

# Blastocystosis amongst the Orang Asli (Aborigine) Schoolchildren at Pos Sanderut, Kuala Lipis, Malaysia

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## ABSTRACT

**Introduction:** *Blastocystis hominis* is one of the most commonly detected protozoan parasites in the human intestine. Its infection leads to gastrointestinal symptoms which include acute or chronic diarrhoea, abdominal pain, nausea & vomiting. Blastocystosis is highly prevalent in tropical developing countries and in Malaysia, it is also common especially amongst the Orang Asli community.

**Objective:** This cross sectional study aimed to investigate the prevalence of *Blastocystis hominis* infection amongst the Orang Asli schoolchildren at Pos Sanderut, in the district of Kuala Lipis, Pahang, Malaysia.

**Materials and Methods:** Two hundred and eight aboriginal schoolchildren from SK Sanderut, Kuala Lipis participated in this study. The children were divided according to gender and age groups. Faecal samples were collected and examined for the presence of *Blastocystis hominis* using two diagnostic techniques, namely direct faecal smear and formalin-ether concentration techniques.

**Result:** The overall prevalence of *Blastocystis hominis* infection among Orang Asli children was 32.7%. The infection was higher in females (33.9%) compared to males (31.3%) even though it was not statistically significant ( $p > 0.05$ ). Those in upper primary school had a slightly higher infection rate (34.8%) though not significant, compared to those in lower primary school (30.1%). The formalin-ether concentration technique showed better detection of *Blastocystis hominis* compared to the direct faecal smear method.

**Conclusion:** The high prevalence of blastocystosis indicates that it is still a significant health issue in Malaysia especially among the children of the aboriginal community. This study recommends increasing the health awareness of the Orang Asli community by organizing health talks especially on the aspect of personal hygiene and sanitation.

## KEY WORDS

*Blastocystis hominis*, Orang Asli (aborigine), schoolchildren, Malaysia

## INTRODUCTION

*Blastocystis hominis* was initially thought as a harmless species of yeast until Zierdt *et al.* 1967 proved them to be a protozoan parasite. The parasite mainly spread via fecal-oral route which makes poor hygiene a major risk factor for infection (Ust & Turgay, 2006). A study done in Taiwan (Kuo *et al.* 2008) had shown that drinking non-boiled water also significantly increase the risk of infection. Once infected, most patients remain asymptomatic and those who become symptomatic manifest non-specific gastrointestinal symptoms such as nausea, abdominal pain and diarrhoea, however there has been cases where more serious symptoms such as rectal bleeding, weight loss, anaemia, and eosinophilia, are more likely to occur if the patients are immunocompromised (Idris *et al.* 2010). In our country, the aboriginal community are very vulnerable to this infection due to lack of awareness and poor source of clean water.

Aboriginal children are particularly susceptible and typically have

the largest number of intestinal infection compared to adults. Previous study has demonstrated that infections caused by intestinal parasites are still prevalent among aboriginal children with 87.4% were positive for one or more parasites, with children aged 7 to 9 years old appeared to be the most significantly infected (Hartini *et al.* 2013). *Blastocystis hominis* infection was also inflicted in 30.6% of that study population (Hartini *et al.* 2013). The aim of this study was to evaluate the prevalence of *Blastocystis hominis* infection among the aboriginal schoolchildren at Pos Sanderut, Kuala Lipis, Pahang.

## MATERIALS & METHODS

### Subject and Study Area

This cross-sectional study was carried out at Pos Sanderut, an

Received on June 1, 2020 and accepted on September 17, 2020  
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**Table 1: Prevalence of Blastocystosis amongst Aboriginal student at Pos Senderut**

Protozoa	No. of Student Examined	No. of Positive samples	Prevalence (%)
<i>Blastocystis hominis</i>	208	68	32.7

**Table 2: Prevalence of Blastocystosis according to Gender and Age**

GENDER	Number of school children examined	Number of positive samples	Prevalence (%)
Male	96	30	31.3
Female	112	38	33.9
AGE GROUP			
7 < 10 (lower primary)	93	28	30.1
10 < 13 (upper primary)	115	40	34.8
Total	208	68	32.7

**Table 3: Detection of *Blastocystis hominis* by DFS and FEC techniques**

Diagnostic Techniques	<i>Blastocystis hominis</i> N = 68 (%)
Direct faecal Smear (DFS)	40(58.8)
Formalin Ether Concentration technique (FEC)	60(88.2)

aboriginal settlement in the district of Kuala Lipis, Pahang in April 2014. It is situated about 300 km from Kuala Lumpur. The study was conducted among 208 Orang Asli primary schoolchildren of SK Senderut from standard 1-6. In this study, students aged from 7 to 13 years old were recruited as study subjects. Students under the age of 10 years (standard 1-3) are classified as the lower primary group, whereas those between 10-13 years old (standard 4-6) are classified as the upper primary group. 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. The faecal samples were collected and immediately screened upon arrival at the laboratory.

### Faecal Examination

The stool samples were examined for the presence of *Blastocystis hominis* using two techniques; the Direct faecal smear (DFS) and Formalin-ether concentration techniques (FEC).

## RESULT

A total of 208 stool samples were collected from the aboriginal students of Pos Senderut and examined by the direct faecal smear and formalin ether concentration techniques. From the 208 students, 112 were females and 96 were male students.

Of the 208 stool samples, 68 (32.7%) were found to be positive with *Blastocystis hominis* as shown in Table 1.

According to gender, 33.9% of the female students were infected with *Blastocystis* whereas for the male students, the infection rate was 31.3% (Table 2). When comparing between different age groups, those in upper primary school had a slightly higher infection rate (34.8%) than those in lower primary school (30.1%) as shown in Table 2.

The direct faecal smear technique detected 40 cases (58.8%) while the formalin-ether concentration had a better detection with 62 cases

(88.2%) as shown in Table 3.

## DISCUSSION

*Blastocystis hominis* infection is often underestimated as it is usually harmless in small numbers, however, in the presence of a large number, the infection can cause severe symptoms. In our study, the overall prevalence of *Blastocystis hominis* was 32.7%. This significantly high rate of infection was comparable to previous studies done in Pahang by Samseh *et al.* 2017 and Nabilah *et al.* 2017 where the overall prevalence of *Blastocystis infection* were 42.6% and 40.7% respectively. However, a study done by Tengku *et al.* 2013 in Negeri Sembilan, Perak and Pahang, had a lower prevalence of 20.4%. A much larger study done by Nithyamathi *et al.* 2016 involving 5 states in peninsular Malaysia, recorded a much lower infection rate of only 10.6% and this could be attributed to the much larger sample size as it also included non-Orang Asli population. Possible reasons why there is such a high infection rate of intestinal parasites among the aborigines are due to a lot of risk factors. These include, low monthly household income, absence of toilets, usage of untreated water, not boiling water before drinking, walking barefooted outside of home, not washing hands after contact with soil, not washing hands before eating and not washing hands after using the toilet (Yuee *et al.* 2016).

Water-borne spread and person-to-person transmission are known for the occurrence of blastocystosis. Tengku *et al.* 2013 discovered that drinking untreated water and the presence of other family members infected with *Blastocystis* as the real risk factors for *Blastocystis* infection. Though this community of Orang Asli does have piped water supply, the source is from gravity feed system in which the water is untreated. During visits to the villages, we observed that most of the population preferred to drink unboiled water.

Our result showed an insignificantly higher rate of infection in female students compared to males (33.9% and 31.3% respectively), similar to our previous study conducted at Pos Lenjang in 2011 (Mohamed Kamel *et al.* 2011). This is also in line with a previous study (Tengku *et al.* 2013) where the majority infected were females (21.7%) compared to males (18.7%). Another study done by Nabilah *et al.* 2017 showed no significant differences in the infection rate between gender.

When comparing the infection rate of *Blastocystis hominis* according to age group, our study showed that those in upper primary school had an insignificantly higher infection rate (34.8%) than those in lower primary school (30.1%). Study done by Nithyamathi *et al.* 2016 showed similar infection rate between upper primary school (10.7%) and lower primary school (10.3%). Tengku *et al.* 2013 showed that the prevalent was higher (22.6%) in those less than 15 years old than those more than 15 years old (18.6%).

The prevalence of *Blastocystis* infection might also be influenced by the choice of laboratory methods used for detection, in which in this study only the direct faecal smear as well as the Formalin ether sedimentation techniques were employed. Had a more sensitive technique such as the Trichrome staining technique or a culture in Jones' medium being employed, the prevalence would be expected to increase. Furthermore, our results were based on a single stool specimen submitted by the participants.

## CONCLUSION

The prevalence of *Blastocystis hominis* among Orang Asli schoolchildren is still very high, indicating that these children are still exposed to the many risk factors that influence the spread of the protozoa via faecal-oral route. Our findings may serve as baseline data to the health authorities in order to eradicate intestinal parasitic infections. In the meantime, it is necessary to promote health awareness and good hygiene practices especially in schoolchildren.

## ACKNOWLEDGEMENT

We wish to thank the headmaster and all teachers of SK Senderut, Pahang for supporting us in this study. Our gratitudes also go to Professor Dr Hidayatulfathi, all MSc students (Infectious disease module) batch 2014/15 and technical staffs for their support and technical

assistance.

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