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ORIGINAL ARTICLE

Measuring Malnutrition and Intestinal Helminthiasis on Tobacco Plantation Workers' Children

by

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Abstract

Assessment of nutritional status and fecal examination for intestinal helminthiasis were conducted on 317 children of Tobacco Plantation workers. The nutritional status was measured by using the "three coloured cord" and fecal examination was done by the direct smear method with the result 15.14% of the children suffered from severe malnutrition, 44.80% possible mild malnutrition and 40.06% were normal.

Fecal examination revealed that 64.90% had Ascariasis, 20.20% had Trichuriasis, 4.33% had Oxyuriasis.

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Introduction

In large areas of the world today, malnutrition, especially that affecting young children, is one of the principal public health problems (Jelliffe, 1966). In Indonesia, malnutrition and parasitic infection are still common. Even though the epidemiology of these diseases is quite dissimilar, they are frequently combined in the same population to make life precarious and even untenable.

Many plantations like tobacco, rubber and red palm oil are found in Indonesia, which are of the most important sources of national income. So it is necessary to establish the health status of the workers and their family. Health surveys have been conducted in some plantations and we still need further details of these data.

Moderate or severe malnutrition can of course be detected by eye, but milder degrees of malnutrition or growth failure are easily missed. Biochemical tests are expensive and unsuitable for population screening (Adnan and Morley, 1974). Measuring the mid upper arm circumference is simple and practical in hands of auxiliary workers. Fortunately, in the age group in which malnutrition is most common, between the first and fifth birthday, the arm circumference is nearly constant, and the same measurement can therefore be used throughout this age period. The simple method has several uses. In the clinical situation, where simple weight charts are not available, it is a quick and reliable means for identifying the ill nourished children (Adnan and Morley, 1974).

Tarigan et al. (1976) in their survey on preschool children in some settlements of Tobacco plantation's labour in North Sumatera found that 33.0% are undernourished and 70.6% suffered from Ascariasis and 12.8% suffered from Trichuriasis but no Ancylostomiasis was found.

The objective of this survey is to find out malnutrition and intestinal helminthiasis in young children of tobacco plantation workers.

Material and methods

From February 7 until February 16, 1977, measuring Malnutrition and intes tinal helminthiasis surveys were conducted on children of Tobacco plantation workers in 7 population.

The children's ages were between one and five years. The plantations are located 6 to 35 km from Medan, the capital of North Sumatera. Some difficulties arose in collecting the samples because these surveys were conducted during working hours. Due to this condition, the minimal time and low budget, only children who lived around the plantation clinic could be included in this survey.

The total of children examined was 317, specified as follows :

— Sampali : 40 children
— Tandem Hilir : 46 children

TABLE 1 : *Age Distribution of the Children for Arm Circumference*

Age (years)	Male	Female	Total
1	36	24	60
2	33	34	67
3	34	47	81
4	35	30	65
5	20	24	44
Total	158	159	317

TABLE 2 : *Arm Circumference of the Children (Three Coloured)*

Age (yrs)	Red	%	Yellow	%	Green	%
1	22	36 , 66	29	48 , 33	9	15
2	14	20 , 90	32	47 , 76	21	31 , 34
3	8	9 , 88	34	41 , 97	39	48 , 15
4	3	4 , 62	30	46 , 15	32	49 , 23
5	1	2 , 27	17	38 , 64	26	59 , 09
Total	48	15 , 14	142	44 , 80	127	40 , 06

— Tandem Hulu : 35 children
— Klambir Lima : 24 children
— Kuala Binge : 57 children
— Sei Somayang A : 71 children
— Sei Somayang B : 44 children

Measuring Malnutrition :

Measuring malnutrition was conducted by using the "three coloured cord", which can be made by cutting off X-ray films into ¼ inch strips with scissors and then scratch the film with a sharp point- and colour with a spirit felt pen, not quite up to the scratch line. The three colours of the cord : red, yellow and green have a universal significance thanks to the ubiquitous traffic lights (Adnan and Morley, 1974). The red — area begins at 7 cm from the black line to 12.5 cm, yellow area from 12.5 cm to 13.5 cm and Green area from 13.5 to 17.5 cm (Fig. 1). The piece of cord is placed around the middle of the extended relaxed upper arm (Fig. 2). The children are divided into three groups according to their arm circumference (Adnan and Morley, 1974).

Intestinal Helminthiasis :

The examination was done by collecting the stool in bottles by taking stool with rectal toucher. The stool collected was preserved in formalin 10% and sent to the laboratory of the Department of Parasitology, Medical School, University of North Sumatera for examination.

Results

1. Measuring Malnutrition :

   Table 1 shows us the 317 children observed classified by age groups. By measuring the arm circumference with the "three coloured cord" we found that 48 (15.14%) were in the red area, 142 (44.80%) in the yellow area and 127 (40.06%) in the green area. It showed us that 15.4% suffered from severe malnutrition, 44.80% had possible mild malnutrition and the remaining 40.06% were normal (Table 2).

2. Intestinal Helminthiasis :

   Stool examination showed that 135 children (64.90%) had Ascariasis, 42 children (20.20%) had Trichuriasis, 9 children (4.33%) had Ancylostomiasis, and 9 children (4.33%) had Oxyuriasis.

Discussion

The use of the "three coloured cord" is an easy way and a simple method for detecting malnutrition. Measuring malnutrition on tobacco plantation workers' children in North Sumatera with this "three coloured cord" we found that out of 317 children examined only 40.06% were normal, 15.14% suffered from severe malnutrition (red — area) and the high prevalence was found at the age group of one and two years, i.e. 36.66% and 20.90% respectively (Table 2).

TABLE 3: *Age Distribution of the Children for Stool Examination*

Age (Yrs)	Male	Female	Total
1	22	15	37
2	24	24	48
3	20	34	54
4	22	17	39
5	12	18	30
Total	100	108	208

TABLE 4: *The Prevalence of Intestinal Helminthiasis*

Age (Yrs)	Ascaris	%	Trichuris	%	Hookworm	%	Oxyuris	%
1	17	59,46	3	8,11	0	0	0	0
2	33	68,75	5	10,42	0	0	2	4,17
3	33	61,11	10	18,52	3	5,56	6	11,11
4	33	84,62	14	35,90	3	7,70	1	2,56
5	19	63,33	110	33,33	3	10	0	0
Total	135	64,90	42	20,20	9	4,33	9	4,33

Table 2 also shows us that the prevalence of severe malnutrition declines with the increasing age, while malnutrition is still prevailing in all the age groups of 1 to 5 years (red and yellow area). This finding is similar to what Simatupang et al. (1976) found in their survey of the health status of children in two rural areas of North Sumatera in 1975.

If we compare our results of possible mild malnutrition and severe malnutrition (59.94%) with what Tarigan et al. (1976) found in their survey of preschool children in some settlements of Tobacco plantation's labour in North Sumatera (33%) we can see that our finding is higher.

From 317 only on 208 children could the stool be examined because 109 children had an empty rectum when rectal toucher was performed. Fecal examination showed a high prevalence of Ascariasis (64.90%) but it was lower than what Tarigan et al. (1976) found (70.6%), while Trichuriasis (20.20%) was higher than what Tarigan et al. (1976) found (12.8%). We found that 4.33% of the children suffered from hookworm infestation, but none at the age groups of 1 and 2 years, with a high prevalence (10%) at the age of 5 years (Table 4).

This differed from what Tarigan et al. (1976) found on their survey, where no hookworm infestation was found.

The intestinal nematode infestation on our survey was lower than what Lubis et al. (1976) found on their survey on hospitalized children in the Plantation Hospital. On our survey we found that Ascariasis was 64.90%, Trichuriasis 20.20% and Ancylostomiasis 4.33% (Table 4), while Lubis et al. (1976) found a higher incidence of Ascariasis (93.-10%), Trichuriasis (82.76%) and Ancylostomiasis (36.20%). This difference was probably due to the small material of stool that could be collected by rectal toucher and preservation with formalin 10% diluted the stool materials.

On our survey we also found Oxyuriasis (4.33%).

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