Galore International Journal of Health Sciences and Research
Vol.4; Issue: 1; Jan.-March 2019
Website: www.gijhsr.com
Original Research Article *P-ISSN: 2456-9321*

The Risk Factors of Dengue Hemorrhagic Fever Incidence in Sorong City Papua Barat Province

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ABSTRACT

Background: Dengue Hemorrhagic Fever continues to occur, including in Sorong City, which in the last three years (2016-2018) has experienced improvements that are influenced by the physical environment, social environment, knowledge, attitude, action, occupancy density and health services.
Objective: To determine the risk factors for the incidence of Dengue Hemorrhagic Fever in Sorong City, West Papua Province.
Research Method: observational with a case control study design conducted in September-October 2018. The population was DHF patients in Sorong Hospital with a total sample of 66 people with a total of 22 people and 44 people in control. Data were obtained using questionnaires and analyzed using chi square, odds ratios and logistic binary regression.
Results: The factors that influence the incidence of Dengue Hemorrhagic Fever in Sorong City are the physical environment (p-value 0.045; OR = 3.403; CI95% (1.152 - 10.053), social environment (p-value 0.029; OR = 3.750; CI95% (1,264-11,123) attitudes (p-value 0.036; OR = 3.600; CI95% (1,221 - 10,618), actions (p-value 0,010; OR = 4,667; CI95% (1,564 - 13,922). Factors that did not affect the incidence of fever dengue in Sorong City is knowledge (p-value 0.538; OR = 31.588; CI95% (0.565 - 4.461), occupancy density (p-value 0.477; OR = 1.815; CI95% (0.570 - 5.779), health services (p- value = 0.066; OR = 3.063; CI95% (1.057 - 8.874). The dominant factor with the incidence of Dengue Hemorrhagic Fever in Sorong City is seen from the values of action, social environment and physical environment.

Keywords: Dengue Hemorrhagic Fever Incidence, Sorong City

I. INTRODUCTION

Dengue fever in Southeast Asia has only begun to be known since the mid-fifties, when Quintos Philippines in 1954 found 58 children lying sick with the same symptoms, namely high heat, acute bleeding and shock, even 28 of them died. A few years later, it turns out that in several countries in Asia, the same epidemic is reported and this is a sign that dengue fever has spread in Asia (Nasrul, 2016).

Thailand and Vietnam in 1958, in Singapore in 1960, Laos in 1962, India had one sufferer, in 1985 it appeared in 1965, and Indonesia itself only appeared on reports of the first dengue fever in Surabaya in 1968 with a number of cases 58 people and 24 of them died (Case Fatality Rate = 41.3%). Shortly thereafter followed by other cities: Jakarta in 1969, Bandung and Yogyakarta in 1972, even in the early 1973 epidemics of dengue fever attacked Semarang, Solo, Tanjung Karang (Lampung), Padang, Manado, Pekanbaru, and Ujung Pandang. Today all provinces throughout Indonesia, according to reports, have contracted dengue hemorrhagic fever (Pusdatin, 2016) The Ministry of Health of the Republic of Indonesia recorded the number of dengue sufferers in Indonesia in January-December 2016 as many as 8,487 people with DHF with 108 deaths, with a CFR of 1.3%. Most age groups who experience DHF in Indonesia at the age of 5-14 years reach 43.44% and ages 15-44 reach 33.25% (Ministry of Health, 2016).

In Papua, DHF has arisen since 1979 in Asano Village with one sufferer in

Ardipura, in 1989 one sufferer in Bhayangkara Village, in 1990 there were two cases in Argapura and Mandala Village, in Jayapura City. Then the explosion in 1993 spread to five districts in the city of Jayapura with the number of cases 249 people while the dead were 3 people. Since then dengue fever has begun to appear in several districts, such as; Sorong, Manokwari, Fakfak, Nabire, Biak and Mimika (Haryono, 1999).

DHF events in Papua Province throughout 2015 with a total of 47 patients and 1 person died or with a CFR of 2.13% (Berita Satu Com, 2016). Data on dengue incidence in Sorong Regency, West Papua Province, according to the recapitulation of reports of infectious diseases throughout the years 2017-2018, with the number of patients as many as 46 children in 2016 and 39 patients in 2017 with a CFR of 2.6%. This CFR number is much higher than the national CFR which should not be >1%, and 22 sufferers in 2018 (January-August),

Based on data obtained from the Regional General Hospital (RSUD) Sorong, in 2017 there was a decrease in the number of cases to 39 patients from the previous year which amounted to 46 incidents, as well as in the January-August period in 2018, the number of cases tended to decline. The DHF case above is data that has been separated between patients residing outside Sorong, meaning that this DHF case is truly a patient who lives in Sorong City (RSUD, 2018). The high level of CFR in Sorong City, so it becomes very important to study various risk factors, including a description of the frequency of new sufferers of a disease found at a certain time, in a community group. Determining the incidence rate of an illness, it must be known in advance about Population at Risk (David, Dullah 2016). DHF epidemiological data is estimated to occur due to various factors that accelerate its spread, which include: 1). Increased means of transportation between cities, 2). The occurrence of the rainy season, 3). There is a source of transmission, 4). The existence of vectors (Suroso, 1997).

The above risk factors are all owned by Sorong City, where the city is the gateway to all regions in West Papua Province. The habit of people who hold water allows the Aedes aegypti mosquito to breed, which is a vector of the Dengue virus. Moreover, the Eradication of Dengue Hemorrhagic Fever (PSN-DBD) and larvae monitoring (Jumantik) activities have not proceeded properly.

Community efforts to prevent the transmission of dengue hemorrhagic fever through efforts to improve the quality of the physical, social environment, increase knowledge, attitudes, and actions are still very limited, as evidenced by the high incidence of dengue which is also called "serious or fatal" disease which is very dangerous and deadly (Indrawan, 2001).

2. MATERIALS AND METHODS

2.1 Types of Research

This study was an observational study with a case control study design (case control study). A case control study is a design of an epidemiological study that studies the relationship between exposures (risk factor) to a disease or health status by comparing a case group with a control group based on the status of his father. In case-control studies, effects (health status) were identified at this time, while risk factors were identified to occur in the past (retrospective) (Hasmi, 2016).

2.2. Time and Place of Research

a. Research Time

The time for conducting research for 1 (one) month, namely in September-October 2018.

b. Research Place

This research was conducted in Sorong City, West Papua Province

2.3 . Research Populations and Samples

a. Population

The criteria for the research subjects that became the population in this study were all patients with Dengue Hemorrhagic Fever (DHF) who had been treated in Sorong Hospital (limited population), at least

treated for 3 days, assuming that not all respondents took their children to the hospital as soon as possible when the child has a fever. It may have been two or three days of fever / illness in the new home under the hospital. The population of dengue cases in the January-August period of 2018 was 22 cases (as a sample). Control cases are diseases that have symptoms that are almost the same or similar to the initial symptoms of dengue cases, so the control is cases of pharyngitis infection, which in the same period amounted to 350 cases.

b. Samples

The sample size that was used as the object of the study was the total incidence of dengue hemorrhagic fever as of January-August 2018 as many as 22 cases that had been treated at Sorong District Hospital. Based on the number of cases above, the number of controls is a minimum with a ratio of 1: 2, so that there are 44 cases of control needed. The technique for determining case control samples used in this study was convenience sampling technique where case control samples were taken based on convenience considerations, because the addresses of respondents were spread unevenly in the Sorong City area.

3. RESULTS

3.1 Bivariate Analysis

a. Physical Environmental Effects on the incidence of Dengue Hemorrhagic Fever

Table 1. Physical Environmental Effects on the incidence of Dengue Hemorrhagic Fever in Sorong City

No	Physical Environmental	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		n	%	N	%		
1	Risks	15	68,2	17	38,6	32	48,5
2	Not Risks	7	31,8	27	61,4	34	51,5
Total		22	100	44	100	66	100
p-value = 0,045; OR = 3,403; CI95% (1,152 – 10,053)							

Table 1 shows that in the DHF case group in the risky physical environment there were 15 people (68.2%) and not at risk as many as 7 people (31.8%). In the control group there were 17 people (38.6%) at risk of physical environment and as many as 27 people (61.4%) were not at risk. The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.045 or p <α (0.05), thus there was an influence of the physical environment on the incidence of dengue hemorrhagic fever in Sorong City. When viewed from the OR value = 3.403; CI95% (1,152 - 10,053) which was interpreted that the incidence of DHF in the physical environment of the respondents who were at risk was 3,403 times compared to the respondents in the physical environment who were not at risk.

b. Effect of the Social Environment on the incidence of Dengue Hemorrhagic Fever

Table 2. Effect of the Social Environment on the incidence of Dengue Hemorrhagic Fever in Sorong City

No	Social Environment	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		n	%	n	%		
1	Risks	15	68,2	16	36,4	31	47
2	Not Ridkd	7	31,8	28	63,6	35	53
Total		22	100	44	100	66	100
p-value = 0,029; OR = 3,750; CI95% (1,264 – 11,123)							

Table 2 shows that in the DHF case group in the risky social environment there were 15 people (68.2%) and not at risk as many as 7 people (31.8%). In the control group there were 16 people (36.4%) a risky social environment and as many as 28 people (63.6%) were not at risk. The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.029 or p <α (0.05), thus there was a social environmental influence on the incidence of dengue hemorrhagic fever in Sorong City. When viewed from the OR value = 3.750; CI95% (1,264 - 11,123) interpreted that the incidence of DHF in the social environment of the risky respondents was 3,750 times compared to respondents with a non-risky physical environment.

c. Effect of Knowledge on the incidence of Dengue Hemorrhagic Fever

Table 3. Effects of Knowledge on the incidence of Dengue Fever in Sorong City

No	Knowledge	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		n	%	n	%		
1	Less	11	50	17	38,6	28	42,4
2	Good	11	50	27	61,4	38	57,6
Total		22	100	44	100	66	100
p-value = 0,538; OR = 1,588; CI95% (0,565 – 4,461)							

Table 3 shows that in the DHF case group there were 11 people (50%) and less knowledge (11%). In the control group there were 17 people (38.6%) lacking knowledge and good knowledge as many as 27 people (61.4%). The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.538 or p> α (0.05), thus there was no effect of knowledge on the incidence of dengue hemorrhagic fever in Sorong City. When viewed from the OR value = 31,588; CI95% (0,565 - 4,461) which is interpreted that knowledge is not a risk factor with the incidence of DHF.

d. Effect of Attitudes towards the incidence of Dengue Hemorrhagic Fever

Table 4. Effects of Attitudes on the incidence of Dengue Hemorrhagic Fever in Sorong City

No	Attitude	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		n	%	n	%		
1	Less	12	54,5	11	25	23	34,8
2	Good	10	45,5	33	75	43	65,2
Total		22	100	44	100	66	100
p-value = 0,036; OR = 3,600; CI95% (1,221 – 10,618)							

Table 4. shows that the DHF cases group in respondents who behaved less, as many as 12 people (54.5%) and good attitudes as many as 10 people (45.5%). In the control group there were 11 people (25%) who behaved less and had a good attitude as many as 33 people (75%). The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.036 or p <α (0.05), so that there was an attitude influence on the incidence of Dengue Hemorrhagic Fever. When seen from the value of OR = 3.600; CI95% (1,221 - 10,618) which is interpreted that the attitude of respondents who are less likely to be at risk with the incidence of DHF is 3,600 times compared to respondents who have a good attitude.

e. Effect of Actions on the incidence of Dengue Fever

Table 5. Effect of Actions on the incidence of Dengue Hemorrhagic Fever in Sorong City

No	Action	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		N	%	n	%		
1	Less	14	63,6	12	27,3	26	39,4
2	Good	8	36,4	32	72,7	40	60,6
Total		22	100	44	100	66	100
p-value = 0,010; OR = 4,667; CI95% (1,564 – 13,922)							

Table 5 shows that in the DHF cases group, there were 14 respondents (63.6%) and less than 12 respondents (27.3%). In the control group of respondents whose actions were less than 12 people (27.3%) and good actions were 32 people (72.7%). The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.010 or p <α (0.05), thus there was an effect of action on the incidence of dengue hemorrhagic fever in Sorong City. When viewed from the value of OR = 4,667; CI95% (1,564 - 13,922) which is interpreted that the actions of respondents who are less likely to be at risk with the incidence of DHF are 3,600 times compared to respondents who have good actions.

f. Effect of Occupancy Density on the incidence of Dengue Fever

Table 6. Effect of Occupancy Density on the incidence of Dengue Fever in Sorong City

No	Occupancy Density	Incidence of Dengue Hemorrhagic Fever				n	%
		Casus		Control			
		n	%	n	%		
1	Risks	7	31,8	9	20,5	16	24,2
2	Not risks	15	68,2	35	79,5	50	75,8
Total		22	100	44	100	66	100
p-value = 0,477; OR = 1,815; CI95% (0,570 – 5,779)							

Table 6 shows that in the DHF case group in respondents the risk of occupancy density was 7 people (31.8%) and the occupancy density that was not at risk was 15 people (68.2%). In the control group of respondents who stated the risk of occupancy density as many as 9 people (20.5%) and non-risk residential density as many as 35 people (79.5%). The results of the chi square statistical test on the significance value of 95% (α = 0.05) obtained p-value 0.477 or p> α (0.05), thus there was no effect of occupancy density on the incidence of

dengue hemorrhagic fever in Sorong City. When seen from the value OR = 1,815; CI95% (0.570 - 5.779) interpreted that occupancy density is not a risk factor for the incidence of DHF.

4. DISCUSSION

4.1 Physical Environmental Effects on the incidence of Dengue Hemorrhagic Fever

Physical environmental conditions such as types of containers or water reservoirs that are rarely drained will be a breeding ground for mosquitoes. This can cause disease in humans if poor health behavior (Hidayat, 2011). Environment is everything that exists around humans that affects the development of human life both directly and indirectly. Environmental conditions have a major influence on the spread and transmission of dengue disease (Mufidah, 2012). The results of the study show that the physical environment of the respondents in Sorong City is generally 97% of the walls are made of cement cast, 62% install wire mesh on ventilation and 86% use the ceiling. The condition of the home page has 30% plant pots / flowers inundated and 32% stated that there were excavated trash cans to dispose of waste and 47% stated that there were water reservoirs outside the house, and 82% stated that there were sewerage and wastewater flowing smoothly, so that it does not cause puddles as a breeding ground for mosquitoes.

The physical condition of the respondents was 51.5% risky, that is, as much as 68.2% in the DHF case group while in the control group or not suffering from DHF as much as 38.6%. This shows that physical environmental conditions that are at risk of causing DHF. The results of statistical tests stated that there were physical environmental influences on the incidence of Dengue Hemorrhagic Fever in Sorong City and the incidence of DHF in the physical environment of respondents who were at risk of 3,403 times compared to respondents with a non-risky physical environment.

This study is in line with Umaya (2013) who conducted research in the Talang Ubi Pendopo Health Center work area stating that poor physical environmental factors caused a risk of 4 times the incidence of DHF rather than good physical environmental factors. This is because physical environmental conditions cause mosquito nesting sites to breed. Poor physical environment conditions are very risky to the people around them because of the large number of mosquito populations so that people around them experience the bite of the Aedes aegypti mosquito.

Environmental sanitation is also one of the efforts to achieve a healthy environment through controlling physical environmental factors, especially those that have a detrimental impact on the physical development of health and human survival. Environmental sanitation business is a health effort that focuses on efforts to control physical environmental factors that might cause and cause harm in physical development, health and human survival (Notoatmodjo, 2011). The physical environment of the house and the environment in the Sorong City area needs attention from local health agencies in controlling dengue fever, because this requires awareness of all elements of society to create healthy physical environmental conditions in preventing environmental-based diseases.

4.2 Effects of the Social Environment on the incidence of Dengue Hemorrhagic Fever

Community habits that are detrimental to health and lack pay attention to environmental cleanliness such as hanging habits clothes, the habit of taking a nap that is not safe from the bite of the Aedes aegypti mosquito, does not clean the landfill regularly, low habits cleaning the yard, and also low community participation especially in the context of eradicating mosquito nests (PSN), it will pose a risk of transmission of dengue transmission in the community. This habit will get worse where people find it difficult to get clean water, so

they tend to store water in reservoirs or tubs, because the landfill is often not washed and cleaned regularly and eventually become a potential breeding place for Aedes aegypti mosquitoes (Zulkoni, 2011). The social environmental conditions for respondents in Sorong City were as much as 47% at risk. This is due to 97% of residential and adjoining homes, 59% of the habit of families hanging clothes, lack of family habits to clean the home environment (85%), lack of community participation in cleaning the drainage channels in the environment which causes water to not flow smoothly or inundated (68 %), there are 33% of ponds around the residence and 68% of them state the dirty environment of the residence and rarely even the presence of devotion in the local environment in the Eradication of Mosquito Nests (PSN).

Respondents in the DHF case group in the risky social environment were (68.2%) and not at risk (31.8%). This shows the risk of poor social environment causing high DHF sufferers. The results of statistical tests revealed the existence of social environmental influences on the incidence of Dengue Hemorrhagic Fever in Sorong City with a large risk of dengue incidence in the respondent's social environment by 3,750 times compared to respondents with a non-risky physical environment. Research conducted by Purwanti (2013) revealed that the family social environment had an effect on the incidence of Dengue Fever. Socio-cultural environment conditions such as high population density will facilitate the occurrence of dengue virus infection, because densely populated areas will increase the number of incidents of dengue cases. In addition, the habit of hanging clothes made by families causes the nesting place of mosquitoes and the risk of transmitting dengue fever. Social environmental conditions can be anticipated to prevent environmental-based diseases such as Dengue Hemorrhagic Fever with an active role in families that have a habit of maintaining environmental cleanliness and the community in the environment in maintaining cleanliness, especially at mosquito breeding sites. This needs support from health workers in overcoming social environmental problems by providing counseling regularly.

4.3 Effect of Knowledge on the incidence of Dengue Fever

Behavior based on knowledge will last more than behavior that is not based on knowledge. People will make efforts to Eradicate Mosquito Nests (PSN) to prevent DHF if they know what the goals and benefits are for health or their families and the danger of not doing the eradication (Ministry of Health, 2014). The respondent's knowledge about Dengue Hemorrhagic Fever disease was 57.6% well-informed and 42.4% lacked knowledge. This shows that the public's understanding of dengue fever is still low, especially in the causes of the transmission of dengue fever. In the DHF case group, there was 50% less knowledge and good knowledge (50%). The results of statistical tests stated that there was no effect of knowledge on the incidence of Dengue Hemorrhagic Fever in Sorong City and was not a risk factor for the incidence of Dengue Hemorrhagic Fever. Research conducted by Novrita (2017) in Ogan Ilir District revealed that knowledge was not related to the incidence of Dengue Fever, because the knowledge of dengue fever mostly had good knowledge.

According to the researchers' assumption that the absence of a knowledge relationship to the incidence of dengue hemorrhagic fever is a disease that often occurs in the community and the community generally knows about dengue fever, causes and prevention, but in the questions given do not know how to transmit Dengue Fever, so community knowledge must be improved ... This is also expressed by Fentia (2017), that there is still an assumption in society that creates inappropriate behavior, such as; the assumption that DHF only occurs in slums and the eradication of mosquito nests (PSN) does not appear to be clear compared to fogging. This assumption is often overlooked, even though it greatly

influences people's behavior in making decisions especially in the transmission of dengue (Fentia, 2017).

4.4 Effects of Attitudes on the incidence of Dengue Hemorrhagic Fever

According to Fishbein and Ajzen in Azwar (2013), that positive or negative attitudes formed in a person depend on whether or not there is a benefit from the knowledge component, the more benefits that are known to be the more positive attitudes that are formed. Respondents' responses to dengue hemorrhagic fever were mostly in the good category as much as 65.2% and less as much as 34.2%. The respondent's lack of attitude about Dengue Hemorrhagic Fever is that cleaning / draining the bath once a week does not affect the spread of dengue fever including storing hanging clothes. Besides that, the attitude response is lacking because they assume that supervision of mosquito larvae is not necessary and fogging is not effective in preventing dengue fever.

Attitude response in the DHF case group in respondents who behaved less as much as 54.5% and good attitude as many as 10 people 45.5%. The results of statistical tests stated that there was an attitude effect on the incidence of Dengue Hemorrhagic Fever in Sorong City and the risk of attitude was less when viewed from OR = 3.600; CI95% (1,221 - 10,618) which is interpreted that the attitude of respondents who are less likely to be at risk with the incidence of DHF is 3,600 times compared to respondents who have a good attitude. This study is in line with what was done previously by Suyasa (2016), that the attitude influences the incidence of dengue fever because the attitude that does not support causes low enthusiasm and motivation in doing prevention of Dengue Hemorrhagic Fever.

The attitude of respondents in the city of Sorong to drain water storage was not accompanied by awareness as an action to remove the larvae of Aedes aegypti mosquitoes, but more towards poor physical conditions of water. In people who lack 3 M (Drain, Close and Bury) water storage areas and do not improve sanitation and physical condition of houses in the use of wire mesh and habits not cleaning the environment have a high risk of developing Dengue Hemorrhagic Fever and presumption, important is not the family itself who has Dengue Fever even though it is known that mosquitoes do not recognize social status and other attributes so that the attitudes and actions taken will be different in responding to the prevention of Dengue Fever. There is still the attitude of the people who are less concerned with the disease of Dengue Hemorrhagic Fever in Sorong City, so they will be at risk of developing dengue disease which tends to cause outbreaks (extraordinary events). Attitude awareness efforts are an effort to raise awareness of the belief as the underlying aspect, so that awareness of anyone if it is not successful will have the same risk of developing Dengue Hemorrhagic Fever. When the house and the environment are clean, but family members can be bitten by mosquitoes when schooling and so on

4.5 Effect of Actions on the incidence of Dengue Hemorrhagic Fever

Every reported DHF sufferer is treated with patient care, epidemiological investigations in the field, and control efforts. The high rate of dengue morbidity is caused by an unstable climate and quite high rainfall in the rainy season which is a potential breeding tool for Aedes aegypti mosquitoes (Ministry of Health, 2014). Dengue Hemorrhagic Fever Case, the right method to prevent DHF is the Eradication of Mosquito Nests (3M) through 3M plus (draining, closing and burying) plus other activities that can prevent or eradicate mosquitoes Aedes aegypti breed, including the use of wire netting, using mosquito repellent lotion, and using mosquito nets and this requires community participation in acting to prevent blood emam (Republic of Indonesia Ministry of Health, 2014).

The actions of respondents who were good at doing prevention of Dengue Hemorrhagic Fever as much as 60.6% and

less action as much as 39.4%. The respondent's actions were lacking, from the respondent's answer about the habit of throwing or burying water reservoirs such as cans, jars, unused used tires as much as 74%, cleaning the sewerage channel as much as 89% and periodically preventing mosquito breeding as much as 71%. This shows that the core actions in the prevention of dengue fever are still low. Respondents whose actions were lacking in the DHF cases group were 63.6% and good actions were 27.3%. This shows that while there is less action, the higher the incidence of DHF. The results of statistical tests stated that there was an effect of action on the incidence of Dengue Hemorrhagic Fever in Sorong City and the risk of the actions of respondents who were less risky with the incidence of DHF was 3.600 times compared to respondents who had good actions.

Some family actions in Sorong City still tend to be unclean, causing the breeding of Aedes aegypti mosquitoes, where in 2016 as many as 46 cases and in 2017 as many as 37 cases this was due to family actions that many still hung clothes, there were water shelters that were not closed , and the bath is rarely drained, a habit like this must be corrected to anticipate the occurrence of dengue disease.

4.6 Effect of Occupancy Density on the incidence of Dengue Hemorrhagic Fever

Home is a basic requirement for human life (Notoatmodjo, 2011). A house is a building that functions as a residence or shelter and a family building facility (Law Number 4 of 1992). Approximately half of human life will be at home so that the quality of the house will greatly affect their health conditions (Ministry of Health, 2014).

A dwelling is said to be dense if the occupancy density is <10 m2 floor area / person (RI Ministry of Health, 2010). The results showed that occupancy density of 75.8% was not risky while 24.2% was at risk. This is due to the narrow area of the house and the large number of family members in the residence of more than 5 people.

Respondents in the DHF cases group with a risk of residential density as much as 31.8% and non-risk residential density as much as 68.2%. This shows that respondents who occupy densities that are not at risk of suffering from dengue hemorrhagic fever are good enough. The results of statistical tests stated that there was no effect of occupancy density on the incidence of Dengue Hemorrhagic Fever in Sorong City. This research is in line with the results of research by Ratri (2015) who found no relationship between occupancy density and the incidence of Dengue Hemorrhagic Fever.

Based on the results above, the density of residents in this study is not one of the factors that support the transmission of dengue fever, due to the density of residential buildings, but in one place of residence there were no dengue hemorrhagic fever sufferers because it was affected by the physical condition of the house such as the installation of wire and behavior in maintaining cleanliness and preventing mosquito bites from transmitting Dengue Hemorrhagic Fever. So that respondents with dense and non-dense occupant densities are equally at risk for dengue hemorrhagic fever events affected by physical conditions and social environmental conditions in their behavior to prevent Dengue Hemorrhagic Fever.

5. CONCLUSION

1. There are physical environmental influences on the incidence of Dengue Hemorrhagic Fever in Sorong City (p-value 0.045; OR = 3.403; CI95% (1.152 - 10.053).
2. There are social environmental influences on the incidence of Dengue Hemorrhagic Fever in Sorong City (p-value 0.029; OR = 3.750; CI95% (1,264 - 11,123).
3. There is no effect of knowledge on the incidence of Dengue Hemorrhagic Fever

in Sorong City (p-value 0.538; OR = 31.588; CI95% (0.565 - 4,461).

4. There is an attitude influence on the incidence of Dengue Hemorrhagic Fever in Sorong City (p-value 0.036; OR = 3.600; CI95% (1,221 - 10,618).
5. There is an effect of action on the incidence of Dengue Fever in Sorong City (p-value 0.010; OR = 4.667; CI95% (1,564 - 13,922).
6. There was no effect of occupancy density on the incidence of Dengue Hemorrhagic Fever in Sorong City (p-value 0.477; OR = 1.815; CI95% (0.570 - 5.779).

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How to cite this article: Saghawari TO, Rantetampang AL, Hasmi et.al. The risk factors of dengue hemorrhagic fever incidence in sorong city papua barat province. Galore International Journal of Health Sciences & Research. 2019; 4(1): 81-90.

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