

ABSTRACT

Formulation of Physical Environment Index to Predict increasing case of Malaria in Endemic Areas (Case Study in Pacitan District Jawa Timur Province)

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Malaria is a re-emerging disease that is still a health problem in Indonesia. In Jawa and Bali, method of malaria eradication which had conducted since 1959 until 1968 decreased greatly Annual Parasite Incidence (API) becoming 0,16 ‰ in 1968. However, when the program last and changed by method of malaria controlling, API showed increasing to 4,19 ‰ in 1973. The situation happened due to case detection had been done intensively. Furthermore, API can be decreased greatly until 0,30 ‰ in 1998. In East Java Province, malaria incidence has reached 0,03 ‰ in 1998 and then 1999/2000, it starts to increase becoming 0,14 ‰. The situation causes high new cases of malaria (indigenous case), it's about 3,28% - 4,68%. It proves that transmission of malaria are still happening in Pacitan district. Initially, an indigenous case is caused by import cases which needed to be anticipated in receptive areas (receptive villages) where is a potential area to happen malaria case due to availability of malaria vector.

By considering and taking attention to the problems background, it has been formulated a main problem that will be answered in the study. The main problem is:

Could it be formulated an physical environmental index which can describe increasing case of malaria in an endemic area such as Pacitan? The objective of the study is to arrange an environmental index through investigating direct and indirect factors to increasing case of malaria (malariaogenic potency) in endemic areas. Meanwhile, the specific objectives are 1) to investigate indirect factors such as physical environment and climatologic factors, chemical environment factor, biological environment factor, socio-economic factor and houses lay-out, house contamination, job and education, to increasing case of malaria in endemic areas 2) to investigate and formulate environmental index as a prediction value of increasing case of malaria in endemic areas.

The study results show that some variables relate significantly to indigenous malaria. The variables are lagoon salinity, pH of lagoon, river salinity, pH of rice field, salinity of natural water resource, natural predator of vector, and houses construction. To get the index is conducted with confirmation to the variables and including temperature and pH of river. It's called with analysis of confirmatory factor. Before that, it's done categorization of continuous data such as temperature, salinity, pH and houses construction. Categorizing is done with calculating critical point of each continuous variable for happened case probability ($p=0,28125$).

Physical Environmental index to predict increasing case of malaria is got through the following mathematical model:

This Physical Environmental index = $(-0,75 \times \text{natural predator}) + (-0,70 \times \text{Z score Lagoon salinity}) + (0,60 \times \text{Z score pH of lagoon}) + (-0,70 \times \text{Z score river salinity}) + (0,60 \times \text{Z score pH of river}) + (-0,66 \times \text{score salinity of natural water resource}) + (0,70 \times \text{Z score pH of rice field})$.

It's suggested to improve neighborhood and settlement mainly endemic areas of malaria, to give report to health officer if there is a malaria case in order to get quick preventive measures so the case doesn't spread to other areas. Health Department c.q General Directorate of Prevention and Controlling of Communicable Disease and Healthy Settlement consider the environmental index to be applied in system of environmental based malaria observation. If the index is used it can prevent increasing malaria case or malaria outbreak. It's an alternative solution to control malaria disease. A similar study can be conducted that more emphasize to complete geographical aspect, and supported by multi temporal and complete data. It's conducted to complete and establish an application of environmental based malaria system.

Key words : Physical Environment Index , Annual Parasite Incidence (API) . malaria Controlling.

