53.1	0.1
South Jakarta	71.6	54.6	37.4	0.0
West Jakarta	74.7	59.3	42.6	2.2
Central Jakarta	85.8	71.6	30.5	0.6

Source : Yayasan Kusuma Buana
Note : Al = *Ascaris lumbricoides,* Tt = *Trichuris trichiura*
Hw = Hookworm, sth = soil-transmitted helminthiasis

Table IIIa. *Prevalence rate of soil-transmitted helminthiasis among population of plantation areas in some provinces in Indonesia 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen Al.	Tt.	Hw.	(+) Rate (%) Al.	Tt.	Hw.
N. Sumatera	Timbang-Deli	731	466	265	181	63.7	36.2	24.7
C. Java	Banaran	595	226	114	42	37.9	19.1	7.1
Assihan		374	58	26	23	15.5	6.9	6.1
Kempul		181	38	26	38	20.9	14.3	20.9

Note : N = North, C = Central, Al = *Ascaris lumbricoides*, Tt = *Trichuris trichiura*, Hw = Hookworm

Table IIIb. *Prevalence rate of soil-transmitted helminthiais among population of plantation areas in some provinces in Indonesia based on surveys from 1977 trough 1985*

Provinces	Locations	Samples	(+) Al.	Rate Tt.	(%) Hw.
Jambi	Kayu Aro	275	91.6	56.4	39.4
W. Sumatra	Pinang Awan	149	74.5	6.0	24.8
Liki		248	84.3	17.3	37.5
Lampung	Kedaton	644	74.3	28.4	45.9
W. Java	Pengalengan	572	73.4	60.7	8.9
Serpong		184	48.9	75.5	57.1
E. Java	Sumber Wadung	195	35.4	13.3	66.7

Note : W = West
E = East
Al = *Ascaris lumbricoides*, Tt = *Trichuris trichiura*
Hw = Hookworm

si (Table IIa). The overall prevalence rate among primary schoolchildren which are based on the results of these surveys are lower if compared to those surveys of 1977 and 1982 in other locations of Jakarta and Yogyakarta (Table IIb) and also lower (except for hookworm) if compared to the results of stool examinations done by Yayasan Kusuma Buana in Jakarta in 1987 (Table IIc). However, it is hard to draw conclusions from these sets of data because the surveys were done in different locations among different individuals.

Prevalence rate among population of plantation areas

The results of surveys among population in plantation areas presented in Table IIIa.

The prevalence rate of soil-transmitted helminthiasis based on these surveys showed that in all locations *Ascaris lumbricoides* prevalence rate was the highest, while *Trichuris trichiura* prevalence rate was the second highest and hookworm prevalence rate was the lowest. Except for Kempul plantation, *Trichuris trichiura* prevalence rate was lower than that of hookworm. The range of *Ascaris lumbricoides* prevalence rate is from 15.5% to 63.7%, the range of *Trichuris trichiura* prevalence rate was from 6.9% to 36.2% and the range of hookworm prevalence rate was from 6.1% to 24.7%. This data set showed lower prevalence rate if compared to that of the results of surveys conducted in some plantation areas in Java and Sumatra before 1985 (Table IIIb). Table IIIb shows that the range of prevalence rates of *Ascaris lumbricoides, Trichuris triciura* and hookworm are 35.4% to 91.6%, 6.0% to 75.5% and 8.9% to 66.7% respectively.

Prevalence rate among population of mining area

Only one mining area was covered during these surveys namely the coal mining area of Ombilin in West Sumatra. Prevalence rate of soil-transmitted helminthiasis is relatively low in this area (Table IVa) because control programme had been implemented intensively and successfully here from 1975 to 1985. The control programme included of mass treatment, improvement of hygiene and sanitation and health educations activities.

As a comparison, the results of base line surveys in other mining area which were done in 1980 to 1984 is presented in Table IVb which shows much higher prevalence rates of the three kinds of worms.

Table IVa. *Prevalence rate of soil-transmitted helminthiasis among populations of coal mining area of Ombilin in West Sumatra 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen Al.	Tt.	Hw.	(+) Rate (%) Al	Tt.	Hw.
W. Sumatra	Ombilin	738	208	21	14	28.1	2.8	1.9

Note : W = West, Al = *Ascaris lumbricoides*, Tt = *Trichuris trichiura*, Hw = Hookworm

Table IVb. *Prevalence rate of soil-transmitted helminthiasis among population of mining areas of Pomalaa - South East Sulawesi and Bukit Asam - South Sumatra 1980 - 1984*

Provinces	Locations	Samples	(+) Al.	Rate Tt.	(%) Hw.
SE. Sulawesi	Pomalaa	518	32.2	25.9	6.2
S. Sumatra	Bukit Asam	320	38.8	23.8	45.0

Note : SE = South East, S = South, Al = *Ascaris lumbicoides*, Tt = *Trichuris trichiura*, Hw = Hookworm

Table V. *Prevalence rate of soil-transmitted helminthiasis among population of general community in some provinces in Indonesia 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen			(+) Rate (%)		
			Al.	Tt.	Hw.	Al.	Tt.	Hw.
W. Java	Ciparay	1152	382	134	3	33.1	11.6	0.3
Jakarta	E. Jakarta	602	247	182	7	41.0	30.2	1.7
E. Java	Pasuruan -	665	102	25	1	15.3	3.8	0.2
Municipality	Lawang	1061	61	8	19	5.7	0.8	1.8

Note : W = West, E = East, Al = *Ascaris lumbricoides*
Tt = *Trichuris trichiura*, Hw = Hookworm

Table VI. *Prevalence rate of soil-transmitted helminthiasis among population of tourist areas in some provinces in Indonesia 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen			(+) Rate (%)		
			Al.	Tt.	Hw.	Al.	Tt.	Hw.
W. Java	Cisarua	1252	432	486	9	34.5	38.8	0.7
Bali	Ubud	1150	800	610	106	69.5	53.0	9.2

Note : W = West, Al = *Ascaris lumbricoides*,
Tt = *Trichuris trichiura*, Hw = Hookworm

Table VIIa. *Prevalence rate of soil-transmitted helminthiasis among population of transmigration area of Mamuju in South Sulawesi 1990 - 1991*

Provinces	Locations	Samples	(+) Specimen			(+) Rate (%)		
			Al.	Tt.	Hw.	Al.	Tt.	Hw.
S. Sulawesi	Mamuju	1156	355	197	160	30.7	17.0	13.8

Note : S = South, Al = *Ascaris lumbricoides*,
Tt = *Trichuris trichiura*, Hw = Hookworm

Prevalence rate among population of general community and tourist areas

The prevalence rate of soil-transmitted helminthiasis among population of general community and tourist areas are presented in Table V and Table VI.

This set of data shows that the prevalence rate of hookworm are generally low (less than 2%) except for Ubud which is 9.2%. The prevalence rates of the three specia are low in Lawang (less than 6%).

Prevalence rate among population of transmigration areas

The transmigration area of Mamuju is the only transmigration area covered during the surveys and the result is presented in Table VIIa. Result of survey which was done in 1980 in another transmigration area in South Sulawesi is presented in Table VIIb.

The prevalence rate of soil-transmitted helminthiasis in Indonesia differs from

Table VIIb. *Prevalence rate of soil- transmitted helminthiasis among populations of transmigration area of Bonebone in South Sulawesi 1977*

Provinces	Locations	Samples	(+) Rate (%)		
			Al.	Tt.	Hw.
S. Sulawesi	Bonebone	396	89.9	38.1	21.7

Note : S = South, Al = *Ascaris lumbricoides*,
Tt = *Trichuris trichuria*, Hw = Hookworm

Discussion and Conclusion

area to area and from community to community. These facts can be seen from the results of the recent surveys as well as the results of the surveys conducted before 1985. The difference is due to the different socio-economic level of the community and the environmental factors. *Ascaris lumbricoides and Trichuris trichiura* tend to be more prevalent compared to hookworm.

In general, the recent surveys showed that data on the prevalence rate of soil-transmitted helminthiasis based on the recent surveys are lower than that of the surveys conducted before 1985. Prevalence rate among the 12.100 people examined during these surveys are only 30.4% for *Ascaris lumbricoides*, 21.2% for *Trichuris trichiura* and 6.5% for hookworm. The ranges of prevalence rate based on the results of examination in each locations are from 5.7% to 69.5% for *Ascaris lumbricoides*, from 0.8% to 53.0% for *Trichuris trichiura* and from 0% to 24.7% for hookworm. Howefer, it is difficult to know whether or not there is really a decline of prevalence rate in Indonesia, since the surveys were done in different locations among different people.

Results of the recent surveys also indicated that soil-transmitted helminthiasis are still a public health problem. Althoughthere is a tendency that the prevalence rates of soil-transmitted helminthiasis among population selected as sample in these surveys of 1990 - 1991 are lower if compared to those which were done before 1985.

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