

# Comparison of Characteristics in Children and Adult Living in Malaria Endemic Area

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Abstract: Malaria is still a public health problem worldwide with nearly 500,000 death cases in 2014. Indonesian government has put a lot of efforts to achieve malaria elimination in 2030. Defining characteristics of the people living in malaria endemic area will help achieving better malaria control. We did a descriptive study in Tanjung Leidong, Labuhanbatu Utara, Indonesia and screened 67 subjects who came to the health centre. We analyzed the data using STATA ver 15.1. We found that 28 subjects were positive for malaria, among those 11 were children and 17 were adults. Parasitaemia was slightly higher in children compared to adult. Haemoglobin level in adult was slightly higher than in children. We conclude that malaria in Tanjung Leidong is more common in adult with milder symptom than in children.

## 1 INTRODUCTION

Despite all the efforts toward malaria elimination, malaria is still one of public health problem in the world with more than half a million people die in 2014 (WHO, 2014). Indonesia is one of malaria endemic countries that determined to achieve elimination in 2030 and has generally succeeded in reducing malaria cases over these few decades (MoHoR, 2016), however malaria still remains endemic in some regions, including North Sumatera, in western part of Indonesia. In 2010, we still found around 300 malaria cases in Tanjung Leidong District, Labuhanbatu Utara Regency (Pasaribu *et al.*, 2013). To have a successful malaria control, all aspects involving host, agent and environment have to be covered (Paaijmans *et al.*, 2010). One strategy to combat malaria is through understanding the epidemiology and characteristics of the host, in endemic areas it means the people living in the community (CDC, 2012). The aim of this study is to compare the possible characteristics occur both in children and adult to develop the specific strategy for malaria control.

## 2 METHODS

In between June-July 2018, we screened 67 subjects who came to the health center with fever or history of

fever. Personal information such as age, sex, temperature and occupation were collected. Blood was collected from finger prick and examined for hemoglobin level and malaria examination. Diagnosis of malaria was done by rapid diagnostic test then confirmed by microscopy. Malaria blood smear was made according to the World Health Organization procedure (WHO, 2010). Malaria smears was read by a certified microscopist.

Data were analyzed using STATA ver 15.1. Descriptive data was presented as percentage, mean and standard deviation.

This study has been approved by the Ethics Committee of Medical Faculty, Universitas Sumatera Utara/H. Adam Malik General Hospital.

## 3 RESULTS

From 67 subjects screened, we found 28 (41.79%) were positive for vivax malaria. Plasmodium vivax is the only malaria species found in this study. Among those 28 subjects, 11 were children and 17 were adult (figure 1).

Mean age for children was 9.25 years and 32.8 years for adult. Mean body temperature was 37.6°C for children and 37.4°C for adult. The characteristics of subjects are explained in table 1.

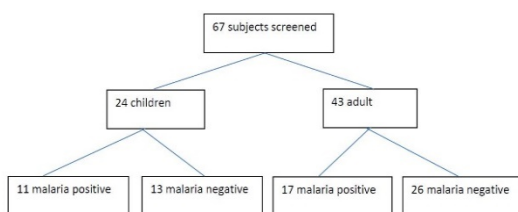


Figure 1: Trial profile.

Mean temperature in subjects with malaria was 38.3°C compared to 36.7°C without malaria. There were 32 subjects came to the health center with fever, and all positive for malaria was having fever at the time of admission (28/32).

Table 1: Subject characteristic comparison between children and adult.

Subject profile	Children	Adult
Sex (N,%)	N= 24	N=43
Female	10 (41.67)	18 (41.86)
Male	14 (58.33)	25 (58.14)
Malaria (N,%)	N=24	N=43
Positive	11 (45.83)	17 (39.53)
Negative	13 (54.17)	26 (58.14)
Body weight (mean,SD,kg)	N=23, 21.87 (9.16)	N=41, 55.80 (17.49)
Age (mean,SD,year)	N=24, 9.25 (3.30)	N= 43, 32.8 (13.51)
Temperature (mean,SD,°C)	N=24, 37.6 (0.88)	N=43, 37.4 (0.92)

From the laboratory result we found that the mean haemoglobin level in malaria subjects are comparable to nonmalaria (12.2gr/dL vs 12.9gr/dL). The mean haemoglobin level in children was lower than adult (11.65gr/dL vs 13.22gr/dL). Mean asexual parasite in children was 209.67/µL compared to adult 1578.61/µL. The finding of laboratory examination is shown in table 2.

Table 2: Comparison of laboratory examination between children and adult.

Laboratory profile	Children	Adult
Haemoglobin (mean,SD,gr/dL)	N=24, 11.65 (1.48)	N=41, 13.22 (1.19)
Asexual parasitemia (mean,SD,/µL)	N=11, 209.67 (4093.55)	N=17, 1578.61 (3389.85)
Sexual parasitemia (mean,SD,/µL)	N=11, 660 (845.41)	N=17, 794.42 (1234.07)

## 4 DISCUSSION

Malaria remains one of the greatest public health problem in the world (WHO, 2014). In Indonesia, the government has committed to achieve malaria elimination in 2030. Many efforts has been done and we can see declining number of malaria cases and malaria free in Java island, however, there are still many works need to be done for Sumatera and east Indonesia (MoHoR, 2016).

In our study, we found that more malaria cases were found in adult compared to children. This finding is similar to the study done in China in 2012-2014 where adult age between 35-49 years are the predominant age group (Xu *et al.*, 2016). This is because adult go outside the house more often than children eq. for work.

The study done by Kwak *et al.* (2013) in Korea found that about 98.8% subjects who had malaria were having fever. This similar result is also found in our study where all of our malaria subjects came to the health centre with fever.

In previous study done by Camargo *et al.* (2018), the mean parasitaemia found was below 2000 parasite/µL, while in our study, we found that parasitaemia was higher in children (>2000 parasite/µL) compared to adult (<2000 parasite/µL). This can be explained by the partial immunity that adult has but not in children.

Our finding showed that haemoglobin level in adult was higher compared to children. This is similar to the result from the study done by Siqueira *et al.* (2014) that showed children haemoglobin level was lower.

## 5 CONCLUSIONS

Malaria affects more commonly in adult than in children, however the symptom and lab result in adult is milder than in children.

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