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Intervention Model of Breeding Places of Malaria Vektor Base on Physical Environment in Mountain and Custom areas in Hamadi Jayapura, Papua 2016

Karya S[a], Alimin Maidin[b], Anwar Daud[c], Arsunan A. A [d]

Doctoral Study Program, Medical Faculty, Hasanuddin University, Makassar
Faculty of Public Health, Hasanuddin University, Makassar
Environmental Health Department, Faculty of Public Health, Hasanuddin University
Epidemiology Department, Faculty of Public Health, Hasanuddin University, Makassar

Abstract

Jayapura City is an endemic area of malaria has high prevalence in Papua Province. Many activities have been done to reduce malaria but there are onli temporary. So we should apply a models that sustainable to threat malaria. This Research make model about breedingplaces of malaria vector. This Research is observational research with a cross sectional design. Research location in Jayapura, Hamadi sub district. Sampling method is purposive sampling. The goal of this study was i,e: To find intervention model of breeding places of malaria vektor according to the physical environment in the mountain and custom areas. Then, to decreased anpheles mosquitos population according to the wide breeding pleaces. To minimalized using insecticide for vector control. To decreased breedingplaces by backfill and To find the vector control that efectif,efficient and sustainable. Result of this study were: an Intervention model of sustainable malaria vector control that decreases of anopheles larvae after intervention are: Large Wide (> 5 m^2): 67%-100%, Midle Wide (2 m^2 – 5 m^2): 75%-100%, Small Wide (< 2 m^2): 50%-100%. The conclusion of this study was malaria vector breeding is externality of stakeholders so it very effective if be done together in sustainable model. Interventions have been done: drainage, cleaning, backfill and application larvacide.

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* Corresponding author.

The declines of vector after intervention were 67% - 100% for all wide breeding places.

Keywords: Malaria; intervention model; sustainable.

1. Introduction

Malaria ranks in fifth as the cause of death in the world [1]. Each year, malaria causes 1.5 to 2.7 million people died. It occurs mainly in Sub-Saharan Africa, East Asia and the Pacific. WHO in more detail in the report said that in 2009 there are 225 million cases in the world and 34 million cases in Southeast Asia. In the same year occurred 781,000 deaths worldwide and 49,000 of them in Southeast Asia [2]. Profile malaria in Southeast Asia in 2009 showed that the Annual Blood Examination Rate (ABER) of 0.31 / 100, Annual Parasite Incidence (API) 2.2 / 1000, and Malaria Mortality Rate (MMR) of 0.262 / 100.000 [2,3]. Although it is known that there has been some progress in the prevention of malaria even malaria eradication in some temperate countries, but the response to this still needs to be improved as stated in the Millennium Declaration in September 2000 and 2007-2008 by the leadership of the country. In the declaration stated that the objective to six Development Millennium Goals (MDGs) is to fight against the Human Immunodeficiency Virus (HIV), Acquired Immunodeficiency Syndrome (AIDS), malaria and other diseases [4]. It is proved that malaria is still a major problem in the world that needs to be taken seriously

In the province of Papua in addition morbidity is high, the disease is still prone to severe malaria and death, because the Papua region consists of islands, where there are many areas that are difficult to reach while the available means of transportation is still very limited, where malaria mostly is due to plasmodium palciparum, causes tropical malaria. Specifications of this type of malaria can easily lead to severe malaria when the late handled even cause outbreaks when no serious attention from the parties involved in the malaria program in the region.

Malaria is one of the most disease caused suffering and death. Diseases caused by protozoa of the genus Plasmodium that is transmitted through mosquito bites or attacks almost all regions of the earth's surface. Supposedly this problem can be minimized by optimizing the utilization of existing resources in all units for the implementation of eradication can work well for the sake of accelerating elimination malaria on this earth, especially in Papua. In 2014, one of the areas of high malaria endemicity are Jayapura City with epidemiology unit area in general is the beach and the mountains. Generally Papua is a malaria endemic area with a high incidence [5-8].

2. Materials and Methods

This study was observational type by making observations through various facts on the ground and examine supporting literature, and then create a model that is a picture which is expected to be realized for the realization of a situation which allows the interaction between institutions / groups of related support existing efforts to combat malaria. One example of efforts to eradicate the vector which can run continuously for the support of various stakeholders, the research carried out in the coastal area and the mountainous region of Hamadi sub district.

This study was conducted in Hamadi Coastal area and in Mountains of the Jayapura City from June to September 2016. The population in this study was the stable water in coastal areas and mountainous regions Hamadi Coastal Mountains and the city of Jayapura.

The sample was stable water in the mountainous and coastal areas, Hamadi Mountains in the city of Jayapura that containing the anopheles mosquito larvae. Sampling technique is purposive or sampling considerations also called sampling ratings (judgment sampling), members of the sample rated special or chosen to represent the population. Sampling considerations in selecting a sample based on the specific characteristics or properties deemed to have bearing on closely related to population characteristics or properties to be observed. Results are presented in the table as follow;

Table 1: Number of breeding sites based interventions with Water Flooded in the village of Hamadi 2016

No	Intervention	Number of breeding site	(%)
1	Drainage	4	13
2	Cleaning	21	66
3	Backfill	1	3
4	Application Larvacide	1	3
5	Cleaning & Drainage	5	16
Total		32	100

Table 1 above shows that the interventions given in stable water in the village of Hamadi where 21 units (66%) were cleaning, then drainage was 4 pieces (13%), backfilled 1 piece (3%), given larvacida 1 piece (3%) cleaned and streamed 5 pieces (16%).

Table 2: Total Points proliferation Water Based Surface Condition in Hamadi village

No	Intervention	Number of breeding site	(%)
1	Wide	18	56
2	Middle	6	19
3	Narrow	8	25
Total		32	100

Note : ***: wide (>5m2,) ** middle (2m2 s/d 5m2, * narrow (<2m2)

Larvae number: ;number of larvae captured per detention.

Table 2 above shows that the surface of stagnant water in the breeding place of mosquito larvae in the Hamadi village is wide was 18 units (56%), narrow 8 pieces (25%) and middle is 6 units (19%)

Table 3: Total Points proliferation Broad Based Intervention with Water Flooded in Hamadi village

No	Intervention	Number of breeding site	(%)
1	Drainage	3	17
2	Cleaning	13	72
3	Cleaning and Drainage	2	11
Total		18	100

Table 3 above shows that the intervention of the extensive breeding places are cleaned 13 pieces (72%), cleaned and drained 2 (11%), drained 3 (17%).

Table 4: Interventions performed on Breeding Sites with Water Flooded in village of Hamadi 2016

No	Intervention	Number of breeding site	(%)
1	Drainage	1	17
2	Cleaning	3	50
3	Cleaning & Drainage	2	33
Total		6	100

Table 4 above shows that there are three or (50%) of a breeding site being interfered with cleaned, 2 or (33%) was cleared and drained, and 1 (17%) is drainage.

Table 5: Interventions Performed on Breeding Sites Cramped in the village of Hamadi 2016

No	Intervention	Number of breeding site	(%)
1	Drainage	5	63
2	Backfill	1	13
3	Application Larvacide	1	13
4	Cleaning & Drainage	1	13
Total		8	100

Table 5 above shows that the intervention of the breeding places with narrow surface is cleaned 5 pieces (63%), piled one fruit (13%), given larvacida 1 fruit (13%), cleaned and drained 1 fruit (13%)

Table 6: Reduction in Size Breeding Flick in place after the intervention in the village of Hamadi 2016

No	Intervention	Number larva		(%)
		Before Intervention	After Intervention	
1	Drainage	4	0	100
2	Cleaning	4	1	75
3	Cleaning & Drainage	3	1	67

Table 6 above shows that the decrease in the number of larvae after intervention was 75% with a clean, 100% with, 67% to be cleaned and drained.

Table 7: Reduction in Average Flick on Breeding Sites in Sub Hamadi

No	Intervention	Number larva		%
		Before Intervention	Before Intervention	
1	Drainage	4	0	100
2	Cleaning	3	0	100
3	Cleaning & Drainage	4	1	75

The number of larvae; The number of larvae were captured per number of detention Table 7 above shows that the decrease in the number of larvae in breeding sites with the surface being cleaned is 100% to, 100% by drained, 75% with the cleaned and drained.

Table 8: Reduction in proliferation Narrow Flick in place in the village of Hamadi 2016

No	Intervention	Number larva		Number of larva
		Before Intervention	Before Intervention	
1	Cleaning	4	0	100
2	Backfill	4	0	100
3	Application Larvacide	4	1	75
4	Cleaning & Drainage	3	0	100

Table 8 above shows that the decrease in the number of larvae in the breeding place of narrow surface is cleaned

by way of 100%, 100% stockpiled, cleaned and drained 100% and given larvacida 75%.

Table 9: Number of Flick Descending by Type of Intervention in Flooded Water Surface Area

No	Intervention	number of larvae reduced
1	Drainage	4
2	Cleaning	3
3	Cleaning & Drainage	2

The number of larvae decreased in breeding sites with a surface area with the intervention drain is 4 heads, 3 heads with cleaning, with cleaning and drain are two tails.

Table 10: Kinds of Intervention Guide Based Water Surface Condition on surface in the village of Hamadi

No	Surface condition	Kinds of Intervention
1	Wide	2
2	Middle	2
3	Narrow	4

Note: ***: Size (> 5m2,) ** Medium (2m2 s / d 5m2, * narrow (<2m2)

The number of larvae; The number of larvae were captured per detention

Table 10 above shows that the handling of larvae in stagnant water with a surface area can be done with two kinds of intervention, while in the stagnant water with narrow surfaces can be done with 4 different interventions.

Table 11: Use of Various Interventions Miscellaneous Surface Condition in the stagnant water in the village of Hamadi 2016

No	Intervention	Surface condition
1	Drainage	Wide, middle, narrow
2	Cleaning	Wide, middle, narrow
3	Backfill	Narrow
4	Application Larvacide	Narrow
5	Cleaning & Drainage	Wide, middle, narrow

Note: ***: Size (> 5m2,) ** Medium (2m2 s / d 5m2, * narrow (<2m2)

The number of larvae; The number of larvae were arrested per detention

Table 11 above to assert that the types of interventions are most widely used on all kinds of surface area is cleaning (cleaning) and drainage (drainage) while the least is hoarding (backfill) and larvaciding (application larvacida)

4. Discussion

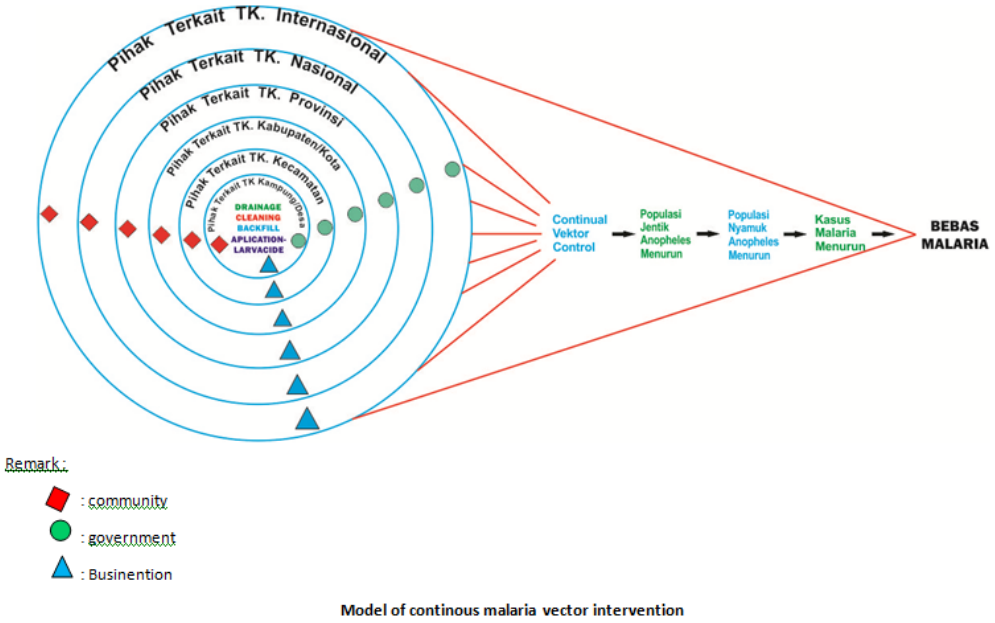
Of all the interventions carried out in stagnant water, most is by cleaning with 21 pieces (72%) while the least is backfilled ie 1 piece (3%). Intervention hoard indeed need to be done selectively by considering the designation of the puddle and where possible not disturb the surrounding environment. While the cleaning activity is the easy way to do and not spend big, and it is possible to do continuously through the eradication of sustainable models (sustainable) with the involvement of the Department of Hygiene, PU, etc. Water surface conditions were positive mosquito larvae in the village of Hamadi is large in size, there are 18 units (56%), medium-sized 6 pieces (19%), small-sized 8 pieces (25%). To intervene in the extensive breeding places need to complete the equipment to make it easier to reach a place far away from the mainland, remember that the way to clean most practiced and proven to reduce the mosquito population to 67%. Narrow breeding sites can be cleaned with simple equipment eg buckets, brooms, shovels, sieve, etc., even it can easily be closed or stockpiled when not disturb the environment and the designation of the puddle.

In places with large surface intervention by way of cleaning 13 pieces (72%), clean and drain 3 pieces (17%) drain 2 pieces (11%). As already mentioned above that cleaning large surfaces need to be done with the proper equipment, because the preparation of tools need to be done together with the related parties, among others; Sanitation department, Public Works, Health Office, BPLH etc. Likewise, if cleaned and drained it easier to do when it involves related parties, and appearing and worth noting is where the water will circulate, to consider the allotment and the state of the environment. Likewise at streamed intervention should always pay attention to the designation and the state of the environment. Among the seven fruit breeding places with the medium surface, there are 3 pieces (50%) intervened by cleaning and there are 2 pieces (.33%) intervened by clearing and draining and there is .1 fruit (17%) intervened by flowing. As in place of extensive breeding places which were also intervened in a way cleared. Cleaning the breeding sites being easier than cleaning the vast breeding places. Intervention is most lacking is cleaned and drained. Cleaning and drain to note where the water flowed, should consider environmental conditions.

Of all the interventions carried out on the surface of stagnant water with a narrow, 5 pieces (63%) by cleaning, there is .1 fruit (13%) by landfill, there is one fruit (13%) in a way given larvacida and there is one fruit (13%) by cleaning and drain. The breeding place of narrow relatively easier to clean than the extensive breeding places and being. Equipment used for cleaning also is relatively simpler and easier to do. Intervention by landfill is very important attention to the allotment of the breeding places. The decision to intervene hoard if it is feasible from the technical, economic and environmental. Given larvacida is an alternative option that can be done after all other interventions deemed not feasible, larvacida application can reduce the population of Anopheles larvae up to 75% in 2 days. In the breeding sites were cleaned and drained should be considered where the water

flowed so as not to disturb the environment. The decline in the number of larvae in the breeding place comprehensive after intervention was 75% with a clean, 100% to be streamed, 67% to be cleaned and drained (table 9).

Of all the interventions in the comprehensive breeding places obtained decreasing the number of larvae was 67% -100%. This decrease is very possible occurrence of significant decline in malaria cases when done on an ongoing basis. The decline in the number of larvae in breeding sites with the surface being cleaned is 100% to, 100% by drained, cleaned and 75% with drainaged. Of all the interventions made in the breeding place of being is 75% -100%. This decrease was very significant to reduce cases of malaria when done on an ongoing basis. The decline in the number of larvae in the breeding place of narrow surface is cleaned by way of 100%, 100% stockpiled, cleaned and drained 100% and given larvacida 75%. Of all the interventions made in the breeding place of narrow obtained decrease by 75% -100%. If this intervention is done on an ongoing basis then it will give a significant impact on population decline anopheles mosquito.



Model of continous malaria vector intervention

A decrease in larvae of 67% s / d to 100% with intervention to clean, drain, stockpiling and gave larvacida, will be very significant in reducing the population of Anopheles if done on an ongoing basis in cooperation with relevant parties in a village or island, both in the mountains and in the coastal area. This cooperation will be maintained well when the support of stakeholders in stages can also be done on an ongoing basis. Support may include activities, resources or regulations and sanctions and rewards. The impact of the cooperation between the parties is the elimination of the vector which is continuously making an impact on population decline anopheles larvae and adult anopheles mosquito. Without the anopheles mosquito, the malaria transmission does not occur naturally malaria cases also decreased. What if there is a decrease in the number of patient with malaria continues then malaria is no longer a public health problem, the situation is called free malaria [9. 10].

5. Conclusion

1. Efforts to eradicate malaria vectors are often made during this proven to lower the anopheles mosquito populations, but the efforts have only temporary and does not last long, so that when it is done according to the model of sustainable eradication can reduce mosquito populations continuously, which means malaria vectors will exhausted.

2. Interventions that most people do in a variety of surface conditions of stagnant water in the village of Hamadi is a way to clean and drain.

3. Interventions performed in stagnant water in the village of Hamadi namely: cleaning, drain, stockpiling, giving larvacida.

Conflict of Interest

Authors declare that there is no conflict of interest within this study.

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