

Malaria Screening in Kayo Batu Village: Malaria Prevention Efforts in Endemic Areas

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ABSTRACT

Jayapura City is a malaria-endemic area, with Kayo Batu Village as one of the villages in Jayapura City, which has an endemic level III or API > 100%. The highest of APIs are influenced by an imbalance of host, agent, and environmental factors, such as low levels of malaria prevention behavior and lack of environmental control. This service activity aims to carry out early detection of malaria, which is expected to be a step in preventing malaria transmission to reduce morbidity and death rates due to malaria. The activity method was carried out by mass blood examination (Mass Blood Survey) using the Rapid Diagnostic Test (RDT) on 164 residents in three RT Kampung Kayo Batu. Inspections are carried by door to door. There were three people (1.8%) who tested positive for malaria with the Plasmodium falciparum parasite type. Of the three people who tested positive for malaria, two people were children aged 6-11 years, and one person was an adult. There is a need to increase the knowledge, skills, and awareness of the people of Kampung Kayu Batu regarding preventing malaria by routinely eradicating mosquito nests around the house to reduce the number of malaria infections. It is hoped that all parties will increase awareness of malaria and encourage behavioral changes toward malaria prevention and environmental control.

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INTRODUCTION

Malaria is still a serious health problem in Indonesia. Malaria is an infectious disease that can cause death in many tropical countries. Malaria is caused by the Plasmodium parasite, which transmitted through mosquitoes. Globally, it was estimated that there are 249 million cases of malaria and as many as 608,000 deaths due to malaria in 85 countries. Children under five years of age account for 80% of malaria deaths (WHO, 2023). Malaria cases continue to increase in Indonesia (WHO, 2022). The Annual Parasite Malaria Indicator (API) for malaria has increased since 2018 from 0.84 per 1000 people to 0.93 per 1000 population (Sari. et al., 2023).

The number of malaria cases in 2021 in Indonesia was 250,644 cases, the highest in Papua Province, namely 216,380 cases, followed by NTT Province with 12,909 cases and West Papua Province with 7,079 cases (Kementerian Kesehatan RI, 2021). Papua is a region in Indonesia that still needs to work hard to control malaria cases. The number of malaria cases continues to increase, from 215,396 in 2020 to 393,801 in 2022. Jayapura City has the second-highest number of cases in Papua. Based on data, malaria endemicity per sub-district or village is highest in the Koya Barat Health Center and the Skouw Mabo Health Center, namely four villages each. Meanwhile, Puskesmas located in urban areas with a high-level III endemic rate are Waena Puskesmas, Yoka Puskesmas, and Tanjung Ria Puskesmas with one village or sub-district each. Kayo Batu Village, as one of the working areas of the Tanjung Ria Community Health Center, has a high-level III endemic rate with an API figure > 100% (Dinas Kesehatan Provinsi Papua, 2022)(Dinas Kesehatan Kota Jayapura, 2022).

Various control efforts have been carried out by the Jayapura City government to control malaria cases and achieve the target of eliminating malaria by 2030. Control strategies implemented were case detection and completed treatment, vector control with mass distribution of insecticide-treated bed nets, spraying residual indoors, environmental cleaning, and control measures to change community behavior. So, one of the activities that needs to be carried out to prevent malaria is Malaria screening or Mass Blood Survey (MBS). Malaria screening or early detection of malaria cases is one effort to prevent malaria and deaths. Early detection can be done using a Rapid Diagnostic Test (RDT), although the gold standard for malaria examination is a microscopic examination of blood smears (Yu et al., 2020). RDT to detect antigens is a diagnostic tool recommended by WHO for managing malaria, as well as increasing access to malaria diagnosis in endemic countries (Gatton. et al., 2020).

Malaria cases that are still endemic in Kayo Batu Village are influenced by imbalance factors between the host, agent, and environment. Environmental factors such as the large number of mosquito breeding sites and lack of malaria prevention behavior are factors causing the high level of malaria transmission (Utami et al., 2022). Education and knowledge, work, customs and habits, and community behavior are also factors of malaria. In endemic areas, prevention must be carried out by increasing the participation and awareness of local communities. Malaria screening, apart from reducing the risk of malaria transmission, can also be a forum for increasing awareness of the large number of malaria cases in the area that require control. Several studies have found that public knowledge in endemic areas is still lacking and often gives rise to misperceptions (Suharjo, 2015). Whereas people who think malaria is not dangerous can have an impact on the difficulty of controlling malaria. Malaria can cause losses to sufferers and the government. In sufferers, apart from causing complications and even death, it also has an impact on economic and productivity aspects. Malaria directly impacts business turnover (increased health care costs) and indirectly on the economic environment (increased absenteeism, decreased productivity, weakened human capital, loss of savings, decrease in investment and tax revenues, and reduction in public health budgets (Mbohou. et al., 2019). Malaria also has an impact on pregnant women. Pregnant women who suffer from malaria can pose a risk to the fetus and newborn baby (Ariasih & Budiharsana, 2020).

Thus, this community service activity has been done to detect malaria incidents early in the Kayo Batu Village community with the aim of increasing awareness of all elements of society regarding malaria incidents.

METHOD

The community service activities were held in Kayo Batu Village, Tanjung Ria Village, North Jayapura District, Jayapura City on October 2023. The target of this activity is all people of all ages who live in Kayo Batu Village. The method of this community service activity is blood examination using the Rapid Diagnostic Test (RDT) for early detection of malaria. The service team collaborates with the Jayapura City Health Service and the Kayo Batu Village Government. Community health center officers and malaria cadres were involved in taking blood from screening participants for one door-to-door measurement. The examination form contains the respondent's identity, address, age, gender, signs/symptoms, RDT results, plasmodium examination results, and signature. Participants who are positive will receive treatment by the Tanjung Ria Community Health Center team.

RESULTS AND DISCUSSION

The characteristics of the respondents can be seen in the following table

TABLE 1. Distribution of Respondent Characteristics in Kayo Batu Village

Population Characteristics (N=164)	n	%
Sex		
Man	63	38,4
Female	101	61,6
Age (Years)		
0-5	49	29,9
6-11	36	22,0
12-15	15	9,1
16-25	16	9,8
26-55	38	23,2
≥56	10	6,1
Occupation		
Not Working	139	84,8
Fisherman	3	1,8
Government Employees	6	3,7
Private Employees	16	9,8

Based on Table 1 above, the people of Kayo Batu Village who are willing to undergo malaria testing come from all ages, with the most common age groups being toddlers (30%), adults (23.2%), and children (22%). Meanwhile, based on gender and occupation, more respondents were female (61.6%) and respondents who did not work (139%). This malaria screening activity was carried out door to door during the day so that most of the respondents available were housewives and children.



FIGURE 1. Blood checks by medical personnel and malaria cadres



FIGURE 2. Blood checks by medical personnel and malaria cadres



FIGURE 3. Blood checks by medical personnel and malaria cadres

TABLE 2. Distribution of Malaria Examination Results in the Kayo Batu Community

Skrining Result (N=164)	n	%
Malaria		
Positive	3	1,8
Negative	161	98,2
Plasmodium		
Plasmodium falciparum	3	100,0
Symptoms		
Headache	29	17,7
Fever (chills)	19	11,6
Pale	3	1,8
Fatigue	11	6,7
Decreased Appetite	2	1,2

Skrining Result (N=164)	n	%
Left Side Abdominal Pain	5	3,0
Nausea	6	3,7
Sore	18	11,0

Based on Table 2 above, the results of blood tests using RDT found that 3 (1.8%) respondents had plasmodium parasites in their blood, with the type of plasmodium found being Plasmodium falciparum. P. falciparum is the most common type of plasmodium found in Indonesia (Salsabila., Gunawan., & Irawiraman., 2021). Plasmodium falciparum infection can cause mild and severe disease symptoms. In mild cases, the general symptoms that appear are not very specific, such as fever, chills, myalgia, headache, anorexia, and cough. The average Malaria incubation period is 12 days. Meanwhile, for severe cases, symptoms of severe disease usually appear 3 to 7 days after the general symptoms above. However, there have been several reports of rapid organ damage, or failure to recover consciousness, and even death. P. falciparum is responsible for the majority of cases of severe malaria. Clinical manifestations of severe malaria include respiratory distress (respiratory acidosis) and impaired consciousness, and also include multiple seizures, radiologically confirmed pulmonary edema (respiratory failure due to acute lung injury that progresses to acute respiratory distress syndrome), abnormal bleeding (disseminated intravascular coagulation), acute kidney injury, jaundice, shock, and coma (Zekar. & Sharman., 2023). Mild malaria generally begins with symptoms of chills, fever, sweating, headache, muscle aches, lethargy, and weakness. Meanwhile, for severe malaria, the symptoms are seizures, yellow eyes, and body, bleeding in the nose, gums, or digestive tract, shortness of breath, and decreased appetite (Suharjo, 2015). Malaria case detection in malaria-endemic areas such as Papua needs to be improved with more effective methods. The implementation of training and mentoring carried out in Teluk Kimi sub-district, Central Papua, for three months found that the results of empowerment in the intervention target group were successful in screening 562 people with 12 cases of malaria diagnosed (Sukatemin., Ester., Ardiansa., & Lasmadasari., 2023).

Based on Table 2 above, people who were willing to be respondents most often experienced symptoms of dizziness/headache (17.7%) during the last week, then symptoms of fever, chills (11.6%), and aches (11%). These three symptoms are not specific symptoms of malaria because these are general symptoms of other diseases. Mild malaria generally begins with symptoms of chills, fever, sweating, headache, muscle aches, lethargy, and weakness. Meanwhile, for severe malaria, the symptoms are seizures, yellow eyes, and body, bleeding in the nose, gums, or digestive tract, shortness of breath, and decreased appetite (Suharjo, 2015).

The results of blood tests during this activity found that three people were infected by malaria. Two were children under five, and one other person was an adult. Malaria is a public health problem that can cause death, especially in high-risk groups, namely babies and children under five and pregnant women. Children are more likely to experience non-specific symptoms such as gastrointestinal, fever, lethargy, malaise, nausea, vomiting, and stomach cramps. In addition, you are more likely to experience severe anemia. Whereas in cases of severe malaria, children can experience convulsions and sepsis that occur simultaneously. In pregnant women, the clinical symptoms that appear can depend on the level of immunity. Pregnant women who do not have strong immunity may experience fever or other symptoms. Malaria in pregnant women is very dangerous because it has negative impacts, such as having low birth weight babies and increasing maternal and infant mortality rates (Zekar. & Sharman., 2023). In addition, malaria directly causes anemia and decreased work productivity (Suharjo, 2015).

Early diagnosis is necessary to control and treat malaria, including malaria caused by P. falciparum infection. More studies have found that late diagnosis contributes to the occurrence of severe malaria (Xia. et al., 2020). In addition, a number of studies have found an increased risk of malaria after

asymptomatic malaria infection in all age groups. Asymptomatic infections are plasmodium parasite infections that do not cause general symptoms. This incidence is as much as 25% in children aged 2 to 10 years in Africa and 30% in adults (Zekar. & Sharman., 2023).

The lack of public awareness to get checked when they have symptoms will accelerate malaria transmission. High public knowledge regarding preventing malaria transmission will encourage community attitudes and behavior in preventing malaria (Purba., Sitorus., & Camelia., 2016). This is because there are malaria infections without acute symptoms which, if allowed to persist, apart from having a negative impact on the individual, the infected individual can become a reservoir for further transmission of the plasmodium parasite (Summer. et al., 2021). Thus, improving the performance of the surveillance system and ensuring that the risk of *P. falciparum* transmission is detected early is very important to support malaria elimination (Xia. et al., 2020).

CONCLUSIONS AND RECOMMENDATIONS

There are 3 (1.8%) residents of Kayo Batu Village who suffer from malaria, 2 of whom are children and live in the same house. Malaria transmission occurs very quickly and is influenced by environmental factors in people's homes, which are still breeding places for mosquitoes, as well as preventive behavior such as the use of mosquito nets, which is still rarely practiced. People who live in malaria-endemic areas still need to increase their knowledge, skills, and awareness of malaria prevention by routinely eradicating mosquito nests around the house in order to reduce the number of malaria APIs. It is hoped that all parties will increase awareness of malaria and encourage behavioral changes towards malaria prevention and environmental control.

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