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Determinants of the Incidences of Dengue Hemorrhagic Fever (DHF)

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West Sumatra Provincial Health Office noted that during 2018 there were 2,203 patients with dengue hemorrhagic fever (DHF), and 5 of them were known to have died. Based on the data, the most DHF cases were found in the city of Padang as many as 699 cases and in the death of 3 cases. The incidence of Dengue Hemorrhagic Fever (DHF) in Indonesia until July 2020 reached 71,633 with the number of deaths throughout Indonesia reaching 459 and in Padang City from January to June 2020 there were 189 cases of DHF. The problem to be studied is what determinants affect the incidence of DHF. Data collection was carried out using a fixed disease sampling method with a ratio of 1:1 to cases and controls. The location of data collection was carried out in the city of Padang from January to November 2021. The results showed that there was a relationship between the level of education, knowledge, 3M Plus behavior and social capital variables on the incidence of dengue fever in Padang City and there was no statistically significant relationship between the breeding place variables and the condition of the house environment with the incidence of DHF. The results of this study are expected to be used for planning and evaluating health programs, especially in the prevention of DHF.

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Kata kunci:

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A B S T R A K

Dinas Kesehatan Provinsi Sumatera Barat (Sumbar) mencatat selama Tahun 2018 terdapat 2.203 penderita demam berdarah dengue (DBD), dan 5 diantaranya diketahui meninggal dunia. Berdasarkan data, Kasus DBD terbanyak ditemukan di Kota Padang sebanyak 699 kasus dan berujung kematian 3 kasus. Data tahun 2019 ada sebanyak 1.234 kasus DBD di Sumbar dan Kota Padang tetap menjadi kota dengan jumlah kasus tertinggi sebanyak 296 kasus. Kejadian Demam Berdarah Dengue (DBD) di Indonesia hingga juli 2020 mencapai 71.633 dengan jumlah kematian di seluruh Indonesia mencapai 459 dan di Kota Padang sejak Januari hingga Juni 2020 tercatat sebanyak 189 kasus DBD. Masalah yang akan diteliti ini adalah determinan apa saja yang mempengaruhi kejadian DBD. Dalam pengumpulan data dilakukan dengan metode fixed disease sampling dengan perbandingan kasus dan kontrol yaitu 1:1. Lokasi pengambilan data dilakukan di Kota Padang pada bulan Januari sampai dengan November 2021. Hasil penelitian diperoleh terdapat hubungan variabel tingkat pendidikan, pengetahuan, perilaku 3M Plus dan modal sosial terhadap kejadian DBD di Kota Padang dan tidak terdapat hubungan yang bermakna secara statistik variable tempat perindukan dan kondisi lingkungan rumah dengan kejadian DBD. Hasil penelitian ini nantinya diharapkan bisa digunakan untuk perencanaan dan evaluasi program kesehatan, khususnya dalam pencegahan penyakit DBD.

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INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a disease caused by the dengue virus which is transmitted from person to person through the bite of the Aedes aegypti mosquito. DHF is often found, especially in the tropics and causes extraordinary events. The emergence of this disease is related to environmental conditions and human behavior (Kemenkes RI, 2017). Based on data on the average number of dengue cases reported to WHO in the period 2004-2010, from 30 endemic countries to dengue, Indonesia is in second place with an average number of cases of 129,435 cases, below Brazil which is ranked first with 447,446 cases. so that Indonesia is the country with the highest number of dengue fever cases in Asia (WHO, 2012). The results of research conducted byBhatt et al., (2013) reported that cases of dengue fever were far more than WHO estimates and indicated that 390 million dengue virus infections could occur every year.

DHF cases in Indonesia in 2017 amounted to 68,407 cases, with the number of deaths of as many as 493 people. The number of cases decreased drastically from the previous year, which was 204,171 cases and the number of deaths was 1,598 people. The DHF morbidity rate in 2017 decreased compared to in 2016, from 78.85 to 26.10 per 100,000 population. However, the decrease in the case fatality rate (CFR) from the previous year was not too high, namely from 0.78% in 2016 to 0.72% in 2017 (Kemenkes RI, 2018). Cases of Dengue Hemorrhagic Fever (DHF) in Indonesia until July 2020 reached 71,633 with the number of deaths throughout Indonesia reaching 459 (Ministry of Health RI, 2020). DHF cases in West Sumatra Province in 2017 were 2,755, with a comparison of cases in males1. 309 people and cases in women totaling 1,446 people. Of the 19 regencies/cities in the province of West Sumatra, the highest dengue cases occurred in the city of Padang. The death rate from dengue cases in West Sumatra Province in 2017 was 7 people. The death rate was found in the city of Padang with 4 people with a CFR value of 0.66%, followed by Pesisir Selatan Regency with 1 male who died with a CFR value of 0.35%, and in the city of Pariaman 1 male who died with a CFR value. 0.84 (West Sumatra Provincial Health Office, 2018).

DHF cases in the city of Padang decreased from 1,126 cases in 2015, 911 cases in 2016, and 608 cases in 2017. This case was more common in men by 305 cases and women by 303 cases. And for the DHF death rate in the city of Padang in 2015 there were 8 people, in 2016 there were 11 people and in 2017 it decreased there were 4 people who died. Through out 2018, the West Sumatra (West Sumatra) Provincial Health Office noted that there were 2,203 patients with dengue hemorrhagic fever (DHF), and 5 of them were known to have died. In 2018, the number of dengue cases was 699 cases in the city of Padang. The most cases of DHF in 2018 were in the working area of the Belimbing Health Center (105 cases) followed by Pauh Health Center (55 cases) and Air Cold Health Center with 40 cases with a death rate of 3 people (Cold Air Health Center, Belimbing Health Center and Pauh Health Center), meaning the CFR of DHF is 0.43%. The target of CFR < 1% has also been achieved, as well as the handling of cases, has been carried out 100%.

Kuranji and Koto Tangah sub-districts are the sub-districts with the most dengue cases, 183 cases and 155 cases respectively (Pandang City Health Office, 2019). Data for 2019 were 1,234 cases of DHF in West Sumatra and Padang City remained the city with the highest number of cases of 296 cases and from January to June 2020 there were 189 cases of DHF (Suara, 2020).

Factors that influence the incidence of dengue fever include host factors, environment, clean and healthy living behavior, and viruses. Environmental factors are the main determinants in the transmission of DHF. Environmental factors, including the biological, physical, and socio-economic environment support mosquito breeding (Sarfraz et al., 2014). Environmental factors that affect the spread of dengue cases include: physical environmental factors are the presence of a water reservoir (TPA), the presence of clothes that depend on the condition of the house; biological environmental factors are the presence of agricultural land, the presence of mosquito larvae, and the presence of a pond; socio-economic environmental factors are the continuity of mosquito nest eradication activities (mosquito nest eradication), education, and work (Nurrochmawati & Dharmawan, 2017; Diaz-quijano et al., 2018). Destination from writing article this is for knowing factor what only affects-incident Fever Dengue Hemorrhagic Fever (DHF) in Padang City.

METHOD

This type of research is quantitative with the research design used being observational analytic with a cross-sectional approach. This study aims to analyze the relationship of all independent variables with the dependent variable. Ethics Study obtained from Faculty Andalas University Medicine based on letter number: 382/UN.16.2/KEP-FK/021. Study this implemented in Padang City, West Sumatra Province in the working area Public health center Nanggalo, Ikur Koto, Lubuk Buaya , Andalas , Coral and Lubuk Begalung. The implementation study worked from the month of January until by November 2021.

The population in the study is residents, sufferers, and suspected dengue fever in the city of Padang in 2021 in the work area the number of health centers the case tall based on incidence. The sample used in the study this 120 subjects with comparison ratio cases and controls 1:1 60 cases and 60 controls. Taking the sample in the study with the method of fixed disease sampling. Researched Subject in the study this that is diseased (case) or no diseased (control) (Murti, 2013). Instruments in studying this that is use questionnaires and sheets of observation as well as a tool measuring Thermo hygrometer and Lux Meter.

Data analyzed with analysis purpose ful univariate to explain each variable that is independent and dependent variables. After that group the following characteristics of each. Data is also analyzed bivariate with the statistical test used namely the chi-square test. Test this used for knowing how much big connection Among variable independent with dependent, as well as analyzed multivariate with logistic regression test.

RESULTS AND DISCUSSION

Of the 120 research subjects, most of the research subjects were female as many as 101 people with a percentage of 84.0%, and 19 men with a percentage of 16.0%. The age of respondents who were interviewed was mostly under 35 years old as many as 87 people with a percentage of 72.5% and a small proportion of respondents aged 35 years as many as 33 people with a percentage of 27.5%. Most of the respondents are respondents who do not work 60 with a

percentage of 50.0% and a small proportion of respondents work as civil servants as many as 10 with a percentage of 8.4%.

Distribution of mother respondents, frequency and characteristics of research subjects are described in table 1 below:

Table 1
Characteristics of Research Subjects

No	Characteristics	Frequency	Percentage (%)
1	**Type sex**		
	Man	19	16.0
	Woman	101	84.0
	Total	**120**	**100.0**
2	**Age**		
	< 35 years old	87	72.5
	35 years old	33	27.5
	Total	**120**	**100.0**
3	**Work**		
	Not Working	60	50.0
	Private	50	41.6
	civil servant	10	8.4
	Total	**120**	**100.0**

The results of the study are presented as follows using univariate analysis, bivariate analysis and multivariate analysis :

The univariate description of the research variables explains the general description of the research data for each research variable including the respondent's education level, respondent's knowledge, 3M Plus behavior, mosquito breeding places, home environmental conditions, social capital and the incidence of DHF.

Table 2
Description of Research Variables

No.	Variable	N	%
1	**Education**		
	Tall	102	85.0
	Low	18	15.0
2	**Knowledge**		
	Well	89	74.2
	Not enough	31	25.8
3	**3M Plus Behavior**		
	Well	84	70.0
	Bad	36	30.0
4	**The place Brood Mosquito**		
	There is	31	25.8
	Not	89	74.2
5	**Condition Environment House**		
	Well	63	52.5
	Not enough	57	47.5
6	**Social capital**		
	Strong	80	66.7
	Not enough	40	33.3
7	**DHF**		
	Dengue cases	60	50.0
	Not DHF Sick	60	50.0

Table 2 shows that the majority of respondents with higher education are 85.0% and a small proportion of respondents with low education are 15.0%. Knowledge of respondents who lack as much as 25.8%, while the education of good respondents as much as 74.2%. 3M Plus bad behavior as much as 30.0%, while the good as much as 70.0%. There are 25.8% mosquito breeding places, while 74.2% mosquito breeding places that don't exist. the environmental conditions of the respondent's house in the good category were 52.5% and in the less category was 47.5%. Some respondents have less social capital as much as 33.3%, most respondents have strong social capital as much as 66.7%. Furthermore, the percentage of DHF incidence is 50.0% with DHF and 50.0% without DHF.

Bivariate analysis was used to explain the relationship between the independent variable and the dependent variable. The method used is the chi-square test with a 95% confidence level (p = 0.05).

Table 3
Analysis Results bivariate with Chi-Square Test

Variable	DHF incident				Total		OR	CI (95%)	*P-value*
	No DHF		DHF						
	N	%	n	%	N	%			
Education									
Tall	56	54.9	46	45.1	102	100	4.2	1,722-7,623	0.019
Low	4	22.2	14	77.8	18	100			
Knowledge									
Well	51	57.3	38	42.7	89	100	3.2	1.362-7.365	0.012
Not enough	9	29	22	71	31	100			
3M Plus Behavior									
Well	48	57.1	36	42.9	84	100	2.5	1,663-8,492	0.028
Bad	12	33.3	24	66.7	36	100			
The place Brood									
Not	50	56.2	39	43.8	89	100	2.6	1.137-6.373	0.036
There is	10	32.3	21	67.7	31	100			
Condition Environment House									
Well	35	61.4	22	38.6	57	100	2.4	1,982-8,624	0.028
Not enough	25	39.7	38	60.3	63	100			
Social Capital									
Strong	46	57.5	34	42.5	80	100	2.5	1,813-8,742	0.033
Not enough	14	35	26	65	40	100			

Table 3 presents the results of the chi-square test analysis of the relationship between respondents' education levels, respondents knowledge, 3M Plus behavior, breeding places, environmental conditions, and social capital to the incidence of DHF which can be explained as follows, the effect of respondent's Education on the incidence of DHF. Respondents with low education (< senior high school) have a 4.2 times chance of getting DHF compared to respondents with high education (≥ senior high school). This shows that there is a relationship between respondents' education and the incidence of DHF and is statistically significant with a p-value = - 0.019 < 0.05. The effect of respondents' knowledge on DHF incidence, respondents who lack knowledge has a 3.2 times risk of developing dengue disease compared to respondents who have good knowledge of respondents. There is a relationship between respondents' knowledge of the incidence of DHF in respondents and is statistically significant with a p-value = 0.012 < 0.05. The Influence of respondents' 3M plus behavior on DHF incidence, respondents with bad behavior has 2.5 times the risk of developing dengue disease compared to respondents with good respondent behavior. The results of this analysis indicate that there is a relationship between the behavior of 3M Plus respondents to the incidence of DHF in respondents and it is statistically significant with a p-value = 0.028 < 0.05. The effect of mosquito breeding places on DHF incidence, the presence of breeding sites has a 2.6 times chance of getting DHF compared to the absence of breeding sites. The results of this analysis indicate that there is a relationship between mosquito breeding sites and the incidence of DHF, statistically, the results are significant with a p-value of 0.036 < 0.05.

The Influence of home environmental conditions on DHF incidence, respondents with poor environmental conditions had a 2.4 times risk of developing dengue disease compared to those with good environmental conditions. Due to poor environmental sanitation conditions, the respondents are at greater risk of contracting DHF. The results of this analysis indicate that there is an influence of environmental conditions on the incidence of DHF in respondents and is statistically significant with a p-value = 0.028 < 0.05. Regarding the effect of social capital on the incidence of DHF, respondents who live in an environment with less social capital have 2.5 times the possibility of contracting DHF compared to respondents who live in an environment with high social capital. The results of this analysis indicate that there is an effect of social capital on the incidence of DHF and is statistically significant with a p-value = 0.033 < 0.05.

Table 4
Analysis Results Regression Logistics Determinant DHF incident

	DHF incident	B	SE	Wald	df	Sig.	Exp (B)	95% CIfor EXP (B)	
								Lower	Upper
Step 1 [a]	Level of education	-1.597	.719	4.930	1	.026	.202	.049	.829
	Knowledge Level	.449	.220	4.143	1	.042	1.566	1.017	2.412
	3M Plus Behavior	-.401	.129	9.589	1	.002	.670	.520	.863
	The place Brood	.445	.518	.738	1	.390	1,560	.566	4.303
	Condition Environment House	.114	.291	.154	1	.695	1.121	.634	1981
	Social Capital	-155	.063	6.188	1	.013	.856	.757	.968
	Constant	7.539	2,686	7.879	1	.005	1879,019		

a. Variable (s) entered on step 1: Education Level, Knowledge Score, 3M Plus Behavior, Place Missing, Condition Score Environment Home, Social Capital Score.

Analysis Multivariate

Analysis multivariate explain about influence more from one variable independent to one variable dependent. Method used is regression logistics using the SPSS program. Of the 6 variables independently analyzed with regression test logistics, there are 4 variables independent who has results significant by statistics that is variable level education, knowledge, 3M Plus behavior and social capital.

Table 4 presents regression test results logistics that can be explained as follows, the effect of respondent's education with DHF incident, analysis test results this show influence Partial level education to the incidence of dengue fever that has sig value of 0.026 < 0.05 so that variable gives significant influence to the incidence of dengue with value b = 0.202, which signifies level education and the incidence of DHF have connection statistically which means sample with level education more low possibility as factor risk as much as 0.202 times compared level more education high Influence Knowledge Respondent to DHF incident, analysis test results this show influence Partial level knowledge to The incidence of DHF has sig value is 0.042 < 0.05 so that variable give the influence that significant to the incidence of dengue with value b = 1.566 which indicates level education and the incidence of DHF have connection positive. Sample with level knowledge more low possibility as much as 1,566 times Becomes factor risk compared level more education high.

Influence 3M Plus Respondent Behavior to DHF incident, analysis test results this show Influence Partial level 3M Plus behavior towards the incidence of dengue fever that has sig value of 0.002 < 0.05 so that variable give influence significant partial to the incidence of dengue with value b = 0.670 which indicates level education and the incidence of DHF have connection negative. Sample with 3M Plus bad behavior possibility as much as 0.670 times be a risk factor compared 3M Plus good behavior. Influence the place brood mosquito to DHF incident, analysis test results this show that no there is influence the place brood to dengue incidence. The place brood to the incidence of DHF has sig value is of 0.390 < 0.05 so that variable no give influence significant partial to dengue incidence. Influence Condition Environment House to DHF incident, analysis test results show that no there is influence condition environment house to dengue incidence. Condition environment house to the incidence of DHF has sig value is 0.695 < 0.05 so that variable no give influence significant partial to dengue incidence. Effect of social capital with DHF incident, analysis test results this show lower there is influence partial social capital to the incidence of dengue fever that has sig value is 0.013 < 0.05 so that variable give influence significant partial to the incidence of dengue with value b = 0.856 which indicates level education and the incidence of DHF have connection negative. Sample with bad social capital possibility as much 0.856 times fold be a risk factor compared good social capital behavior.

DISCUSSION

Influence Level Education to DHF Incident

Respondent's education show connection because consequence direct with something problem health, because take effect to ability somebody in absorb information. More increased education will follow the enhancement ability to understand the information it receives (Respati et al, 2017). Research results this show there is a meaningful relationship Between education respondents with incident DHF respondents (p = 0.026). This is in line with research conducted by Sunarsih & Azam (2017) mentioned results calculation and analysis on 88 respondents state that acquisition of p-value of 0.019, which means there is an influence Among education respondents on dengue incidence. Meanwhile, research conducted by Harmawan (2017) which states based on data analysis with a p-value = 0.305 indicates that no there is connection Between level education with dengue incidence.

Influence Knowledge to DHF incident

Research results in this show that there is an influence on knowledge respondent to the incident. Basic knowledge consist from amount facts and theories that make it possible somebody for could solve the problem he faces. Knowledge is obtained from experience direct or other people's experiences. Study Harmawan (2017) stated that the existing relationship Between level knowledge with the incidence of dengue with acquisition p-value = 0.040 and the percentage part big respondents with level knowledge no know namely 41 (59.4%).

Research results this is also in line with Novrita et al (2017) who state that from results calculation is obtained p-value = 0.015 so which will have a significant influence. Among knowledge and incidence of DHF and the acquisition of OR is 2.7 which shows that respondents who have low knowledge have possibility suffer from DHF by 2.7 times compared to with respondent with high knowledge. Research results this is also different from results research conducted by Handoyo et al (2017) which states that knowledge does no have a significant relationship to the incidence of dengue due to obtained p-value = 1000 (p>0.05).

Influence 3M Plus behavior towards DHF incident

Research results in this showing that there is an influence on knowledge respondents to incident dengue. The result is in line with research that has been conducted by Akbar & Syaputra (2019) about Factor Risk Incident Fever Dengue Hemorrhagic Fever (DHF) in Kabupaten Indramayu, where? results study show that there is a significant relationship _ namely (p=0.020, OR=2.778; 95% CI:1.174-6.574). Study this is also in line with the study by Priestley et al in 2018, about Connection Behavior Mosquito Nest Eradication with Closing, Draining and Recycling Reset Plus (mosquito nest eradication M Plus) against Incident Fever Dengue Hemorrhagic Fever (DHF) in Kelurahan Andalas. Where is the result study show there is a connection Between 3M Plus behavior with DHF incidence with statistical test results p-value 0.001 < (0.05)?

These results are also reinforced by the results of the study from Herlambang et al the year 2019 that there is a connection Between 3M Plus behavior with the incidence of dengue fever in Cicadas Sub-district Cibeunying South Bandung Municipality with a p-value < 0.001 (p-value 0.05). Whereas comparable results backward with research conducted by Husna et al (2016) about Connection 3M Plus behavior with Incident Fever Dengue Hemorrhagic Fever (DHF) in Semarang City was found results that are not significant Among 3M Plus behavior with the incidence of dengue with p-value = 1000 OR = 0.868.

Influence the place brood to DHF incident

Research results this showing that no existence influence the place brood to incident dengue. Research results this in line with research conducted by Hasyimiet al (2011) who stated no there is meaningful relationship _ Among the place drinking water reservoir (place) miss) with The incidence of dengue fever is obtained p value = 0.486. This thing supported by research Salawati et al (2010) that no there is connection Among the place brood outside house with the incidence of dengue with nila p=0.096.

Research results this no in line with research conducted by Syamsul (2018), which states: results study through Interview deep with officer service health and health center that factor environment in the form of clean water facilities, and rainwater channels that become the place brood Aedes mosquitoes and some big informant state that clean water facilities and rain water channels is very important factor to transmission or happening incident outside normal dengue. Research results this supported by research Susmaneli (2011) which shows variable relate with the incidence of dengue is the place water reservoir OR = 3.768 (95% CI: 2.492-5.699).

Influence condition environment house to DHF incident

Research results show that no existence influences the environment house to incident dengue. Research results in this in line with the study Handoyo et al (2017) found p-value = 0.775 (p>0.05) then, can be concluded that no there is connection by mean Among characteristics house with dengue incidence. It is also appropriate with the results study Winarsih (2013) which states that humidity house no there is the connection with the incidence of DBB which is p=0.349. In line with research conducted by Sari et al (2017) who found results that no there is no connection between ventilation (p=0.33) and humidity (p=0.692) against the incidence of dengue, but with lighting there is a meaningful relationship with p-value = 0.001. Different from the results of research conducted by Tamza & Suhartono (2013), which states that there is connection installation wire gauze with the incidence of DHF obtained p-value of 0.038 which means <0.05. OR value = 4.753 (CI 95 % : 1.206-18.738).

Effect of social capital to incident DHF

The strong role from aspects of social capital in helping the family in the prevention of the moment infected with dengue. The connection between social capital (particularly trust and participation in society) can become a predictor independent of condition health in the environment society. Social capital is a factor supporter in resolving the problem of DHF (Sulaeman et al., 2019. This is in line with the results research of by Asri et al., 2017 which shows that social capital as a featured community gives base main action prevention. Formation group social, cooperation cross-sector, and cooperation clean up is the visible form of social capital in dengue prevention and control. Research results this supported by research conducted by Fatimah et al. (2019) which states that there is a strong relationship between social capital and with health status community in the neighborhood the place stay to prevention DHF transmission (b= 1.07; 95% CI= 0.26 to 1.89; p= 0.010).

CONCLUSIONS AND SUGGESTIONS

Research results obtained there is a connection variable level 3M Plus education, knowledge, behavior and social capital to the incidence of dengue fever in the city of Padang and not there is meaningful relationship by place variable statistics miss and condition environment house with dengue incidence. Research results this later expected can be used for planning and evaluation of health programs, in particular in the prevention dengue disease.

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CONFLICT OF INTEREST STATEMENT

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