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## **A COMPREHENSIVE ECONOMIC ANALYSIS OF HOSPITALISED PATIENTS WITH DENGUE FEVER**

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### **ABSTRACT**

DHF poses a significant public health concern in regions characterised by tropical and subtropical climates. Indonesia is among the nations that have encountered challenges in effectively addressing the issue of DHF, as seen by the escalating number of cases. West Java Province is positioned at the forefront among the top three provinces in terms of reporting the highest number of DHF cases, with a total of 10,722 cases. The number of DHF cases in Depok City shown a notable rise, escalating from 1,276 cases and resulting in 3 fatalities in the year 2020 to a total of 3,155 cases in the subsequent year of 2021. The primary aim of this study was to ascertain the demographic characteristics of families with inpatients and intensive care patients, and to assess the overall financial burden associated with treatment, non-treatment expenses, indirect costs, and economic losses experienced by families of inpatients and intensive care patients afflicted with DHF disease at Depok City Hospital. The present study employed a descriptive analytic strategy utilising a quantitative methodology. The study was carried out at the Depok City General Hospital, utilising both primary and secondary data sources. The population under investigation in this study had a total of 429 patients. The sample size for the study was determined to be 203 using Lameshow's sample size technique. The variables considered in this study encompassed demographic characteristics, the overall direct expenses associated with treatment, the entire direct costs associated with non-treatment, the aggregate indirect costs, and the complete economic losses experienced by families of patients with DHF at Depok City General Hospital. The data underwent analysed through the application of univariate analysis and cost evaluation computation. The findings indicated that the average direct cost of therapy was Rp. 7,797,833 or USD 507.23. The average non-treatment direct expenditures amount to Rp. 2,701,440 or USD 178.59. The average value of indirect costs was Rp. 2,471,557 or USD 163.40. The average family economic loss was Rp. 12,970,830 or USD 843.72. Conclusions: This study demonstrates that the sickness known as dengue hemorrhagic fever (DHF) can result in financial burdens for families, particularly in terms of non-medical direct costs and indirect costs.

Keywords: DHF; direct medical costs; economic loss; indirect costs; non-medical direct costs

### **INTRODUCTION**

Dengue hemorrhagic fever (DHF) is a globally prevalent infectious disease that is transmitted through vectors, exhibiting variable case numbers over time. Dengue Hemorrhagic Fever (DHF) instances pose a persistent challenge in several tropical and sub-tropical nations globally, encompassing Southeast Asia, Central America, Latin America, and the West Pacific region (Salam, 2021). Dengue Hemorrhagic Fever (DHF) is commonly associated with the spread of the virus through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes (Kementrian Kesehatan RI, 2021). Based on forecasts, it is expected that the worldwide

prevalence of Dengue Hemorrhagic Fever (DHF) will reach 400 million cases by the year 2022, leading to a fatality rate of 22,000 (Salim, 2022). In examining the population residing in tropical regions, which amounts to approximately 2.5 billion individuals, it becomes evident that roughly 1.3 billion are impacted by dengue hemorrhagic fever (DHF). According to available data, the nations exhibiting the highest incidence of dengue cases include Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor Leste (Nurabdillah, 2021).

Dengue Hemorrhagic Fever (DHF) remains a persistent public health challenge in Indonesia, as seen by the escalating number of cases. In the year 2019, the number of reported cases amounted to 138,127, which exhibited a notable rise compared to the 65,602 instances recorded in the preceding year of 2018. The incidence of fatalities attributed to Dengue Hemorrhagic Fever (DHF) likewise shown an upward trend, rising from 467 to 919 deaths. The incidence rate of dengue in the year 2019 shown an increase to 51.48 cases per 100,000 individuals, as compared to the preceding rates of 26.1 and 24.75 cases per 100,000 individuals in the years 2016 and 2017, correspondingly (Kementerian Kesehatan RI, 2022).

According to the report from the Depok City Health Office, it has been documented that the incidence of Dengue Hemorrhagic Fever (DHF) in 2018 amounted to a total of 891 cases. In the year 2019, there was a notable surge in the number of reported cases, reaching a total of 2,200, accompanied by a regrettable loss of two lives. Subsequently, in the year 2020, there was a decline in the incidence of cases, with a recorded count of 1,276, albeit with an unfortunate increase in the number of deaths, totaling three. In 2021, the incidence of Dengue Hemorrhagic Fever (DHF) in Depok City amounted to a total of 3,155 cases. The aforementioned statistic has already surpassed the cumulative number of instances reported in preceding years. The DHF disease exhibits a uniform distribution across all sub-districts within Depok City. There is evidence of a notable increase in cases between 2020 and 2021, despite a decline in case numbers observed in 2020 (Dinas Kesehatan Kota Depok, 2022).

The Depok City General Hospital (RSUD) is a publicly funded healthcare facility that was established in 2004 and commenced operations on April 17, 2008, functioning as a hospital classified under class C. The number of inpatients at Depok General Hospital experienced an increment from 4,186 in 2020 to 4,874 in 2021, reflecting a rise of 688 people. In 2021, preliminary data collected from Depok General Hospital revealed that Dengue Hemorrhagic Fever (DHF) occupied the second position among the top three disorders requiring inpatient care, with a total of 374 reported cases. The three most prevalent disorders requiring inpatient care are Covid-19, Dengue Hemorrhagic Fever (DHF), and Bronchopneumonia. The number of patients admitted for dengue hemorrhagic fever (DHF) experienced a notable increase in the year 2023, reaching a total of 429 individuals.

The management of patients with dengue hemorrhagic fever (DHF) necessitates a substantial investment of time and financial resources. According to the literature, individuals diagnosed with DHF often experience an average hospital stay of four days under normal management protocols (Tuzzahra, 2016). Furthermore, it is important to acknowledge that this disease not only results in loss of life, but also exerts a significant influence on both the social and economic aspects of society (Syawal, 2017). According to a study conducted in Southeast Asia, it was found that the whole yearly economic burden of dengue hemorrhagic fever (DHF) amounted to USD 950 million. Among the countries in the region, Indonesia had the biggest economic burden, accounting for USD 323,163 or 43% of the total cost (Shepard et al., 2013). A study conducted in Indonesia in 2015 revealed that the comprehensive economic impact of Dengue

Hemorrhagic Fever (DHF) was approximated to be USD 381.2 million (Nadjib et al., 2019).

In the year 2016, the occurrence of Dengue Hemorrhagic Fever (DHF) in Indonesia resulted in a substantial economic loss amounting to 986 billion. The economic loss includes both the expenses associated with therapy and the reduction in productivity time experienced by individuals affected with DHF (Putri, Dwi, 2018). The findings of a study conducted at Banjarnegara Hospital and Puskesmas revealed that the overall expenditure associated with DHF disease amounted to Rp. 275,307,500, with direct expenses accounting for 75.29% and indirect costs accounting for 24.71% (Sihite et al., 2017). Previous research conducted on this topic lacked comprehensive economic evaluation components. This study was undertaken in response to the escalating number of cases of dengue hemorrhagic fever (DHF), with the objective of assessing the financial implications associated with the disease. Specifically, the study aimed to determine the comprehensive components of direct medical costs, non-medical direct costs, and indirect costs incurred by families of DHF patients at Depok General Hospital.

## **METHOD**

The current investigation utilized a descriptive analytic approach, employing a quantitative methodology. The study was conducted in Depok City General Hospital, employing primary data obtained from questionnaires administered directly to the families of patients diagnosed with Dengue Hemorrhagic Fever (DHF) at Depok General Hospital. Furthermore, the study utilized secondary data sources, which included statistical data on the population of patients with dengue hemorrhagic fever (DHF) from January to September 2023, as well as medical records and billing information of DHF patients at Depok General Hospital within the same time frame. The research included all persons diagnosed with dengue hemorrhagic fever (DHF) throughout the period of January to September 2023, comprising a total of 429 patients. The research utilized a sampling methodology that involved a total of 203 samples using Lameshow sampling technique. The study was conducted from March to July 2023. This study investigated various factors, including demographic characteristics, treatment-related medical direct cost, non-medical direct costs, indirect costs, and total economic losses experienced by families of patients diagnosed with dengue hemorrhagic fever (DHF) at Depok General Hospital. The data was subjected to univariate analysis, in addition to employing economic assessment calculations related to the economic burden. This burden comprises three essential elements: the explicit expenses associated with therapy, the explicit expenses associated with lack of treatment, and the implicit expenses. The present work has obtained ethical approval from the Depok City General Hospital Ethics Committee. The document in question is an acceptance letter with the reference code No.65/KEPK/12/2023.

## **RESULTS AND DISCUSSION**

### **Family Demographics of DHF Patients at Depok General Hospital**

The sample population for the study comprised 203 patients, who were chosen based on criteria such as their level of education, occupation, income, distance, and categorization of dengue. Based on the data provided in Table 1, it is evident that a significant proportion of the samples (84.2%) had attained a high school education as their greatest degree of educational achievement. On the contrary, a minute fraction of the samples (1.0%) possessed either an elementary or postgraduate degree. According to the data, a majority of 50.2% of household heads were engaged in private sector employment, while a small proportion of 1.0% were identified as retired adults. In the city of Depok, a significant proportion of household heads, accounting for 60.1%, earn an income that is below the officially designated minimum wage threshold of Rp. 4,377,000. In contrast, a lesser percentage, precisely 2.0%, of the income earned by heads of households surpasses Rp. 6,000,000. Approximately 44.3% of the

population lived within a geographical range of 1.1 kilometers to 5 kilometers from healthcare services, whilst only 5.4% of inhabitants were situated within a radius of 1 kilometer or less. In the study, it was found that 61.6% of the patients fell under the classification of Dengue Hemorrhagic Fever (Grade 1), while 2.5% were labeled as Dengue Hemorrhagic Fever (Grade 4).

Table 1.  
Family Demographics of DHF Patients at Depok General Hospital Respondent characteristics (n= 203)

Family Demographics of DHF Patients	f	%
<b>Educations</b>		
Graduated from elementary school	2	1,0
Graduated from Senior High School	171	84,2
Graduated from Diploma Degree	13	6,4
Graduated from Undergrad Degree	15	7,4
Graduated from Graduate Degree	2	1,0
<b>Occupations</b>		
Civil servants / Military / Police	8	3,9
Private Employee	102	50,2
Trader/ Self-employed	31	15,3
Techer/ Lecturer	9	4,4
Retired	2	1,0
Others	51	25.1
<b>Income</b>		
≤ IDR 4.377.000	122	60,1
IDR 4.378.000 – IDR 6.000.000	77	37,9
> IDR 6.000.000	4	2,0
<b>Health Service Distance</b>		
≤ 1 KM	11	5,4
1,1 KM-5KM	90	44,3
5 KM- 10 KM	87	42,9
> 10 KM	15	7,4
<b>DHF Classification</b>		
Dengue Fever	7	3,4
DHF (Grade 1)	125	61,6
DHF (Grade 2)	56	27,6
DHF (Grade 3)	10	4,9
DHF (Grade 4)	5	2,5

### **Family Medical Direct Costs of DHF Patients at Depok General Hospital**

Families may bear Family medical direct costs in the form of expenses related to insurance coverage and out-of-pocket payments. The cost components associated with inpatient care in this study were derived from the billing data of Depok City General Hospital. The direct cost of treatment can be categorized into three main components: inpatient expenditures, intensive care costs, and pharmacological costs. According to Table 2, it can be observed that the families of patients classified as Grade 4 DHF, with the Indonesian National Health Insurance payment type, experienced the highest inpatient expenditures amounting to Rp. 17,149,000 or USD 1,134.81. On average, these families incurred costs of Rp. 6,763,410 or USD 447.13. Families of patients classified as Grade 1 DHF with a Indonesian National Health Insurance payment type of Rp. 590,000 or USD 39.00 were the only ones who bore the burden of intensive charges. In addition, it was observed that the highest expenses for medication were borne by households of patients categorized as DHF grade 4, who were covered under the Indonesian National Health Insurance payment scheme, amounting to Rp. 10,062,659 or USD 665.88, with an average cost of Rp. 3,434,053 or USD 227.03. According to the data presented in Table 3, the average direct

cost of treatment borne by families of patients with Dengue Hemorrhagic Fever (DHF) across several payment types (Indonesian National Health Insurance, and OOP) was Rp. 7,797,833 or USD 505.38. The lowest recorded cost was Rp. 1,923,325 or USD 124.65, while the highest cost was Rp 43,185,205 or USD 2,798.85.

Table 2.  
Family Medical Direct Costs of DHF Patients at Depok General Hospital Respondent (n= 203)

DHF Classification	Frequencies	Payment Method	Min/Max/Average	Inpatient Care Costs	Intensive Care Costs	Pharmaceutical Costs
Demam <i>Dengue</i>	7	Indonesian National Health Insurance	Min (Rp)	1.054.400	0	137.571
			Max (Rp)	3.761.300	0	939.516
			Average (Rp)	1.569.500	0	444.470
0	0	OOP	Min (Rp)	0	0	0
			Max (Rp)	0	0	0
			Average (Rp)	0	0	0
DBD (Grade 1)	103	Indonesian National Health Insurance	Min (Rp)	2.105.234	590.000	31.684
			Max (Rp)	12.168.767	590.000	3.214.779
			Average (Rp)	3.946.192	590.000	549.258
22	22	OOP	Min (Rp)	633.574	0	97.780
			Max (Rp)	4.247.300	0	2.318.201
			Average (Rp)	1.716.758	0	547.758
DBD (Grade 2)	50	Indonesian National Health Insurance	Min (Rp)	2.868.300	0	184.974
			Max (Rp)	10.002.800	0	2.572.534
			Average (Rp)	4.873.774	0	854.005
6	6	OOP	Min (Rp)	1.205.500	0	107.159
			Max (Rp)	2.363.900	0	695.431
			Average (Rp)	1.774.212	0	360.939
DBD (Grade 3)	10	Indonesian National Health Insurance	Min (Rp)	2.404.000	0	539.335
			Max (Rp)	5.562.200	0	3.198.163
			Average (Rp)	3.407.930	0	1.163.552
0	0	OOP	Min (Rp)	0	0	0
			Max (Rp)	0	0	0
			Average (Rp)	0	0	0
DBD (Grade 4)	4	Indonesian National Health Insurance	Min (Rp)	2.908.874	0	581.089
			Max (Rp)	17.149.000	0	10.062.659
			Average (Rp)	6.763.410	0	3.434.053
1	1	OOP	Min (Rp)	3.265.700	0	1.362.909
			Max (Rp)	3.265.700	0	1.362.909
			Average (Rp)	3.265.700	0	1.362.909

Table 3.  
Total Family Medical Direct Costs of DHF Patients at Depok General Hospital Respondent (n= 203)

Jenis Pembayaran	Min (Rp)	Max (Rp)	Average (Rp)
Indonesian National Health Insurance	1.191.971	15.973.546	3.478.562
OOP	731.354	27.211.659	4.319.271
Total Family Medical Direct Costs	1.923.325	43.185.205	7.797.833

### Family Non-Medical Direct Costs of DHF Patients at Depok General Hospital

Non-medical direct costs are expenses that DHF patients' families bear out of the blue and are separated into two categories: transportation costs and caregivers costs. These expenses are unrelated to medical services. According to Table 4, the families of patients classified as Grade 1 DHF and who paid with Indonesian National Health Insurance had the highest transportation expenditures, averaging Rp. 579.528 or USD 37,70, and amounting to Rp. 1.180.000, or USD 76,76. The highest caregivers' costs, Rp. 1,755,000 or USD 116.02, and the lowest caregivers' costs, Rp. 135.000 or USD 8,78, were experienced by the families of Grade 4 DHF patients with Indonesian National Health Insurance payment type. According to Table 5, the total non-medical direct costs paid by the families of DHF patients with varying payment types (Indonesian National Health Insurance, and OOP) ranged from a minimum of Rp. 1.005.000 or USD 65,37, to a maximum of IDR 5.270.000, or USD 348.40. The mean of these costs was 2.701.440, or USD 178.59.

Table 4.  
Family Non-Medical Direct Costs of DHF Patients at Depok General Hospital  
Respondent (n= 203)

DHF Classification	Frequencies	Payment Method	Min/Max/Average	Transportation Costs	Caregivers Costs
Demam <i>Dengue</i>	7	Indonesian National Health Insurance	Min (Rp)	100.000	135.000
			Max (Rp)	200.000	300.000
			Average (Rp)	122.857	241.428
0	OOP	Min (Rp)	0	0	
		Max (Rp)	0	0	
		Average (Rp)	0	0	
DBD (Grade 1)	103	Indonesian National Health Insurance	Min (Rp)	300.000	410.000
			Max (Rp)	1.180.000	1.410.000
			Average (Rp)	579.528	981.198
22	OOP	Min (Rp)	150.000	300.000	
		Max (Rp)	500.000	675.000	
		Average (Rp)	266.590	509.772	
DBD (Grade 2)	50	Indonesian National Health Insurance	Min (Rp)	600.000	1.350.000
			Max (Rp)	1.110.000	1.695.000
			Average (Rp)	801.870	1.386.121
6	OOP	Min (Rp)	300.000	600.000	
		Max (Rp)	390.000	810.000	
		Average (Rp)	315.000	690.000	
DBD (Grade 3)	10	Indonesian National Health Insurance	Min (Rp)	400.000	800.000
			Max (Rp)	900.000	1.215.000
			Average (Rp)	507.000	1.055.000
0	OOP	Min (Rp)	0	0	
		Max (Rp)	0	0	
		Average (Rp)	0	0	
DBD (Grade 4)	4	Indonesian National Health Insurance	Min (Rp)	550.000	1.300.000
			Max (Rp)	1.000.000	1.755.000
			Average (Rp)	737.500	1.460.000
1	OOP	Min (Rp)	450.000	1.215.000	
		Max (Rp)	450.000	1.215.000	
		Average (Rp)	450.000	1.215.000	

Table 5.  
Total Family Non-Medical Direct Costs of DHF Patients at Depok General Hospital Respondent (n= 203)

Jenis Pembayaran	Min (Rp)	Max (Rp)	Average (Rp)
Indonesian National Health Insurance	555.000	3.605.000	1.847.130
OOP	450.000	1.665.000	854.310
Total Family Non-Medical Direct Costs	1.005.000	5.270.000	2.701.440

### Family Indirect Costs of DHF Patients at Depok General Hospital

The families of patients with dengue hemorrhagic fever (DHF) may endure indirect costs, specifically in the form of productivity loss. This refers to the costs incurred as a result of reduced productivity or the inability to work owing to the illness or death of the patient, resulting in a tangible negative impact and financial loss. According to Table 6, the families of patients with Grade 4 DHF categorization and INDONESIAN NATIONAL HEALTH INSURANCE PBI payment type had the highest productivity loss expenses. The amount was Rp. 2,900,000 or USD 191.72, with an average of Rp. 1,879,860 or USD 134.28. According to the data shown in Table 7, the average indirect costs incurred by families of patients with Dengue Hemorrhagic Fever (DHF) across several payment types (Indonesian National Health Insurance, and OOP) amounted to IDR 2,471,557 or USD 163.40. The lowest recorded cost was IDR 980,769 or USD 64.84, while the highest cost reached IDR 5,436,621 or USD 359.42.

Table 6.  
Family Indirect Costs of DHF Patients at Depok General Hospital Respondent (n= 203)

DHF Classification	Frequencies	Payment Method	Min/Max/Average	Productivity Loss
Demam <i>Dengue</i>	7	Indonesian National Health Insurance	Min (Rp)	230.769
			Max (Rp)	430.769
			Average (Rp)	306.593
	0	OOP	Min (Rp)	0
			Max (Rp)	0
			Average (Rp)	0
DBD (Grade 1)	103	Indonesian National Health Insurance	Min (Rp)	548.077
			Max (Rp)	1.960.006
			Average (Rp)	1.321.167
	22	OOP	Min (Rp)	461.538
			Max (Rp)	1.463.083
			Average (Rp)	815.833
DBD (Grade 2)	50	Indonesian National Health Insurance	Min (Rp)	1.192.238
			Max (Rp)	2.797.153
			Average (Rp)	1.880.259
	6	OOP	Min (Rp)	923.007
			Max (Rp)	1.280.792
			Average (Rp)	1.071.313
DBD (Grade 3)	10	Indonesian National Health Insurance	Min (Rp)	993.517
			Max (Rp)	1.851.937
			Average (Rp)	1.293.210
	0	OOP	Min (Rp)	0
			Max (Rp)	0
			Average (Rp)	0
DBD (Grade 4)	4	Indonesian National Health Insurance	Min (Rp)	1.346.154
			Max (Rp)	2.900.000
			Average (Rp)	1.879.860
	1	OOP	Min (Rp)	1.273.898
			Max (Rp)	1.273.898
			Average (Rp)	1.273.898

Table 7.

Total Family Indirect Costs of DHF Patients at Depok General Hospital Respondent (n= 203)

Jenis Pembayaran	Min (Rp)	Max (Rp)	Average (Rp)
Indonesian National Health Insurance	519.231	3.973.538	1.587.071
OOP	461.538	1.463.083	884.486
Total Family Non-Medical Direct Costs	980.769	5.436.561	2.471.557

**Economic Losses of of DHF Patients at Depok General Hospital**

The economic impact experienced by the families of patients with dengue hemorrhagic fever (DHF) was assessed by aggregating the expenses associated with treatment, non-treatment related expenditures, and indirect costs borne by the families through the utilisation of the *INDONESIAN NATIONAL HEALTH INSURANCE* and out-of-pocket (OOP) payment methods. According to Table 8, the aggregate economic detriment experienced by households of patients with Dengue Hemorrhagic Fever (DHF) at Depok City Hospital, categorised by payment types of *INDONESIAN NATIONAL HEALTH INSURANCE* and out-of-pocket (OOP), surpassed the minimum wage of Depok City in 2022, amounting to IDR 12,970,830 or USD 843.72 on average. The minimum economic loss recorded was IDR 3,909,094 or USD 254.28, while the maximum reached IDR 53,891,826 or USD 3505.52.

Table 8.

Total Economic loss of DHF Patients at Depok General Hospital Respondent (n= 203)

Jenis Pembayaran	Min (Rp)	Max (Rp)	Average (Rp)
Indonesian National Health Insurance	2.266.202	23.552.084	6.912.763
OOP	1.642.892	30.339.742	6.058.067
Total Family Non-Medical Direct Costs	3.909.094	53.891.826	12.970.830

**Family Demographics of DHF Patients at Depok General Hospital**

There exists a positive correlation between an individual's level of education and their ability to acquire information and possess a higher degree of knowledge. This phenomenon is particularly visible in the context of education, where those with a sufficient level of knowledge, such as relatives of patients with dengue hemorrhagic fever (DHF), are able to engage in successful communication (Nurliaty, 2023). The findings of this study indicate that a majority of individuals, specifically 84.2%, completed their education with a high school diploma. A very small percentage, namely 1.0%, attained their education at the elementary school level, while an equally small percentage achieved postgraduate education. This finding aligns with the earlier research, which reported that 91.7% of families affected by DHF had completed their education up to the high school or vocational school level (Adinda and Roosalina, 2022).

According to Notoatmodjo (2018), there exists a correlation between work and an individual's knowledge. This correlation is influenced by the individual's socio-economic background, whereby a higher economic standing is associated with a higher degree of knowledge. Furthermore, those with a higher socio-economic status tend to have greater ease in acquiring information. The findings of this study indicate that 50.2% of the individuals serving as the head of the family held positions as private employees, whilst 1.0% were classified as retired. This finding aligns with prior scholarly investigations, which have reported that 35.6% of individuals holding the position of family head are employed in the private sector (Mokodompit et al., 2019).

Income is widely recognised as a critical determinant in the satisfaction of individuals' basic needs. The capacity of an individual to meet their life's necessities is contingent upon their income level, while the purchasing power of a family, including their ability to acquire food, is

influenced by the magnitude of their household income (Sadiq et al., 2018). The findings of this survey indicate that 60.1% of household heads had incomes below the minimum wage threshold, specifically  $\leq$  Rp. 4,377,000. These results align with prior research, which reported that 94.8% of household heads have low incomes, defined as being at or below the minimum wage (Lidvina et al., 2023). The proximity between a patient's dwelling and health services typically influences the decision of the patient's family to seek healthcare from a nearby healthcare facility. Healthcare professionals should possess the capacity to offer guidance and elucidate the closest healthcare establishments capable of delivering medical attention and subsequent healthcare services in the event that individuals are required to journey to a remote location for any given purpose (Setiandari et al., 2021). The findings of this study indicate that a significant proportion, specifically 44.3%, of health services are situated within a distance range of 1.1 kilometres to 5 kilometres. This study diverges from its predecessor in that it examines the impact of travel distance on the demand for health care. There is a positive correlation between the proximity of a hospital and the level of interest exhibited by patients towards the facility (Nanda, 2021). The present study found that the proximity of health services to the family residence had a significant impact on the transportation expenses incurred.

The categorization of Dengue Hemorrhagic Fever (DHF) into four degrees based on the severity of the illness, with degrees III and IV being classified as Dengue Shock Syndrome (DSS). Distinguishing factors between dengue fever I and II and dengue fever include the occurrence of thrombocytopenia and haemoconcentration (World Health Organization, 2020). The findings of this study revealed that a majority of patients, specifically 61.6%, were diagnosed with Dengue Hemorrhagic Fever (DHF) and were classified under the DHF Grade 1 category. This finding is consistent with prior studies, which reported that 78.3% of patients diagnosed with Dengue Hemorrhagic Fever (DHF) at Santosa Bandung Central Hospital were categorised as having Grade 1 DHF (Atira et al., 2023).

#### **Family Medical Direct Costs of DHF Patients at Depok General Hospital**

Family medical direct costs refer to the expenses that are specifically associated with the process of providing treatment or achieving a cure. These costs encompass various components, including inpatient charges, critical care costs, and expenditures connected to pharmaceutical drugs. This study presents findings on the total direct cost of treatment associated with various classifications of Dengue Hemorrhagic Fever (DHF), including DHF (Grade 1), DHF (Grade 2), DHF (Grade 3), and DHF (Grade 4), as well as the types of payment methods used (Indonesian National Health Insurance, and OOP). The average cost was found to be Rp. 7,797,833 or USD 507.23, with a minimum cost of Rp. 1,923,325 or USD 125.11 and a maximum cost of Rp. 43,185,205 or USD 2809.08. This result was supported by prior studies who found that the direct costs associated with treatment were more than the direct costs associated with non-treatment among hospitalised patients with dengue hemorrhagic fever. The aggregate direct expenditure associated with hospital-based treatment for patients with dengue hemorrhagic fever (DHF) amounted to USD 1,010 or IDR 15,277,405 per episode, with an average cost of USD 240.04 or IDR 3,630,879 (Undurraga et al., 2015).

#### **Family Non-Medical Direct Costs of DHF Patients at Depok General Hospital**

Non-medical direct costs encompass expenses borne by the patient's family that are not directly associated with medical services. These costs include transportation expenses and wages paid to companions. This study presented findings on the aggregate non-treatment direct costs associated with transportation expenses and accompanying wage costs in various classifications of Dengue Hemorrhagic Fever (DHF), including Dengue fever, DHF (Grade 1), DHF (Grade 2), DHF (Grade 3), and DHF (Grade 4), considering different payment methods

(INDONESIAN NATIONAL HEALTH INSURANCE, OOP). The average cost was found to be Rp. 2,701,440 or USD 178.59, with a minimum cost of Rp. 1,005,000 or USD 65.37, and a maximum cost of Rp. 5,270,000 or USD. Similar results were also found by a study conducted in Banjarnegara City that the total non-treatment direct costs of DHF patients in hospitals and Puskesmas were IDR 35,979,800 or USD 2,378.65 with an average of IDR 631,224 or USD 41.73 (Sihite et al., 2017).

### **Family Indirect Costs of DHF Patients at Depok General Hospital**

Indirect costs encompass the financial implications resulting from reduced productivity or absence from work owing to illness or mortality experienced by patients. This can be exemplified by the period of time during which patients are unable to engage in therapy or experience diminished productivity as a consequence of the disease or treatment they are undergoing (Saliha, 2019). This study presents findings on the cumulative indirect costs associated with productivity loss in different classifications of Dengue Hemorrhagic Fever (DHF), including DHF (Grade 1), DHF (Grade 2), DHF (Grade 3), and DHF (Grade 4), considering the type of payment (INDONESIAN NATIONAL HEALTH INSURANCE, OOP). The mean value of these costs is Rp. 2,471,557 or USD 163.40, with a minimum of Rp. 980,769 or USD 64.84 and a maximum of Rp. 5,436,621 or USD 359.42. This study received support from prior studies who reported that indirect expenses accounted for 24.71% of the morbidity costs associated with DHF. The aggregate indirect expenses incurred by families of patients with dengue hemorrhagic fever (DHF) at hospitals and health centres amounted to IDR 22,336,700 or USD 1,476.69, with an average cost of IDR 391,871 or USD 25.91 per case (Sihite et al., 2017).

### **Economic Loss of DHF Patients at Depok General Hospital**

The economic impact experienced by the families of patients with dengue hemorrhagic fever (DHF) was assessed by aggregating the expenses associated with treatment, non-treatment related expenditures, and indirect costs borne by the families through the utilisation of the Indonesian National Health Insurance and out-of-pocket (OOP) payment methods. The present study revealed that the overall economic burden experienced by families of patients with dengue hemorrhagic fever (DHF) was determined by combining the direct costs associated with treatment, the direct costs associated with lack of treatment, and the indirect expenses incurred within a specific time frame. In 2022, the average economic loss experienced by families in Depok City surpasses the minimum wage set at Rp. 12,970,830 or USD 843.72. The least economic loss is recorded at Rp. 3,909,094 or USD 254.28, while the maximum economic loss reaches Rp. 53,891,826 or USD 3505.52.

According to Shepard, Undurraga, and Halasa (2013), a prior investigation revealed that the collective yearly economic impact of dengue in Southeast Asia amounted to USD 950 million. Notably, Indonesia emerged as the nation with the most substantial economic burden, accounting for USD 323,163 or 43% of the overall expenses. A study conducted in India yielded comparable findings, indicating that the economic burden amounted to around USD 111 million, or USD 0.88 per capita, encompassing both non-medical and indirect expenditures (Shepard et al., 2014).

## **CONCLUSION**

The present investigation has demonstrated that Dengue Hemorrhagic Fever (DHF) can result in significant negative consequences, particularly in relation to family members. On average, families utilising the Indonesian National Health Insurance payment system experienced medical direct charges amounting to Rp. 3,478,562 or USD 223.95. In contrast, households that

relied on personal funds or out-of-pocket expenses reported an average amount of Rp. 4,319,271 or USD 278.08. In addition, it is worth noting that families utilising the Indonesian National Health Insurance system faced an average of Rp. 1,847,130 or USD 118.92 in non-medical direct costs. In contrast, households that relied on personal funds or out-of-pocket expenses had an average expenditure of Rp. 854,310 or USD 55. The average indirect costs borne by households utilising the payment option of the Indonesian National Health Insurance amounted to Rp. 1,587,071 or USD 102.18. Families who rely on personal funds or out-of-pocket expenses have an average amount of Rp. 884,486 or USD 56.94. The average economic loss incurred by the Indonesian National Health Insurance is estimated to be Rp. 6,912,763 or USD 445.05. In contrast, households that rely on own funds or direct expenditures possess an average amount of Rp. 6,058,067 or USD 390.02.

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