Conference Paper

Analysis of the Risk Factors of Dengue Hemorrhagic Fever (DHF) In Rural Populations in Panongan Subdistrict, Tangerang 2016

Deborah Siregar[1], I Made Djadja[2], and Ririn Arminsih[2]

[1]Postgraduate student of Public Health, Faculty of Public Health Universitas Indonesia
[2]Department of Environmental Health, Faculty of Public Health Universitas Indonesi, C Building 2nd Floor Kampus Baru UI Depok 16424, Indonesia

Abstract

DHF is a disease that affects the population in urban areas. But several recent research shows that the incidence of dengue has spread to rural areas as well. This study aims to analyze the risk factors of dengue in rural areas in Panongan Subdistrict, Tangerang in 2016. This study is a case control study. The samples of this study consisted of individuals diagnosed with DHF in the case group and individuals without DHF in the control group as recorded in Puskesmas Panongan in 2016. The research was conducted in June 2016. The study was conducted by interviewing the patients in both groups. The analysis used was a logistic regression analysis. The analysis showed a significant association between sex (4,99; 2.05-12.14) and mobility (2.28; 1.20-4.35) with the incidence of dengue. This research concludes that sex is the most dominant variable related to the incidence of DHF with OR = 4,17. It means that males have 4,17 times higher risk of acquiring DHF compared to females after controlling the mobility. Strategies to prevent Ae.Aegypti bite are by using mosquito nets, wearing mosquito repellent and using windows or doors screen.

Keywords: dengue fever; rural areas; risk analysis

Corresponding Author:
I Made Djadja
imddjaja@ui.ac.id

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1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a disease caused by dengue virus that belongs to Arthropod-Borne Virus, genus Flavivirus and family Flaviviridae, dengue is transmitted by mosquitoes of the genus Aedes, especially Aedes aegypti or Aedes albopictus, it can occur throughout the year and it can affect all age groups and is related with the environment and people's behavior (Ministry of Health, 2014) [1].

Data from the World Health Organization (WHO) in 2011 stated that 2.5 billion people (about 2/5 of the world population in tropical and subtropical countries) are at risk by dengue and 50-100 million people are infected by dengue virus each year, it has

become an endemic in more than 100 countries in Africa, America, Eastern Mediterranean, Southeast Asia and Western Pacific, and Southeast Asia and Western Pacific are the regions most seriously affected due to the spread of dengue disease (Ginanjar, 2008) [2].

DHF is still a major public health problem in Indonesia and Indonesia is the one country with an endemic dengue fever which every year always occur an outbreak in various cities and every 5 years will occur a large outbreak (Department of Health, 2007) [3]. Indonesia has increased the risk of acquiring DHF due to the dengue virus and Ae. Aegypti that has already widespread in both areas of rural and urban, both in homes and in public places, except for areas that the altitude is more than 1,000 meters above sea (Department of Health, 2003) [4].

Ministry of Health (2016) [1] stated that the patient of dengue fever in Indonesia on January-February 2016 was 13.219 people and 137 people died, the highest proportion of patients who are affected with DHF in Indonesia is the group of children age range 5-14 years (42.72%) and the second highest falls in the age range of 15-44 years (34.49%). Recently, dengue fever is widespread in some areas. Not only the number of cases increased and the disease spreads to a new areas, but also it causes an outbreak. Data from the Ministry of Health (2016) [1] stated that the outbreaks on 2016 were reported in 9 districts and 2 cities from 11 provinces in Indonesia, including Tangerang.

Tangerang is located in the eastern part of Banten, there are 29 sub-districts, 28 government district, and 246 rural villages, there are some sub-districts that are still a rural village which includes Panongan. Panongan is divided into 1 government district and 7 rural villages are Ranca Iyuh, Mekar Jaya, Ranca Kalapa, Panongan, Serdang Kulon, Ciakar, Mekar Bakti, and Peusar (Central Bureau of Statistics Tangerang, 2015) [5]. In 2015 there were 372 cases of dengue in Tangerang. From January to April 2016, there is a surge of dengue fever cases in Tangerang with 1041 cases and 20 people died. The highest rate is in Panongan with 158 cases of patients diagnosed with DHF, while Cikupa with 122 cases and two people that died. On the other hand Balaraja has 76 cases and two people that died, and Kresek with 60 cases and two people died (Department of Health Tangerang, 2016) [6].

Initially, DHF is a problem in urban areas but now it is also threatening the suburbs (Department of Health, 2003) [4]. Dengue has spread from big cities, where urban areas act as reservoirs of the virus to areas with the scope of the smaller communities, it showed that mobility contributes to the incidence of the disease, in this case the spread of dengue virus (Kittayapong, 2005) [7]. It was found that in Lebak and Bogor

there were 12 cases among which 5 cases were from rural villages and 7 cases of urban areas (Kusumawardani & Achmadi, 2014) [8, 9].

Whether there was an increase or decrease cases of dengue, it should be monitored and controlled because dengue can cause death within a short period of time (Ministry of Health, 2014) [1]. Based on the foregoing, the researcher wanted to find out the risk factor of dengue in rural village, Panongan in 2016. The research is expected to help people who live in rural villages to pay more attention to the risk factors on the incidence of dengue so that the incidence of dengue in rural villages especially in Panongan can be decreased.

2. METHODS

This study is an observational study which had the researcher do the observations directly to the respondent by distributing questionnaires to be later analyzed. The design is a case-control, comparing subjects with the disease as cases and subjects without the disease as a control. then the researcher calculates the proportion of cases that are at risk and not at risk, and the proportion of control that are at risk and not at risk. The independent variables in this study included age, sex, education, employment, and mobility and the dependent variable was the incidence of dengue in Panongan, Tangerang.

The study was conducted on June 2016 in 8 villages within the Primary Health Center of Panongan, Tangerang, there are Ciakar, Panongan, Ranca Kalapa, Serdang Kulon, Ranca Iyuh, Peusar, Mekar Bakti, and Mekar Jaya. The study begins with a preliminary survey, followed by data collection, processing and reporting of research. The population in this study are the community who live within the area of the Primary Health Center of Panongan, Tangerang. The sample in this study (1) cases are individuals who are affected by dengue in Primary Health Center of Panongan, Tangerang which was reported from the hospitals and recorded in Primary Health Center of Panongan on January 2016-May 2016 (2) control are individual who is not affected by dengue and are the nearest neighbor with the case group and live within the Primary Health Center of Panongan area. Based on the results of sample calculations and previous research, the minimum sample size is 87, with a comparison of cases and controls 1:1. The addition of the samples are 10% (95 samples). So the minimum of total sample are 190 samples with a minimum sample of cases are 95 cases and minimum sample of control are 95.

The sampling technique used is a simple random sampling so the population has the opportunity to be elected to be part of the sample. The steps done during the sampling

in this study were (a) to ask for a list of the names and addresses of individuals with dengue positif (case) from Primary Health Center of Panongan on 2016 (b) the name of individuals with a positive dengue then will be used as the sampling frame to the case (c) from each of the frame sampling, a simple random sampling was conducted to get the number of samples in accordance with the calculation of at least 95 for both cases and controls groups (d) each respondent in the sample was used as subjects and conducted interviews based on instrument that has been compiled.

Datas that were collected are (1) secondary data, obtained by interviews directly given to the staff of the Primary Health Center, Panongan (2) primary data, obtained by interviews to the respondent to determine risk factors of dengue in Panongan using a questionnaires.

Processing the data was done using a data software that includes editing, coding, processing, and cleaning data. Univariate analysis was done to get information about the frequency distribution from each variables. Bivariate analysis was done to see a significant relation between the two variables: risk factors (independent variable) to the incidence of dengue (dependent variable). Multivariate analysis with logistic regression was done to get a the best model between risk factors to the incidence of dengue. Before the research, all the respondents are given information about the plans and objectives of the research through a formal meeting and through writing. Each respondent was given the full right to approve or disapprove as a respondents by signing an informed consent. In addition, respondents were also given the information about the benefits and risks from this research and respondents were given the right to autonomy to obtain information to make a choices without coercion. Researcher do not show the identity of the respondent to maintain the confidentiality of the data. The data obtained is stored as an archive and can only be accessed by researcher.

Researcher can provide data when needed for the improvement of health in accordance with the principles of openness and fairness. Researchers also observe the principles of honesty and maximize outcomes for the benefit and minimize the things that can be detrimental.

3. Results

The results showed that the number of male was 34 peoples (17.9%). The proportion of male in the case group was 27 peoples (28.4%) and the proportion of male in the

control group was 7 peoples was (7.4%). Statistical analysis showed a significant relationship between sex and dengue fever in Panongan. Results of the analysis showed that male are at risk of dengue 4.99 times higher than female (Table 1).

The results showed that the proportion of case group <15 years are 3 peoples (3.2%) and in the control group are 2 peoples (2.15%). The results found that there is no significant relationship between age and dengue fever in Panongan. Results of the analysis showed that the respondents <15 years are at risk of dengue 1.5 times higher than respondents ≥15 years (Table 1).

Educational is categorized into two groups according to the 9 year education program. Low educational level is defined as having received a middle school or lower education. High education level is defined as having received a high school or high education. The results showed there is no significant relationship between educational and dengue fever in Panongan. Although the analysis showed there is no relationship, the data showed a high percentage of respondents with a low educational background (72.6%) and the proportion in case group with low education 70.5% (Table 1).

The result showed that respondents who did not work are 76.3% and the proportion in case group who did not work are 71.6%. Results showed there is no significant relationship between work and dengue fever in Panongan. (Table 1).

The result showed that respondents who's mobility are 29.5%. The proportion in the case group with a mobility of a 37.9% and the proportion in the control group with mobility 21.1%. Results showed a significant relationship between the mobility and dengue fever in Panongan. Results of the analysis showed that respondents who have mobility have 2.28 times higher risk than respondents without mobility (Table 1).

Then, each independent variable correlate with dependent variable (bivariate analysis). If p-value < 0.25, variables directly into a multivariate. For independent variables with p-value > 0.25 but substantially important, these variables can be included into multivariate (Table 2).

Based on the results of the bivariate selection, there is a variable with p-value < 0.25 are gender, occupation, and mobility. While the variables with p-value > 0.25 are age and, education (Table 2).

The first multivariate modeling explain that sex has a p value < 0.05. Occupation had the highest p value so the next step of occupation is excluded from the model (Table 3).

After the variables is excluded from the model, there is no changes of OR > 10% so occupation does not include of confounding (Table 4).

Table 1: Relationship between Population Factor with Fever Dengue in Panongan, 2016

Variable	Group				(n=190)		P value	OR (95% CI)
	Cases (n=95)		Control (n=95)					
	N	%	N	%	N	%		
Sex								
Male	27	28.4	7	7.4	34	17.9	0.001	4,99 (2.05-12.14)
Female	68	71.6	88	92.6	156	82.1		
Age								
<15 years	3	3.2	2	2.1	5	2.6	1.000	1.51 (0.24-9.28)
≥15 years	92	96.8	93	97.9	185	97.4		
Educational								
≤9 years	67	70.5	71	74.7	138	72.6	0.625	0,80 (0.42-1.53)
>9 years	28	29.5	24	25.3	52	27.4		
Occupation								
No	68	71.6	77	81.1	145	76.3	0,17	0.58 (0,29-1,16)
Yes	27	28,4	18	18.9	45	23.7		
Mobility								
Yes	36	37.9	20	21.1	56	29.5	0.017	2.28 (1.20-4.35)
No	59	62.1	75	78.9	134	70.5		

Table 2: Selection Bivariat Independent Variables to Dependent Variables

Variable	Nilai p	Remarks
Sex	0,001	Continue to multivariate
Age	1,000	Does not continue to multivariate
Education	0.625	Does not continue to multivariate
Occupation	0,17	Continue to multivariate
Mobility	0,017	Continue to multivariate

Table 3: Multivariate Modeling 1

Variable	B	p-value	OR	95% CI
Sex	1.415	0,003	4,118	1,624-10,441
Occupation	- 0,077	0,845	0,926	0,430-1,996
Mobility	0,482	0,191	1,620	0,786-3,337

Table 4: Multivariate Modeling 2

Variabel	B	p-value	OR	95% CI	Change of OR (%)
Sex	1,429	0,002	4,175	1,663-10,483	1,3%
Mobility	0,504	0,152	1,655	0,830-3,299	2,1%

Table 5: Multivariate Modeling 3

Variable	B	p-value	OR	95% CI	Change of OR (%)
Sex	1,608	0,001	4,992	2,051-12,149	21,22%

There is changes of OR > 10% so that confounding variables is including mobility therfore putting it back into the model (table 5).

There is no interaction between sex and mobility (p value > 0,05). Next, interaction variable (Sex by Mobility) are removed from the model (table 6).

This research concludes that sex is the most dominant variable related to the dengue fever with OR = 4,99. It means that males have 4,17 times higher risk of acquiring DHF compared to females after controlling the mobility (table 7).

4. Discussion

4.1. Relationship between gender and dengue fever

The result showed a significant relationship between sex and dengue fever in Panonggan. Results of the analysis showed that male are at risk of dengue fever 4.99 times higher than female. This is accordance with the research of Kusumawardhani (2012) [8] in rural village in Bogor and Lebak that the proportion of male (58,3%) is higher than female (41.7%).

Table 6: The Interaction of Sex and Mobility

Variable	B	p-value	OR	95% CI
Sex	1,162	0,065	3,195	0,932-10,954
Mobility	0,408	0,290	1,504	0,707-3,200
Sex by Mobility	0,573	0,545	1,774	0,277-11,368

Table 7: Multivariate Modeling 4

Variable	B	p-value	OR	95% CI
Sex	1,429	0,002	4,175	1,663-10.483
Mobility	0,504	0,152	1,655	0,830-3,299

4.2. Relationship between age and dengue fever

Based on the analysis there is no significant relationship between age with dengue fever in Panongan. The results found that the proportion of cases in age group of <15 years are 3 people (3.2%). Age is one of the internal factors related to the behavior of a person or community. Age is related with the daily activities inside and outside, because Aedes Sp has a habit of biting in the morning and afternoon (Azwar, 1999) [10]

4.3. Relationship between education and dengue fever

Based on the analysis there is no significant relationship between education and dengue fever in Panongan. People with high education usually have a breadth and ease in receiving information from outside as from television, newspapers, and magazines (Wati, 2009) [11]. However, the education has no effect directly against the occurrence of dengue fever, but have a role in the prevention of dengue fever.

4.4. Relationship between occupation and dengue fever

Based on the analysis there is no significant relationship between occupation and dengue fever in Panongan. Kusumawardhani (2012) [8] in rural village in Bogor and Lebak found that the proportion of dengue fever of respondents who didn't work 50% is higher than respondents who worked as a private employees (33.3%), employees (8,5%), as well as ustadz (8,35%).

4.5. Relationship between mobility and dengue fever

Mobility is the movement of the respondents out of the regional subdistricts within 1-2 weeks before diagnosed DHF. Results showed there is no significant relationship between mobility and dengue fever in Panongan. Kusumawardhani (2012) [8] states that in rural area in Bogor and Lebak found that the proportion of dengue fever

of respondents with mobility (66,7%) is higher than respondent without mobility (33.3%). In this study, mobility caused by the movement of community or travel to outside or other reasons because the location of the job.

5. Conclusions

There is a significant relationship between sex and dengue fever (4.99; 2.05-12,14), mobility and dengue fever (2.28; 1.20-4.35). Sex is the most dominant variable related to dengue fever with OR = 4,17. It means that males have 4,17 times higher risk of acquiring dengue fever compared to females after controlling the mobility.

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