



# Behavior of the Use of Mosquito Net as a Prevention of Malaria in Ondorea Village, Nanga Panda Sub-district

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## Abstract

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**BACKGROUND:** Malaria is an infectious disease that is still a world public health problem, especially in developing countries with tropical climates, including Indonesia. Ondorea Village in Nangapanda Subdistrict, Ende Regency, is one of the villages in East Nusa Tenggara, which is a province with academic performance indicators (APIs) above the national average.

**AIM:** The objective of the study is to determine family behavior in using mosquito nets as an effort to prevent malaria in Ondorea Village, Nangapanda District.

**METHODS:** This research is a survey research type with descriptive research design, the design used is "cross sectional". The population were all families residing in Ondorea Village, totaling 178 families, the sample in this study used a total sample. The variable in this study was a single variable, namely, family behavior in the use of mosquito nets. The data used in this study are primary data collected by making home visits.

**RESULTS:** Public knowledge about the use of mosquito nets as an effort to prevent malaria in Ondorea Village, Nangapanda District was in the sufficient category, namely, 85.39%, those with good knowledge of 6.34% and those with moderate knowledge of 7.87%. The public attitude about the use of mosquito nets is in a good category, namely, 99.4%, which has a sufficient attitude of 0.56%.

**CONCLUSION:** There is no relationship between the level of knowledge and the behavior of using mosquito nets, but it is found that there is a relationship between family attitudes and the behavior of using mosquito nets as an effort to prevent malaria.

## Introduction

Malaria is an infectious disease that is still a public health problem in the world, especially in developing countries with tropical climates, including Indonesia [1]. This disease affects the high mortality rate for infants, toddlers, and pregnant women [2]. In addition, malaria directly causes anemia and can reduce work productivity [3]. The World Malaria Report in 2011 states that malaria occurs in 106 countries and infects 3.3 billion of the world's population who live in areas at risk of contracting malaria [4]. The incidence of malaria in Indonesia has shown a decline, namely 4.10 in 2005 to 1.38 in 2013 [5]. The incidence of malaria in Ondo Rea Village, Nangapanda District in 2017 was 24% and in 2018 was 8%. Insecticide-treated mosquito nets have been distributed to every family (Puskesmas Nangapanda, 2018) [6]. In its use, there are still families who say that the mosquito nets they received were not used at nighttime, some even used it as a hedge.

The national prevalence of malaria based on the 2013 Riskesdas was 0.6% where the provinces with academic performance indicator (API) above the

national average were West Nusa Tenggara, Maluku, North Maluku, Central Kalimantan, Bangka Belitung, Kepulauan Riau, Bengkulu, Jambi, Central Sulawesi, Gorontalo, and Aceh [7], [8]. The highest prevalence rates were found in eastern Indonesia, namely in West Papua (10.6%), Papua (10.1%), and East Nusa Tenggara (4.4%). Ondorea Village in Nangapanda Subdistrict, Ende Regency is one of the villages in East Nusa Tenggara which is a province with APIs above the national average [7], [9].

Efforts to reduce morbidity and mortality are carried out through the malaria eradication program, whose activities include early diagnosis, prompt and precise treatment, as well as vector surveillance and control in terms of public education and an understanding of environmental health, all of which are aimed at breaking the chain of malaria transmission [10], [11]. The government's efforts to reduce morbidity and mortality are through a malaria eradication program with early diagnosis and prompt and appropriate treatment, vector control, and control in order to break the chain of malaria transmission [12], [13]. Control is also carried out using chemical, biological, environmental management, and integrated control. In the National

Medium Term Development Plan (NMTDP), malaria control indicators reduce the malaria morbidity rate to below 1/1,000 population, so that Indonesia will be free of malaria by 2030 [14], [15].

Malaria control that is currently being carried out in Indonesia is an integrated control, namely a combination of several methods including vector control, preventive therapy, diagnostic tests, treatment with artemisinin-based combination therapy (ACT), and strengthening surveillance [5], [9]. Vector control is carried out by taking approaches and considerations according to the environmental needs of the local community. Integrated control through vector control aims to reduce contact between humans and vectors and protect humans from the bites of mosquitoes infected with the malaria parasite. One of the efforts to protect against mosquito bites is the use of a mosquito net, the use of a mosquito net is a form of community participation in efforts to prevent malaria transmission that is personal protection [16], [17].

The distribution and use of insecticide-treated nets, especially Long Lasting Insecticidal Nets (LLINs) are one of the main interventions considered effective in malaria prevention and control recommended by the WHO with the aim of achieving the Millennium Development Goals target [5], [18], [17]. Insecticide-treated mosquito nets can also be an alternative for malaria vector control in areas where people reject the indoor residual spraying method or it can be an additional effort to prevent malaria transmission [17]. The distribution of LLINs in Indonesia has been carried out since 2006, while the free treatment using ACT has been carried out since 2004 [17].

One of the preventive measures for malaria that is still being implemented is to use insecticide-treated mosquito nets or polishing mosquito nets, as recommended by the WHO from November 2004. Insecticides used in mosquito nets are safe for humans and have been used by many countries [19]. The insecticide-treated mosquito net program is an alternative for malaria vector control in areas where mosquitoes bite inside the house. The use of insecticide-treated mosquito nets can also be an additional effort to prevent malaria transmission using insecticide-treated mosquito nets [17].

The district government of Ende targets that by 2022, malaria will be eliminated, this is a joint commitment that has been stated in the NMTDP. The research objective was to determine family behavior in using mosquito nets as an effort to prevent malaria in Ondorea Village, Nangapanda District. The specific objectives of this study were to identify knowledge and attitudes of the family about malaria in the use of mosquito nets, further identifying the relationship between knowledge, family attitudes with family behavior in using mosquito nets. It is hoped that the results of this study can provide an overview of family behavior in using mosquito nets as an effort to prevent

malaria so that it can be an input for health workers in implementing health promotion programs.

## Methods

This research was a descriptive survey research with a "cross sectional" design. The sample in this study were all families in the Ondorea Village area, amounting to 178 families. The location was Ondorea Village, Nangapanda District, which was held in August - October 2019.

The instrument used was a questionnaire, data collected in the form of primary data were obtained from interviews. Before analyzing the collected data, it was processed manually, namely Editing (checking data), coding (coding), data entry (entering data), and tabulating (tabulating). Data analysis used descriptive analysis, for the knowledge questionnaire, each question was given a value of 1 if the respondent answered correctly, and 0 if the answer was wrong. The attitude questionnaire was given a score of 1 if the answer is yes, and 0 if the answer is no, likewise the behavior questionnaire was given a score of 1 if it answers yes, and 0 if it answers no. The next assessment was determined by the categories: Good = 75–100%, Enough = 50–74%, Less = <50%. Furthermore, the results were analyzed using the Chi-square statistical test to analyze the relationship between knowledge and attitudes toward family behavior in the use of mosquito nets.

This research has received ethical permission from the Research Ethics Commission of Poltekkes Kemenkes Kupang with Number LB.02.03/1/0009/2019 dated July 26, 2019, all respondents were asked for willingness by signing an informed consent.

## Results

Table 1 shows that the majority of household respondents are male, 84.2%, age >39 years as much as 60.67%, junior high school education as much as 46.6%, work is dominated by farmers, 74.1%, and family income >Rp. 1,000,000 83.14% and the number of family members >4 people is 70.9%.

Table 2 shows that the level of family knowledge is at a sufficient criterion of 85.39% with community behavior in good criteria of 80.3%. The results of the analysis showed a  $p > 0.05$  (0.007), meaning that there was no relationship between the level of knowledge and family behavior.

Table 3 shows that family attitudes are in good criteria, namely 99.4% and family behavior is in good criteria

**Table 1: Characteristics of respondents**

Characteristics	n	%
Gender		
Male	150	84.2
Female	28	15.7
Age		
19–29 years old	20	11.23
30–38 years old	50	28.0
≥39 years old	108	60.67
Education		
Elementary	39	22.0
Junior High	83	46.6
High school	48	27.0
College	8	4.5
Occupation		
Farmer	132	74.1
Civil servants	32	18.0
Private/Employee	14	2.24
Family Income		
>Rp. 1,000,000	148	83.14
<Rp. 1,000,000	30	16.85
Number of Family Members		
1–4 people	52	29.21
>4 person	126	70.9
Total	178	100

80.3%. Further analysis showed that the  $p < 0.05$  (0.000) means that there is a relationship between attitude and the behavior of using mosquito nets.

**Table 2: The relationship between knowledge and the behavior of using mosquito net Ondorea village, Nanga district**

Knowledge	Behavior						Total		p-value
	Good		Enough		Moderate		n	%	
	n	%	n	%	n	%			
Good	8	4.4	3	1.6	1	0.5	12	6.74	0.07
Enough	133	74.7	19	10.6	0	0	152	85.39	
Less	2	1.1	11	6.1	1	0.5	14	7.87	
Total	143	80.3	33	18.5	2	1.1	178	100	

## Discussion

Malaria is an infectious disease that results from the interaction of hosts, parasites, and the environment. This disease is contagious, caused by parasites of the genus *Plasmodium* which are included in the protozoan group through a puncture (bite) of the *Anopheles* spp mosquito that lives and reproduces in humans red blood cells. There are several types of malaria parasites, namely *Plasmodium falciparum*, which causes malaria tertiana maligna; *Plasmodium vivax*, which causes malaria tertiana benigna; *Plasmodium malariae*, which causes malaria quartana; and *Plasmodium ovale*, which causes malaria ovale [20], [21]. Also, *Plasmodium knowlesi* has a malaria rate that is quite severe, reaching 8% [22].

**Table 3: The relationship of family attitudes toward mosquito net use behavior in Ondorea Village, Nanga District**

Family Attitudes	Behavior						Total		p-value
	Good		Enough		Moderate		n	%	
	n	%	n	%	n	%			
Good	142	79.8	33	18.5	2	1.1	177	99.4	0.00
Enough	1	0.5	0	0	0	0	1	0.56	
Less	0	0	0	0	0	0	0	0	
Total	143	80.3	33	18.5	2	1.1	178	100	

The result of protozoan infection affects the health of the body from mild levels that cause asymptomatic infections to severe levels in the form

of cerebral malaria [23], [24]. The cycle of malaria transmission is influenced by human behavior as the host, which will then be easily transmitted if a new vector is suitable, *Anopheles* spp. mosquito. Community behavior in preventing mosquito bites will significantly affect the transmission of malaria. Prevention of mosquito bites will cut off the eye of the migratory vector to transmit protozoa from the host to other healthy individuals. This activity can take the form of environmental conditioning, such as the use of mosquito nets. The usage of mosquito net effectively overcomes the malaria burden worldwide [25], [26].

In this research, the respondent's level of knowledge about malaria and mosquito nets shows that the category is sufficient (85.39%), about 7.87% less knowledge, and 6.74% good knowledge about malaria the use of mosquito nets. However, further analysis in this study shows no relationship between the level of knowledge and the behavior of using mosquito nets. Based on research, most respondents have a good family attitude about using mosquito nets (99.44%), and only 0.56% of respondents have sufficient family attitudes on it, with a  $p < 0.05$ , which means a relationship between attitude and behavior of using mosquito nets.

The behavior in using mosquito nets is supported by knowledge and other factors, such as experiences, habits, culture, and family economy. In this research, people in Ondorea Village, Nangapanda District, were using mosquito nets influenced mainly by the habit or culture within the families. Their daily habit already kept them from mosquito bites, which indirectly reduces the risk of malaria infection.

## Conclusion

From the results of this study, it was concluded that the level of public knowledge in the moderate category was 85.39%, those who had good knowledge were 6.34%, and those who had moderate knowledge were 7.87%. The public attitude about using mosquito nets is in a suitable category, namely 99.4%, with a good attitude of 0.56%. There is no relationship between the level of knowledge and the behavior of using mosquito nets, but it is found that there is a relationship between family attitudes and behavior using mosquito nets.

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