



PROFILE OF DENGUE HEMORRHAGIC FEVER CASES IN CHILDREN

Novitasari Tsamrotul Fuadah*, Yuyun Sarinengsih, Denni Fransiska Helena

Faculty of Nursing, Universitas Bhakti Kencana, Jl. Soekarno-Hatta No.754, Cipadung Kidul, Panyileukan, Bandung, Jawa Barat 40614, Indonesia

*novitasari.tsamrotul@bku.ac.id

ABSTRACT

Cases of Dengue Hemorrhagic Fever (DHF) in Bandung have increased in 2024. DHF is caused by the Dengue virus, which is transmitted through the bite of the *Aedes aegypti* mosquito. It can affect all age groups but primarily affects children, with one of its clinical manifestations being a decrease in platelet levels. DHF with clinical manifestations of shock in pediatric patients carries a risk of death if not treated promptly and appropriately. This study aims to determine the profile of DHF cases in children at the Ibrahim Adjie Health Center in Bandung, including the children's age, gender, education level, platelet count, and hematocrit levels. This study employed a descriptive retrospective method. The population in this study consisted of children aged ≤ 18 years diagnosed with DHF who sought treatment at the Ibrahim Adjie Health Center in Bandung City from January to October 2024, totaling 129 children. A sample of 54 children was obtained using purposive sampling. Data collection utilized secondary data extracted from patient medical records. Univariate data analysis was presented in frequency distribution tables. The study results showed that children with DHF were distributed as follows: 9 children (17%) aged 1–3 years, 7 children (13%) aged >3 to <6 years, 31 children (57%) aged 6–12 years, 7 children (13%) aged >12 –18 years, and none under 1 year old. Male children accounted for 29 cases (54%) and females for 25 cases (46%). Based on education level, 23 children (43%) had not yet started school, 24 children (44%) were in elementary school, 5 children (9%) were in junior high school, and 2 children (4%) were in senior high school. All 54 children (100%) had low platelet counts, defined as $<150,000/\mu\text{L}$ of blood. Hematocrit levels varied: 4 children (7%) had low hematocrit levels, 41 children (76%) had normal levels, and 9 children (17%) had high levels. It can be concluded that most children with DHF are aged 6–12 years, or school-aged. There is no significant difference between male and female cases. The majority occur at the elementary school education level. All children experienced thrombocytopenia or a decrease in platelet count, and most had normal hematocrit levels.

Keywords: case profile; characteristics; children; clinical manifestations; dengue hemorrhagic fever (DHF)

INTRODUCTION

Dengue hemorrhagic fever (DHF) is a disease caused by the dengue virus, which is an RNA virus, with four serotypes (DEN 1-4). The natural host of this virus is humans, and its agent is the dengue virus belonging to the Flaviviridae family and the Flavivirus genus. Transmission to humans occurs through the bite of an infected mosquito, particularly the *Aedes aegypti* and *Aedes albopictus* mosquitoes, which are prevalent throughout most regions of Indonesia (Artawan et al., 2016). The incidence of DHF in Indonesia increased to 88,593 cases from January 2023 to April 2024, with 621 deaths. The areas with the highest number of DHF cases include Bandung City with 3,468 cases (Kemenkes RI, 2024). The Bandung City Health Department reported that by April 26, 2024, the cumulative number of DHF cases in Bandung had reached 3,025 cases. In several healthcare facilities in Bandung city, including the Ibrahim Adjie Health Center, the incidence of DHF increased, recording 129 cases among children aged ≤ 18 years from January to October 2024.

DHF is classified into four degrees of severity. Thrombocytopenia and hemoconcentration indicate that a case falls into DHF grades I and II, as opposed to dengue fever. Grades III and IV are classified as DSS (Dengue Shock Syndrome) (Nugraheni et al., 2023). Awareness of DSS is crucial because mortality in DSS is ten times higher than in DHF without shock. DSS patients face a risk of death if not treated promptly and appropriately (Podung et al., 2021). Based on literature reviews and previous research, as well as the high prevalence of dengue hemorrhagic fever in Bandung City, the researcher conducted a study to examine the case profile of dengue hemorrhagic fever in children at the Ibrahim Adjie Health

Center, aimed at determining the profile of DHF cases in children at Ibrahim Adjie Public Health Center, Bandung City, including the children's age, gender, education level, platelet levels, and hematocrit levels.

METHOD

This study employed a descriptive retrospective method. Data collection was conducted using secondary data extracted from medical records. The population focused on in this study was all pediatric patients aged ≤ 18 with a diagnosis of DHF who sought treatment at the Ibrahim Adjie Health Center in Bandung City from January to October 2024. The sampling technique used was purposive sampling with inclusion criteria involving complete medical record data, including age, gender, education level, platelet count, and hematocrit levels. Exclusion criteria were incomplete medical record data. During the period from January to October 2024, 129 children aged ≤ 18 years with a DHF diagnosis were treated at the Ibrahim Adjie Health Center. Out of these 129 patients, data that met the inclusion criteria were available for 54 patients, making the sample size for this study 54 pediatric patients aged ≤ 18 years with a DHF diagnosis at the Ibrahim Adjie Health Center. Data from medical records were recorded on a data collection sheet consisting of respondent codes, age, gender, education level, platelet levels, and hematocrit levels. The collected data were analyzed using Microsoft Excel software and presented in the form of frequency distribution tables.

RESULT AND DISCUSSION

Table 1.

Frequency Distribution of Children with DHF at the Ibrahim Adjie Health Center by Age (n=54)

Age	f	%
<1 year	0	0
1-3 years	9	17
>3 - <6 years	7	13
6-12 years	31	57
>12 - 18 years	7	13

Based on Table 1, it can be seen that children with DHF are most commonly affected at the school age, which is 6–12 years old with 31 children (57%). Then, there are 9 children (17%) in the 1–3 years age group, and an equal number of 7 children (13%) in the preschool and teenage age groups. None of the children were under 1 year old.

Table 2.

Frequency Distribution of Children with DHF at the Ibrahim Adjie Health Center by Gender (n=54)

Gender	f	%
Male	29	54
Female	25	46

Based on Table 2, it can be seen that there is not much difference between the genders in children with DHF, with 29 males (54%) and 25 females (46%).

Table 3.

Frequency Distribution of Children with DHF at the Ibrahim Adjie Health Center by Education level (n=54)

Education level	f	%
Preschool	23	43
Elementary school	24	44
Junior high school	5	9
High school	2	4

Based on Table 3, it can be seen that dengue fever is most commonly experienced by children at the

elementary school level, with 24 cases (44%), followed by children who are toddlers to preschool age, with 23 cases (43%). Meanwhile, there are 5 cases (9%) among junior high school students and 2 cases (4%) among high school students.

Table 4.

Frequency Distribution of Children with DHF at the Ibrahim Adjie Health Center Based on Platelet Levels (n=54)

Platelet Levels	f	%
< 150.000/ μ L	54	100
150.000–450.000/ μ L	0	0
> 450.000/ μ L	0	0

Based on Table 4, it can be seen that all children with dengue fever have low platelet levels, specifically < 150,000/ μ L of blood, totaling 54 cases (100%).

Table 5.

Frequency Distribution of Children with DHF at the Ibrahim Adjie Health Center Based on Hematocrit Levels (n=54)

Hematocrit Levels	f	%
Low	4	7
Normal	41	76
High	9	17

Based on Table 5, it can be seen that most children with dengue fever have normal hematocrit levels, totaling 41 cases (76%), followed by high hematocrit levels with 9 cases (17%), and low hematocrit levels with 4 cases (7%).

Dengue Hemorrhagic Fever (DHF) can affect all age groups, particularly children. One factor contributing to the high prevalence of DHF in children is their lower immunity compared to adults. DHF is influenced by age, as immunity plays a role. School-age are a highly vulnerable group to contracting and transmitting dengue hemorrhagic fever (Wirantika & Susilowati, 2020). Children under 15 years old are more susceptible to DHF due to their immature immune response and suboptimal interferon (IFN) production, which is essential for inhibiting viral replication and preventing the spread of the virus to other cells (Aliyyu, 2023). The high risk of DHF occurrence in children under 15 years old can be attributed to their still low immunity levels, the habit of taking afternoon naps, and low awareness of mosquito bites. In addition, children generally spend time engaging in outdoor activities such as school and play (Anjani & Fajri, 2022). Consistent with this, the results of this study indicate that 57% of children diagnosed with DHF at the Ibrahim Adjie Health Center are of school age, ranging from 6 to 12 years old.

DHF in children can be caused by various factors, one of which is the environment, such as schools, which contributes to the potential for transmission and spread of the disease. The older age group most affected by DHF is 12 years old. This may be due to the increased activity of 12-year-old children at school, such as additional activities in preparation for graduating from elementary school (Aliyyu, 2023). Initially, DHF transmission generally occurred at home, but it has now shifted to public facilities such as schools and children's play areas. A study found that 72% of patients hospitalized for DHF were school-aged children, while only 28% were under 5 years old (Raihan et al., 2010). Another study reported that 51.9% of dengue infection cases occurred in children aged 5–10 years. This age group coincides with the school period, and schools are one of the most common places for dengue infection transmission since they are environments where people from various areas gather (Artawan et al., 2016). Schools can be a

potential site for the spread and transmission of DHF among schoolage. This is because the mosquito that causes DHF, *Aedes aegypti*, is a multiple biter (feeds on blood by moving from one host to another multiple times) and is actively biting during the daytime, coinciding with schoolchildren's activities in the classroom. Additionally, schools often have many habitats conducive to the breeding of *Aedes aegypti* mosquitoes (Sari et al., 2012). In line with these findings, this study shows that 44% of children diagnosed with DHF at the Ibrahim Adjie Health Center are at the elementary school education level.

The prevalence based on gender shows no difference in the ratio between males and females. Research indicates that the incidence of dengue virus infection in endemic areas is identical between boys and girls (Raihan et al., 2010). The spread of dengue infection in the community does not depend on the gender of the patient, as both males and females have nearly the same likelihood of experiencing dengue infection (Artawan et al., 2016). On the other hand, gender is also considered a predisposing or enabling factor that contributes to a person's health behavior. Women tend to be more concerned about their environment and health. They are more likely to exhibit good behavior compared to men. This phenomenon results in women being more attentive to environmental conditions and their health (Tokan & Artama, 2022). Consistent with these findings, this study shows that there is no significant difference in gender among children diagnosed with DHF at the Ibrahim Adjie Health Center, with 29 cases (54%) in males and 25 cases (46%) in females.

The World Health Organization identifies thrombocytopenia as one of the laboratory diagnostic criteria for dengue infection. The morbidity and mortality of children affected by dengue hemorrhagic fever (DHF) tend to increase, requiring greater attention both to clinical severity and laboratory findings. In the early stages of fever, leukopenia serves as a marker of viral infection (Rosdiana et al., 2017). Thrombocytopenia indicates the presence or absence of blood clotting dysfunction, while hematocrit levels reflect vascular permeability (Widyanti NN, 2016). Thrombocytopenia, or a platelet count below the normal range, is a symptom of dengue fever that can be life-threatening. The normal platelet count is 150,000–400,000/ μL . Thrombocytopenia occurs due to bone marrow suppression, platelet destruction, and a shortened platelet lifespan (Artawan et al., 2016; Az-Zahra & Al Jihad, 2022). This explanation aligns with the findings of this study, where all children (100%) were found to have low platelet levels ($< 150,000/\mu\text{L}$). In this study, the lowest platelet count recorded was 22,000/ μL , and the highest was 149,000/ μL .

Thrombocytopenia is a strong prognostic factor in the immunopathogenesis of dengue. Platelet dysfunction increases the risk of prothrombotic complications associated with severe dengue cases. Patients with a platelet count $< 100,000/\mu\text{L}$ are 1.815 times more likely to experience shock, while a platelet count $< 50,000/\mu\text{L}$ increases the risk 7.439 times. Thus, it can be concluded that the lower the platelet count, the higher the risk of complications and the longer the recovery period (Cahyani et al., 2020). The lower the platelet count, the more severe the clinical severity of DHF, and the higher the hematocrit level, the more severe the clinical severity of DHF. Hematocrit levels are usually normal or slightly elevated in the early stages of fever due to high fever, vomiting, and loss of appetite. Hematocrit levels can vary depending on the stage of the illness. Plasma leakage, indicated by an increase in hematocrit levels, typically occurs at the end of the fever phase and continues 1–2 days after the body temperature has decreased. Hemoconcentration or an increase in hematocrit $\geq 20\%$ from normal values is used as a marker of plasma leakage, usually beginning on the third day of fever. According to WHO, not only an increase in hematocrit levels but also a $>20\%$ decrease after fluid therapy can serve as an indicator for diagnosing DHF. Low hematocrit levels can occur due to bleeding, fluid therapy, a reduction in blood cellular components, or an increase in plasma levels, as seen in anemia (Kamila et al., 2022). This explanation is consistent with the findings of this study, which show that most children with DHF have normal hematocrit levels (41 cases, 76%), followed by high hematocrit levels (9 cases, 17%) and

low hematocrit levels (4 cases, 7%). In this study, the lowest recorded hematocrit level was 30%, and the highest was 49%.

CONCLUSION

Based on the results of the study, it can be concluded that most children with DHF are aged 6–12 years or school-age, with no significant gender difference between boys and girls. The majority of cases occur at the elementary school education level, all children experience thrombocytopenia or a decrease in platelet levels, and most have normal hematocrit levels.

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