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Original Research Article

Factors associated with prolonged length of stay in dengue hemorrhagic fever patients at Wangaya Hospital, Denpasar, Bali

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ABSTRACT

Background: Dengue hemorrhagic fever (DHF) is a vector bone disease which is being a serious public health concern in tropical and sub-tropical countries around the world. A high number of dengue cases are reported annually in Bali. Prolonged hospital stays affect the high cost of dengue treatment. The aim of the study was to analyze the factors associated with prolonged lengths of stay in dengue hemorrhagic fever patients.
Methods: This study was an analytic observational study with a retrospective study design. The data was collected from the medical records of DHF patients at Wangaya Hospital between January - May 2024. The data analysis method used was the Chi square test as a bivariate test.
Results: A total of 152 subjects, mostly DHF patients, were male (54.61%), <40 years old (73.68%), without comorbid disease (71.05%), without low food intake (56.58%), and with a length of stay ≥4 days (66.45%). Most of the patients (>50%) had clinical symptoms of fever (100%), headache (91.45%), and myalgia (83.55%). A statistically significant association was found between comorbid disease and prolonged length of hospital stay with a p value of 0.039 ($p<0.05$), and low food intake showed a significant association with prolonged length of stay with a p value of 0.001 ($p<0.05$).
Conclusions: This study identified that comorbid disease and low food intake were factors associated with prolonged lengths of stay in DHF patients. Findings of this study may still prove beneficial for physicians to do early identification of DHF patients who have high risk factors for prolonged hospitalization, which can be an effective tool to combat the increasing disease burden.

Keywords: Dengue haemorrhagic fever, Dengue virus, Prolonged length of stay

INTRODUCTION

Dengue is an Aedes mosquito-borne viral infection brought about by an arbovirus, which is a serious public health concern in tropical and sub-tropical countries around the world. The dengue virus (DENV) is classified into four serotypes: (dengue virus-1) DENV-1, (dengue virus-2) DENV-2, (dengue virus-3) DENV-3, and (dengue virus-4) DENV-4.[1] Dengue fever is spreading worldwide and threatening more than 2.5 billion people globally. It is estimated that 50-100 million dengue infections occur each year.[2] Common manifestations include high fever, headache, muscle and joint pain, nausea, vomiting, a rash, and potentially fatal complications as a result of plasma leakage, fluid accumulation, respiratory failure, severe bleeding, and organ disorders.[1,3] It has been reported that dengue cases in Indonesia in 2022 has reached 143,000 cases with a national dengue fever incidence rate (IR) of 52 per 100,000 populations, higher than in the previous period (namely 49 per 100,000 population).[4] The Bali Provincial Health Office recorded that 7,068 cases of dengue fever occurred in Bali Province from January to

September 2023. Denpasar City is an endemic area for dengue fever at both village and sub-district levels because, for three consecutive years, dengue cases have always been reported. It has been reported that dengue cases in Denpasar in 2023 reached 1,332 cases, consisting of 715 male sufferers and 617 female sufferers. The DHF incidence rate in 2023 is 128.4 per 100,000 population, when compared with the DHF IR in 2022, which is 107.7 per 100,000 population, there will be an increase in the DHF IR. In 2023, there will be 4 cases of death in women due to dengue fever (CFR=0.3%).[5]

Dengue fever is included in the top 10 most common acute febrile diseases requiring hospitalization in all hospitals in Indonesia.[6] Handling dengue fever patients takes a long time and costs relatively large losses because dengue fever patients generally spend around 11 days in hospital, and the duration of the fever is an average of 6 days, with direct and indirect cost or loss consequences for the patient. Research by Suriantina et al states that the shortest patient hospitalization period is 2 days, the longest time is 6 days, and the average survival time is 4 days. Based on medical record data from Wangaya Denpasar Hospital, 646 dengue fever cases were recorded as hospitalizations for the period January to May 2024.

This context was intended to investigate how early identification of risk factors associated with prolonged length of stay can help physicians prioritize the management of high-risk patients with DHF.

METHODS

This research obtained ethical approval from the Wangaya Hospital Denpasar Bali research ethics committee with reference number 000.9.2/3320/RSUDW. It was conducted as an analytic observational study with a retrospective study design. Researchers only make observations without giving treatment to the variables studied. This research was conducted at Wangaya Hospital from January to May 2024. The sample for this study used the medical records of DHF patients. The sampling technique used was purposive sampling, where samples were taken based on inclusion and exclusion criteria. The inclusion criteria included patients who had been diagnosed with DHF, patients hospitalized for ≥1 day, and patients >17 years old. Exclusion criteria included the age of the patients <18 years, incomplete medical record data, and discharge against medical advice.

During the data collection process at Wangaya Hospital, a total of 646 medical records of patients with DHF were initially identified. However, due to some samples not meeting the inclusion and exclusion criteria, a total of 152 patients were included in this study. The characteristics shown in the independent variables in this study were age, gender, comorbid disease, and low food intake, which is characterized by decreased appetite, which is when a person does not want or refuses to eat the type or amount according to physiological age or the eating pattern changes from normal conditions. The dependent variable was length of stay in patients with DHF.

As previously reported, many researchers have reported that patients with DHF have a median hospital stay of 4 days; hence, patients in our study were divided into two groups based on length of stay <4 days and ≥4 days. Data analysis was performed using the Statistical product and service solutions (SPSS 24) program. The data analysis method in this study was the Chi square test as a bivariate test and multivariate test. The presentation of the data is in the form of a frequency distribution table and cross-tabulation. The p value of <0.05 is considered significant.

RESULTS

The characteristics of the subjects, as shown in Table 1, showed that the majority were aged <40 years (73.68%), the majority were male (54.61%), and most of the patients did not have comorbid diseases (80.92%) and did not have complaints of low food intake (51.32%). Based on several studies, the average age of DHF patients is 40 years old, the cut off points for age were divided into <40 and ≥40 years old.[8] Comorbid disease of the subjects, as shown in Table 2, diabetes mellitus 5.26%, hypertension (9.21%), obesity (1.97%), hyperthyroid (0.66%), chronic kidney disease (0.66%), and human immunodeficiency virus (1.32%).

Table 1: Characteristics of the subjects.

Characters	N	%
Age (years)		
<40	112	73.68
≥40	40	26.32
Gender		
Male	83	54.61
Female	69	45.39
Comorbid disease		
Yes	29	19.08
No	123	80.92
Low food intake		
Yes	74	48.68
No	78	51.32
Length of stay (days)		
<4	51	33.55
≥4	101	66.45

Table 2: Comorbid disease of the subjects.

Comorbid	N	%
Diabetes mellitus	8	5.26
Hypertension	14	9.21
Obesity	3	1.97
Hyperthyroid	1	0.66
Chronic kidney disease	1	0.66
HIV	2	1.32

Most of the patients (>50%) had clinical symptoms of fever, headache and myalgia. Symptoms of bleeding (12.5%) occurred in DHF (Table 3).

Table 3: The clinical symptoms of the subjects.

Clinical symptoms	N	%
Fever	152	100
Nausea/vomiting	71	46.71
Abdominal pain	21	13.82
Low food intake	66	43.42
Headache	139	91.45
Myalgia	127	83.55
Bleeding	19	12.50

The association of the variable with length of stay in DHF patients is shown in Table 4. The majority of DHF patients who had a length of stay of ≥4 days were patients <40 years old (47.37%), male (36.84%), with no comorbid disease (50.66%), and with low intake (38.82%).

Based on the results of the results of the bivariate analysis using the Chi square test, a statistically significant association was found between comorbid disease and length of stay in DHF patients with p value of 0.039. Low food intake showed a significant association with length of stay in DHF patients with p value of 0.001.

Meanwhile, the remaining factors, such as age and gender, were not statistically associated with the length of stay in DHF patients (p value more than>0.05).

Table 4: Factors associated with prolonged length of stay in DHF patients.

Variables	Length of stay, n (%)		P value
	<4 days	≥4 days	
Age (years)			
<40	40 (26.32)	72 (47.37)	0.345
≥40	11 (7.24)	29 (19.08)	
Gender			
Male	27 (17.76)	56 (36.84)	0.770
Female	24 (15.79)	45 (29.61)	
Comorbid disease			
Yes	5 (3.29)	24 (15.79)	0.039*
No	46 (30.26)	77 (50.66)	
Low food intake			
Yes	15 (9.87)	59 (38.82)	0.001*
No	36 (23.68)	42 (27.63)	

Note: *- Statistically significant (p<0.05).

If all of significant associated factors are put into regression model (using backward LR multiple regression analysis), it was shown only one factors significantly (p value less than 0.05) associated with prolonged length of stay in DHF patients consisted of low food intake (Table 5).

Table 5: Regression analysis of factors associated with prolonged length of stay on comorbid disease and low food intake.

Variables	Multiavariate analysis	
	P	OR (0.95% CI)
Low food intake	0.002*	1.481 (0.148-0.638)
Comorbid disease	0.071	1.322 (0.131-1.088)

Note: *- Statistically significant (p<0.05).

DISSCUSION

Dengue virus infection (DVI) is a mosquito-borne illness that is endemic in tropical and subtropical regions around the world. The virus is spread through the bite of an infected Aedes aegypti mosquito.[9] In recent years, there has been an increase in the number of DVI cases reported worldwide.

This is due in part to the increased movement of people and goods between countries, which has facilitated the spread of the virus.[10] A total of 152 years (73.68%), where there was a male predominance (54.61%). This finding is similar to the study of Mehta et al., all done in a tertiary care hospital in Pune. The age group most affected was 21-40 years. DHF patients confirmed cases the majority of DHF cases were noted in the age group of <40 years.

Low food intake was found in 66 (43.42%), and forty-four patients (28.98%) had comorbid diseases such as diabetes, hypertension, bronchitis, and HIV. One hundred and five patients (66.45%) had a length of stay of ≥4 days. Fifty-one patients (33.55%) had a length of stay <4 days. Most patients (>50%) had clinical symptoms of fever, headache, and myalgia. Symptoms of nausea/vomiting (46.71%), low food intake (43.42%), abdominal pain (13.82%), and bleeding (12.5%). This finding is similar to the study of Uddin et al all done in a tertiary care hospital in Bangladesh. The clinical features present are vomiting (7.69%), headache (4.62%), and pleural effusion (3.08%).[12]

The relationship between age and length of stay did not show a statistically significant result with a p value of 0.345 (p>0.05). Following research reports at Dr. Moewardi Hospital, Surakarta (2019), the relationship between age and length of stay did not show a significant result with a p value of 0.258 (p>0.05). [3] Another study reported that there was no significant relationship between age and length of stay, with a p value of 0.305 (p>0.05).[13] This finding is consistent with past studies that have shown that older patients tend to have more severe forms of dengue and may require extended hospital care.[1] Age does not show an effect on length of stay because this length of stay can be affected by many things besides age. The result showed that the younger the age, the longer the length of stay, because it was related to the cooperative level of the patient, where the older patients were more cooperative than the younger patients. Therefore, it affected the length of stay, although it was not statistically significant.[3,14]

The relationship between gender and length of stay also did not show a statistically significant result with a p value of 0.770 (p>0.05). This was followed by research reports in 2019. The result of the study showed a negative and weak relationship between sex and length of stay, where females tended to stay longer than men. However, it did not show a statistically significant result. (b=-0.79; p=0.329).[3] Another study reported at RSPI Prof. Dr. Sulianti Saroso did not show a significant relationship between gender and length of stay, with a p value of 0.917 (p>0.05).[15] The majority of male patients showed that there are more male sufferers than female sufferers. This is influenced by the fact that, in general, men are more susceptible than female because women are easier in producing genetically managed immunoglobulins and antibodies.[16]

A significant association was observed between comorbid disease and low food intake. In this study, a statistically significant result was found between comorbid disease and length of hospital stay with a p value of 0.039 (p value less than 0.05). This was following research reports at Universitas Airlangga Hospital (2024). Among this group, DHF patients with hypertension and diabetes mellitus experienced a longer duration of illness. Another study reported in Peninsular Malaysia (2017) found that DHF patients with comorbid diseases were significantly associated with prolonged hospitalization.[13]

This indicated that patients with hypertension tend to have a prolonged illness duration compared to those without hypertension. Hypertension could serve as a risk factor for the progression of dengue fever to severe dengue. Diabetes mellitus can lead to insulin deficiency, which may result in damage to antibodies and cause a weakened immune system, making the body more susceptible to infections and other diseases.[17] Co-morbid conditions can also complicate the management of dengue and increase the overall length of stay. Patients with more severe infections require more intensive care and treatment, which can prolong the hospital stay. End organ injury can also be serious and require prolonged treatment, which can also lead to a prolonged length of stay.[1]

In this study, a statistically significant result was found between low food intake and length of hospital stay with a p value of 0.001 (p value less than 0.05. There is no evidence to suggest that nutritional status can interfere with transmission or alter susceptibility to infection after the bite of dengue-infected mosquitoes however, the nutritional status or supplement that a person consumes may decrease the probability of developing DENV infection into a severe disease or reduce the severity of the disease in the patient.[18]

Another study showed nutritional intake was also a factor that can increase the severity of dengue fever.[19] Research conducted by Suryani et al shows that obesity in patients increases the risk of shock by 4.9 times compared to patients who have normal nutritional status. This is because there is excessive accumulation of adipose tissue, which will increase cytokines. pro-inflammatory, which is also the pathogenesis of DHF. This causes the accumulation of cytokines, which results in increased capillary permeability, thereby triggering plasma leakage and worsening dengue fever, which can cause SSD in patients.[20]

Limitations

The study was conducted in a single hospital with a small sampe size. So, the results may not represent the whole community.

CONCLUSION

This study identified factors associated with length of stay in DHF patients. This study found that comorbid diseases and low food intake were statistically associated with prolonged lengths of stay in DHF patients. Low food intake was the most significant factors in this study. Patients with comorbid diseases have a weakened immune system, making them more susceptible to infections and other diseases, which can affect the patient's length of stay. People who have a normal appetite have a better immune system, which can affect the patient's length of stay. However nutritional status plays very vital role in recovery and illness it is always recommended that proper evaluation of nutritional assessment helps in effective intervention and nutrition support provision. Despite some shortcomings, the findings of this study may still prove beneficial for physicians to do early identification of DHF patients who have high risk factors for prolonged hospitalization, which can be an effective tool to combat the increasing disease burden. Future research can be research using other sampling methods and other independent variables.

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REFERENCES

1. Kaleem Z, Waris MH, Muneer R, Malik MN, Akram A, Ghazanfar S, et al. Predictors of hospital stay and prognostic factors for dengue infection in Holy Family Hospital, Rawalpindi. J Popul Therap Clin Pharmacol. 2023;995-1000.
2. Inderjit S, Sudarmaja IM, Swastika IK. Clinical characteristic of dengue fever and dengue hemorrhagic fever among patients at Sanglah

Hospital, Denpasar, Bali. Intisari Sains Medis. 2021;12(3):974-77.
3. Arianti MD, Prijambodo J, Wujoso H. Relationships between age, sex, laboratory parameter, and length of stay in patients with dengue hemorrhagic fever. J Epidemiol Public Health. 2019;4(4):307-13.
4. Ministry of Health of the Republic of Indonesia. Indonesian Health Profile, 2022. Available at: https://asiaactual.com/indonesia/indonesia-ministry-of-health/. Accessed on 25 May 2024.
5. Denpasar City Health Office. Denpasar City Health Profile, 2023. Available at: https://www.dinkes.denpasarkota.go.id/. Accessed on 25 May 2024.
6. Utama IMS, Lukman N, Sukmawati DD, Alisjahbana B, Alam A, Murinati D, et al. Dengue viral infection in Indonesia: Epidemiology, diagnostic challenges, and mutations from an observational cohort study. PLoS Negl Trop Dis. 2019;13(10):e0007785.
7. Putra RA. Faktor Yang Berhubungan Dengan Lama Hari Rawat Inap Pasien Demam Berdarah Dengue (DBD) di Rumah Sakit Umum Daerah Kota Kendari Tahun 2017. 2018;2(2):70-6.
8. Prattay KMR, Sarkar MR, Shafiullah AZM, Islam MS, Raihan SZ, Sharmin N. A retrospective study on the socio-demographic factors and clinical parameters of dengue disease and their effects on the clinical course and recovery of the patients in a tertiary care hospital of Bangladesh. PLoS Negl Trop Dis. 2022;16(4):e0010297.
9. Singh LS, Singh RM, Singh HL. Epidemiological scenario of dengue in the state of Manipur during the last 3 years. Peer J. 2020;8:e8518.
10. Songane M. Challenges for nationwide vaccine delivery in African countries. Int J Health Econ Manag. 2018;18(2):197-219.
11. Mehta SR, Bafna TA, Pokale AB. Demographic and clinical spectrum of dengue patients admitted in a tertiary care hospital. Med J DY Patil Vidyapeeth 2018;11:128-31.
12. Uddin AFMH, Rahman ML, Alim MA, Khan MMH, El-Arefin S, Nahar K, et al. Clinical spectrum of dengue fever in patients admitted to a tertiary care hospital in Bangladesh. Int J Adv Med 2023;10:186-93.
13. Mallhi TH, Khan AH, Sarriff A, Adnan AS, Khan YH. Determinants of mortality and prolonged hospital stay among dengue patients attending tertiary care hospital: a cross-sectional retrospective analysis. BMJ Open. 2017;7(7):e016805.
14. Shahid AM, Jain D, Harikumar H, Rana S, Gupta S, Budhiraja S, et al. Identification of predictors and model for predicting prolonged length of stay in dengue patients. Health Care Manag Sci. 2021;24(4):786-98.
15. Banggai CE, Lisdawati V, Kusumowardhani D, Firmansyah I, Montain M. Association between hemoconcentration and longer hospitalization day of dengue patients. Health Sci J Indonesia. 2017;8(1).
16. Ayu DP. Karakteristik Pasien Demam Berdarah Dengue Rawat Inap di Rumah Sakit Umum UKI Tahun. 2022;1(1):60-70.
17. Nabila LS, Sulistiawati, Bramantono, Maimunah U. Comorbid Factors and Duration of Illness in Dengue Hemorrhagic Fever Patients at Universitas Airlangga Hospital, Surabaya, Indonesia. J Comm Med Public Health Res. 2024;5(1):71-8.
18. Maharani AR. Nutrient intake of dengue hemorrhagic fever patients in Semarang City'. J Phys Conference Ser. 2018;1025:012059.
19. Abidah N, Atmaka DR. The Nutrition Care Process in Inpatients of Dengue Hemorrhagic Fever (DHF)+Vomitting+Bronchitis at Bhayangkara H.S. Samsoeri Mertojoso Hospital Surabaya. Media Gizi Kesmas. 2023;12(1):250-9.
20. Suryani ET. The Overview of Dengue Hemorrhagic Fever Cases in Blitar City from 2015 to 2017. J Berkala Epidemiol. 2018;6(3):260-7.

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