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## Clinical characteristic of dengue fever and dengue hemorrhagic fever among patients at Sanglah Hospital, Denpasar, Bali



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### ABSTRACT

**Background:** Mosquito-borne diseases are one of the most significant public health risks globally, and dengue fever seems to be one of the most important arboviral diseases in humans. In humans, dengue viruses are the supreme agents that cause dengue fever (DF) and dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS). Following that, the virus's presence, sufficient numbers of susceptible populations, and mosquito vectors are required to transmit dengue infection. This study aimed to identify the clinical characteristics of dengue fever and dengue hemorrhagic fever among patients at Sanglah Hospital, Denpasar, Bali.

**Method:** The study is a descriptive retrospective study design. The data was collected from the medical records of patients diagnosed with dengue and dengue hemorrhagic fever in Sanglah Hospital, Denpasar,

Bali, from June 2015- June 2016. We took 50 patients according to sample size calculation by randomized sampling technic. Data were analyzed descriptively.

**Result:** The study found the age range from 5 to 53 years old. The mean age for DF and DHF were 11 and 31, respectively. Secondly, the proportion of gender in this research was male by 21 (42%) and 29 (58%) female. Further to this, Denpasar showed the maximum number of cases between all the nine regencies. Both DF and DHF cases recorded the highest total cases in April 2016.

**Conclusion:** Expected clinical characteristics prior knowledge and prognosticators of DF and DHF development will be able to provide data to detect persons who are higher risk category and provide adequate time to clinicians to lessen dengue related morbidity and mortality.

**Keywords:** dengue, dengue hemorrhagic, fever.

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### INTRODUCTION

Mosquito-borne diseases are one of the most significant public health risks globally, and dengue fever seems to be one of the most important arboviral diseases in humans. Dengue fever is spread worldwide and threatening more than 2.5 billion people globally. It is estimated that 50-100 million dengue infections occur each year. In humans, dengue viruses are the supreme agents that cause dengue fever (DF) and dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS). *Aedes aegypti* is the principal vector of the dengue virus in almost all countries. Also, it is the most efficient vector for arboviruses. *Aedes aegypti* has highly anthropophilic, bites frequently, and is closely proximate to humans. Dengue virus can cause dengue

fever, and approximately 1-5% will develop severe dengue, primarily characterized by plasma leakage causing shock and pleural organ impairment. Unfortunately, there is still no medical treatment found to treat dengue patients completely. There is no approved dengue vaccine, but there is a vaccine in phase 3 trials. Most vaccines or prevention methods are implemented to control the breeding of *Aedes* mosquitoes but not to provide medical care. The present treatment is supportive care.<sup>1-4</sup>

Dengue represents a vast international public health concern that poses significant health, particularly the population of endemic areas. Researches show that about 40% of the world's population lives in areas with dengue infection.<sup>5</sup> According to the Bali Provincial Health Profile of the Year 2014, the incidence rate

of dengue hemorrhagic fever cases in 2014 was higher than the previous three years, with the total highest number of cases reported in Kota Denpasar.<sup>6</sup> This study determined the clinical characteristics of dengue fever and dengue hemorrhagic fever among patients at Sanglah Hospital, Denpasar, Bali

### METHODS

This study was a descriptive retrospective study design. We collected the data from the medical records of patients diagnosed with dengue and dengue hemorrhagic fever in Sanglah Hospital, Denpasar, Bali, from June 2015-June 2016. The data consisted of age, job, primary complaint, current medical history, past medical history, stay area, social and family history.

We collected the data from randomized 50 samples according to the sample size calculation. The samples were excluded if the data was not clear. The data were analyzed descriptively.

## RESULTS

All the data included in this research are patients who have met the required criteria. The records from two groups were used to identify clinical characteristics associated with dengue fever (DF) and dengue hemorrhagic fever (DHF). Their age, gender, location, time, and, more predominantly, the patient's clinical characteristics were analyzed closely in this research.

In this study, we found that a total of 13 (26%) contracted dengue fever, and 37 (74%) were dengue hemorrhagic fever. The age was ranged from 5 - 53 years old. The age range discloses 14 (28%) patients were aged 20 years old and below, while another 22 (44%) were between the age range of 21 to 40 years old. A total of 14 (28%) patients were above 40 years old. This finding shows that the age group below 20 years old shows the highest case for dengue fever. Whereas, for dengue hemorrhagic fever, the most affected age was between 21 to 40 years old. Based on the information above, we can conclude that the mean age for dengue fever and dengue hemorrhagic fever were 11 and 31 years old, respectively (Table 1).

A total of 21 (42%) patients were males and 29 (58%) females. Out of the findings for dengue fever cases, it was recorded that 8 (62%) were males and the remaining 5 (38%) were females. However, from the balance of 37 patients, 13 (35%) males and 24 (65%) females were infected with dengue hemorrhagic fever. These results showed that males have a slightly higher number of cases than females for dengue fever. In contrast, for dengue hemorrhagic fever, females have a higher number of cases (Table 1).

Most of the patients (>50%) had clinical symptoms of fever, headache, myalgia, vomiting, and nausea. Symptoms of petechia (12%), gum bleeding (10%), and vaginal bleeding (4%) occurred in DHF (Figure 1). We found Denpasar Regency with the most prevalence of DF and DHF cases (46%). The Buleleng Regency and

Bangli Regency had the lowest prevalence among the other regencies (2%). Only, Jembrana and Klungkung did not record any dengue cases during the period (Figure 2).

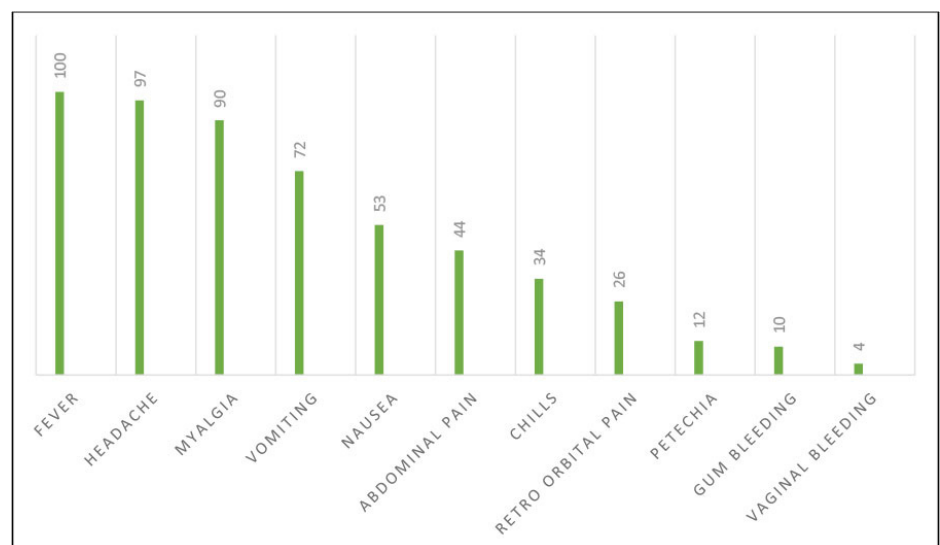
## DISCUSSION

This study showed that the occurrence of dengue fever is higher in children. In contrast, dengue hemorrhagic fever is

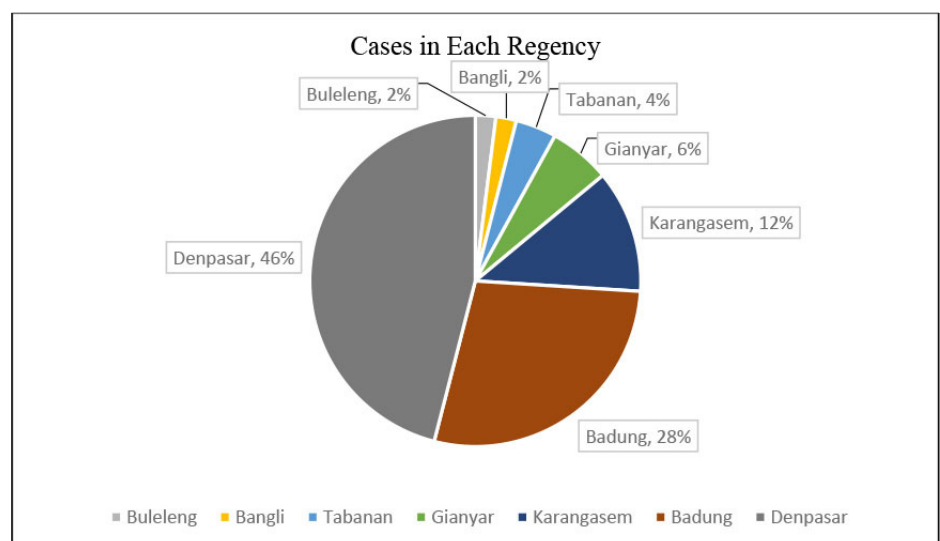
**Table 1.** Patients age and gender characteristics based on dengue infected.

	Dengue Infected		Total
	DF	DHF	
<b>Age (years)</b>			
0-20	8	6	14 (28%)
21-40	2	20	22 (44%)
>40	3	11	14 (28%)
<b>Gender</b>			
Male	8	13	21 (42%)
Female	5	24	29 (58%)

DF: Dengue Fever; DHF: Dengue Hemorrhagic Fever



**Figure 1.** The clinical symptoms of DF and DHF patients.



**Figure 2.** DF and DHF cases based on regency in Bali.

found more common in adults age between 21 to 40 years old, although it cannot be denied that it may also occur in children.<sup>7,8</sup> Firstly, based on age interpretation for this research, it can be said that dengue fever is slightly higher in children below ten years old than dengue hemorrhagic fever, which is more common in adults, although it does occur in children. Thus, the difference can be due to few reasons, such as adults with secondary infection is more prone to increase the risk of severe disease. The level of exposure in adults usually is higher than those in children, which also increases the risk of severe infection. For instance, a study conducted in Malaysia shows that dengue infection was initially a children's disease. However, in recent years the age distribution for dengue fever has changed to adults and older age, and it is found that patients who are more than 40 years of age are four times more likely to be contracted with DHF.<sup>9</sup>

Based on gender factor revealed females shows higher morbidity rate than males. A study also concurs with the overall findings for dengue fever and dengue hemorrhagic fever, which showed a higher morbidity rate in females than males. This result can be due to the sex-linked inheritance or difference in hormone balance in females. Similarly, that study mentioned no proper answer for this phenomenon due to more remarkable inflammatory or higher vulnerability to capillary permeability results in females being more prone to the disease.<sup>10-12</sup>

The main presenting complaint was fever and other symptoms in most patients, including severe frontal headache, muscular pain (myalgia), nausea, vomiting, and abdominal pain.<sup>11,13</sup> These were the communal findings in almost all the patients who were hospitalized. Also, patients displayed other less common symptoms, such as retro-orbital pain, petechia, and vaginal bleeding.<sup>3,11</sup> In addition, the hemorrhagic manifestation of dengue fever is not as common as those shown in dengue hemorrhagic fever. Dengue hemorrhagic patients have almost all the symptoms presented in dengue fever patients but with additional petechia, gum bleeding, and vaginal bleeding.<sup>4,11</sup> Although a few similarities can be seen between the two, dengue hemorrhagic

fever has more severe symptoms than dengue fever.<sup>14</sup> Besides, there are almost no bleeding symptoms that were found in any dengue fever cases. The study carried out in Bandung, Indonesia, indicated that complaints such as vomiting, nausea, and abdominal pain may be linked with dengue disease. However, vomiting and abdominal pain were not prominent among adults. It is only nausea that happens significantly more regularly among those infected with dengue infection.<sup>15</sup>

The dengue cases increased in Bali were further compounded by the fact that areas like Kuta and Nusa Dua in Badung, Sanur in Denpasar, and Buleleng were identified as the upcoming tourist destination and were experiencing massive development projects.<sup>6,16,17</sup> In contrast, even though the study has shown the constant increase of DHF cases in Bali, it cannot be said the same for research that contributed to the study on why dengue cases had increased. There has been a lack of research done towards finding the cause of the increase.<sup>18</sup> However, this contrasts to studies that have been done in other countries like Italy and Japan.<sup>19,20</sup>

This study did not determine the clinical characteristics prior knowledge and prognosticators of DF and DHF development. Further research will provide data to detect higher-risk category persons and provide adequate time to clinicians to lessen dengue-related morbidity and mortality.

## CONCLUSION

The incidence of dengue infection tends to occur in the age group of 21-40 years, where DF is more likely to occur in the age group 0-20 years and DHF in the age group 21-40 years. Men tend to experience DF, while women tend to have a high incidence of DHF. The most common symptoms of patients are fever, headache, myalgia, and vomiting. Denpasar City has a proportion of cases of dengue infection in Bali.

## DISCLOSURE

### Author Contribution

All authors contributed equally to publishing this article.

## Ethical Consideration

Ethical clearance number 1018/UN14.2.2.IV.1/2018.

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All authors stated that no external funding or grant-funded this study.

## Conflict of Interest

All authors disputed no conflict of interest regarding the publication of this study.

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