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Risk Factor Level of Knowledge About the Use of Long Lasting Insectiside Nets (LLIN) to Malaria Incidence (A Study in Genyem Primary Health Care Unit Areas, Jayapura Regency, Papua Province Indonesia)"

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Abstract:- Malaria is a tropical disease that infects almost all people in Papua, as an endemic area with the highest Annual Parasite Incidence (API=95%) in all of Indonesia. The government's program is intense in elimination malaria with a target of reducing the API by 2030 to the level of 1/1,000, while the Papua Provincial Health Office reports that the 2017 API is 95 cases per 1,000 population. The Genyem Primary Health Center is one of the areas with the highest malaria cases in Jayapura Regency. This study is to prove the level of knowledge of malaria sufferers about the use of LLINs mosquito nets is a risk factor for the incidence of malaria in the Genyem Primary Health Center area. This study used a *mixed method* design on 81 subjects with malaria who were written on the medical records of the Genyem Health Center (cases) by comparing 81 subjects who did not suffer from malaria (controls) who lived around malaria sufferers (cases). Data were analyzed using chi square test and estimated value of Odd Ratio (OR). The results of this study prove that the level of knowledge of malaria sufferers who lack knowledge about the use of LLINs is proven to be a risk factor for the incidence of malaria (ρ = 0.001) and subjects who have a low level of knowledge about the use of LLINs have a risk of 4.23 times being infected with malaria compared to subjects with a good level of knowledge (OR: 4.23;95%CI: 1.851-9.669).

Lack of knowledge of malaria sufferers is a risk factor for the incidence of malaria. It's recommended that counseling on the use of LLINs be held to increase public knowledge about how to wash, how to dry, and how to care for insecticide-treated mosquito nets (LLINs) and that LLINs mosquito net suppliers should replace LLINs materials that are comfortable for the community to use in realizing a malaria-free Papuan society by 2030.

Keywords:- *Risk Factor, Incidence Malaria, Level of Knowledge, LLINS.*

I. INTRODUCTION

Long Lasting Insecticida Nets (LLIN's) insecticid mosquito nets are effective mosquito nets for the prevention of vector mosquito bites and malaria transmission, especially in pregnant women, infants, and toddlers because apart from being a physical barrier against mosquitoes, the insecticidal activity contained in them can also kill mosquitoes (Nurmaliani et al 2016). The use of insecticidal mosquito nets has a major impact on the vector and incidence rate of malaria so it is recommended as an effective means of self-protection for malaria control. The results of a study conducted in South Sumatra Province showed that there is a relationship between the use of insecticidal mosquito nets and the incidence of malaria, people who do not use mosquito nets are more at risk of developing malaria compared to those who use mosquito nets.

Long Lasting Insecticidal Nets (LLIN's) is one of the main intervention efforts that are considered effective in malaria prevention and control recommended by WHOde with the goal of achieving the Millennium Development Goals (MDGs) target (WHO, 2016). The basic ingredients of LLIN's mosquito nets circulating in Indonesia consist of two types, namely polyester and polyethylene. There are two types of LLIN's, namely Olyset made from polyethylene and contains permethrin insecticide, and PermaNet made from polyester and contains deltamethrin insecticide (Guillet in Hadi, UK 2010). Olyset Net and Permanet 2.0 are LLIN's that received full recommendations from WHO for malaria prevention and control in 2009. LLIN's users can consistently reduce malaria transmission by up to 90% (Gimnig, 2016).

Based on the results of research by Rizki, et al (2014) in Bumi Kawa Village, Lengkiti District, Oku Regency and the Bioassay test which was carried out at the Resistance Assessment Test Laboratory of the Center for The Development and Research of Vectors and Reservoirs of Disease (B2P2VRP) Salatiga concluded that insecticidal mosquito nets are grouped based on the duration of use (2 -3 years or even more than 3 years) and the frequency of washing (not washed, 1 time, 2 times, and 3 times) showed all mosquito nets tested had a mosquito knockdown rate of less than 95% and a mosquito mortality rate of less than 80%. This figure shows that all insecticidal mosquito nets tested are no longer effective in killing mosquitoes. The use of mosquito nets is a

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form of community participation in efforts to prevent malaria transmission which is personal protection (Laihad, 2011).

Annual parasite Incidence (API) in Indonesia nationally malaria morbidity rate during 2009 – 2017 tends to decrease, from 1.8 per 1,000 population in 2009 to 0.99 per 1,000 population in 2017 (health profile of the Republic of Indonesia 2017). The API in Papua is 59.00 per 1,000 inhabitants. This figure is very high when compared to other provinces in Indonesia. The other three provinces with API per 1,000 population are West Papua (14.97), East Nusa Tenggara (5.76), and Maluku (2.30). As many as 90% of cases come from Papua, West Papua, and East Nusa Tenggara (Indonesia's health profile, 2017).

In Papua Province, the condition of mosquito nets greatly affects the incidence of malaria if not treated properly and correctly. The results of research in Sorong Regency and western seram in 2015 stated that the washing behavior of long lasting insecticidal nets (LLIN's), as much as 98.6% will be washed if it is dirty (Kenti Friskarini et al 2015). If the public does not understand how to properly and correctly treat insecticidal mosquito nets, the transmission of malaria will increase. One of the malaria control that is being carried out in Indonesia is by using LLIN's insecticidal mosquito nets, the distribution of insecticidal mosquito nets in Indonesia has been carried out since 2006, while free treatment using ACT has been carried out since 2004 (Ikawati B et al 2010).

Based on data from the Jayapura Regency Health Office, malaria cases in 2012 there were 24,913 (43%) malaria positive people, in 2013 there were 28,133 (39%) malaria positive people, in 2014 there were 22,558 malaria positive people, in 2015 there were 25,911 (35%) malaria positive people, and finally in 2016 there were 25,078 malaria positive people. Api data report in Jayapura Regency is still a serious health problem where in the last 5 years there has been a significant increase from API > from 100 per 1000 population to 232 per 1000 population in 2013 then in 2016 to 203 per 1000 population. The number of malaria cases in the Nimboran District of the Geyem Health Center Working Area in 2018 was 1,621 out of 2,403 people.

The data on the number of LLIN's insecticidal mosquito nets that have been needed for malaria sufferers in the geyem health center work area of Nimboran District in 2018 are as follows: Tabri Village with 55 mosquito nets, Kuipons Village with 44 mosquito nets, Pobaim Village with 35 mosquito nets, and Kuwase Village with 28 mosquito nets.

This article will discuss the risk factors of the level of knowledge about the use of Durable Insecticide Nets (LLIN) on the incidence of malaria (study in the Genyem Health Center Area, Jayapura Regency, Papua Province, Indonesia)"

II. METHOD

This research uses a mix method approach. The quantitative approach uses a case control study design. While qualitative with interviews with 6 informants. The samples in the quantitative study totaled samples in the quantitative approach, namely 162 respondents taken from 10-15% of the total population in the study area, namely the genyem health center work area, Jayapura Regency, Papua, Indonesia.

III. RESULT AND DISCUSSION

The risk factors that play a role in the incidence of malaria were observed on research subjects who tested positive for malaria by doctors through peripheral blood examination with a microscope whose names of malaria sufferers (cases) were listed in the medical record data of the Genyem Health Center from January 2020 to December 2020, namely 6,048 cases consisting of 2,803 men and 3,245 women according to data from the Jayapura Regency Health Office as one of the Puskesmas with the highest number of malaria sufferers. The selection of 81 subjects with malaria (cases) according to the minimum sample size and as a comparison selected 81 other subjects as subjects who did not suffer from malaria (control), so that a total of 162 study subjects were selected.

Searching the study subject by finding patients according to the name and address of the subject was a little difficult for researchers because the subject factor of changing addresses, the name and address data listed in the medical record were not detailed or inaccurate, the subject was difficult to find, the subject's disapproval and others. The sampling method used in this study is quota sampling, which is to overcome the difficulties above, case subjects that can be encountered and observed until the minimum sample size quota is reached. The subjects of the control group in this study were family members or closest neighbors of the case subjects who did not suffer from malaria and expressed their willingness to be selected as control subjects by signing an informed concent and selecting these control subjects without doing individual matching such as age or gender, occupation, level of education and others.

A. Univariate Analysis

A description of the characteristics of host factors on the subject of the case and control includes gender, age, level of education, and occupation described as follows.

1) Gender Factors

The proportion of the female sex was greater at 57.4% (93 people) and those spread in the malaria case group were 64.2% (52 people).

2) Age Factors

The grouping of respondents' ages was based on the median value of 34. The age categories ≤36 years and >36 years showed that the most respondents were ≤36 years old, namely 51.9% (42 people) in the group of cases (malaria) who were classified as young.

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The lowest age (minimum) suffering from malaria is 15 years one person (0.6%) and the highest age (maximum) at the age of 69 years is one person (0.6%). The highest frequency of malaria incidence occurred at the age of 21 years as many as 7 cases (6.2%) and the normality of data based on Skewness = 0.367 (>0.05); it was concluded that the age data of the respondents were normally distributed. Graves (2008) states that malaria transmission is without different age levels.

3) Education level factors

The most respondents had received education at the junior high school education level, namely 63 people (38.9%) and the group of respondents who did not contract malaria (control) as the largest group was 34 people (42.0%).

4) Job type factors

The largest proportion of respondents was the farmer and fishermen group, which was 55.6% (9 people) and the smallest proportion of respondents, namely those who worked as Government, Army and Police Employees, was 10.5% (17 people).

B. Bivariate Analysis

Bivariate tests were carried out to see the relationship between independent variables and dependent variables by observing ρ-value which <α = 0.05 to be declared to have significance between research variables and assessing the magnitude of the odd value of cases versus the odd control value (Odd Ratio / OR) to assess the magnitude of the effect of exposure to factors that act as risk factors for malaria events (outcomes).

Respondents' understanding of how to use, wash, and treat insecticidal mosquito nets will contribute positively to malaria prevention. The results of measuring the respondent's knowledge level factor as shown in the table 1.

Tingkat Pengetahuan	Kejadian Malaria					*ρ*	OR	95%CI
	Kasus			Kontrol				
	f		%	F	%			
	Kurang	56	69,1	34	42,0	*0,001*	*3,096*	*1,623-5,929*
	Baik	25	30,9	47	58,0			
Jumlah	81		100	81	100			

Tabel 1:- Faktor Tingkat Pengetahuan terhadap Kejadian Malaria di Wilayah Kerja Puskesmas Genyem Kabupaten Jayapura tahun 2021

The highest frequency of respondents in the case group was the one with less knowledge level, namely 56 respondents (69.1%) and the highest frequency of respondents in the control group was in the good knowledge level group, namely 47 respondents (58.0%). The display of bivariate analysis results states that the level of knowledge is less is a risk factor for malaria events (ρ=0.001; OR:4.0 at 95%CI: 1,623-5,929).

Thus it can be concluded that statistically the level of knowledge of the respondents that is lacking is a risk factor for malaria events. Respondents who are less knowledgeable about how to care, how to wash, how to dry, and how to treat durable insecticidal mosquito nets (LLINs) are at risk of 4 times contracting malaria compared to well-informed respondents, at a lower limit of 1,623 to upper limit 5,929

C. Qualitative Analysis

Penelitian ini menyertakan analisis kualitatif This study included qualitative analysis, namely interviews conducted on 6 informants with the aim of comparing with quantitative data obtained. The following are some statements of some subjects.

Subject	**Interview result (with Papuan Languange)**
Cheiftain YM	*Kitong pu warga pu rumah bnyak yang tra masuk kriteria rumah sehat, masih bnyak yang tra pake langit-langit, dinding ada cela nyamuk masuk, mana dikase kelambu tra pake lagi.* Many of our residents are found to have houses that do not meet the requirements of healthy houses, there are still houses without ceilings, grids on the walls of houses, some who do not use mosquito nets while sleeping.
NS (Male)	Kitong dapa kasi kelambu dari mantri dan suster, tapi kitong tra pake, rasa panas kalo pake kelambu… tra biasa pake kelambu jadi.. We have received mosquito nets that were distributed from puskesmas, but we did not use them. We feel sultry using mosquito nets, not used to using mosquito nets.
MS (female)	*Kami semua pake kelambu yang dibagi dari puskesmas, masyarakat suka pake malam kalo tidur, senang bisa tidur sono to.. Hehh* Our residents all use mosquito nets distributed from the health center, our community enjoys using them while sleeping, can sleep well.
TM (Male)	*Kitong pake kelambu yang ada obat ini untuk taruh di pohon rambutan supaya semut mati.* We use insecticidal mosquito nets on rambutan trees to kill ant pests.

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NT (Female)	*Sa cuci pake sabun, rendam lama sdikit baru kucak, trus jemur di tali jemuran yang ada matahari.* I wash using soap, soaked for a while, checked, then dried in the sun.
ST (Female)	*Sa biasa cuci di mesin cuci setiap bulan.* I usually wash using the washing machine every month

Table 2:- Excerpts of informant interviews on the level of knowledge

D. Discussion

The relationship between the findings of the research results and the theories underlying each research variable also by comparing the results of previous research is presented in this discussion.

Malaria prevention, mitigation and eradication measures that are the target of the eradication program of the Ministry of Health of the Republic of Indonesia in 2030 are malaria-free in malaria-endemic areas in Indonesia, including Papua. 4

Puskesmas Genyem is one of the places of health services as declared alma ata in 1978 (WHO) as a manifestation of human rights with the main strategy for achieving health for all, and the foremost in carrying out primary health services. Topographically, the Nimboran valley area has the potential for the breeding of mosquito vectors that cause malaria. On the plains can be found still dense forests. In the rainy season, population dynamics of malaria vectors can breed in these lowland areas.

Search for research respondents was based on medical record data from the Genyem Health Center which was declared through a doctor's diagnosis which was confirmed from the results of the blood preparation examination in the Laboratory and tested positive for malaria (case). Some malaria sufferers were excluded from the list of research subjects (exclusion) because they were not residents of Nimboran, namely malaria sufferers who came from outside the administrative area of Namlong District, Nimbokrang District and surrounding areas.

Subject who was excluded was a malaria sufferer whose name was recorded in a medical record book but the patient's personal data and address were not detailed, making it difficult for researchers to trace the sufferer. Respondents of the case group were malaria sufferers whose names were recorded in the medical records tested positive for malaria patients with blood test results in the laboratory as and as respondents the control group was the subject of checking their blood bath in The cause of a disease is influenced by various factors that contribute, the incidence of malaria is influenced by three main factors according to the epidemiological triassic, namely host, agent, and environment (environment). The results of the bivariate test of this study showed that the knowledge level factor was proven to be a risk factor for malaria events (ρ= 0.001; OR: 3,096 (95%CI: 1,623 – 5,906).

The results of the same study carried out by Suharjo et al (2004) in Banjarnegara Regency showed that public knowledge about malaria was relatively high but the incidence of malaria cases still remained high as well. 52

The same is shown by the research of Dlamini et al (2015) which states that the level of knowledge is relatively high in the people of Lomahasha, Swaziland but does not directly affect their actions. Their actions (practices) are not influenced by the level of knowledge but are influenced also by other underlying factors. It was found misinformation about the etiology of malaria and because they got the help of health information from sources of misinformation.

The level of knowledge that is high or lacking about the incidence of malaria, does not directly affect the perception, attitudes and practices of the community in preventing the incidence of malaria.

It can be concluded that the poor level of knowledge of respondents about how to wash, how to check, how to dry and how to treat durable insecticidal mosquito nets directly risk contracting malaria. Changes in attitude and action (practice) are always dynamic and change slowly. A person's good understanding of how to prevent malaria can slowly change their perception and attitude in carrying out healthy living practices to avoid contracting malaria.

The results of research by Khairy et al (2016) in the southwestern part of Saudi Arabia state that gaps in good knowledge levels and poor practices on malaria prevention require innovative strategies based on local evidence that are appropriate to local circumstances to promote and encourage the strengthening of community participation and personal protection practices.

The use of mosquito nets is one way to prevent the contact of malaria vectors with humans. The World Health Organization (WHO) states in Insecticide Treated Mosquito Nets: A WHO Position Statement (2007) that mosquito nets can prevent the contact of malarial mosquito bites with humans, and WHO recommends the use of mosquito nets for widespread use around the world in dealing with cases of malaria incidence.

The state of the environment around the community and the habits of the community affect the use or non-use of mosquito nets. Interviews with several respondents can be seen in the narrative of the respondents of the following study.

- Pake kelambu tidur bisa tidur sono. Tra dengar bunyi nyamuk di telinga.

We use mosquito nets, can sleep well without hearing annoying mosquito sounds.

- Kami semua pake kelambu yang dibagi dari puskesmas, masyarakat suka pake malam kalo tidur, senang bisa tidur sono to.. Hehh

Our residents all use mosquito nets distributed from the health center, our community enjoys using them while sleeping, can sleep well

- Kitong dapa kasi kelambu dari mantri dan suster, tapi kitong tra pake, rasa panas kalo pake kelambu.

We have received mosquito nets distributed from puskesmas, but we do not use them because we feel sultry when using mosquito nets

Coverage of the distribution of mosquito nets has begun to have a positive effect on the community so that mechanical contact with malaria mosquitoes has been prevented, however, malaria management strategies using long-lasting insecticidal mosquito nets (LLINs) are still necessary with counseling and increasing public understanding of the importance of using mosquito nets while sleeping to avoid malaria mosquito bites, counseling on how to wash, how to use, how to dry, how to take care of mosquito nets need to be conveyed to the community.

IV. CONCLUSION AND SUGGESTIONS

A. Conclusion

Factors Respondents' level of knowledge about how to wash, how to dry, how to treat long-lasting insecticidal mosquito nets (LLINs) proved to play a role as a risk factor for malaria events.

B. Suggestion

For Health Agencies: It is expected to improve health partnerships by involving religious and customary institutions to synergize in malaria eradication programs, especially in malaria prevention activities. It is recommended to motivate people to use durable insecticidal mosquito nets (LLINs) through counseling and community involvement in environmental health programs.

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