

THE KNOWLEDGE AND PRACTICES RELATED TO DENGUE HAEMORRHAGIC FEVER IN BLITAR MUNICIPALITY, EAST JAVA PROVINCE

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ABSTRAK

Untuk mengontrol penyakit Demam berdarah Dengue (DBD), Departmen Kesehatan RI telah melaksanakan penyuluhan pemberantasan DBD, baik melalui puskesmas maupun media masa. Dengan menggunakan survei cross-sectional, studi ini bertujuan (i) mengukur pengetahuan DBD dan praktik pemberantasan nyamuk *Aedes* dari anggota masyarakat, dan (ii) melihat hubungan antara pengetahuan DBD dengan praktik pemberantasan nyamuk *Aedes*. Dengan menggunakan multistage random sampling, dipilihlah 198 keluarga dari 4 kalurahan di dua kecamatan, Kota Madia Blitar, Propinsi Jawa Timur. Kepala keluarga atau anggota keluarga lainnya diwawancarai dengan menggunakan kuisisioner semi-terstruktur. Keseluruhan ada 198 responden telah diwawancarai. Sembilan puluh tiga persen dari responden telah mendengar istilah DBD. Dari mereka yang pernah mendengar DBD, 87% memperoleh informasi tentang DBD melalui media masa (TV 85,3%, radio 1,1%, koran 0,5%), dan hanya 13% dari sumber non media masa (tetangga 12,5%, bidan 0,5%). Setelah dilakukan analisis pengetahuan DBD dengan melihat sub-kelompok populasi, didapatkan bahwa secara statistik pengetahuan DBD antar sub-kelompok adalah heterogen dengan signifikan ($P < 0,05$) Didapatkan korelasi yang lemah (Spearman $r = 0,49$), antara praktik pemberantasan nyamuk *Aedes* dengan pengetahuan DBD. Hasil studi ini membuktikan bahwa media masa merupakan metoda yang penting dalam penyebaran informasi tentang DBD. Namun demikian, penyuluhan lewat media tetap harus dikombinasi dengan pengorganisasian gerakan masyarakat, untuk mencapai aksi nyata masyarakat dalam memberantas nyamuk *Aedes*.

Kata kunci: Demam Berdarah Dengue, wawancara semi-terstruktur, pengetahuan, praktik, pemberantasan nyamuk *Aedes*

Introduction

Since Dengue Haemorrhagic Fever (DHF) struck Indonesia in 1968, it is

becoming a major public health problem in the country. During the last ten years, both the incidence rate and geographical spread have been increasing. For

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example, the incidence rate (IR) of the disease in 1990 was 12.7 per 100,000 population; although in 1994 it decreased to 9.72 per 100,000 population, in 1995 and 1996 it increased by 18.5 and 23.22 per 100,000 population, respectively. More over, in 1998 the incidence has rocketed to 35.19 per 100,000 population. In terms of the number of the attacked areas, from 1990 to 1998, the attacked districts/municipalities has been increasing from 177 (58.4%) to 227 (92.0%) districts/municipalities all over Indonesia (Ministry of Health Republic of Indonesia, 2000).

As so far the vaccine against Dengue virus has not been found, the only control method is to stop the transmission of the virus. A number of recommended strategies that should be conducted in a simultaneous way are surveillance, law enforcement, vector control, and community education (Yow-Cheong, Kai-Lok and Beng-Chuan, 1972; Halstead, 1986; WHO, 1998).

For controlling DHF, the Ministry of Health Republic of Indonesia (MOH RI) already determined two objectives of the program, i.e. (i) to decrease the morbidity (incidence) of DHF, and (ii) to decrease the mortality (Case Fatality Rate/CFR) of the cases. To decrease the morbidity, the MOH RI has determined the programs as surveillance, focal fogging (limited fogging if the cases occur), and *Aedes*-breeding-places prevention (*Pem-berantasan Sarang Nyamuk/PSN*). Meanwhile, for decreasing the mortality (CFR), the MOH

RI is continuously developing better management of the cases; and so far have already provided guideline (protocols) for the management of the patients. The MOH RI proposed that *PSN* belongs to the responsibility of households and community. To facilitate this, the MOH RI has performed DHF education via both health center and mass-media. Health officers and health cadres are supposed to give DHF education. Whilst via mass-media, the MOH has been using a number of channels such as television, radio, magazines, and leaflets.

So far very limited studies have been done to assess the knowledge and practices about DHF in Indonesia. Therefore, it is of importance to conduct a study for assessing the knowledge and practices related to DHF. The objectives of this study were: (i) to explore the knowledge and practices of DHF, and (ii) to assess the relation between the knowledge of DHF and the practices of *Aedes* control. This study is useful for providing the portrait of DHF education, as input for policy makers (planner) for enhancing the program.

Methods

Sample and data collection

This study was a cross-sectional survey in Blitar Municipality, East Java Province. Blitar municipality is an urban municipality, consisting of 3 sub-districts. The study applied a multistage probability

sampling method. Due to limited funds, only 200 households from 4 villages, two from Sukerojo and another two from Sanan Wetan sub-district, were selected. However, 2 households dropped as the members were unavailable for interview.

Data collection was done by semi-structured interview. Those who were eligible to answer the interview were, from the most priority to the least priority, first, head of household, second, the wife, and lastly, the oldest descendants. If there was no husband in household (died or divorced), the widow was assumed as a head of household. Four investigators conducted the interview in September 2000. Interview was done in Indonesian language; but for those who were difficult in understanding Indonesian language, interview was translated in local language (*Javanese*).

Variables

The items included in the survey were: (i) the characteristics of respondents, such as sex, position in family, age, education level, and occupation, (ii) the awareness of DHF and the sources of information from which it was mostly got, (iii) the knowledge of DHF and the practice of *PSN*. The survey items for the knowledge of DHF were extracted from the messages of DHF education in leaflets, in television spots, and in radio spots, designed by MOH RI.

The explanation of variable construct for the knowledge of DHF and practice of *PSN* was as follows. The knowledge of

DHF was defined as the essential knowledge of the household head or the members about DHF from anti-DHF campaign. The variable of the knowledge of DHF was consisting of 10 items: the symptoms of DHF (1 item), the transmission of the disease (4 items: the mode of getting the infection, the time of *Aedes* attack, and seasonal presentation of DHF, and the most susceptible age for DHF), the care for the suspects (2 items: first aid and the appropriate provider), the knowledge of controlling the mosquito (3 items: the common breeding places of the mosquito, *Aedes* control as general, and the adequate frequency of cleaning water containers). The 10 items were assumed to have the same weight. To measure the variable of knowledge, the 10 indicators were summed up. Then, the variable was treated as continuous one (Hair et al., 1998). It has been realized that some items had the possibility of multiple correct responses. However, as such multiple correct responses were very small, the items can be assumed as having the same weight.

The practice of *PSN* was defined as the previous month practices of the individuals or households for doing *PSN*. The variable of practice of *PSN* were consisting 5 items, 1 item depicting the practice of *PSN* as general, and another 4 items reflecting the previous month cleaning practice for bath container, toilet container, kitchen container, and water containers for drinking/flasks. These containers were selected, as most of

households possessed such containers, for avoiding more missing data. For improving the validity, the investigators were asking the respondents while checking the containers. The appropriate cleaning practice of water containers is to be done at least once a week (MOH RI, 1999; Christophers, 1960). The final variable of the practice of *PSN* was the adding-up of the five items and it was treated as a continuous variable.

Analytical framework

The knowledge was examined in connection with sex, age, position in family, occupation, and information channel. Also, the channel of DHF information exposure was examined with respect to other factors by single regression, as the purpose of analysis was exploratory. The practice of *PSN* was examined in connection with the knowledge of DHF. A more detail analytical framework can be seen in Figure 1.

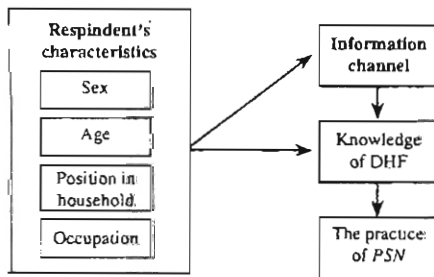


Figure 1. Analytical framework of the study

However, to explore the knowledge of DHF and the practice of *PSN* in more

detail, the indicators (items) was also examined individually. Data analysis was done using SPSS version 10.

Results

Characteristics of respondents

Out of 198 respondents, 103 (52%) were head of households, consisting of 87 males and 16 females, wives were 74 (37.4%) and descendants were 21 (10.6%). The mean age of respondents was 44.0 with a range of 13 - 77. Fourteen (7.1%) did not graduate from any school, 83 (41.9%) graduated from elementary school, 41 (20.7%) from junior high school, 60 (30.3%) from senior high school or more. Fifty-seven (28.8%) were farmers or unskilled workers, 59 (29.8%) merchant or private workers, 22 (11.1%) civil servants, and 60 (30.3%) others.

The awareness and source of information

Out of 198 respondents, 184 (92.9%) were aware (already heard) of DHF. When asked their sources of DHF information they mostly got, 87% responded from mass-media, whilst the rest (13%) saying from non mass-media. The main sources of mass-media were television (85.3%), followed by radio (1.1%), and newspaper (0.5%). Meanwhile, the main sources of non mass-media was neighbor (12.5%), followed by midwives (0.5%). There was no difference in terms of mass-media as the sources of DHF information between two sub-districts, Sukorejo vs Sanan

Wetan (χ^2 test, $p = 0.70$). This demonstrates that the exposure of people to DHF education via mass-media (television) was homogenous across localities. In interview process, it also revealed that most of the wives and descendants obtained DHF information from DHF television spot.

The knowledge about DHF

When asked about the symptoms of DHF, (30.8%) responded as a sudden high fever, followed by nausea and vomiting (27.8%), fatigue and muscular or articular pain (12.6%), bleeding (2.0%); whilst the rest (26.8%) did not know. Therefore, 73.2% of respondents gave the correct responses for at least one of the symptoms of DHF. With regard to the four items for the transmission of DHF, 50.5% of respondents knowing the mode of getting infection (i.e. *Aedes* bite), 35.4% knowing of daytime attack of *Aedes*, and 56.1% knowing of seasonal feature of DHF (rainy season), and 80.8% knowing that children were the most susceptible. For the two items of care for the suspects, 11.6% gave the correct response of providing oral rehydration solution for first aid, and 93.9% gave the correct response for seeking proper provider (health center, hospital, doctor practice, and midwife practice).

In order to explore the knowledge of DHF control, three questions were introduced, i.e. the common breeding places for *Aedes*, the methods for *Aedes* control, and the adequate frequency of

cleaning water containers for larvae prevention. For the knowledge of breeding places, nearly half (48.0%) responded as bath container, and then 14.1% kitchen container, 7.1% can/ bottles, 3.5% any containers, 0.5% responded as the combination, and the rest (26.8%) did not know. So, 73.2% of respondents gave the correct response at least one of the common breeding places of *Aedes*. In terms of knowledge of *Aedes* control, one-third (35.9%) answered 3M¹ (covering, cleaning, and burying), followed by larvicide (21.7%), fogging (19.7%), fish rearing (2.0%), and did not know (20.7%). Therefore, overall 79.3% knew at least one of the control methods for *Aedes* control. When asked how often to clean water container for larvae control (*jentik-jentik*), 71.2% gave the correct answer i.e. at least once a week. The summary of the knowledge about DHF can be seen in Figure 2 below.

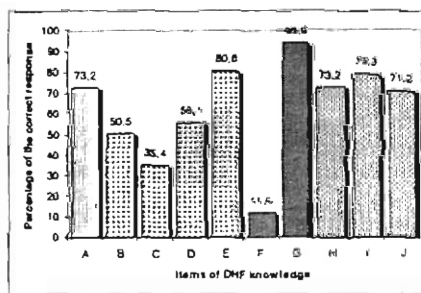


Figure 2. The summary of DHF knowledge across the items

Explanation:

- A: Knowing at least one of the symptoms of DHF (73.2%)

- B: Knowing that the mode of getting infection is via Aedes bite (50.5%)
- C: Knowing that Aedes attack is in the day time (35.4%)
- D: Knowing that high presentation of DHF is in rainy season (56.1%)
- E: Knowing that the most susceptible is children (80.8%)
- F: Knowing that first aid as giving drink solution (11.6%)
- G: Knowing that the appropriate carer for the suspects are doctors, midwives, health centers, and hospitals (93.9%)
- H: Knowing at least one of the Aedes common breeding places (73.2%)
- I: Knowing at least one of Aedes controls (79.3%)

As a summated scale, the knowledge of DHF has the mean of 6.25 (minimum

scale 0 and maximum scale 10) and SD 2.41. The knowledge was then examined in relation with other respondent's characteristics, the results was as in Table 1. Looking at gender, there was no significant difference of DHF knowledge between male and female. Interestingly, the knowledge was negatively correlated with age (Pearson coefficient = - 0.34); the younger the respondents the better the knowledge of DHF they had. Examining the knowledge by position of respondent in family, descendants had significantly better knowledge compared with wives, and wives were significantly better than head of household ($p < 0.01$). Also, civil servant had significantly better knowledge

Table 1. The relationship between the knowledge of DHF and selected respondent's characteristics

Relationship concerned	Test	Results (N, subgroup means (M), Standard Deviation (SD), or strength of correlation)	P
The knowledge and sex	t test	N = 198 Male: n = 94, M \pm SD = 6.1 \pm 2.2 Female: n = 104, M \pm SD = 6.4 \pm 2.60	NS
The knowledge and age of respondents	Pearson correlation	N = 198 Strength of correlation (Pearson coefficient) = - 0.34	$p < 0.01$
The knowledge and the position in household	Anova and subgroup comparison	N = 198 Head of household: n = 103, M \pm SD = 5.7 \pm 2.4 Wife: n = 74, M \pm SD = 6.6 \pm 2.4 Descendants: n = 21, M \pm SD = 7.7 \pm 1.3	$p < 0.01$
The knowledge and occupation	Anova and comparison between civil servant and the rest	N = 198 Farmer & unskilled: n = 57, M \pm SD = 5.4 \pm 2.6 Merchant & private: n = 59, M \pm SD = 6.6 \pm 2.3 Civil servant: n = 22, M \pm SD = 7.6 \pm 1.6 Others: n = 60, M \pm SD = 6.3 \pm 2.3	$p < 0.01$
The knowledge and the source of information	t test	N = 184 Mass-media: n = 160, M \pm SD = 7.1 \pm 1.7 Non mass-media: n = 24, M \pm SD = 4.4 \pm 1.9	$p < 0.01$

compared to the respondents engaged in other types of occupation, with the mean of knowledge 7.6. Looking at the knowledge by the sources of DHF information, the respondent who acquired the information from mass-media had significantly better knowledge compared to non mass-media ($p < 0.001$).

To investigate the variation of exposure to different sources of the information, whether it was from mass-media or non mass-media media, a single logistic regression was done. The likelihood of acquiring DHF information from mass-media by respondent's characteristics was as in Table 2.

The practice of PSN

When asked what the respondents have been practicing for *Aedes* control,

66.7% responded they were cleaning and scrubbing water containers weekly, 10.6% covering water containers, 8.6% burying solid wastes, 3.5% putting temephos (larvicide) on water containers, 2.0% rearing fish, and the rest (8.6%) responded with inappropriate practices. Overall, therefore 91.4% of the respondents have been practicing at least one of *Aedes* control measures correctly. When their domestic water containers (bath container, kitchen container, toilet container, and water container for drinking) were asked how often they (the family as a whole) have been cleaning and scrubbing such containers, the following result was observed. Assuming that adequate cleaning of containers must be done at least weekly, 64.1% respondents performing properly for bath container, 57.1% toilet container, 76.8%

Table 2. The relationship between the sources of DHF information i.e. via mass-media or non mass-media and some selected respondent's characteristics (using single logistic regression)

Respondent's characteristics	Information channel		OR	95% CI
	Mass-media (n)	Non mass-media (n)		
Sex				
Female	83	13	1	
Male	77	11	1.10	0.46-2.60
Age (year)	NA	NA	0.93	0.90-0.96
Position in family				
Head of household	77	17	1	
Wife or descendant	83	7	2.6'	1.03-6.66
Occupation				
Farmer/unskilled	36	16	1	
Merchant/private	52	5	4.62	1.55-13.75
Civil servant	20	1	8.89	1.10-72.08
Other	52	2	11.56	2.50-53.37

for kitchen container, and 91.4% for drinking container/flask. The summary of the practice of *PSN* can be seen in Figure 3. As a cummated scale, the practice of *PSN* has a mean \pm SD of 3.8 ± 1.4 (minimum scale 0 and maximum scale 5).

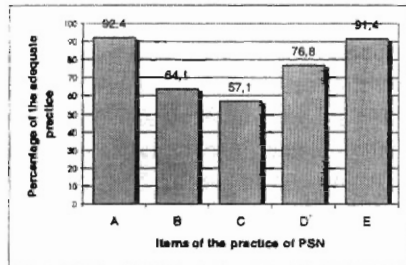


Figure 3. The summary of the practice of *PSN*

Explanation:

- A: Practicing at least one of *Aedes* control measures, cleaning and scrubbing water containers, covering water containers, burying solid waste, putting temephos, fish rearing (92.4%)
- B: Adequate cleaning and scrubbing for bath containers (64.1%)
- C: Adequate cleaning and scrubbing for toilet container (57.1%)
- D: Adequate cleaning and scrubbing for *genthong* (kitchen water container) (76.8%)
- E: Adequate cleaning and scrubbing for drinking container/flask (91.4%)

Relationship between the knowledge of DHF and the practice of *PSN*

As figured in analytical framework (see Figure 1), the practice of *PSN* was examined with respect to the knowledge of DHF. By using Spearman correlation test, it has been found that Spearman

coefficient was 0.49 with $p < 0.001$. This demonstrates that there is a weak correlation between the practice of *PSN* and the knowledge about DHF.

Discussion

WHO (1995) has emphasized that the key of DHF control is the action of individuals and communities in conducting *Aedes* control. The information regarding people's knowledge about DHF and the practice of *Aedes* control is very useful as an evaluation as well as an input for policy makers for improving the program.

Being the second endemic area after Surabaya, almost all respondents in Blitar Municipality (92.9%) were aware (heard) of DHF. As a city community, most of the residents seem to have an access to television and radio. There is no doubt that more than four-fifth (87%) obtain the knowledge of DHF control from mass-media, especially television. It seems that DHF television spot has a profound and influencing tool for disseminating DHF knowledge. Assessing people's knowledge in slum area of Delhi, Gupta et al. (1998) found that 82.3% were aware of DHF and the main sources of DHF information was mass-media. Further more, Dobbins and Else's (1975) study in urban dwellers of Malaysia, found that all those who were aware of DHF obtained DHF information from mass-media (television, radio, and newspaper).

In order to reduce the morbidity, the people's knowledge on DHF transmission must be improved, because only half

(50.5%) knew that the disease was transmitted by *Aedes* mosquito, only one-third (35.4%) knowing about daytime attack of *Aedes*, and only 56% knowing the seasonal feature of DHF. For reducing the mortality at household level, the knowledge of giving oral rehydration solution as first aid also needs improvement, as only one-tenth (11.6%) gave the correct response. Good responses were found on DHF symptoms and the methods of combating DHF (3M). Better knowledge on the symptoms and PSN (3M) might be in relation with DHF television spot.

The heterogeneity of the knowledge across respondent's characteristics needs attention for the improvement of DHF program (see Table 1). It seems that such a variation relates with whether or not people were exposed to DHF education, especially via television. This conclusion can be ascertained in Table 2. The table has shown that the younger, the more they obtained DHF information from mass-media; wives or descendants were more likely to obtain the information from mass-media compared to head of household; and civil servant and others were the most likely obtaining the information from mass-media compared to other occupations. If the component of the subgroup of others was examined, 73% were consisting wife and descendants. It seems that even though DHF education via television spot can improve the awareness and knowledge of people, but only for those who have high

level of exposure to television, i.e. wives, descendants, and people with higher level of social economic status.

Lower knowledge of head household (mean 5.7) needs special attention, as the key policy maker regarding household matters and community action initiatives, for example, the decision on community voluntary action for larval breeding place eradication, is coming from head of household. In other words, even though wives and descendants have better knowledge of DHF, they have 'no power' to make 'community action' with the people surrounding their residency. However, as stated by Lloyd *et al.* (1994), wives and descendants were better be assigned for domestic containers, whilst men assigned for solid waste management and large water storage (tank). Also, higher knowledge among civil servants (mean 7.6) is good, because they are usually a 'reference person' in their community. It might be very beneficial if health center officers could make use of them for enhancing PSN.

Looking at the practice of PSN for domestic containers with an assumption that for *Aedes* control the cleaning must be done at least once a week, the worst practice was found at toilet container, as only half (57%) performing adequate cleaning; followed by bath container, two-third (64%) performing adequate cleaning. Better practices were found for flasks (91.4%) and kitchen container (76.8%), but still below 100%. For breaking the life cycle of *Aedes* mosquito,

these practices of *PSN* are not enough, especially for bath container and toilet container. It is very common that mosquito's larvae are found in these two types of containers, especially in toilet container. Investigating the major foci of *Aedes aegypti* in Northeast Thailand, Flemming et al. (1997) found that 54% of bath containers and toilet containers were positive of immatures (larvae); in fact they harbored the highest number of larvae compared to other containers.

A weak relationship between the knowledge about DHF and the practice of *PSN* with a Spearman coefficient of 0.49 is not surprising, as human behavior is influenced by complex factors. Conducting a study in Brazil, Rosenbaum et al. (1995) found a little relationship between knowledge of dengue prevention methods and their actual implementation in respondent's house. To understand this phenomenon, human behavior must be viewed not only by individual level but also by interpersonal level as well as environmental level (Glanz and Rimer, 1995). More over, for better understanding of human behavior, the US Center for Disease Control and Prevention (1999) has proposed to apply a comprehensive perspective, examining health behavior at all level together, i.e. individual level, interpersonal level, as well as environmental (community) level. By using a 'comprehensive approach', it can be understood the result of this study that the practice of *PSN* is not strongly related with the knowledge of DHF. And, this could be

a consequence of DHF information the people got i.e. mass-media. In this case, there would be no appraisal support or compulsory behavior defined by public policy from accountable institutions, like health centers or Municipality Health Office (MHO). To put *PSN* into 'community mass action', DHF education via mass-media must be combined with 'a more clear community organization' by health center's personnel or MHO.

The limitations of this study were, first, the sample size was not so large for a survey, second, the measures of variables, the knowledge of DHF and the practice of *PSN*, need more precise constructs for future research.

From this survey, the following findings are of importance as an input for policy maker for improving DHF education program. From the four domains of DHF knowledge, i.e. the disease symptoms, the transmission, the care for the suspects, and the knowledge of controlling *Aedes* mosquito, the knowledge about the transmission of DHF needs to be improved, as only half (50.5%) knowing that the disease was transmitted by *Aedes* mosquito, one-third (35.4%) knowing of daytime attack of the mosquito, and only 56% knowing the seasonal feature of DHF. Mass-media has the important role in disseminating DHF knowledge, as 87% of the respondents obtained their knowledge of DHF from mass-media. However, it has been found that the knowledge of DHF was significantly heterogeneous across

population subgroups. This difference across population subgroups may be attributable to the level of exposure of people to DHF education in mass-media, especially television. Therefore, even though mass-media could provide a profound tool for disseminating DHF education, to translate the knowledge into 'daily practice of DHF control', such a mass education must be combined with 'a better community organization' by the accountable institutions.

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3 M is the popular abbreviation for *Menguras* (cleaning and scrubbing), *Mengubur* (burying), and *Menutup* (covering).