The level of knowledge and attitude towards dengue fever among medical students of Udayana University, Bali, Indonesia in 2018

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ABSTRACT

Background: There is a lot of impact of dengue among youngsters and also adults. The virus infects human blood and causes a migraine-like headache, rash, achiness, queasiness, tiredness and fever. Severe dengue can cause organ damage, severe bleeding, dehydration and even death. So, this study aims to know the level of knowledge and attitudes towards dengue infection among medical students from Faculty of Medicine, Universitas Udayana, Bali, Indonesia

Methods: A cross-sectional study was conducted among 99 respondents by using a valid and reliable self-questionnaires to assess the participants' knowledge and attitude about dengue fever. Knowledge is the ability to answer correctly towards Dengue related questions. Knowledge was evaluated based on 20 questions grouped under the following three categories. The attitude was assessed based on the ability of participants to give correct answers to 14 questions on attitude towards dengue. After that, the data were analysed using SAS software package version 9.1.

Results: There was 43% were men and 56% of women enrolled in this study. Most of them are aged 18 years old (69.7%), followed by 19 years old (23.2%), and 17 years old (6.1%). The average age was 18.15 + 0.5 years old. All of the participants (100%) answered that they would go to the doctor they get the dengue infection. Around 94,9% of them stated that they would drink a lot of water if they get dengue fever, and 89,9% of them said they would get a lot of rest. The vast majority of participants use insecticide (86,9%), curtains (84,8%), mosquitoes net (81,8%), cover their water storage (98,0%) and try to not hoard stuff in their home (90,9%).

Conclusion: The recent findings suggest that most students know the symptoms, transmission, and how to manage dengue fever. The attitudes of participants toward dengue infection have been assessed, and all answered that they would go to the doctor if they get the dengue infection

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INTRODUCTION

Since the beginning of the 21st century, dengue fever (DF) has been the most important vector-borne viral disease in humans, occurring mainly in tropical and sub-tropical countries where over 2.5 billion people are at risk of infection. With an estimated 50–100 million dengue infections worldwide, the disease is currently endemic in more than 125 countries in Africa, the Americas, the Eastern Mediterranean, South-east Asia, and the Western Pacific.[1]

Dengue Hemorrhagic fever causes 40% of world population to be at risk. Indonesia is the second most endemic country in Southeast Asia in morbidity and mortality rate, after Thailand. This disease can be found in almost every region and any time of the year, with a higher incidence during rainy season, which is generally October to April (the highest incidence usually is during February and March), because it gives a better habitat for the vector, the mosquito, to breed. Dengue is quite common in tropical regions such as Bali heightened during the rainy season that runs from October to April.[2]

Preventing or reducing dengue virus transmission depends largely on controlling the mosquito vectors.

Although the community-wide effort is the key to eradicate dengue, commitment and participation at the individual level such as emptying the flower pot or empty cans and practice of regular removing of water collecting containers and rubbish from their homes, play equally critical role. The Health Belief Model (HBM) is one of the most widely used social cognition models to predict health behaviours. The HBM posits that individual's health behaviour is determined by four main elements: i) consideration of the likelihood (susceptibility); ii) consideration of the seriousness (severity) of illness; iii) perceived benefits of taking health action; iv) perceived barriers to taking health action.[3]

Dengue fever affects the body by causing a high fever and flu-like symptoms in the primary stage. The virus infects human blood and causes a migraine-like headache, rash, achiness, queasiness, tiredness and fever. It can affect the blood, causing mild bleeding of the gums, and may bruise easily. A severe form of the illness that can cause organ damage, severe bleeding, dehydration and even death.[2]

Knowledge about dengue and its association with preventive behaviours have not been adequately elucidated. Findings have shown that increased understanding of dengue virus transmission was positively attributed to better dengue prevention practices. The importance of knowing DF is to make a prevention step before become severe and also be precaution on the cause of DF together avoid it.[2] Regarding this statement, medical students should have sufficient education about Dengue in general. They should be the guiders for other youths who are out there to prevent and to create awareness about dengue and its preventive methods. Therefore, a survey was conducted among medical students from The Medical Faculty at Universitas Udayana to know their level of knowledge and attitude towards Dengue.

METHODS

This research is based on a descriptive cross-sectional study where the subjects in the study were medical students at Udayana University. The sample size is based on the number of medical students who volunteered to take part in the survey. The questionnaires were distributed among semester I medical students. The estimated population was calculated to be 100.

The study was conducted using self-administered questionnaires. The questionnaire was divided into 2 parts. Part A was on Basic details of the participant, and Part B is the knowledge and attitude test towards DF. Knowledge is the ability to answer correctly towards Dengue related questions. Knowledge was assessed based on 20 questions grouped under the following three categories: i) Knowledge of the symptoms of dengue; ii) Knowledge of dengue transmission; iii) Knowledge of dengue management. The attitude was assessed based on the ability of participants to give correct answers to 14 questions on attitude towards dengue. After that, the data were analysed using SAS software package version 9.1.

RESULTS

A total of 99 respondents voluntarily joined the study. They consist of 43% men and 56% women. Most of them aged 18 years old (69.7%), followed by 19 years old (23.2%), and 17 years old (6.1%). There was 1 participant who was aged 17 years old. The age average was 18.15 + 0.5 years old. All the participants filled the questionnaires and understood all questions.

Overall knowledge of the participant was good, with more than half of them answered the right answer for the questions (Table 1). Nevertheless,

in some questions, participants got confused and chose either the wrong answer or admitted they did not know about that statement. For instance, in the question —Is retro-orbital pain one of the dengue fever's symptoms?" around 53.5% of them answer they do not know about that, and only 32.3% answered it correctly. In the question —Does dengue can spread with transfusion?" there were 33.3% of participant who answered wrongly by choosing —yes. The other two questions which confuse the participants were "When will dengue vectors bite their victims?" where majority of participant answered it wrongly and "Is aspirin consumption necessary for dengue infection?. Where there was 32.3% participant who answered incorrectly (Table 1).

All the participants answered that they would go to the doctor they get the dengue infection. Around 94.9% of them stated that they would drink a lot of water if they get dengue fever, and 89.9% of them said they would get a lot of rest. These answers were appropriate acts as a self-handle of dengue fever (Table 2). Majority of them shows good attitudes to prevent dengue infection by more than half of them chose the correct action to prevent dengue infection. The vast majority of participants use insecticide (86.9%), curtains (84.8%), mosquitoes net (81.8%), cover their water storage (98.0%) and try to not hoard stuff in their home (90.9%) in order to avoid mosquitoes, contact that can higher the risk of getting dengue infection (Table 2).

DISCUSSION

In this study, the author found that overall knowledge and attitudes of medical students towards dengue fever were good. This result similar to a study by Nasir in Malaysia where they found most of the respondents had good knowledge (63.2%) and good attitudes (79.9%).[4] Another similar study by Bota found that 94.6% of participants reported that they had heard about dengue, and 58.6% of participants reported "Aedes mosquito" as a vector of dengue virus. The Aedes mosquito is - a small dark mosquito having white stripes on its leg‖ was reported by 54.8% students. The Aedes mosquito breeds in "Stagnant clean water" was reported by 47.6% students and usually bit at "Dusk" by 44.7% and at "Dawn" by 51%. Regarding symptoms of dengue fever, "Prolonged high fever" was reported by 52.6%, "Muscular pain" by 39.6% (p-value 0.009), "Bleeding" by 41.3% (p-value = 0.001) and "Headache, nausea and vomiting" by 44.7% (p-value = 0.001).[5]

Research on first-year medical students by Mirza found that 33(25%) respondents knew that there are four types of Dengue Fever, 44% correctly

Table 1 The answers of participants regarding knowledge on dengue fever

No.	Question	Answer	Frequency (n,%)
1	Is fever one of the dengue fever's symptoms?	Yes*	95 (96.0)
		No	2 (2.0)
		Don't Know	2 (2.0)
2	Is headache one of the dengue fever's symptoms?	Yes*	79 (79.8)
		No	5 (5.1)
		Don't Know	15 (15.2)
3	Is arthralgia one of the dengue fever's symptoms?	Yes*	53 (53.5)
		No	17 (17.2)
		Don't Know	29 (29.3)
4	Is myalgia one of the dengue fever's symptoms?	Yes*	59 (59.6)
		No	9 (9.1)
		Don't Know	31 (31.3)
5	Is retro-orbital pain one of the dengue fever's symptoms?	Yes*	32 (32.3)
		No	14 (14.1)
		Don't Know	53 (53.5)
6	Does fly spread dengue virus to a human?	Yes*	5 (5.1)
		No	86 (86.9)
		Don't Know	8 (8.1)
7	Do all types of mosquitoes spread dengue virus?	Yes*	4 (4.0)
		No	94 (95.0)
		Don't Know	1 (1.0)
8	Does aedes mosquito spread dengue virus?	Yes*	81 (81.8)
		No	18 (18.2)
		Don't Know	0 (0.0)
9	Can dengue virus spread by transfusion?	Yes*	33 (33.3)
		No	43 (43.4)
		Don't Know	23 (23.2)
10	Can dengue virus spread from human to human?	Yes*	14 (14.1)
		No	77 (77.8)
		Don't Know	8 (8.1)
11	Can dengue virus spread by needle injection?	Yes*	22 (22.2)
		No	53 (53.5)
		Don't Know	24 (24.2)
12	When will dengue vectors bite their victims?	Yes*	39 (39.4)
		No	38 (38.4)
		Don't Know	22 (22.2)
13	Do some window sheets and mosquito net prevent the spread?	Yes*	86 (86.9)
		No	3 (3.0)
		Don't Know	10 (10.1)
14	Can closed water storage container decrease mosquito reproduction?	Yes*	95 (96.0)
		No	2 (2.0)
		Don't Know	2 (2.0)

Table 1 *Continued*

No.	Question	Answer	Frequency (n,%)
15	Can mosquito repellent tools decrease their reproduction?	Yes*	76 (76.8)
		No	18 (18.2)
		Don't Know	5 (5.1)
16	Can tree cutting decrease mosquito reproduction?	Yes*	71 (71.7)
		No	12 (12.1)
		Don't Know	16 (16.2)
17	Is aspirin consumption necessary for dengue infection?	Yes*	32 (32.3)
		No	36 (36.4)
		Don't Know	31 (31.3)
18	Can dengue infection be treated?	Yes*	91 (91.9)
		No	2 (2.0)
		Don't Know	6 (6.1)
19	Do you think dengue fever is a severe disease?	Very Agree	30 (30.3)
		Agree	57 (57.6)
		Less Agree	11 (11.1)
		Not Agree	0 (0.0)
		Not Sure	1 (1.0)
20	Do you have a risk to get dengue infection?	Very Agree	35 (35.4)
		Agree	37 (37.4)
		Less Agree	21 (21.2)
		Not Agree	2 (2.0)
		Not Sure	4 (4.0)
21	Do you think you can avoid dengue infection?	Very Agree	40 (40.4)
		Agree	38 (38.4)
		Less Agree	9 (9.1)
		Not Agree	11 (11.1)
		Not Sure	1 (1.0)

Table 2 **The answers of respondents regarding attitude on dengue fever**

No.	Question	Answer	Frequency (n,%)
1	Will you get a lot of rest if you get dengue infection?	Yes*	89 (89,9)
		No	4 (4,0)
		Don't Know	6 (6,1)
2	Will you drink a lot of water if you get dengue infection?	Yes*	94 (94,9)
		No	0 (0.0)
		Don't Know	5 (5.1)
3	Will you go to the doctor if you get dengue infection?	Yes*	99(100.0)
		No	0 (0.0)
		Don't Know	0 (0.0)
4	Do you use an insecticide to reduce mosquitoes?	Yes	86 (86.9)
		No	13 (13.1)
5	Do you use professional midges to reduce mosquitoes?	Yes	76 (76.8)
		No	23 (23.2)

Table 2 *Continued*

No.	Question	Answer	Frequency (n,%)
6	Do you use a curtain to reduce mosquitoes?	Yes	84 (84.8)
		No	15 (15.2)
7	Do you use a fan to reduce mosquitoes?	Yes	52 (52,5)
		No	47 (47.5)
8	Do you use a mosquito net to reduce mosquitoes?	Yes	81 (81.8)
		No	18 (18.2)
9	Do you cut the bushes in your garden to reduce mosquito?	Yes	51 (51.5)
		No	48 (48.5)
10	Do you use fish to reduce mosquitoes?	Yes	68 (68.7)
		No	31 (31.3)
11	Do you use burned mosquito's repellent?	Yes	75 (75.8)
		No	24 (24.2)
12	Do you not hoarding to reduce mosquitoes?	Yes	90 (90,9)
		No	9 (9.1)
13	Do you use a cover in your water reservoir storage?	Yes	97 (98,0)
		No	2 (2.0)
14	How often you clean your water reservoir and trench?	Always	57 (57.6)
		As often as possible	32 (32.3)
		Sometimes	9 (9.1)
		Never	1 (1.0)

named the causative agent as flavivirus and 65% of students were aware that the incubation period of Dengue Fever is 4-7 days. Among the respondents, 87% knew that the vector of this disease is female mosquitoes, though only 39% of students rightly named the species like *Aedes aegypti*. Around 90% students correctly answered high fever, severe headache, pain behind eyes, muscle and joint pains and rash as a symptom of dengue infection.[6]

Regarding the attitudes, a study by Amanah in Malaysia shows that the vast majority of medical students had good attitudes regarding dengue infection. They agreed to seek professional treatment if they get the infection and also agreed with the necessity of elimination larvae breeding with some efforts such as fogging, covering water storage, using water repellent and also applying mosquitos net and curtains (95.2%-99.6%).[7]

In the aspect of knowledge, it is noteworthy to see that there were still a mistake and lack of knowledge about retro-orbital pain as one of the dengue fever symptoms. The study by Cherng stated that ocular pain is described in 8 out of 29 papers as presenting dengue fever symptoms. Pain mostly located in retrobulbar and sometimes diffused. The patients with retrobulbar pain consisted of those who presented with subconjunctival haemorrhage and retinopathy sparing the macula, stellar neuroretinitis, and retinal haemorrhages.[8] The causes of haemorrhage could be thrombocytopenia with coagulation defects, capillary fragility, consumptive coagulopathy, and platelet dysfunction. Generally, there is complete resolution of ocular changes in dengue fever.[9]

The other issues that still become a pitfall in dengue fever knowledge were about its vector and how it spreads. Dengue is one of the arboviruses which mean it needs an insect for some phase of their cycles to eventually infect the human host. *Aedes aegypti* is a necessary vector for dengue virus. Besides dengue virus, it also plays a role in spreading the virus that is contributed to yellow fever, chikungunya and Zika virus. A study that analyses the characteristics of *Aedes aegypti* found that most of the mosquitos more often can be found indoors compare to outdoor (p<0,001). The peak of mosquito existences is on the evening and night which is around 4:30 pm -7:30 pm for outdoor mosquitos, whereas it will be on 6:30 pm-7:30 pm for indoor mosquitos. The highest prevalence of *Aedes aegypti* will be on March and April.[10]

In a recent discussion, some of the publications stated their concern about the possibility of dengue virus could be transferred by blood transfusion. Transfusion transmitted-DENV (TT-DENV) has been reported in Singapore, Hong Kong, Puerto Rico, and Brazil. However, no other countries reported the incidence nor have taken a

further study to analyse whether the infection is caused purely by the transfusion or not. A survey conducted by Rooks showed that none of the blood samples collected during local dengue outbreaks were positive for DENV RNA despite a subset being collected from —higher-risk‖ areas.[11] It is known that dengue as an arbovirus need its vector, which in this case is *Aedes aegypti* to incubate and replicate for about a couple days until they can bite and infect the person.[11,12] Female mosquitoes get infected by biting infected humans during their viremic phase; after 7 to 14 d of incubation, the mosquito is able to transmit the virus via blood-feeding. Besides mosquito biting, DENV may be accidentally acquired after vertical transmission, especially in near-term pregnant women through the placenta. Although this fact is still in the debate, we still have to put a precaution in the blood with high load of dengue viral (from 10^4 to 10^8 copies/mL) and variant DEN V with higher risk of transmission through blood.[13]

Some students are still confused whether they should use Aspirin or not manage dengue fever. A lot of treatment and management guidelines for dengue fever do not include the use of *Nonsteroidal Anti Inflammatory Drugs* (NSAIDs) and focus on fluid therapy for dengue fever management. On the contrary, they even stated that the use of NSAIDs such as aspirin is forbidden in the case of dengue infection. The reason is that NSAIDs can alter platelets aggregation, therefore higher the risk of bleeding in dengue fever and dengue hemorrhagic fever. Moreover, the reason for the students not to know much about aspirin is because Aspirin uses to be banned for those under 16-year-olds. The UK Medicines Control Agency has recommended that children under 16 should not be given aspirin, because of its links with Reye's syndrome, the rare but potentially fatal disorder found almost exclusively in children and adolescents.[14]

To date, paracetamol is being used as the pain killer. Aspirin, ibuprofen and paracetamol are all effective painkillers. Paracetamol is typically used for mild or moderate pain. It may be better than aspirin for headaches, toothache, sprains, stomach ache, and nerve pain like sciatica, but there is no any side effect. A study conducted by Wijewickrama proved that among 919 dengue fever patients, 36.7% of NSAIDs user-developed bleeding while only 28% of non NSAIDs user-developed bleeding (p<0,005). They also found liver enzyme derangement in Dengue patients who consumed NSAIDs with 25% of them had ALT>300μ/L whereas it only happened in 14.8% non NSAIDs consumers (p<0,005).[15]

CONCLUSION

Based on the findings in this study, we can conclude that a total of 99 respondents voluntarily join the study. Around 70.4% of students knew the symptoms of dengue fever, 72.3% understood the transmission of dengue and 71.3% knew how to manage dengue. The attitudes of participants toward dengue infection have been assessed and all answered that they will go to the doctor they get the dengue infection. Around 94.9% of them stated that they will drink a lot of water if they get dengue fever, and 89.9% of them stated they will get a lot of rest. These answers were appropriate acts as a self-handle of dengue fever. Majority of them shows good attitudes to prevent dengue infection by more than half of them choose the correct action to prevent dengue infection. The vast majority of participants use insecticide (86,9%), curtains (84,8%), mosquitoes net (81,8%), cover their water storage (98,0%) and try to not hoard stuff in their home (90,9%) in order to avoid mosquitoes, contact that can increase the risk of getting dengue infection.

ETHICS CONSIDERATION

Ethics approval has been obtained from the Ethics Committee, Faculty of Medicine, Universitas Udayana, Bali, Indonesia prior to the study being conducted.

CONFLICT OF INTEREST

There is no competing interest regarding the manuscript.

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AUTHOR CONTRIBUTION.

All of the authors are equally contributed to this study from the conceptual framework until reporting the results of study.

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