Amoebiasis amongst the Orang Asli (aborigine) School Children at Kuala Kubu Bharu, Selangor, Malaysia

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ABSTRACT

Introduction: Entamoeba histolytica is the protozoan parasite of human intestine which is responsible for amoebiasis. Amoebiasis still prevails in our country especially amongst the Orang Asli (aboriginal) communities.

Objectives: This study was conducted to investigate the prevalence of amoebiasis amongst the Orang Asli (aboriginal) school children at a primary school in Kuala Kubu Bharu (SKTAR), Selangor, Malaysia.

Materials & methods: Cross-sectional study was carried out among 92 volunteered aboriginal school children aged between 7 to 12 years old comprising 49 boys and 43 girls. The stool specimens were collected and screened for E. histolytica by the direct fecal smear method followed by formalin ether concentration technique.

Results: The overall prevalence of amoebiasis in this population is 51.1%. The highest infection rate was observed in lower primary school children aged between 7 < 10 years (55.3%). Males (57.1%) have a higher rate of infection compared to females (44.2%). The formalin-ether concentration technique had shown a higher percentage of detection (85.1%) for E. histolytica compared to direct fecal smear (59.6%).

Conclusion: E. histolytica infection amongst the aboriginal children at SKTAR still indicates a relatively low health standard of this indigenous community. Improving socioeconomic status, including enhanced access to quality health care and adequate sanitation has the potential to significantly reduce the prevalence and intensity of amoebiasis in this aboriginal community.

KEY WORDS

Entamoeba histolytica, Orang Asli (aborigine), school children, Malaysia

INTRODUCTION

Amoebiasis, also known as amoebic dysentery, is an infection caused by the amoeba Entamoeba histolytica. Symptoms can range from asymptomatic, mild diarrhoea to dysentery and even causing extra-intestinal complications in the extreme cases. According to Sebastian et al. 2007, amoebiasis is the third most important parasitic disease of humans which causes death. The aborigines in Malaysia frequently face these parasitic infections probably due to low socioeconomic status, poor environmental sanitation and poor personal hygiene.

The Orang Asli children are particularly susceptible and typically have the largest number of intestinal infections compared to adult. Previous study has demonstrated that infections caused by intestinal parasites are still prevalent among aboriginal children with 87.4 percent were positive for one or more parasites; with children aged between 7 to 9 years old appearing to be the most vulnerable (Hartini et al., 2013). The aim of this study was to evaluate the prevalence E. histolytica infection among the aboriginal school children at SKTAR primary school, Kuala Kubu Bharu in the state of Selangor.

MATERIALS & METHODS

Subject and Study Area

A cross-sectional study was conducted at SKTAR primary school, Kuala Kubu Bharu, in the state of Selangor in April, 2017 (Fig. 1). The Orang Asli students are mostly from the nearby villages including Kampung Tun Abdul Razak, Kampung Peretak, Kampung Gerachi, Kampung Batu 3, Kampung Kolam Ayer, Kampung Ulu Kali, Kampung Hulu Tamu and Kampung Buluh Telur. Most of their parents work as plant collectors from the forest or earn a living by selling forest product. In this study, 92 students aged from 7 to 12 years old, participated as study subjects.

After an informed consent was obtained, plastic containers for collection of faecal samples were distributed to the students. Each container was labelled with the student's name and class number. Only a single stool specimen was collected from each participant and the samples were immediately processed upon arrival at the laboratory.

Faecal Examination

Each stool sample was examined for E. histolytica cysts and trophozoites using two techniques, ie; the direct faecal smear and formalin-ether concentration.
92 stool samples were collected from the aboriginal students of SKTAR and examined by the direct faecal smear and formalin-ether concentration techniques. Of the 92 stool samples, 47 (51.1%) were found to be positive for *E. histolytica* as shown in table 1.

The age groups were classified into the lower primary school (those aged 7 < 10 years old) and the higher primary school (10-12 years old). Table 2 shows that there is a higher rate of infection in those who are in the lower primary school (55.3%) than those who are in the higher primary school (46.6%).

Males (57.1%) have a higher rate of infection of *E. histolytica* compared to females (44.2%) as shown in table 3.

When comparing the different diagnostic techniques employed, the formalin-ether concentration showed a much higher sensitivity in detecting *E. histolytica* (85.1%) compared to the direct faecal smear technique (59.6%) as shown in table 4.

**DISCUSSION**

As shown in our study, *E. histolytica* is still very much prevalent in our country especially among the aborigines. In this study, 51.1% of the participants were found to be positive for *E. histolytica* and this rate was much higher when compared to previous studies done by Tengku et al. 2013 and by Noor Aziah et al. 2007 where the overall prevalence of *E. histolytica* was only 18.6% and 18.5% respectively. Our previous studies done at Pangsoo (Mohamed Kamel et al. 2002), Pos Lenjang (Hartini et al. 2009) and Pos Sungai Rual (Mariam et al. 2012) all recorded lower prevalence at 6.92%, 22.5% and 38.7% respectively. A more recent study done in Pakistan (Aurang et al. 2018) also showed a lower rate of infection at 23.6%. According to Phue et al. 2011, the main risk factors for higher rate of infection of *E. histolytica* were poor socio economic status and hand hygiene. People with lower socio-economic status had a much higher risk of infection compared to those with better socioeconomic status. In addition, those who never use soap during hand wash, has 3-4 times higher risk of infection compared to those who use it. Similarly, Tengku et al. 2012 discovered that not washing hands after playing with soil or gardening and the presence of other family members infected with *E. histolytica* were the significant risk factors of infection among all Orang Asli ethnic groups.

When comparing between different age groups, those in lower primary school (aged 7 < 10 years old) have a higher rate of infection compared to those in higher primary school (aged 10-12 years old). This is in accordance with a previous study done by Tengku et al. 2013 where the infection rate was higher in those who are less than 15 years old (33.9%). Mariam et al. 2012, in a study done at Pos Sungai Rual, also found a higher infection rate amongst children who were in the lower primary school. A study done in Pakistan (Aurang et al. 2018) also supports that children aged between 6-10 years old (33.8%) have a higher infection rate when compared to children who are 11-15 years old (29.4%). Also in line with our findings, is a study done in Libya (Esalem et al. 2017) where children aged 8-11 years old (6.66%) have a higher infection rate compared to those 12-15 years old (2.5%).

In our study, males have a higher infection rate (57.1%) when compared to females (44.2%). Similarly in Pakistan (Aurang et al. 2018) and Libya (Esalem et al. 2017), both studies showed that males have a higher infection rate when compared to females. However in previous studies done in Malaysia (Tengku et al. 2013; Hartini et al. 2009; Mariam et al. 2012) showed that females have a higher infection rate compared to males. However all of the studies done showed that there were no statistical significance in infection rate between genders.

Two diagnostic techniques employed for detection of *E. histolytica* in this were the direct faecal smear and formalin-ether concentration. In this study, the formalin-ether concentration was more sensitive (85.1%) in detecting *E. histolytica* when compared to direct faecal smear technique (59.6%). This is consistent with a study done in Africa (Ikepeze et al. 2018) which shows that formalin-ether concentration technique has a better detection (6.32%) of *E. histolytica* when compared to direct faecal smear (3.16%).

Even though the prevalence of amoebiasis is considered high in this population, we cannot be absolutely sure that the causative agent is really *E. histolytica*, as *E. dispar* is also morphologically indistinguishable from *E. histolytica*. *E. dispar* is a non pathogenic amoeba that resembles *E. histolytica* morphologically. Furthermore, majority of the children infected, remain asymptomatic. To confirm the exact species involved, a molecular technique such as the polymerase chain reaction should be employed, which is not feasible in this study.

**CONCLUSION**

The present study showed a high prevalence of *E. histolytica* / *E. dispar* among the aboriginal school children of SKTAR, Kuala Kubu Bharu. The contributing risk factors for this high infection rates include poor hand hygiene and low socioeconomic status. Therefore health education should be given to them regularly, so that they can become more aware and understand the importance of hygiene and health care in preventing diseases such as amoebiasis.
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REFERENCES


