Determinants of Dengue Hemorrhagic Fever Outbreak in Cipayung, East Jakarta

Cicilia Windiyaningsih and Tiwi Nurhastuti

Universitas Respati Indonesia, Jl. Bambu Apus I, No. 3, Cipayung, Jakarta Timur, DKI Jakarta 13890 Indonesia

Abstract: Background: DHF (dengue hemorrhagic fever) is an infectious disease that is caused by dengue virus. To date no specific medicine is available for this disease. Jakarta Province ranks 5th in the incidence of DHF. In 2014, the CI (cumulative incidence) of DHF was 48.7 cases/100,000. In Cipayung sub district (East Jakarta), there were 136 new cases of DHF (CI = 52.1/100,000) in 2015. This study aimed to investigate the determinants of DHF outbreak in Cipayung, East Jakarta. Subjects and Method: This was a cross-sectional study, conducted in Cipayung, East Jakarta. A sample of 594 households were selected at random for this study. The dependent variable was DHF. The independent variables were dweller density, water container drainage, container supervision. The data were collected using questionnaire and observation. The data were analyzed by multiple logistic regression. Results: DHF incidence was affected by container supervision < 1 time per week (OR (Odd ratio) = 2.45; 95% CI = 1.57 to 3.84; $p < 0.001$), container drainage < 4 times/month (OR = 1.82; 95% CI = 1.19 to 2.79; $p = 0.006$), dweller density < 4 (OR = 0.61; 95% CI = 0.42 to 0.87; $p = 0.007$). Conclusion: DHF incidence is affected by container supervision < 1 time per week, container drainage < 4 times/month, dweller density < 4.

Key words: DHF, container drainage, container supervision, dweller density.

Geographically Setu Village is located in the North of the East Jakarta Administration City and directly borders with other sub-districts, namely Ciracas Sub-district. Lubang Buaya village in the north, Ceger village and Bambu Apus village in the west, Sunter River in the east, and Cipayung Village and Bambu Apus Village in the south, while the topography of the land surface of Setu Village was flat. Based on the decree of Governor of Jakarta Capital Special Region Number 1227 of 1989 on the solution, and the area of Setu Urban Village was 324.12 Ha or about 11.37% from Cipayung Sub-district which was 27.36 km [1].

1. Introduction

DHF (dengue hemorrhagic fever) is an acute infectious disease caused by dengue virus transmitted by Aedes aegypti mosquito species. Mosquitoes can bite anytime, both day and night. Dengue virus itself was divided into four strains or types, namely DEN 1, DEN 2, DEN 3, and DEN 4 [2].

Data from the Ministry of Health year 2015 there were 511 districts/cities in Indonesia which have the potential to become a place for infectious of DHF. Director General of Disease Control and Environmental Health Mohamad Subuh said this means that no single Indonesian area was free of DHF endemicity. The five hundred potential districts/cities, almost 90% of them were endemic areas. Jakarta as the capital city was in it. DHF endemic district was 424 urban districts. Jabodetabek was entirely endemic to DHF, said Director General of Disease Control Dr. Subuh in a press conference about the situation of DHF in Indonesia held at the Health Ministry's, Jakarta, Tuesday (12/1). Jakarta, Bogor, Depok, Tangerang and Bekasi (Jabodetabek) became one of the endemic areas due to unfavorable environmental conditions. Change and manipulation of the environment due to urbanization and the construction of new resettlement sites also become a risk factor [3].

Corresponding author: Cicilia Windiyaningsih, Dr., lector, research fields: public health and epidemiology.

In Year 2015, the number of Dengue cases has decreased from 2014. In October-December 2014, the number of Dengue cases was 23,882 cases, while in 2015 only reached 7,244 cases. Mortality rates also tend to decrease. In 2014 the number of deaths due to DHF reaches 197 people while in 2015 the number of deaths within of three months was reached 100 peoples [4]. DHF is still a public health problem and this disease was endemic disease in almost all provinces in Indonesia. The observation results knowed that from year to year the number of cases and the affected areas continue to increase and potentially lead to outbreak. In Indonesia the number of reported cases trends to increase and the area of expansion was widespread. In 2004 there were outbreaks in 12 provinces in 42 districts with 79,462

cases of patients (IR: 37.01/100,000 people) with 957 deaths (CFR: 1.20%). The latest data reported in 2006 totaled 114,656 cases (IR: 52.48/100,000 people) with 1,196 deaths (CFR: 1.04%) . Because the vaccine to prevent and medicine to treatment of DHF has not been found, then the way it can be done until now must be to control its transmitting mosquito (vector), vector control can be done to mosquito adult and larva [4].

DKI Jakarta in year 2014 was included of the 5th highest number of DHF, despite the lowest number of death in Indonesia number 5 [2]. In Cipayung District the number of cases of DHF reported in 2015 was 136 cases (52.1/100,000) higher than the national target (20/100,000 people) and 2 people deaths, CFR 1.47 is higher than the target of Indonesia that was 1/100 case

DHF (anual report of Cipayung Health Center in Year 2015).

Government policies in this regard the Ministry of Health as outlined in the national program of control DHF basically include 5 main activities such as: finding the case as soon as possible and treating according to Standart Operational Procedure, deciding the transmission chain with the control of vector (mosquito adult and larva), partnership in National Working Group of DHF , community empowerment in mosquito for control source reduction (namely in Indonesia PSN 3M Plus) and improvement of program implementing professionalism.

Various efforts have been made to control increase of DHF cases, one of them and the most important was to civilize the community in the control of source reduction of DHF vector (Countrol of Larvae, pupa, and mosquito) through 3M movement (drain-cover-burying). This activity has been intensified since 1992, and in 2000 it was developed to 3M Plus by using larvasida, maintaining fish and preventing mosquito bites. Until now these efforts have not revealed the desired results because every year there was still an increase in the number of deaths. So far, efforts to cultivate the community in source reduction of DHF vector reservoir (in Indonesia PSN DBD) have been carried out such as through various media, leaflets, posters, banners, t-shirts, radio/TV interviews, but the results have not been able to change the community's behavior to continuously perform source reduction of Dengue vectors (Larvae, pupas, mosquitos in environment and home respectively).

In year 2004 the WHO introduced an approach to changing the behavior of the comunications for Behavioral Impact (COMBI) as new model of a behavior change. This approach was basically not a new approach, but a development of a previously used approach. Some countries in the world such as Asean countries (Malaysia, Laos, Vietnam), Latin America (Nicaragua, Brazil, Cuba) have applied this method with good results. Currently Indonesia was implemented in East Jakarta as a pilot area. In general, this approach emphasizes the cohesiveness of the implementing team to deliver communication messages formulated based on the problems that exist in the community by way of a community-approved solution, it was expected that with this approach the change of community behavior towards the empowerment of source reduction of Dengue Vectors can be achieved because it was believed only with the source reduction of DHF Vectors we can overcome the problem of DHF [3].

To overcome the problem of Dengue Hemorhagic, Head of Cipayung Health Center and its staffs and cross-related sector has done the control of Dengue vectors with two chemical ways of larvasidation and fogging and control of source reduction of DHF Vectors such as larvae, pupas, mosquitos through community participation that becomes self larvae inspector at home and its own environment, self larvae inspector monitored by larvae inspector cadres every Friday.

According to the report of Health Center of Cipayung in 2015 [1], the free rate of larvae reaches 99.52% higher of index larvae free National Standard (95%), but the DHF case is till high. Based on the situation, it is necessary to evaluate the control of dengue fever in the region, especially about knowledge, attitude, behavior in controlling dengue fever by cultivating self larvae inspector at home and in its environment and government role Cq Employees in Subdistrict, Villages, House hold, Heath Centre in Sub District, Health Cadres, and role of Mass Medias Communication .

2. Objective

(1) General

To prove the determinants related to dengue fever case in Cipayung sub-district, East Jakarta.

(2) Specific

To prove the distribution and frequency of age,

education, occupation, number of home dwellers, average/monthly household expenses, type of house, status, marriage, knowledge, attitude, behavior, health promotion.

To prove Environmental Situation include: type of container, presence of larvae, abate.

To prove the relationship of independent variables (age, education, occupation, home occupant, average/monthly expenditure, type of home, status, marriage, knowledge, attitude, health promotion, behavior, jumantik existence, abate with variable ever DHF cases).

To prove the dominant variables related to the occurrence of dengue cases.

3. Research Method

3.1 Place and Time

This research was conducted in DHF endemic villages in Health Center Cipayung in Cipayung Sub District (Bambu Apus, Ceger and Cipayung villages) on 20-31 June 2016.

3.2 Population and Sample

The research population of all head of household in three villages (Bambu Apus, Ceger, and Cipayung Villages) at Cipayung Community Health Center, 600 respondents sampled 600 households were taken randomly for Cipayung Village amount 254 head of family, Bambu Apus Village 180 head of family and Ceger Village 160 head of family.

3.3 Design

Quatitative study, crossectional.

3.4 Technical and Collecting Data Tool

Techniques used with direct interviews using questionnaires (Standart National Questionare), 15 interviewers 15 who have been trained in the evaluation techniques of Dengue Fever Control. Data collection technique from 600 samples of head family, Cipayung Village there were 59 head family taken 20

House Hold (in Indonesia Languange Rukun Rumah Tangga) each household gets 10 respondents Head of Family; Bambu Apus Village there were 65 Head of Family taken 20 House Hold each House Hold 10 respondents, Ceger Village there were 39 House Hold taken 10 House Hold each House Hold 20 Head of Family. The interviewer 15 people lecturer from University Respati Indonesia already trained, in the field accompanied with cadres and staf Health Center Cipayung Sub District. Survey has been carried out 4 days, every people every day has collected 10 respondents, and interview and environmental observation have taken time 30-45 minutes .

3.5 Technical Data Analysis

3.5.1 Univariate Analysis

Analysis of independent variable such as: age, gender, education, occupation, marriage status, housing, number of people in a house; Entomology examination (name of head of family, number of respondent), source of clean water family, type of water container, location (in house & out of house), material of water container, open/closed, positive or negative of larvae, volume of water container, drained or not, sowed with larvicides or not; and dependent variable report of DHF. Results of analysis have distribution and frequency of both variables, by spps 23

3.5.2 Bivariate Analysis

To know correlation between independent variable and dependent variable if alfa 0.05, CI 95% with Chi Square analysis by SPPS 23.

3.5.3 Multivariate Analysis

To determine of dominant variable as risk of DHF occured with mutiple logistic regression by spps 23

4. Result of Research

4.1 Univariat Analysis

Base on Table 1 result univariat analysis varible independent and dependent distribution frequency of good attitude high 85.9%, less behavior still high was a prolem of DHF outbreak despite larva free 93.80%

Table 1 Analysis univariate of DHF case & 18 independent variables.

No.	Variable	Percentage
1	There were DHF case	34.00%
2	Age < 50 years old	88.73%
3	Education ≤ high school	78.62%
4	Occupation	81.50%
5	Marital Status	85.00%
6	Permanent House	87.90%
7	Dweller density ≥ 4 persons	34.80%
8	Expenditure < 1 million	41.42%
9	Less knowledge	99.90%
10	Negative Attitude	24.10%
11	Less Behavior	97.50%
12	Container drainage by maids	4.90%
13	Container drainage by children	19.40%
14	Frequency drainage ≥ 4 times/month	61.80
15	Control drainage of water container < 1 a week	16.80%
16	Showed larvaside (abate)	12.80%
17	Get Health Education of DHF	35.50%
18	Larvae Index in house (all Aedes agepty	6.20%
19	Larvae free rate	93.80%

despite below National target (≥ 95%), control drainage, showed larvaside, direct of Health education of DHF was lowest.

4.2 Bivariat Analysis

Base on Table 2 there were 18 varibles, the varibles have p value ≤ 0.005 there were 6 variables, p value ≤ 0.250 there were 7 variables and rest of variables have p value > 0.250 amount 5 variables.

4.3 Multivariat Analysis of Final Model

Base on Table 3 of multivariat analysis from 13 variables only 3 variables have significance with p value ≤ 0.05, there was not coufounding and modifier effect. Dominant variable control drainage of water container < 1 in a week. And number two of DHF risk was frequency drainage of water container ≥ 4 times in a month and followed the number of occupants of house.

Table 2 Analysis bivariate of DHF case & 18 independent variables.

No.	Variable	p Value	OR	OR 95% CI
1	Age	0.142	1.539	0.862-2.745
2	Sex/Gender	0.018	1.757	1.097-2.814
3	Occupation	0.085	0.196	0.025-1.542
4	Type of House	0.128	1.545	0.879-2.717
5	the number of occupants of the house	0.001	0.555	0.390-0.790
6	Pengeluaran	0.077	1.372	0.966-1.948
7	Knowledge	0.593	1.508	0.334-6.803
8	Attitude	0.786	0.940	0.636-1.408
9	Behavior	0.105	2.340	0.836-6.548
10	Drained the water reservoir by maids	0.005	3.006	1.406-6.425
11	Drained the water reservoir by child	0.001	1.990	1321-2.998
12	Drained the water reservoir by mother	0.950	1.012	0.701-1.461
13	Drained the water reservoir by father	0.098	1.339	0.948-1.892
14	Frequency drainage of water container ≥ 4 times/month	0.049	0.678	0.462-0.999
15	Control drainage of water container < 1 a week	0.000	2.547	1.561-4.154
16	Showed Larvaside (abate)	0.845	1.057	0.607-1.842
17	Health Education of DHF	0.203	0.790	0.550-1.135
18	Therewere Larvae in house & outside house	0.549	1.234	0.620-2.454

Table 3 The final model DHF case withcontrol , frequency drainage water & the number of occupants of the house.

No.	Variable	p Value	OR	OR 955 CI
1	Control drainage of water container < 1 a week	0.000	2.454	1.570-3.837
2	Frequency drainage of water container ≥ 4 times/month	0.006	1.821	1.188-2.791
3	the number of occupants of the house	0.007	0.606	0.421-0.871

5. Discussion

5.1 Age

According to bivariate analysis result with Chi-square α 0.05, H0 received means there was no significant correlation between age with DHF case, it is similar with Zaenal Sugiyanto, Kriswiharsi, and Duwi Sivariato research in Semarang Region Public Health Hospital, Central Java Province, year 2013, which says age did not have significant correlation although in this research, respondent had different age proportion. In this research majority age < 50 years old, and average age 44 years, youngest was 15 years and oldest was 80 years, and then categorited into age < 19 year (11.3%) and age ≥ 19 year (88.7%) as WHO standart age of adult. Meanwhile Zaenal et al [28]. research all child respondents with diagnosed light and severe dengue. This research is not correlated with Endo Sardjito et. al. [9] in Banyumas Region at 2008 that said age had correlation with DHF cases. Differences are between these research. In this research respondent age from 15 until 80 years old meanwhile Endo et al. [9] research youngest age was 2 years old and oldest 75 years old, average age 31 years old and then categorized into < 12 years old (15%) and ≥ 12 years old 85%. According to Sumarmo S.P., at begining at epidemic many of DHF case at children age < 15 years old but a next epidemic young adult increased.

5.2 Gender

According to research result, gender significantly correlated p value 0.018, this research similar with Endo Garjito, 2008 [9] and Liew S. M. et al., June 2016. Je S. et al. 2015 that says gender significantly correlated with dHF cases but was different with Zaenal Sugianto et al. research that there was no significant p value > 0.05. Zaenal research is different due to women proportion 40% and men proportion 60% meanwhile other research 60% men and 40% women. Theorically female Aedes agepty mosquitos like to bite men so many DHF cases happen to men, because man after bath seldom used perfume, talcum, etc. But now many changes happened especialy in Indonesia since promotion of repellent for men and parfume etc. For male cosmetic, DHF situation data according to gender in Indonesia at 2010 male DHF cases 53.78%, female 46.22% (Epidemiology Data Center and Surveilans, Epidemiology Window Bulletin, 2010) [8].

5.3 Occupation

According to this research there was no significant correlation similar to Nur Purwoko Widodo [20], occupation had not significant correlation meanwhile according to Awida Roose, 2008 [7] there was siginificant corelation difference between these researches that in her research, occupation divided into three category educated, working and has not education, and has not worked.

5.4 Education

According to relation analysis between education with DHF case there was not significant, this research is same as M. Hasyimi et al. 2007 [17] research not sigibificant meanwhile other researchers did not mention education.

5.5 Marriage Status

Marriage status did not have siginificantly related with DHF case other research did not mention marriage status with dengue.

5.6 Type of House

Result this research permanent house and semi permanent and luxury was not significantly similar with Nur Purwono Widodo in year 2008 [20], Awida Roose, year 2008 [7] and other reseraches have not reserched type of house.

5.7 The Number of Occupants of the House

Result research was shown significant correlation,

different with Riyanti research in 2002 [23], Nur Purwoko Widodo in 2012 [20] have not significance between number of occupants with DHF. This research was not significant because mayority the number occupants > 4 persons amount 65.28%, meanwhile other researches density uccupants in house less then 4 persons amount 71.43%. Velasco-Salas Z. I. et al., in 2014 [10, 27] had house of density as main DHF transmission. This research is same with Ita Maria, Hasanudin Ishak, Makmur Selomo research, 2013 [12].

5.8 Expenditure

According to result, research was mot significant, this research is similar with Nur Purwono Widodo research in 2012 [20], and other reserches did not research expenditure variable.

5.9 Direct Health Education after Dengue Haemorrhagic Fever

Direct Health education about DHF with DHF cases had not with DHF case had not significant relation because *p* value > 0.05. meanwhile from 11 research journals Indonesia from 2002-2015, there was not direct health education about dHF connected with DHF cases (Riyanti, 2002 [23]; Awida Roose, 2008 [7]; Endo Dardjito 2008 [20]; Widia Ekawati 2009 [26]; DHF Bulletin 2010; Asep Dian Heryanto 2011 [6]; I Gusti Putu Anom Suryadhi 2012 [11]; Nur Purwanto Widodo 2012 [20]; Zaenal Sugiyanto 2013 [28]; Mauren Chintia Carundeng 2014 [19]; Pramudiyo Teguh Sucipto 2015 [21]). Other varibles whose *p* value > 0.250 were: education, marriage status, larvaside used, larvae, knowledge, and attitude.

5.10 Knowledge

Result of research was not significant relation with DHF case, it was same with Nur Purwoko Widodo in 2012 [20] with case control design: Zaenal significant, Ika Novitasari in 2013 [28] knowledge was not

significantly related different with Asep Dian Heryanto research which knowledge significant related with DHF case. This difference due to sample research population was 594 head of family, Nur Purwoko [20] amount 99 head family, case control meanwhile Asep research only crossectional and not random sampling in 98 family. Although knowledge was not significant of DHF outbreak goverment and community must be improved about knowledge of DHF, because of any outbreak in year 2016.

5.11 Attitude

Not related with DHF cases, this research is same with Zaenal Sugiyanto, Ika Novitasari in 2013 [28] other research in bibliography did not research about attitude. In this research attitude majority good attitude despite practice still has larvae in their house.

5.12 Behaviour

Not significant relation with DHF case if analyzing all questions that amount to 45 questions, but after analysis for every behaviour question, there were several questions that significant relation such as: frequency of water container drining with *p* value 0.049, OR 0.678, OR 95%, CI 0.462-0.999; drained the water reservoir by maids *p* value 0.005, OR 3.006, OR 95% CI 1.406-6.425; drained water reservoir by child *p* value 0.001, OR 1.990, OR 95% CI 1.321-2.998; control drainage < 1 in a week *p* value 0.000, OR 2.547, OR 95%, CI 1.561-4.154. After analysis of mutinominal regession logistic only three variable contributions of DHF out break in Cipayung that were: control drainage of water < 1 in a week, frequency drainage of water container ≥ 4 times/month and number of occupants of the house (density of people in a house). This research is similar with research by Asep Dian Heryanto in year of 2011 [6], Mauren Chintia Carundeng in year of 2014 [19]).

6. Conclussion

(1) DHF incidence was affected by container

supervision < 1 time per week (OR 2.454 OR 95% CI 1.570 to 3.837; *p* value 0.000);

(2) DHF incidence was affected by container drainage < 4 times/month (OR = 1.82; 95% CI = 1.19 to 2.79; *p* value 0.006),

(3) DHF incidence was affected by dweller density (the number of occupants of the house) (OR = 0.606; OR95% CI 0.421 to 0.871; *p* value 0.007).

References

[1] www.alodokter.com/Demam-Blood/cause/June 1, 2016, at 15:20 pm Laporan tahunan Puskesmas Cipayung Tahun 2015.

[2] Profil Pengendalian Penyakit dan Penyehatan Lingkungan Tahun 2015.

[3] www.cnnindonesia.com/gaya-hidup/201001122160559-1 03778/kemenkes-Indonesia-belum-bebas-demam-berdara h/1 June 2016,pukul 11.45 WIB.

[4] Kemenkes R. I., 2015. Buku Pengendalian Demam Berdarah Dengue.

[5] Anggun, P. D., Banning, R., and Raharto, S. 2010. Faktor Risiko demam Berdarah Dengue Di Kecamatan Wonosari Kabupaten Gunung Kidul Provinsi DIY. Prosiding Seminar Nasional Kesehatan Jurusan Kesehatan Masyarakat FKIK UNSOED, Purwokerto, 31 Maret 2012.

[6] Tahun, A. D. H. 2011. Faktor-faktor yang berhubungan dengan kejadian Demam Berdarah Dengue di Kelurahan Cisarua, Kecamatan Cikole, Kota Sukabumi.

[7] Roose, A. 2008. Hubungan sosio demografi dan lingkungan dengan Kejadian Demam Berdarah Dengue di kecamatan Bukit raya Kota Pekanbaru.

[8] Pusat Data dan Surveilans Epidemiologi Kemenkes R. I. 2010. Topik Utama Demam Berdarah Dengue. Buletin Jendela Epidemiologi.

[9] Dardjito, E., Yuniarno, S., Wibowo, C., and Prasetyo, A. D. L. 2008. Beberapa faktor yang berpengaruh terhadap kejadian Penyakit Demam Berdarah Dengue di Kabupaten Banyumas.

[10] Gibson, G., Souza-Santos, R., Honorio, N. A., Pacheco, A. G., Moraes, M. O., Kubelka, C., Brasil, P., Cruz, O., and Carvalho, M. S. 2014. "Conditions of the Household and Peridomicile and Severe Dengue: A Casr-Control Study in Brazil." *Infect Ecol Epidemiol* 17 (4).

[11] Surya, I. G. P. A., Aryana, I. K., and Jana, K. T. 2012. Faktor-faktor yang berhubungan dengan kejadian Demam Berdarah Dengue di Kelurahan Abiansemal, Kecamatan

Mengui, Kabupaten Badung, Provinsi Bali.

[12] Maria, I., Ishak, H., and Selomo, M. T. 2013. Faktor Risiko Kejadian Demam Berdarah Dengue Di Kota Makasar.

[13] Kemenkes, R. I. 2015. Buku Pengendalian Demam Berdarah Dengue.

[14] Subagia, K., Sawitri, A. A., and Wirawan, D. N. 2013. "Lingkungan dalam rumah, mobilitas,dan riwayat kontak sebagai determinan kejadian demam berdarah dengue di Denpasar." *Public Health and Preventive Medicine Archive* 1 (1).

[15] Laporan tahunan Puskesmas Cipayung Tahun. 2015.

[16] Lin, H. M., Chen, C. S., Hsu, C. C., and Chung, C. L. 1986. Zhonghua Min Guo wei Sheng Wu Ji Mian Yi Xue Za Zhi. 1986 Aug; 19 (3): 218-23.

[17] Hasyimi, M., Yusniar, A., and Miko, H. 2007. Hubungan tempat Penampungan Air Minum dan Faktor Lainnya Dengan Kejadian Demam Berdarah Dengue (DBD) Di Provinsi DKI Jakarta dan Bali. Media Litbang Kesehatan Volume 21 Nomor 2 Tahun 2011.

[18] Misti, R., Tri, B., and Bambang, W. 2010. "Studi Kohort Kejadian Penyakit Demam Berdarah Dengue." *Berita Kedokteran Masyarakat* 26 (4).

[19] Mauren, C. C., Nancy, S. H. M., Jootje, M. L. U. 2014. Analisis faktor-faktor yang berhubungan dengan kejadian Demam Berdarah dengue di Puskesmas Gogagoman, Kota, Kotamobago.

[20] Tahun, N. P. W. 2012. Factors Associated with the Incidence of Dengue Haemorhagic Fever (DHF) in Mataram City of West Nusa Tenggara Province.

[21] Pramudiyo, T. S., Mursid, R., and Nurjazuli, T. 2015. "Faktor-faktor yang mempengaruhi kejadian Penyakit Demam Berdarah Dengue dan Jenis Serotipe Dengue di Kabupaten Semarang." *Jurnal Kesehatan Lingkungan Indonesia* 14 (2).

[22] Profil Pengendalian Penyakit dan Penyehatan Lingkungan Tahun 2015.

[23] Riyanti. 2002. Beberapa faktor yang berhubungan dengan kejadian penyakit Demam Berdarah Dengue di Wilayah Kerja Puskesmas Werguwetan Kecamatan Kota, Kabupaten Kudus.

[24] www.cnnindonesia.com/gaya-hidup/201001122160559-1 03778/kemenkes-Indonesia-belum-bebas-demam-berdara h/1 June 2016, pukul 11.45 WIB.

[25] WHO. 2011. Comprehensive Guideline for Prevention and Control of Dengue Haemorhagic.

[26] Widia Ekawati. 2009. Beberapa faktor yang berhubungan dengan kejadian Demam Berdarah Dengue di Kelurahan Ploso, Kecamatan Pacitan.

[27] Velasco-Salas, Z. I., Sierra, G. N., Guzman, D. M., Zambrano, J., Vivas, D., Comach, G., Wilschut, J. C., and Tami, A. 2014. "Dengue Seroprevalence and Risk

Factors for Past and Recent Viral Transmission in Venezuela: A Comprehensive Community-Based Study." *Am. J. Trop Med. Hyg*. 91 (5): 1039-48.

[28] Zaenal, S., and Ika, N. 2013. Hubungan suhu, kelembaban Rumah dan Perilaku Masyarakat Tentang PSN dan Larvasidasi dengan keberadaan jentik nyamuk penular DBD di RW 01 Kelurahan Sedanguwo, Semarang.