19. (Jurnal Nasional) The Overview Of Dengue Hemorrhagic Fever Based On Larva Free Index, Education Level, And Population Density

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The Overview of Dengue Hemorrhagic Fever Based on Larva Free Index, Education Level, and Population Density

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ABSTRACT

One of the diseases that still has the potential to become an epidemic in Indonesia is Dengue Hemorrhagic Fever (DHF). Banjarbaru City is a dengue-endemic area with a high number of new cases (IR) of dengue during 2016-2018 consecutively. In 2018, Banjarbaru City's IR DBD was the second highest after Hulu Sungai Selatan Regency at 105.24 per 100,000 population. The purpose of this study is to describe the incidence of dengue hemorrhagic fever based on the review of larva free index, education level, and population density in the City of Banjarbaru in 2018-2019. The population in this study is demographic data and health data in the City of Banjarbaru in 2018-2019. The sample of this research is the data on dengue cases, larva free index data, education level data, and population density data for the City of Banjarbaru in 2018-2019. Descriptive data analysis used frequency distribution tables and cross-tabulations. The results showed descriptively low larva free index showed a low incidence of DHF (2018 (18.75%) 2019 (11.11%), high levels of education showed a high incidence of DHF (2018 (20%), 2019 (20%), and high density indicates a high incidence of DHF (2018 (18.75%) in 2019 (12.5%).

Keywords: DHF, larva free index, level of education, population density

INTRODUCTION

One of the diseases that still have the potential to become an epidemic in Indonesia is Dengue Hemorrhagic Fever (DHF). Banjarbaru City is a dengue-endemic area with a high number of new cases or Incident Rate (IR) of dengue during 2016-2018 consecutively. In 2016, Banjarbaru City was the highest region with IR of DHF in South Kalimantan at 250,26 per 100.000 population. Then in 2017, Banjarbaru City was the third highest IR of DHF after Balangan Regency and Hulu Sungai Selatan Regency with IR of 22,20 per 100.000. After that, Banjarbaru City was the second highest IR of DHF after Hulu Sungai Selatan Regency with an IR of 105,24 per 100.000 population in 2018. This shows that Banjarbaru City is a dengue-endemic area due to high cases of dengue every year.[1]

Dengue Hemorrhagic Fever (DHF) is one of the public health problems that is in line with the increase of population density. Aspects of dengue transmission include the rapid addition of urban communities, an increase in population movements due to increased transportation facilities and infrastructure, and a slackening of population control. So that this can strengthen the occurrence of an outbreak.[2]

Based on the results of Sunarsih and Azam's research, sociodemographic factors such as age, gender, education, and mobilization are associated with the incidence of dengue. In addition, according to Sandra's research, the incidence of dengue fever is 2.5 times greater in mothers with low educational levels than mothers with high levels of education.[3,4]

One of the other factors of DHF transmission is the presence of larvae. The presence of Aedes aegypti larvae in a certain area is an indicator indicating that there are Aedes aegypti populations living in that area. If the presence of larvae is not immediately addressed, the presence of the Aedes aegypti mosquito will increase and the easier it will be to transmit dengue. One of the indicators used nationally to determine the presence of larvae is the Larva Free Index, which is the size of the house where Aedes aegypti larvae are not found.[5]

Based on these problems, it is important to carry out a study that aims to provide an overview of dengue risk factors, namely the Dengue Hemorrhagic Fever (DHF) Incidence Review based on the Larva Free Index, Education Level and Population Density in the City of Banjarbaru.

METHOD

This research is a descriptive study which aims to describe the incidence of DHF based on the Larva Free Index variable, the education level variable and the population density variable. The population in this study is data on dengue disease and demographic data of Banjarbaru City at 2018-2019 period which can be accessed. The sampling technique used was total sampling. The sample in this study amounted to 8 samples from data from the Banjarbaru City Health Service for 2018-2019, data from the Banjarbaru City Population and Civil Registration Service for 2018-2019, and data from the Banjarbaru City Statistics Agency for 2018-2019. The data samples are DHF case data and Larva Free Index data recorded at the Banjarbaru City Health Office 2018-2019, education level data and Banjarbaru City population density data for 2018-2019.

The instrument use secondary data form. The data collection technique use the secondary data documentation method from the annual report of DHF Program at the Disease Control Program Health Office of the City of Banjarbaru, and the websites of the City of Banjarbaru. The research was carried out from May to June 2020. The data collected was checked first before the analysis was carried out to see the completeness and to avoid data errors. Univariate data analysis was presented in the form of a frequency distribution table, and each variable was compared using cross tabulation.

RESULTS AND DISCUSSION

The results of the study explain the incidence of DHF in Banjarbaru City based on the Larva Free Index variable, education level, and population density in 2018-2019 using cross-tabulation. In addition, this research explains Larva Free Index Banjarbaru City based on variables of education level and population distribution in 2018-2019 using cross-tabulation. The cross-tabulation description of each variable in 2018 can be seen in Table 1 below.

Table 1. Cross tabulation of DHF incidence with Larva Free Index, education level, and population density of Banjarbaru City in 2018

Variable	DHF Incidence			Total
	High	Moderate	Low	
Larva Free Index				
Risky	2 (12.5%)	11 (68.75%)	3 (18.75%)	16 (100%)
Not risky	1 (25%)	3 (75%)	0 (0%)	4 (100%)
Level of education				
Low	0 (0%)	2 (40%)	3 (60%)	5 (100%)
High	3 (20%)	12 (80%)	0 (0%)	15 (100%)
Population density				
Very high	3 (18.75%)	12 (75%)	1 (6.25%)	16 (100%)
High	0 (0%)	2 (66.67%)	1 (33.33%)	3 (100%)
Moderate	0 (0%)	0 (0%)	1 (100%)	1 (100%)
Low	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Source: Secondary Data of Research Results in 2020

In the Larva Free Index variable, based on table 1, it shows that the incidence of dengue fever that is in the high category occurs more in areas where Larva Free Index is not at risk (25%), Likewise, the incidence of dengue fever that is in the moderate category occurs more in areas where Larva Free Index is not at risk (75%). Meanwhile, the incidence of dengue fever which was included in the low category occurred more in the Larva Free Index areas at risk (18.75%).

In the education level variable, based on table 1 shows that the incidence of dengue fever that is in the high category occurs more at high levels of education (20%). Likewise, the incidence of dengue fever that is in the moderate category occurs more at high education levels (80%). Meanwhile, the incidence of dengue fever which is in the low category occurs more frequently at low levels of education (60%).

In the population density variable, based on table 1 shows that the incidence of dengue fever that is in the high category occurs more at a very high population density (18.75%). Likewise, the incidence of dengue fever which is in the moderate category occurs more at a very high population density (75%). Meanwhile, the incidence of DHF which is in the low category occurs more frequently at moderate population density (100%).

Table 2. Cross tabulation of the incidence of DHF with Larva Free Index, Education Level and Population Density of Banjarbaru City in 2019

Variable	DHF Incidence			Total
	High	Moderate	Low	
Larva Free Index				
Risky	1 (5,55%)	15 (83.34%)	2 (11.11%)	18 (100%)
Not risky	1 (50%)	1 (50%)	0 (0%)	2 (100%)
Level of education				
Low	0 (0%)	2 (60%)	3 (40%)	5 (100%)
High	3 (13.3%)	12 (86.7%)	0 (0%)	15 (100%)
Population density				
Very high	2 (12.25%)	13 (81.25%)	1 (6.25%)	16 (100%)
High	0 (0%)	3 (100%)	0 (0%)	3 (100%)
Moderate	0 (0%)	0 (0%)	1 (100%)	1 (100%)
Low	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Source: Secondary Data Research Results in 2020

In the Larva Free Index variable, based on table 2 it is known that in 2019 the incidence of dengue fever that was in the high category occurred more in areas where Larva Free Index

was not at risk (50%), while the incidence of DHF that was in the moderate category occurred more in areas where larva Free Index was at risk (83.34%). Then the incidence of DHF which was in the low category occurred in more risky Larva Free Index areas (11.11%).

In the education level variable, based on table 2 shows that in 2019 the incidence of DHF which was in the high category was more prevalent at the high level of education (13.3%), as well as the incidence of dengue which was included in the moderate category, which occurred more at high level of education (86.7%). Meanwhile, the incidence of DHF

which is in the low category occurs more frequently at low levels of education (40%).

In the population density variable, based on table 2 shows that in 2019 the incidence of DHF which was in the high category occurred more at a very high population density (12.25%). Meanwhile, the incidence of DHF which is in the moderate category occurs more frequently at high population density (100%). Meanwhile, the incidence of DHF which is in the low category occurs more frequently at moderate population density (100%).

Table 3. Cross tabulation of Larva Free Index with education level and population density of Banjarbaru City in 2018-2019

Variable	2018		2019		Total
	Larva Free Index		Larva Free Index		
	Risky	No Risk	Risky	Not Risky	
Level of education					
Low	5 (100%)	0 (0%)	5 (100%)	0 (0%)	5 (100%)
High	11 (73.3%)	4 (26.7%)	13 (86.7%)	2 (13.3%)	15 (100%)
Population density					
Very high	12 (75%)	4 (25%)	14 (87.5%)	2 (12.5%)	16 (100%)
High	3 (100%)	0 (0%)	3 (100%)	0 (0%)	3 (100%)
Moderate	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)
Low	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Source: Secondary Data Research Results in 2020

In the education level variable, based on table 3, it is known that Larva Free Index at risk is more at the low level of education (2018 is 100%, 2019 is 100%). Meanwhile, Larva Free Index who were not at risk occurred more at high levels of education (2018 amounted to 26.7%, 2019 amounted to 13.3%).

In the population density variable, based on table 3, it is known that Larva Free Index at risk is more prevalent in high population density (2018 and 2019 at 100%) and medium (2018 and 2019 at 100%). Meanwhile, Larva Free Index who are not at risk are more likely to occur in a very high population density (2018 25%, 2019 12.5%).

In the Larva Free Index variable, based on the results described that in urban villages where Larva Free Index is at risk (<95%), the lower the incidence of DHF, and vice versa. The results of this study agree with Chandra's research[6], which explains that the incidence of dengue fever is not influenced by Larva Free Index in Jambi City (p = 0,169). This is probably due to the behavior of mosquitoes that are easy to bite and switch from one person to another due to the high mobility of the mosquitoes, as well as due to overcrowding population and

overcrowding of houses. In addition, this study also agrees with the results of Ishak[7] which showed that Larva Free Index and DHF cases had no relationship (p = 0,502).[6,7]

Larva Free Index which is the number of houses where *Aedes aegypti* larvae are not found based on larva checks carried out at people's homes in all villages / sub-district every 3 (three) months by health center officers. Larva Free Index is low if there are many larvae in the area surveyed, on the other hand, Larva Free Index is high if there are no larvae in the area. So that if the Larva Free Index is low, the transmission of dengue disease is vulnerable to high.[6]

The results of the research conducted by the researcher descriptively showed that in urban villages where Larva Free Index was at risk (<95%) it was known that the incidence of DHF was lower and vice versa. This incident is out of sync with the theory that the lower the Larva Free Index, the higher the DHF incidence. Based on the results of interview with DHF program holders at one of the health center in Banjarbaru City, that not all cadres of larva observers are active in conducting larva checks. So this is likely to lead Larva Free Index

estimates do not represent the actual conditions. Because based on Sari's research results in 2013, it is possible that the Larva Free Index calculation does not represent the actual conditions if the ratio of houses inspected is not proportional to the number of existing houses/buildings.[8]

At the variable level of education, based on the results that have been described, in urban villages with a high level of community education, the incidence of DHF is also high. Agree with Novrita, that the case group suffering from DHF was more in the group of respondents with high education category (56.1%) compared to the control group (40.4%). The statistical results of their research also showed that there was no influence between the level of education and the incidence of DHF (p = 0,134). This is reinforced by the results of Dhamayanti's study that education was not related to dengue fever prevention measures (p = 0.361).[9,10]

The stages of formal education which include basic education, secondary education and higher education are referred to as the education level. According to Folland et al.,the level of concern for health is driven by education, because the higher the education, the higher the concern for health. Then according to Notoatmodjo in 2014, a highly educated person will have greater knowledge than a person with low education, so that they can produce better actions. However, if this broad knowledge has not been realized in the form of an action, it will not have an effect on an event.[11,12]

The results of this study indicate that in urban sub-district with a high level of community education, the incidence of dengue fever is also high. This is not in line with the theory which explains that the higher the education, the more a person's knowledge about disease and prevention efforts. This is probably due to lack of knowledge realized in the form of action, in this case the prevention of dengue. This can be seen from the number of urban villages where Larva Free Index is at risk, namely as many as 16 sub-districts (80%), where Larva Free Index is an indicator of Mosquito Nest Eradication activities success.

In addition, according to WHO, in the analysis of the obstacles to the success of the dengue case control program, the control of the dengue program has minimal attention by the upper class because of the assumption that only the government is responsible for the program. At the same time, the lower class people do not feel disturbed by living with mosquitoes because they are busy with their livelihoods to fulfill their daily lives. So that the possibility of this could cause urban villages with high levels of community education to show a high incidence of DHF as well.[13]

In the population density variable, It can be seen that in urban villages with high population density, the incidence of DHF is also high and in low density groups the incidence of DHF is also low. In line with the results of Masrizal and Sari's research, that the sub-districts with the highest DHF cases each year are categorized as densely populated. Their results obtained a significant relationship between population density and DHF (p=0,001), which explains that the higher the population density the higher the cases of DHF. In addition, this condition is also in sync with Rahmi and Sari[15] (p=0,000) who obtained a moderate strength relationship (r=0,502) in a positive direction, which indicates that if there is an increase in population which then affects population density, it can increase the incidence of DHF, and vice versa.[14, 15]

According to Achmadi, demographic aspects such as population density have an impact on the process of disease transmission or transfer between humans. If this is related to the incidence of DHF, population density can affect the incidence of DHF due to the areas affected by DHF are generally cities / areas with densely populated areas, where houses are close to each other. So that this facilitates the transmission of DHF, considering the flight distance of the *Ae.* aegypti is short, which is about 50-100 meters, unless carried by the wind and can reach a maximum of 200 meters. This condition is in sync with this study which descriptively shows a high density indicating a high incidence of dengue as well.[16]

In the education level variable, it can be seen that in urban villages with a low level of community education, the more risk for Larva Free Index in the village. On the other hand, in a urban villages with a high level of community education, it is less risky for Larva Free Index in the urban villages. Agree with Damayanti's research[17] which shows a relationship between education and PSN behavior (p=0,000). In addition, this condition is also in line with the research of Fakhriadi and Asnawati which shows that education is related to the presence of larvae in sporadic areas (p=0,022).[17,18]

According to Notoatmodjo, knowledge is also influenced by a number of factors, including the level of education. In general, a highly educated person will have greater knowledge than a person with a lower level of education, so as to be able to produce good actions. The results of this study indicate that in urban villages with a high level of community education, the Larva Free Index value is not at risk (≥95%)

beg and vice versa. This is in line with the theory which explains that the higher education will increase one's knowledge, resulting in good actions in the prevention and eradication of disease.[11]

In the population density variable, it is known that the higher the population density, the lower the Larva Free Index at risk, and vice versa. In line with the research of Sahrir et al, that between population density and *Aedes aegypti* mosquito density (Ovitrap index) (p= 0,939) did not have a significant relationship. This is because the population density unit administratively does not show the true density in the field. This is in line with the research of Maftukhah et al which shows that descriptively population density has no direct relationship with the presence of larvae.[19, 20]

According to Achmadi, demographic aspects such as population density have an impact on the process of disease transmission or transfer between humans. Population density is the ratio of the population per unit area (km2 / ha). The reason for Larva Free Index who is not at risk occurs more in a very high population density because most of the urban villages in Banjarbaru City have very high population density (80%). So that Larva Free Index who are not at risk occurs at a very high population density.[16]

CONCLUSION

Based on the results of this study, it can be concluded that descriptively low Larva Free Index shows a low incidence of dengue fever, high levels of education indicate a high incidence of dengue fever, and high density indicates a high incidence of dengue, low levels of education indicate Larva Free Index are at risk, and population density high shows that Larva Free Index are not at risk. The only variable according to the DHF theory is population density, and the variable according to the Larva Free Index theory is only the level of education. Suggestions can be given to the Banjarbaru City Health Office to tighten the Periodic Larva Inspection process by tightening monitoring and evaluation of DHF program holders at puskesmas who report Larva Free Index in their area, as well as conducting training or common perceptions for larva observers (Jumantik) on Periodic Larva Inspection (PJB) activities. In addition, it focuses on socialization activities for the Eradication of Mosquito Nests (PSN) in densely populated urban villages and communities with higher education such as in Mentaos Village, Guntung Manggis Village, and Landasan Ulin Timur, and Kemuning Village, by forming DHF-free areas.

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