Analysis of Environmental Risk Factors and Treatment Efforts Malaria Import Patients in Puskesmas in the Work Area of District Health Center of Segeri, Pangkep Regency 2019

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Abstract

Malaria is transmitted by female Anopheles mosquito bites. Plasmodium carried by mosquito bites will live and multiply in human red blood cells. This study aims to determine the relationship between environmental risk factors and treatment efforts in patients with Imported Malaria in the work area of the District Health Center of Segeri, Pangkep Regency.

This type of research is observational analytic using a case-control design. The sampling technique for case groups is exhaustive sampling. Control group sampling is adjusted based on the number of sample cases as many as 40 cases with a ratio of 1:1 with a total of 80 respondents. Data analysis was performed univariate, bivariate (Chi-square yielded Odds Ratio (OR), and multivariate (logistic regression).

The results of the bivariate analysis showed an association between malaria sufferers in the migration area (p=0.017; OR=3.273), nighttime habits (p=0.025; OR= 2,786), wearing closed clothes (p=0.044; OR=2.500), using mosquito nets at night (p=0.043; OR=2.538), history of suffering from malaria (p=0.029; OR=9.750), knowledge about the causes of malaria (p=0.012; OR=6.333), knowledge about malaria transmission (p=0.027; OR=2.143), knowledge about the clinical symptoms of malara (p=0.029; OR=9.750), knowledge about the type of malaria treatment (p=0.025; OR=3.857), knowledge about malaria prevention (p=0.025; OR=3.857), and have attended/heard of malaria counseling (p=0.027; OR=2.143) with imported malaria. Multivariate analysis showed that the most dominant factor associated with imported malaria was the use of mosquito nets in the migration area (Wald = 6.604; Exp. (B) = 5.239; 95% CI 1.481-18.526).

The solution provided is the need to increase awareness of protecting the environment specifically with the use of mosquito nets in the migration area, increasing knowledge of malaria and prevention by counseling and awareness to take chemoprophylaxis for people who want to migrate.

Keywords**:** *Environment, Medicine, Import Malaria, Pangkep*

Introduction

Risk factors for malaria transmission, such as environmental factors, the presence of vectors and uncontrolled Plasmodium can cause malaria to re-emerge. Plasmodium sp can hide in the human body, but does not cause symptoms (carrier). If there are environmental changes that support the development of Anopheles sp, contact will begin and malaria can reappear[1]. Other influential factors are the existence of mosquito breeding sites around the house, the environment inside and outside the house, the habit of going out at night, and the level of knowledge about malaria treatment[2]. That is why eradication of malaria through appropriate treatment needs to be done.

Eradication of malaria through treatment can break the chain of transmission if done properly and correctly. In addition, related to the time of seeking treatment, a delay in treatment can cause death in adults up to 25%

in 2 weeks after the occurrence of primary infection. In addition, the impact of malaria infection and treatment failure can result in anemia, fetal death, prematurity, low birth weight, and high economic loss. Therefore, treatment and treatment need to be done quickly and precisely to reduce morbidity, prevent severe and complications, prevent transmission, and minimize the impact of the disease on public health[2]

Data from the Pangkep District Health Office in 2016, the clinical Malaria number was 202 cases with 53 positive cases (API 0.16 ‰). In 2017 the clinical Malaria number was 145 cases with 65 positive cases (API 0.21 ‰) and in 2018 the number of clinical malaria cases was 52 with 26 positive cases (API 0.11 ‰). One of the Subdistricts in Pangkep Regency that has a high API number of 3 consecutive years is the Segeri Subdistrict with a high import Malaria case found in two villages (Segeri and Baring) each year and is fluctuating, namely in 2016 the API values are respectively 0 , 07 ‰ and 0.56 ‰, increased in 2017 to 0.59 ‰ and 0.70 ‰, and again declined in 2018 with API values 0.39 ‰ and 0.42 ‰[3].

Even though malaria positive cases over the past three years are still categorized as Low Case Incidence with API value <1/1000 population, but it remains a big concern in efforts to eliminate Malaria because it cannot be categorized as a Malaria-free area and almost all sufferers are imported Malaria sufferers who cases continue to be found every year.

Materials and Method

Design of Research and Location

Research using quantitative methods, analytic observational design with a case control approach with matching age and gender categories in the control group. Environmental risk factors and treatment efforts in this study are independent variables while imported malaria sufferers are the dependent variable.

Population and sample

The population of this study were all respondents whose blood preparations were found by Plasmodium based on the results of microscopic examination / Rapid Diagnostic Test (RDT) in the work area of Segeri Puskesmas and Baring Puskesmas that migrated / migrated in the last 3 years 2017-2019. The sample in this study consisted of 40 respondents in the case group namely respondents who were migrants and positive malaria and the control group were respondents who were migrants and negative malaria, with a comparison of case: control samples was 1: 1, so the number of samples was 80 respondents.

Data analysis

The data analysis technique of this study used univariate analysis, bivariate with Chi Square test resulted in Odds Ratio (OR), and multivariate analysis with logistic regression with Statistical Package for the Social Sciences (SPSS) 21.0 for windows program.

Results

Environmental risk

Table 1. The results of risk factor analysis of the habit of going out at night show that the p-value of the study was 0.025 (0.025 <0.05) with Odds ratio (OR) = 2.786 with lower limit (LL) = 1.125 and upper limit (UL) = 6,899 indicates a positive relationship between the habit of going out at night in the migration area with imported malaria.

Table 1. Bivariate Analysis of Environmental Variables on Patients with Imported Malaria in the Work Area of the Segeri District Health Center in Pangkep Regency in 2019

Variable	Case		Control		Total		p- Value	OR	95% CI	
	n	%	n	%	N	%			Lower	Upper
Going out at night										
Yes	26	65.0	16	40.0	26	65.0	0,025	2.786	1.125	6.899
No	14	40.0	24	60.0	14	40.0				

Cont... **Table 1. Bivariate Analysis of Environmental Variables on Patients with Imported Malaria in the Work Area of the Segeri District Health Center in Pangkep Regency in 2019**

Wearing Closed Clothes										
Yes	25	62.5	16	40.0	25	62.5	0,044	2.500	1.016	6.149
No	15	37.5	24	60.0	15	37.5				
Wear Mosquito Nets at Night										
Yes	27	67.5	18	45.0	27	67.5	0,043	2.538	1.023	6.298
No	13	32.5	22	55.0	13	32.5				

Table 1. The results of risk factor analysis using mosquito nets at night show that the p-value of the study was 0.043 (0.044 <0.05) with OR = 2.538 with lower limit (LL) = 1.023 and upper limit (UL) = 6.298 indicating a relationship positive between using mosquito nets at night in the migration area with imported malaria. Respondents who do not use mosquito nets at night have a risk of contracting malaria in the migration area of 2,538 times greater.

Treatment effort

Table 2. The results of the analysis of risk factors for history of malaria showed that the p-value of the study was 0.029 (0.029 <0.05) with OR = 9,750 with lower limit (LL) = 1,158 and upper limit (UL) = 82,108 showed a positive relationship between history of having suffered from malaria before migrating with imported malaria. Respondents who have a history of malaria before migrating are at risk of getting malaria in the migration area 9,750 times greater.

Table 2. Bivariate Analysis of Variable Treatment Efforts to Patients with Imported Malaria in the Work Area of Segeri District Health Center in Pangkep Regency in 2019

Variable	**Case**		**Control**		**Total**		**p-Value**	**OR**	**95% CI**	
	n	**%**	**n**	**%**	**n**	**%**			**Lower**	**Upper**
Take Anti-Malaria Medication										
Yes	0	0	0	0	0	0	-	-	-	-
No	40	100	40	100.0	40	100				
History of malaria										
Yes	8	20	1	2.5	8	20	0,029	9.750	1.158	82.108
No	32	80	39	97.5	32	80				
Types of Malaria Treatment										
Yes	12	30	4	10	12	30	0,025	3.857	1.122	13.258
No	28	70	35	90	28	70				

***Cont.*. Table 2. Bivariate Analysis of Variable Treatment Efforts to Patients with Imported Malaria in the Work Area of Segeri District Health Center in Pangkep Regency in 2019**

Prevention of Malaria										
Yes	12	30	4	10	12	30	0,025	3.857	1.122	13.258
No	28	70	36	90	28	70				
Follow/ Hear Malaria Counseling										
Yes	0	0.0	5	12.5	0	0	0,027	2.143	1.682	2.729
No	40	100	35	87.5	40	100				

Table 2. The results of the analysis of risk factors following counseling on malaria indicate that the p-value of the study was 0.027 (0.027 <0.05) with OR = 2.143 with a lower limit value (LL) = 1,682 and upper limit (UL) = 2,729 indicating a positive relationship between having attended / heard of malaria counseling with imported malaria. Respondents who did not attend counseling had a 2,729 times greater risk of malaria.

Multivariate analysis

Table 3. Results of Logistic Regression Analysis of Risk Factor Variables with Malaria Patients in the Work Area of the Segeri District Health Center in Pangkep Regency in 2019

No.	Covariate	B	S.E	Wald	p-value	Exp.(B)
1.	The Habit of Going Out at Night	0.657	1.577	0.174	0.677	1.930
2.	Wearing Closed Clothes	0.129	1.558	0.007	0.934	1.138
3.	Wearing a Mosquito Net	1.656	0.644	6.604	0.060	5.239
4.	History of Malaria	0.749	1.838	0.166	0.684	0.473
5.	Knowledge of the Types of Malaria Treatment	1.108	2.093	0.280	0.597	3.027
6.	Knowledge of Malaria Prevention	1.380	1.649	0.701	0.403	3.976
7.	Follow / Hear Malaria Counseling	-10.421	8035	0.000	0.999	0.000

Discussion

Respondents in this study were 100% using ordinary mosquito nets, not insecticide-treated nets, even though they were living in malaria endemic areas. One of the efforts to prevent malaria transmission is personal protection by reducing contact between humans and vectors, namely interventions to use insecticide-treated mosquito nets[4]. The use of insecticide-treated

mosquito nets in some rural areas has been acceptable to the community, although not all family members use mosquito nets to bedtime continuously[5]

Meanwhile, the p-value in this study for the habit of wearing closed clothing at night was 0.044, which means that there is a relationship between the habit of wearing closed clothing with imported malaria sufferers in the migration area. The use of long-sleeved clothes and long pants when going out outside the house at night is still not a habit for respondents. Not wearing long sleeves and long pants when doing activities outside the house at night is a risk factor for malaria in the Kapoposang Pangkep island area[6]. Respondents said that they were accustomed to not wearing long sleeves and long pants when leaving the house at night, except for certain activities such as recitation and going to the mosque[7,8].

Consumption of anti-malaria drugs or commonly known as chemoprophylaxis in this study 100% or 80 total respondents did not take anti-malaria drugs before migrating. The main reason for respondents is not knowing about this drug and not having time to take it. So it cannot be tested in a bivariate analysis because all respondents' answers are homogeneous. Even though the respondent's response was homogeneous, not taking this anti-malaria drug is a risk factor for imported malaria that deserves attention.

The history of suffering from malaria in this study was interpreted as respondents who had experienced malaria before migrating / to overseas areas. The value of p = 0.012 and OR of 9,750 which means a history of suffering from malaria before migrating is one of the factors of the occurrence of imported malaria. Research by Pratamawati et al.,[9] in the area of Magelang Regency which is a combination of import cases and indigenous cases. The case description is known to be mostly male with age <45 years, as well as most occupations as laborers and all case respondents had experienced malaria before.

Respondents' knowledge in this research is knowledge related to the type of medication and how to prevent malaria. The results of the bivariate analysis showed that the value of each research p-value was 0.025 with a p value <0.05 meaning Ho was rejected, meaning that there was a relationship between knowledge of malaria against imported malaria sufferers. The majority of respondents to the study conducted by Spjeldnæs et al.[10] 82.1% of respondents correctly identified mosquitoes as an infectious agent, mosquito nets as a prevention tool (85.2%) and hospitals according to the needs of care facilities (96.4%). On the other hand, there are conflicting opinions about general malaria symptoms, more than half (58.2%) cite fever as a symptom of malaria, and only one third (32.7%) cite other common symptoms such as headaches, vomiting and body aches. Overall only 17.3% of the total respondents were able to answer correctly.

People who get health education will be well-informed compared to people who have not been provided health education[11]. According to (Notoatmodjo, 2012) knowledge consists of various levels, namely know, understand, application, analysis, synthesis and evaluation. Referring to the theory, it can be concluded that the majority of respondents to this study were only at the level of tofu, against malaria. Knowledge is usually influenced by the level of education[12].

Based on the results of bivariate analysis shows that the research p-value of 0.027 (0.027 <0.05) means that Ho is rejected, meaning that there is a relationship between having attended / heard of malaria counseling by Malaria interpreters at the local health center against imported malaria patients. Then the Odds ratio test value obtained OR value = 2,143 shows that respondents who did not follow / hear counseling about malaria had a risk of getting malaria 2,729 times greater. Respondents in this study 87.5% or the majority never attended or listened to malaria counseling, either at the migration / overseas location or in their place of residence.

Research also conducted by Arisanti et al.,[13] obtained the results of counseling programs on malaria carried out by health workers that have not touched the community, so that in general the public expects counseling to be carried out by health workers that goes on continuously. Based on the results of the analysis of the research questionnaire by Trisnadewi et al.,[14] most respondents did not get information related to the importance of malaria prevention efforts. The low level of knowledge owned by respondents is because respondents have never attended counseling, so the lack of information received by respondents related to the above. The statement is consistent with the theory that the purpose of counseling

is to change unhealthy behaviors into healthy ones. New behaviors that are formed are usually limited to aspects of knowledge, while changes in attitudes and behaviors are indirect effects of counseling[15-16].

Conclusions

Based on the results of research and discussion, it can be concluded that the environmental risk variables and treatment efforts affect imported malaria patients. The habit of using mosquito nets is the most dominant factor against imported malaria. The solution provided is the need to increase awareness of protecting the environment specifically with the use of mosquito nets in the migration area and awareness of taking chemoprophylaxis for people who want to migrate.

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Conflict of Interest : None

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