Hookworm infections among Aboriginal (Orang Asli) Primary School Children at a Semi Urban School in Kuala Kubu Bharu, Selangor

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ABSTRACT

Hookworm infection is one of the most common soil-transmitted helminth infections among the rural communities of the tropics. In Malaysia, the infection is commonly reported among the underprivileged communities living in poverty especially the aborigines (Orang Asli). While many studies focused on the prevalence of hookworm infection in rural communities, there is a lack of studies among the urban or semi urban aboriginal communities. The cross-sectional study was performed in a semi urban aboriginal primary school in Kuala Kubu Bharu. A total of 159 stool samples were collected among the school children. All samples were subjected to direct stool smear and formalin-ether concentration technique followed by microscopic observation. The overall prevalence of hookworm infection among the semi urban school children was low (7.55% ; 12/159) and the highest was among school children aged 11 years old. Male school children had higher prevalence of hookworm infection (10.14 % ; 7/69) in comparison to female students (5.55% ; 5/90). This study shows that living in semi urban area with better facilities and improved sanitation provide good chance and hope for prevention and control of hookworm infection among the aboriginal school children.

Key words *:* Hookworm; aboriginal (Orang Asli) school children, semi urban school

INTRODUCTION

Hookworm infection is one of the most common intestinal parasitic infections which cause anaemia and malnutrition, mainly affecting those with poor socioeconomic status in tropical and subtropical regions (Ghodeif & Jain 2019). Risk factors for developing hookworm infections include low socioeconomic background, barefoot walking, poor hygiene and sanitation and exposure to infected soil. Children are at highest risk to contract such infection (Albonico & Savioli 2017). While hookworm infection is still widely prevalent among aborigines in Malaysia, most studies focused on the aborigines residing in rural areas and there is a lack of study to determine hookworm infection among the urban or semi urban communities in Malaysia. Thus, this study is conducted to determine the prevalence of hookworm infection among the aboriginal school children in a semi urban area in Selangor, Malaysia.

MATERIALS AND METHODS

Subjects and study area

Study participants were recruited among the aboriginal (Orang Asli) primary school children at Kuala Kubu Bharu, in 2011. The cross-sectional study was performed among 159 school children at the age of 7-12 years old. The justifications of the study were briefly explained, and the school children were taught the correct method to collect their stool samples. Stool containers were distributed to the school children after informed consent were obtained.

Stool examination

All stools were examined microscopically after direct stool smear and and formalin-ether concentration technique.

RESULTS

Hookworm infection was positive in 12 (7.55%) aboriginal school children. The aboriginal school children at the age of 11 years old showed the highest prevalence of hookworm infection (19.05% ; 4/21), followed by students aged 10 years old (8.00% ; 2/25), 8 years old (7.69% ; 2/26), 7 years old (6.82% ; 3/44), 12 years old (4.17% ; 1/24) and 9 years old (0.00% ; 0/44). Of all the school children participating in this study, males showed higher prevalence of hookworm infection (10.14 ; 7/69) as compared to the females (5.55% ; 5/90).

TABLE 1. Distribution of hookworm infections among the aboriginal school children according to age

Participants age (years)	Number of samples examined	Number of positive samples	Prevalence (%)
7	44	3	6.82
8	26	2	7.69
9	19	0	0.00
10	25	2	8.00
11	21	4	19.05
12	24	1	4.17

TABLE 2. Distribution of hookworm infection among the aboriginal school children according to gender

Gender	Number of examined samples	Number of positive samples	Prevalence (%)
Males	69	7	10.14
Females	90	5	5.55

DISCUSSION

Hookworm infection is still a major problem in aboriginal (Orang Asli) communities in Malaysia, especially in rural areas. Low health standard has been the main reason for such infection (Nuradli et al. 2019). Several risk factors were found to affect the transmission of hookworm including warm and moist climate, poor sanitation and contaminated water supply (Albonico & Savioli 2017; Ghodeif & Jain 2019). Thus, underprivileged communities including the aborigines in Malaysia who lives in tropical region with low socioeconomic status and sanitation have high risk to contract hookworm infection. Improving socioeconomic status has been postulated to potentially reduce the prevalence of hookworm infection; this has been evidenced by the current study where hookworm infection was found to be generally low among the primary aboriginal school children staying in a semi urban school in Selangor, Malaysia.

The aboriginal school in this study was equipped with good sanitation, clean dining area, clean toilet and school environment. The aboriginal school children were taught to wear shoes all the times in the school compound and hostel. The school children spent most of their time at the school and went back to their home only during weekend and school holidays. Therefore, they may have learnt and practised to walk with their shoes on and apply good personal hygiene and sanitation even when they went back to their homes.

Hookworm infection in this study was higher in male school children in comparison to the female school children. This is in line with previous studies where male rural elementary school students showed higher prevalence of hookworm infection as compared to the female students (Feleke 2018). Other studies performed in adult also found similar gender predilection of hookworm infection, with male participants had higher prevalence of the infection (Behnke et al. 2000; Jiraanankul et al. 2011). In this current study, the male school children may have spent more time with outdoor activities such as playing football and others. Hence, the chance of them to get hookworm infections through barefoot contact with the soil is generally higher in comparison to the female school children.

This study highlighted the relatively low prevalence of hookworm infection among the aboriginal school children living in a semi urban school with proper, clean school environment, good sanitation and health education. Health education

among the aboriginal school children, teachers and family members are hoped to eliminate hookworm infection in this semi urban aboriginal school children. The evidence of this study is hoped to assist in the prevention and control of hookworm infections in other semi urban and rural aboriginal school children.

CONCLUSION

Hookworm infection is low among the primary aboriginal school children living in a semi urban school with good facilities, clean school compound and good health education by the teachers, the school children are at low risk to contract the infection. These efforts were shown to assist in the prevention of hookworm infection among the school children. Long term and continuous strategies are required to eliminate such infection among the aboriginal school children living in semi urban and rural school in Malaysia.

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