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Profile of Malaria Pediatric Patient's Waikabubak Hospital, East Nusa Tenggara period of January-December 2021

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Abstract

Malaria is one of the public health problems that can cause death, especially in high-risk groups such as infants, toddlers and pregnant women. Indonesia as tropical area which malaria is spread throughout the archipelagos, especially in eastern Indonesia.

Method: This study aims to determine the profile of malaria in pediatric patients of Waikabubak Hospital, East Nusa Tenggara Province for the period January 2021 to December 2021. This is retrospective analytic descriptive study, by accessing medical record data of patients. The research subjects were pediatric patients aged 1 month to 18 years old who suffered malaria.

Results: In this study, 53 subjects were positive for malaria. Patient characteristics were dominated by female gender 28 subjects (52.8%), with the highest age group being 1-5 years old 26 (49.1%), body mass index was dominated by underweight as much as 44 (83%). The most common symptom was fever in 19 subjects (35.8%). Another complaint was fever with seizure 9 (17%). This study was dominated by subjects with tropical malaria as many as 31 (58.5%). The length of hospitalization in this study was dominated by 3 days as many as 39 (73.6%). The medications that often used were Dihydroartemisinin-Piperaquine (DHP) and Primaquine as many as 36 (67.9%). The most common comorbid disease in this study was pneumonia as many as 13 (24.5%).

Conclusion: Malaria pediatric patients in Waikabubak Hospital are dominated by female toddlers aged 1-5 years old, underweight. The most common complaints were fever, length of hospitalization was generally 3 days with the most common diagnosis was tropical malaria and the frequent given medication were DHP and Primaquine.

Keywords: Malaria; Children; Falciparum; Tertiana; Vivax; Tropica

1. Introduction

Malaria is one of the major problem in the world [1] More than 100 countries are infected with malaria with estimation 300-500 million cases per year and more than 1 million deaths per year due to malaria infection. Malaria can be acute, latent or chronic. Malaria is still one of the public health problems that can cause death, especially in high risk population such as infants, toddlers, and pregnant women which indirectly reduce work productivity. Although this disease is reported worldwide, the endemic areas of malaria are tropic area furthermore Indonesia as tropical area which malaria is spread throughout the archipelago, especially the eastern part of Indonesia. Most of the deaths occur in infants and children [4].

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Malaria is caused by protozoa plasmodium which is transmitted to humans by the female Anopheles mosquito. Plasmodium vivax and Plasmodium falciparum are the most common parasites causing malaria in Indonesia. However, compared to Plasmodium vivax and other types of plasmodium, Plasmodium falciparum is the most common plasmodium species found in Indonesia [5]. Geographically, Nusa Tenggara and Papua are two Indonesia archipelagic regions with domination of Plasmodium falciparum and Plasmodium vivax compared to other regions in Indonesia [6-7]. Plasmodium falciparum is worst species when it causes malaria infection. Serious complications seen in Plasmodium falciparum including cerebral malaria, acute renal failure, respiratory disorders and hemorrhagic diathesis [8].

The classic feature of malaria is paroxysmal fever. Fever is characterized by high fever, sweating, headache, myalgia, back pain, abdominal pain, nausea, vomiting, and diarrhea, pale and yellow. Children with malaria often have nonspecific symptoms, including: fever, may be mild but often over 40 °C, headache, drowsiness, anorexia, nausea, vomiting and diarrhea [9-10].

The prevalence of malaria between 2013 was 6.0%. Five provinces with incidents and the highest prevalence was Papua (9.8% and 28.6%), East Nusa Tenggara (6.8% and 23.3%), West Papua (6.7% and 19.4%) [11].

The research was conducted in the province of East Nusa Tenggara which is an endemic malaria area in Indonesia with the second highest number of malaria cases in Indonesia. Hospital which will be used as a sampling location is the Waikabubak General Hospital. Researchers hope the results of this study can provide detail information about clinical characteristics of malaria, especially in Waikabubak Hospital, therefore can facilitate medical personnel, especially doctors, in diagnosing malaria in children.

2. Material and methods

Cross-sectional design was used in this study, carried out for 12 months (January until December 2021) there were 53 children with diagnosis of malaria whom underwent inpatient and outpatient care in the Pediatric's Department of Waikabubak General Hospital. Age range from 1 month to 18 years old.

The diagnosis of malaria is based on history, physical examination, and laboratory tests. The gold standard for malaria diagnosis is determined based on the results of peripheral blood smears. All children diagnosed with malaria were checked for weight and height. Subjects were also examined for complete blood count.

The samples studied were all inpatients who were positively diagnosed with malaria based on the results of thin and thick blood smears, with complete medical record and met the inclusion criteria. This study uses primary data with data collection techniques through observation and recording. Data analysis was carried out by descriptive statistics.

3. Result

Total 53 children met the inclusion criteria from January to December 2021. Twenty-five subjects (47.2%) were male and 28 subjects (52.8%) were female. The incidence of malaria patients in children under 1 year old was 12 (22.9%), children aged 1-5 years was 26 (49.1%), children aged 6-10 years was 8 (15.1%) and children aged 6-10 years was 8 (15.1%) children >10 years was 7 (13.2%). The body mass index of the patients mostly was underweight as much as 44 (83%).

The most common signs and symptoms in malaria patients were fever in 19 subjects (35.8%). Another complaint was fever with seizures as many as 9 (17%). This study was dominated by 39 subjects with tropical malaria (73.6%). The length of stay in this study varied, the fastest was 2 days and the longest was 2 days with the dominance length of stay was 3 days as much as 22 (41.5%). The medications that often used were DHP and Primaquine as many as 36 (67.9%). The most comorbid disease in this study was pneumonia as many as 13 (24.5%).

Table 1 Characteristic of sample

Variables	n=53
Gender	
Male	25 (47.2%)
Female	28 (52.8%)
Age	
< 1 years old	12 (22.9%)
1-5 years old	26 (49.1%)
6-10 years old	8 (15.1%)
>10 years old	7 (13.2%)
Chief complain	
Diarrhea	5 (9.4%)
Fever	19 (35.8%)
Seizure	10 (18.9%)
Loss of consciousness	6 (11.3%)
Shortness of breath	13 (24.5%)
Diagnosis	
Malaria Tropica (plasmodium falciparum)	39 (73.6%)
Malaria Tertiana (plasmodium vivax)	14 (26.4%)
Body Mass Index	
Underweight	44 (83%)
Ideal body weight	9 (17%)
Medication	
Artemeter	1 (1.9%)
Artemeter, Primaquine	1 (1.9%)
Artesunat, Primaquine, Quinine	1 (1.9%)
Artesunat	1 (1.9%)
Artesunat, Primaquine	5 (9.4%)
DHP	3 (5.7%)
DHP, Primaquine	36 (67.9%)
DHP, Primaquine, Quinine	2 (3.8%)
Quinine	2 (3.8%)
Quinine, Primaquine	1 (1.9%)
Comorbid	
Diarrhea	6 (11.3%)
Urinary Tract Infection	1 (1.9%)
Complex Febrile Seizures	9 (17.0%)

Mumps	1 (1.9%)
Pneumonia	13 (24.5%)
Acute Rhinofaringitis	2 (3.8%)
Status epilepticus	4 (7.5%)
Thyroid Fever	2 (3.8%)
Length of stay	
2 days	5 (9.4%)
3 days	22 (41.5%)
4 days	10 (18.9%)
5 days	5 (9.4%)
6 days	3 (5.7%)
7 days	3 (5.7%)
9 days	1 (1.9%)
11 days	2 (3.8%)
14 days	1 (1.9%)
16 days	1 (1.9%)
Body temperature in ER	
<36°C	1 (1.9%)
36.5-37.5°C	9 (17%)
37.5-40°C	41 (77.4%)
>40°C	2 (3.8%)
Anemia	
Normal (Hb >11 mg/dl)	12 (22.6%)
Mild Anemia (Hb 8-11 mg/dl)	34 (64.2%)
Moderate Anemia (Hb 6-7.9 mg/dl)	5 (9.4%)
Severe Anemia (Hb < 6mg/dl)	2 (3.8%)

4. Discussion

Malaria infection is a major public health problem in the tropics, including Waikabubak district, East Nusa Tenggara Province. In this study, we obtained 53 pediatric patients with malaria infection during January to December 2021 with 52.8% being dominated by female. This is in accordance with Lailani's research in North Sumatra which found more women suffering from malaria. There are hypotheses underlying the reasons for the sex differences including specific modulation of estrogen or testosterone of antiplasmodium immunity. Although research on sexual dimorphism is not clear and needs further research, these differences may be influenced more by the sex composition for each population than by other factors [12].

This study found that the age of most children with malaria infection was 1-5 years. This is in accordance with research in Papua and South Bengkulu. In endemic areas, children aged 1-5 years old are high risk of malaria infection due to lack of immunity. In the first two months of life, the child may not contract malaria or its manifestations might be mild with low grade of parasitemia, due to passive immunity acquired by maternal antibodies. Morbidity rates in older children are lower than in children aged 1-5 years. This is because the immunity of older children may have been formed due to repeated infections, a state of premunition occurs so that malaria causes mild or no symptoms and the patient is not considered sick and therefore does not seek treatment[10,13].

In this study, the most common symptom of malaria infection in children was fever with temperature of 37.5-40 °C. Fever is the most common symptom in malaria associated with pyrogens such as TNF, IL-1, and IL-6. Jacobsen reported that TNF levels were higher in symptomatic malaria patients than in asymptomatic malaria patients. TNF level correlated with parasitaemia level and body temperature. In this study we did not measure the levels of pyrogens and the number of parasites [14].

The highest incidence and prevalence of malaria are in the provinces of Papua, East Nusa Tenggara, West Papua, Central Sulawesi and Maluku. The most common malaria infection at Waikabubak Hospital in children was malaria tropica as many as 39 (73.6%). In contrast to Abdussalam's research, the most common plasmodium infection in South Sorong was Plasmodium vivax compared to Plasmodium falciparum [7]. This difference is thought to be because the level of endemicity in each region is not same, resulting different patterns. The eastern part of Indonesia is the area of high malaria stratification, in contrast to some areas in Sumatra which are classified as medium stratification. Malaria in one area can be different from other areas, depending on the presence of humans with malaria, the presence of vectors, the presence of parasites, and is influenced by environmental conditions [6].

Almost 83% of total research subjects were underweight. This situation can be caused by lack of food intake or can be caused by chronic infections that cause malnutrition [7]. The medications in this study were dominated by the combination of DHP and Primaquine as much as 67.9% which is the main therapy of tropical malaria. The combination of DHP and Primaquine aimed to increase the effectiveness and prevent resistance. This study was dominated by mild anemia (64.2%) in contrast to the malaria study on adult subjects in Atambua, which most of the subjects did not suffer from anemia [15].

5. Conclusion

Child malaria patients in Waikabubak Hospital are dominated by women aged 1-5 years, mild anemia and underweight. The most common complaints are fever, the length of hospitalization is generally 3 days with the most diagnosis of tropical malaria and the therapy is often given DHP with Primaquine.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

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