

Ascariasis among Orang Asli Children at Pos Lenjang, Pahang, Malaysia

Hartini Y¹ & Mohamed Kamel AG²

¹ Faculty of Health Sciences, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor

² Department of Biomedical Science, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Jalan Raja Muda Abdul Aziz, Kuala Lumpur

ABSTRAK

Satu kajian irisan lintang telah dijalankan pada tahun 2006 bagi menentukan prevalens infeksi *Ascaris lumbricoides* di kalangan kanak-kanak Orang Asli di Pos Lenjang, Pahang. Sejumlah 71 sampel feses telah diperolehi daripada kanak-kanak (40 perempuan dan 31 lelaki) yang berumur antara 1-12 tahun. Sampel tersebut kemudiannya diperiksa menggunakan teknik apusan langsung feses dan konsentrasi formalin-eter bagi mengesan kehadiran ova *A. lumbricoides*. Hasil kajian ini menunjukkan prevalens infeksi *A. lumbricoides* secara keseluruhannya adalah 42.3%. Prevalens infeksi *Ascaris* didapati lebih tinggi di kalangan kanak-kanak lelaki (45.2%) berbanding kanak-kanak perempuan (40%) ($p>0.05$). Kanak-kanak bersekolah menunjukkan prevalens infeksi lebih tinggi (48.6%) berbanding kanak-kanak pra sekolah (35.3%) ($p<0.05$). Prevalens infeksi *Ascaris lumbricoides* yang tinggi di kalangan kanak-kanak Orang Asli ini adalah berkaitan dengan status sosioekonomi, tahap sanitasi persekitaran dan kebersihan diri yang rendah. Daripada 30 sampel yang positif dengan ova *A. lumbricoides*, didapati teknik konsentrasi formalin-eter menunjukkan peratus pengesanan 100% berbanding apusan langsung feses dengan peratus pengesanan hanya 46.7% ($p<0.05$). Oleh itu, adalah disarankan supaya kedua-dua teknik ini (apusan langsung dan konsentrasi formalin-eter) perlu dilakukan dalam pemeriksaan rutin feses untuk diagnosis yang lebih tepat.

Kata kunci: *Ascaris lumbricoides*, Orang Asli, teknik konsentrasi formalin-eter, Malaysia

ABSTRACT

A cross-sectional study was carried out in 2006 to determine the prevalence of *Ascaris lumbricoides* infection among Orang Asli (aborigines) children in Pos Lenjang, Pahang. A total of 71 faecal samples were collected from the children (40 girls and 31 boys) aged between 1-12 years. The samples were examined for the presence of the ova of *A. lumbricoides* using direct faecal smear and formalin-ether concentration techniques. The results revealed that the overall prevalence of *A. lumbricoides* infection was

Address for correspondence and reprint requests: Prof. Dr. Mohamed Kamel Abd Ghani, Department of Biomedical Science, Faculty of Health Science, Universiti Kebangsaan Malaysia, 50300 Jalan Raja Muda Abdul Aziz, Kuala Lumpur. Tel: 603-92897634. Fax: 603-26929032. Email: mkamal@medic.ukm.my

42.3%. The prevalence of *A. lumbricoides* infection was found to be slightly higher in males (45.2%) compared to females (40%) ($p>0.05$). The school-aged children showed higher prevalence of infection (48.6%) as compared to the preschool children (35.3%) ($p<0.05$). The high prevalence of *A. lumbricoides* infection in these Orang Asli children was associated with low socioeconomic status, poor environmental sanitation and personal hygiene. In the 30 samples positive for *Ascaris* ova, a detection rate of 100% was recorded using the formalin-ether concentration technique as compared to 46.7% with the direct smear technique ($p<0.05$). Thus, it is recommended that both techniques (the direct smear and concentration techniques) should be performed routinely for a more accurate diagnosis.

Key words: *Ascaris lumbricoides*, Orang Asli, formalin-ether concentration technique, Malaysia

INTRODUCTION

Ascaris lumbricoides is one of the soil-transmitted helminthes (STH) and is known to be the largest intestinal roundworm of humans. It is a cosmopolitan intestinal parasite with a high prevalence in poor and socio-economically deprived communities in the tropical and sub-tropical areas and is more common in children. About 25% of the world's populations are infected by *A. lumbricoides* and this causes up to a million cases of the disease annually. Poverty, overcrowded living conditions, poor environmental sanitation and lack of health education are the factors related to the intestinal helminthic infection (Norhayati et al. 2003). Several studies have demonstrated a high prevalence of *A. lumbricoides* infection among Orang Asli (Aborigines) children in Malaysia (Norhayati et al. 1997; Mohamed Kamel et al. 2001; Hesham Al-Mekhlafi et al. 2007) where the prevalence of ascariasis ranged between 33.3% - 69%.

The objectives of this study were to determine the prevalence of *A. lumbricoides* infection among 1-12 years old Orang Asli children in Pos Lenjang, Pahang and to evaluate the outcome of the concentration technique compared to

direct faecal smear in detecting *Ascaris* infection.

MATERIALS AND METHODS

Subjects and study area

Pos Lenjang is an aboriginal settlement in Pahang, situated about 320 km from Kuala Lumpur. The aborigines are from the Semai tribe and the village comprises a very small population. After an informed consent was obtained, stool containers were distributed to the population. A total of 71 faecal samples were collected from children aged between 1-12 years old of which 31 were boys and 40 girls.

Faecal parasitological examination

Each faecal sample was subdivided into two parts: one part was unfixed (fresh sample) and the second part was fixed with 10% formalin. Both types of samples were examined for the presence of *A. lumbricoides* ova. The fresh samples were screened immediately in the field using the direct faecal smear technique and two smears were made from each sample. Meanwhile, the formalin-fixed samples were examined later using the

formalin-ether concentration technique at the Parasitology Laboratory, Department of Biomedical Science, Universiti Kebangsaan Malaysia

RESULTS

Seventy one faecal samples were examined using direct faecal smear and formalin-ether concentration techniques. Out of 71 children, 30 (42.3%) were found to be positive for *A. lumbricoides*. The prevalence of *Ascaris* infection was higher (45.2%) in males compared to females (40%) ($p>0.05$). A higher prevalence was also found among the school-aged children (48.6%) as compared to the preschool children (35.3%) ($p<0.05$) (Table 1).

Of the 30 positive samples, the formalin-ether concentration recorded a detection rate of 100% (30 of 30) while the direct faecal smear technique detected only 46.7% (14 of 30) of the total positive samples ($p<0.05$) (Table 2).

DISCUSSION

The overall prevalence of ascariasis in this study was 42.3% which revealed that *A. lumbricoides* infection was common among the Orang Asli children in Pos Lenjang, Pahang. This finding is in agreement with previous studies done in Malaysia where the overall prevalence of *Ascaris* in 1-12 year-old Orang Asli children reported were 62.9% (Norhayati et al. 1997) and 59.5% (Rahmah et al. 1997). It should be noted that these studies were done at different study areas. Two more recent studies conducted among 2-15 year-old Orang Asli children from different study areas have reported similar findings with 61.9% prevalence of ascariasis (Hesham Al-Mekhlafi et al. 2006; Nor Aini et al. 2007). In other local studies involving the Orang Asli community where all age groups were included, the results showed a 33.3% (Mohamed

Table 1: Prevalence of *Ascaris lumbricoides* infection among Orang Asli children at Pos Lenjang, Pahang according to gender and age groups.

Participants Profile	No. of Examined Samples	No. of Positives Samples	Prevalence (%)
Gender:			
Males	31	14	45.2
Females	40	16	40.0
Age groups:			
Preschool (1-6 years)	34	12	35.3
Schooling (7-12 years)	37	18	48.6
Total	71	30	42.3

Table 2: Detection of *A. lumbricoides* ova by direct faecal smear and formalin-ether concentration techniques.

Diagnostic Techniques	Positive Samples (n=30)	
	No.	%
Direct Smear	14	46.7
Formalin-Ether Concentration	30	100.0

Kamel et al. 2001) and 25.7% (Lokman Hakim et al. 2007) prevalence rate of the infection.

According to Zulkifli et al. (2000), the prevalence of the STH infection is closely related and dependent on socio-economic and hygiene conditions. During the study, the Orang Asli's activities, basic facilities and environmental conditions were observed. Like other disadvantaged communities in Malaysia, the Orang Asli at Pos Lenjang also belongs to a lower socioeconomic group. Because of the poor educational level of the villagers, they work as farmers, animal hunters and traders of forest products. Due to low family income, the children live in poor-conditioned houses. Most of the houses

in this village were inhabited by large families. This overcrowded living condition may enhance the faecal-oral transmission among the children in this community.

Poor personal hygiene was observed among the Orang Asli children due to the lack of knowledge about health and hygiene practices. Hand washing before eating and after defecation was not regularly practiced by the children. They also ate raw food especially fruits without washing them first. The disease transmission may be enhanced among this population group who fail to practice good personal hygiene. Based on the review prepared by Fung & Cairncross (2009), there was some evidence implicating that the practice of hand washing is effective in reducing the prevalence of *Ascaris* infection.

Lack of basic facilities such as safe drinking water, proper housing and proper sanitary and garbage disposal render the Pos Lenjang community especially the children vulnerable to *Ascaris* infection. There was very limited number of stand pipes provided in this Orang Asli village. Several families had to share one pipe for their needs and therefore, the existing stand pipes could not supply enough water to all families in the village. Therefore they had to resort to alternative sources and the river played an important role as a source of water for them. They used water from the river for daily activities such as washing clothes, bathing, cooking and drinking. Toilets were not available and generally the villagers, especially children, were inclined to defecate indiscriminately among the bushes close to their homes. Besides bushes, some of the villagers used the river as a defecation site and using river water to clean themselves. The improper disposal of excreta practiced by this community will increase the risk of *Ascaris* infection among the children. A number of studies have reported that in-

adequacy of safe water supply (Norhayati et al. 1998) and poor sanitary disposal (Norhayati et al. 1998; Hesham Al-Mekhlafi et al. 2007) were the significant risk factors for ascariasis in Orang Asli communities. According to Luong (2002), the optimum development of *Ascaris* occurs in moist warm soils where the eggs develop into an infective stage. The conditions in the Pos Lenjang area may be favourable for the development of *Ascaris*. The soil is suitable for helminth's egg survival and transmission since there are many shady areas from the presence of many trees contributing to the high prevalence of *Ascaris* infection among the children in this community.

This post has no accessible road for the provision of adequate garbage disposal. Hence, piles of garbage were left exposed and unattended which attracted flies, cockroaches and other pests. A recent study showed that the housefly is a potential mechanical vector for STH infection, which could spread the infection by transmitting the infective eggs of helminthes to the community with poor sanitary conditions (Maipanich et al. 2008).

Based on the review carried out by Kan (1988), there was little difference in the distribution of helminthes infection between genders, especially boys and girls as they share similar socio-behavioral activity. In this study, males showed a slightly higher prevalence of infection at 45.2% as compared to females 40%, which were not significant statistically.

The result of this study showed that the highest prevalence of *Ascaris* infection was among the schoolchildren (48.6%) as compared to preschool children (35.3%). Bundy et al. (1988) and Norhayati et al. (1997) have reported that the prevalence of *Ascaris* was significantly increased with age. Results from another study performed on children in Gombak by Rajeswari et al. (1994) showed that the prevalence of *Ascaris*

increased reaching a peak in the 9-year age group (15.2%). Sagin et al. (2002) also reported that *Ascaris* infection was more common among children aged 6-14 years than in children below 6 years old who lived in the Bakun Valley, Sarawak. The possible reasons for the obvious difference in the prevalence between age groups are probably due to the children's habits and exposure. Children aged 7-12 years spend more time out of the house. Therefore, they have higher chances of exposure to the infective agent especially when playing on contaminated soil. On the other hand, the younger preschool children are usually under constant supervision by their parents and spend more time indoors thus reducing exposure.

In this study, the faecal specimens were examined for the presence of *Ascaris* ova by two techniques namely the direct smear and the formalin-ether concentration. Based on the results, the formalin-ether concentration was found to be the more sensitive in detecting *Ascaris* ova in faeces with a detection rate of 100% as compared to 46.7% with the direct smear ($p < 0.05$). In this study, two faecal smears were made from the single stool specimen collected, the result could be different if more stool samples were examined for direct faecal smear. A previous study (Oguoma & Ekwunife 2007) reported that 9.47% of *A. lumbricoides* was detected by the concentration technique while 5.26% was detected by the direct smear. They suggested that the concentration technique is a very useful technique in diagnosing intestinal helminthes since it depicted a higher percentage of helminthes infection missed by the direct smear technique. Thus, it is recommended that both techniques (the direct smear and concentration techniques) be performed in routine parasitological examination for a more accurate

diagnosis before any control efforts be implemented in the affected areas.

Ascariasis is still very prevalent among the Orang Asli children at Pos Lenjang, Pahang and it is one of the major causes of public health problems among Orang Asli communities in Malaysia that needs to be addressed.

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