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Comparison Of Platelet Examination Results Automatic And Manual Method In Dengue Hemorrhagic Fever Patient Santa Elisabeth

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ABSTRACT

The number of casess of dengue hemorrhagic fever in indonesia is more than 2.5 billion cases that occur every year. Platelet examination can be done by 2 methods, namely automatic and manual. this study aims to determine whether there is a difference in the number of platelets between the automatic method (abx pentra 60), and the manual method (rees eecker). The research method used in an observational study with a cross sectional approach. The population in this study was 155 people, with a sample of 20 people and quota sampling technique. The inspection was carried out with an automatic abx pentra 60 and an improved neubauer. The results of the examination of flow pletelet counts using the automatic method obtained 1 sample (5.0%) and the manual method12 sample (60.0%) that difference between automatic and manual methods was 11 sample. The results of high automatic method of platelets were obtained by 4 sample (20.0%),and manual 3 sample(15.0%), that difference between two was obtained 1 sample. Comparison of the results automatic and manual platelet examination methods was p=0.004(p<0.005). the conclution from the results there were difference in the automatic method of checking the platelet count and the manual method in patients with dengue hemorrhagic fever.

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1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a very dangerous viral infectious disease caused by mosquitoes and can make the sufferer die (Widyastuti, 2005). In patients with dengue hemorrhagic fever, bleeding manifestations are found which can be in the form of a positive tourniquet test, skin patches, ecchymosis, epistaxis, bleeding gums, and gastrointestinal bleeding in severe conditions that can cause thrombocytopenia (decreased platelet count). Thrombocytopenia in dengue fever patients is caused by decreased platelet formation in the bone marrow. The decrease in platelets in the bone marrow can increase the destruction of platelets in the reticuloendothelial system and platelet aggregation due to endothelial vessel damage. This causes the plasma volume to decrease and the patient experiences hypovolemic shock and circulatory failure (Alvinasyrah, 2021). Around 2.5 billion people in the world live in dengue endemic areas at risk for dengue hemorrhagic fever and around 1.3 billion people at risk are in the Southeast Asian region (Alvinasyrah, 2021).

Cases of dengue hemorrhagic fever in North Sumatra occur every year. In 2016 there were 8,618 cases with an IR of 61.11/100,000 population and a CFR of 0.53%. Very high dengue fever in the last three years is generally reported from urban areas, namely Medan City, Deli Serdang, Pematang Siantar, Langkat and Simalungun. Examination of the platelet count is a very important examination and to support the diagnosis of bleeding disorders. There are several methods of checking the platelet count, namely manually and automatically. Laboratory examinations were done manually using a counting chamber and the indirect method was using a blood smear, while the automatic method was using a hematology analyzer. Based on the results of a preliminary study at Elisabeth Hospital, Medan in 2022, it was found that the number of hospitalized dengue hemorrhagic fever patients in January was 75 and

in February as many as 40 patients. Elisabeth Hospital Medan uses two methods of examination, namely manually and automatically.

The large number of samples to be carried out when using the manual method (rees eecker) requires a long time, human errors often occur, sampling is not good enough to make platelets cluster. Based on this background, the researchers conducted a study with the aim of comparing the results of platelet examination with automatic and manual methods in patients with dengue hemorrhagic fever at the Santa Elisabeth Hospital, Medan in 2022. Researchers hope that this research can provide information and input for the Hospital Laboratory in making policies.

2. METHOD

This research is an observational study with a cross sectional approach. The population used in this study were patients diagnosed with Dengue Hemorrhagic Fever at the Santa Elisabeth Hospital in Medan for the last 2 months, namely 155 patients. While the samples used were 20 people who were patients diagnosed with Dengue Hemorrhagic Fever at Santa Elisabeth Hospital Medan for the last 2 months. The sampling technique used in this study is a quota sampling technique in which the sample to be taken is determined by the data collector and previously determined the amount to be taken. The tools used in this study were a hematology analyzer Abx Pentra 60 and a microscope.

The tool used in this automatic method of platelet examination is the hematology analyzer Abx Pentra 60. The materials used in this study include venous blood, ABX cleaner reagent, ABX Eosinophil, ABX Basolyse II, ABX Lysebio. Data collection techniques were carried out by observation and documentation. After all the data has been collected, data processing and data analysis were carried out descriptively. This research has passed the ethical test from the Health Research Commission of STIKes Santa Elisabeth Medan with letter number No: 018/KEPK-SE/PE-DT/IV/2022.

3. RESULTS AND DISCUSSION

The following are the characteristics of patient demographic data in this study:

Table 1. Frequency Distribution of Respondents Characteristics

characteristics	category	frequency (f)	percent (%)
gender	Man	7	35%
	Woman	13	65%
age	1-11 year	12	60%
	12-22 year		20%
	23-33 year	1	5%
	45-55 year	1	5%
	56-66 year	1	5%

Based on the data in table 1, it can be seen that the frequency distribution of respondents' characteristics based on gender and age in dengue hemorrhagic fever patients at the Santa Elisabeth Hospital Medan in 2022 obtained 13 female patients with dengue hemorrhagic fever (65.0%).) and male sex as many as 7 patients (35.0%). Mean while, based on age, it was found that patients with an age range of 1-11 years were 12 patients (60.0%), aged 12-22 years were 4 patients (20.0%), and patients with an age range of 23-33 years were 45- 55 years, 56-66 years each as many as 1 patient (5.0%).

After knowing the frequency distribution of respondents, the researchers conducted research on the examination of platelets using 2 methods, namely the manual method and the automatic method.

Table 2. Platelet Examination Frequency Distribution

Method	Platelet Count	Amount	Percent (%)
Automatic	**Low** <150.00	1	5%
	Normal 150.000-400.000	15	75%
	Tall >400.000	4	20%

Manual	**Low** <150.00	12	60%
	Normal 150.000-400.000	5	25%
	Tall >400.000	3	15%

Table 2 shows that from 20 samples of dengue hemorrhagic fever patients who performed the automatic method of platelet examination, it was found that samples with low platelet counts were 1 patient (5.0%), normal platelet counts were 15 patients (75.0%), high platelet counts were as many as 1 patient. 4 patients (20.0%). The increase in the number of platelets in the 4 samples in this study was due to the patient having been infected with dengue hemorrhagic fever for more than 7 days. Platelets in dengue hemorrhagic fever patients who have been infected for more than 7 days will increase. This is in line with the research of Masihor et al. (2013) the number of platelets in dengue infection patients decreased on the third to seventh day and reached normal again on the eighth or ninth day. Thrombocytopenia in dengue infection occurs through the mechanism of bone marrow suppression, platelet destruction and shortened life span.

The results of the examination of platelets in patients with dengue hemorrhagic fever with the automatic method obtained samples that had a low platelet count of 1 sample (50.0%). According to Fitrianti's research (2019), the administration of EDTA anticoagulant can also affect the platelet count in the automatic device, so that it can cause the platelet count to decrease. The decrease in the platelet count in the device occurs because the microthrombi in the reservoir can clog the device. , then disintegrates, forming fragments with the same size as platelets so that they are counted by the tool as platelets.

While the results using the manual examination method shown in Table 2, it is known that from 20 samples found samples with low platelet counts as many as 12 patients (60.0%), normal platelet counts as many as 5 patients (25.0%) and high platelet counts as many as 3 patients (15.0%). The occurrence of an increase in the number of platelets in the 3 samples in this study may occur due to the researchers being less focused or less careful in calculating the number of platelets in the counting room.

This is in line with the opinion of Lasmilatu (2019), sampling can also affect the increase in the number of platelets and the technique of inserting the sample into the tube. According to Praptomo (2019) the increase in platelets using the manual method caused by the sample being too attached to the slide or uneven distribution in the smear can cause significant differences in the platelet count.

In addition to the increase in the number of platelets in the study obtained samples that have a low platelet count as many as 12 (60.0%). The decrease in platelet count in 12 samples in this study was caused by uneven staining. The decrease in platelets using the manual method was also caused by pipetting into the counting chamber (improved Neubauer) and poor vision so that the platelets were not read completely.

This is in line with Praptomo's research (2019) that the direct method of checking the platelet count has decreased because it is difficult to distinguish platelets from impurities and the possibility that the reagents used have expired. The occurrence of low platelets in this manual method is caused by adhesion to the slide or uneven distribution in the smear, causing a marked difference in the platelet count. According to Heatubun's research (2013), it was explained that the decrease in platelets in this manual method was also caused by sampling which depended on other diseases suffered by the patient. According to Hidayat et al. (2019) in his research on changes in the number of platelets, it was found that a decrease in the number of platelets also occurs at age. Age can also affect the decrease in the number of platelets, including 4-6 years younger.The results of the study related to the difference between the results of the automatic method of platelet examination and the manual method in this study showed that the Mann-Whitney Test result was significant at 0.004.

This indicates that there is a significant difference in the results of the automatic and manual method of platelet examination because the significant value is <0.005. This is in line with research conducted by Fitrianti (2019) which states that there are differences in the automatic and manual method of platelet examination caused by many factors, one of which is the results issued by the hematology analyzer tool do not match the reality, one of which is the homogenization process.

According to Nuraeni (2020) In taking blood, it is recommended that the filling of 3 ml blood volume must be in accordance with the standard, because it can affect the platelet results so that it can

distinguish the platelet results from the automatic method and the manual method and cause a false increase or decrease in the number of platelets.

This is in line with research Praptomo (2019) that automatic and manual platelet examination have differences, namely the advantages and disadvantages of each method. Automatic platelet count has the advantages of being practical, fast, and reliable when the number of patients is large. as well as being unable to read the attached platelets which can lead to false low results and measurement of the magnitude of the electronic resistance between the two electrodes (Maharani et al., 2017).

Examination of the platelet count by manual method is less accurate in identifying platelets and observing the size of platelets. In this study, it was also found that there were clusters of platelets using the automatic method with the abx pentra 60 device so that the giant platelets could not be detected or could not be distinguished. Likewise with the manual method that the results of platelets are not readable because the staining is too concentrated, which makes it difficult to count platelets.

4. CONCLUSION

Based on the results and discussion, it can be concluded that there is a significant difference between the results of the automatic method of platelet examination and the manual method, namely p = 0.004 (p <0.005).

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