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HEMATOLOGICAL PROFILE OF HIV/AIDS PATIENTS AT UDAYANA UNIVERSITY HOSPITAL

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ABSTRACT
Human Immunodeficiency Virus (HIV) is a virus that will enter the body and infect white blood cells (lymphocytes), causing human immunity to decrease. Acquired Immune Deficiency Syndrome (AIDS) is the final stage that will appear after the HIV virus attacks the immune system, causing variety symptoms. One of the complications that can be found in HIV/AIDS is hematological abnormalities such as anemia, thrombocytopenia, leukopenia and lymphopenia due to impaired hematopoietic caused by viral infection that can disrupt the quality of life of patients. The aims of this research to determine the hematological profile of people with HIV/AIDS such as the prevalence of anemia, thrombocytopenia, leukopenia, and lymphopenia. This research used a descriptive method with a cross-sectional study. Data collection was conducted using medical records from Udayana University Hospital based on established inclusion and exclusion criteria. The results obtained from 31 people diagnosed with HIV/AIDS showed the majorities were male, in the age group of 18-39 years and most were diagnosed with stage IV. The research showed that hemoglobin levels and lymphocyte percentages mostly decreased, while leukocyte counts and platelet counts were in the normal range. Based on age, the highest proportion of anemia, thrombocytopenia, leukopenia and lymphopenia occurs in the 40-59 age group.
Keywords: HIV/AIDS, hematological abnormalities, hematological profile

INTRODUCTION

Human Immunodeficiency Virus (HIV) is a virus that can enter the human body through blood, vaginal fluid, or semen. The HIV virus will infect white blood cells (lymphocyte), which can cause human immunity to decrease. Acquired Immune Deficiency Syndrome (AIDS) is the final stage that appears after the HIV virus attacks the body's immune system and causes symptoms that last for years.[1] The number of HIV/AIDS cases continued to increase until they finally spread to all countries in the world. At the end of 2017, there were 36.90 million sufferers found in the world.[2] According to the annual HIV report up to March 2021, there were 568.618 people living with HIV/AIDS in Indonesia.[3] HIV/AIDS cases can also be found in Bali, where there were 26.519 people living with HIV/AIDS in March.[4] Early HIV/AIDS screening is important because it allows for early treatment, which can help to prevent the progression of the disease and improve the clinical condition of the patient.[5]

One of the initial evaluations that can be done by people living with HIV/AIDS is laboratory tests, such as hematological examination. The hematological profile of people living with HIV/AIDS can be used as a prognostic factor due to hematological abnormalities. Hematological abnormalities is one of the clinical manifestations that can be found in people living with HIV/AIDS, especially in advanced stages.[6] Hematological abnormalities found is cytopenia (decreasing one type of blood cell) such as anemia, leukopenia and thrombocytopenia. The cause of hematological abnormalities in HIV/AIDS is due to impaired hematopoietic caused by viral infection, which leads to decrease in the number of blood cells. The occurrence of hematopoietic dysfunction is characterized by progressive damage and suppression of the function hematopoietic progenitor stem cells (HSPCs) by viral infection, leading to clinical manifestations in the form of cytopenia.[7]

Hematological abnormalities can be impaired the quality of life of the patient or be life threatening if not treated properly.[7] Therefore, hematological examination should be performed to monitor any changes in all blood cell lineages during HIV infection. Hematological examination also aims to provide the necessary clinical interventions to prevent complications and other comorbidities.[8]

Based on the problems that have been explained, this research was conducted to look at the hematological profile

such as hemoglobin, leukocyte, lymphocyte and platelet in people with HIV/AIDS at Udayana University Hospital from January 2022 to June 2023.

MATERIAL AND METHOD

This research is a descriptive study with a cross-sectional design. This research was carried out in the medical records room at Udayana University Hospital. The target population for this research is people with HIV/AIDS at Udayana University Hospital and the study population is people with HIV/AIDS at Udayana University Hospital from January 2022 to June 2023. The inclusion criteria for this research are patients who have been diagnosed with HIV infection and have undergone hematological examination (hemoglobin, platelet, leukocyte, and lymphocyte) for the first time, as recorded in the medical records of Udayana University Hospital from January 2022 to June 2023. The exclusion criteria were patients with incomplete medical records (no hematology examination results sheet) and who did not meet the variables to be studied.

The research process began with making a proposal, requesting permission from the ethics committee of the Faculty Medicine Udayana University and preparing an extraction form to retrieve medical record data. The data collected based on the inclusion and exclusion criteria will be processed and analyzed using SPSS version 26 to determine the frequency distribution and percentage of each variable that has been studied. This research has been approved by the Ethics Committee of the Faculty Medicine Udayana University with the letter number 217/UN14.2.2.VII.14/LT/2023.

RESULT

Table 1. Frequency Distribution Characteristics Respondents

Characteristics Respondents	Frequency (n)	Percentages (%)
Gender		
Male	22	71%
Female	9	29%
Age		
18 – 39	14	45.1%
40 – 59	13	41.9%
>60	4	13%
Stadium		
I	0	0%
II	4	12.9%
III	1	3.2%
IV	26	83.9%
Total	31	100%

Based on Table 1. this study consisted of 31 people that met the inclusion criteria. Other samples included to exclusion criteria due to incomplete medical record data. There were 22 people (71%) with male sex and 9 people (29%) with female sex. Based on age group, the majority of cases occurred in the 18-39 age group, with 13 people (45.1%), followed by the 40-59 age group, with 13 people (41.9%), and the >60 age group, with 4 people (13%). The majority of HIV patient, 26 people (83.9%) was diagnosed at stage IV. Followed by stage II with 4 people (12.9%), stage III with 1 person (3.2%), and no patient in stage I.

Table 2. Frequency Distribution of Hematological Profile in HIV/AIDS Patients

Hematological Profile	Frequency (n)	Percentages (%)
Hemoglobin		
Low	20	64.5%
Normal	11	35.5%
High	0	0%
Platelet		
Low	1	3.2%
Normal	30	96.8%
High	0	100%
Leukocyte		
Low	5	16.1%
Normal	22	71%
High	4	12.9%
Lymphocyte		
Low	17	54.8%
Normal	13	41.9%
High	1	3.2%
Total	31	100%

Based on Table 2. the results of this study showed 20 people (64.5%) with decreased hemoglobin levels. Only 11 people (35.5%) with normal hemoglobin levels. No patient with increased hemoglobin levels.

There are 30 people (96.8%) with normal platelet counts. Only 1 person (3.2%) with decreased platelet counts, and no patient with increased platelet counts.

Most of the samples, 22 people (71%), showed normal leukocyte counts. Only 5 people (16.1%) with decreased leukocyte counts and 4 people (12.9%) with increased leukocyte counts.

The result of the study showed that most of the samples, 17 people (54.8%), had decreased lymphocyte percentages. Only 13 (41.9%) people with normal lymphocyte percentages and 1 (3.2%) person with increased lymphocyte percentages.

Table 3. Proportion Distribution Cytopenia Based on Age in HIV/AIDS Patients

Hematological Profile	18 – 39		40 – 59		>60		Total	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Anemia	7	35%	10	50%	3	15%	20	100%
Thrombocytopenia	0	0%	1	100%	0	0%	1	100%
Leukopenia	0	0%	3	60%	2	40%	5	100%
Lymphopenia	6	35.3%	9	53%	2	11.7%	17	100%

Based on table 3. the proportion of anemia, leukopenia and lymphopenia mostly in the age group of 40 – 59, respectively 10 (50%), 3 (60%) and 9 (53%) people. The proportion of thrombocytopenia only found in the 40 – 59 age group, with 1 person (100%).

DISCUSSION

This research was conducted to determine the hematological profile of HIV/AIDS patients at Udayana University Hospital. Based on this research, of the 31 people with HIV/AIDS the majority were male with 22 people (71%). This is appropriate with the research conducted by Umar, which found that the majority of HIV/AIDS cases are in male. One of the reasons why the number of males with HIV/AIDS is high because of homosexual contact between HIV-infected individuals, both with other HIV-infected individuals and with those who are not yet infected with HIV.[9] In addition, this study is also supported by the theory that homosexual contact has a 1.97 times higher risk of HIV infection than heterosexual contact.[10]

Based on age, the most cases of HIV/AIDS occurred in the 18-39 age group, with 14 people (45.1%). The difference was only 1 sample in the 40-59 age group, with 13 people (41.9%). According to the theory explained by Novita, people with age <40 years are 7.2 times more likely to be infected with HIV/AIDS than people with age >40 years. This is because people with age <40 years are classified as productive years, where their social interactions

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and lifestyles are relatively free. This can lead to an increased risk of HIV/AIDS infection.[11] If many cases of HIV/AIDS are in the >50 age group, it is because education about HIV/AIDS is more focused on younger generations, so the understanding about the risk of HIV/AIDS infection is lower in the >50 age group.[12]

The majority of HIV stages were diagnosed at stage IV, with 26 people (83.9%). Stage IV is the final stage of HIV, where the patient has already entered into AIDS. There are many factors that can contribute to the rapid progression of HIV to stage IV, including delayed diagnosis, stigma, and social discrimination, which can lead to patients hiding their illness and not seeking treatment.[13]

Anemia is one of the most common hematological abnormalities found in people with HIV/AIDS. Anemia can increase mortality and morbidity in HIV infection.[14] This theory is supported by the findings of this research, which found that anemia was the most common hematological abnormalities, with a prevalence of 64.5%. This research is appropriate with research conducted at RSU Bandung Medan, which found mostly had anemia, with 23 of 43 people.[14] Anemia in HIV/AIDS is caused by three main factors such as decreased red blood cell production, increased red blood cell destruction, and infection of red blood cell production.[15] As age increases, the risk of anemia increases too, from 37.4% in people aged 35 to 46% in people aged 46 and over.[16] The proportion of anemia in this study was highest in the 40-59 age group, at 50%. This trend is appropriate with the general finding that the incidence of anemia increases with age. However, there was a slight decrease in the >60 age group.

People with HIV/AIDS who undergone platelet counts examinations generally showed normal results, with 30 people (96.8%). This research is appropriate with research conducted at City of Yaoundé, found that platelet counts were mostly normal at 80.65%.[17] The research conducted by Ayanaw et al also found that platelet counts were mostly normal at 88.4%.[18] A theory suggests that high serum thrombopoietin levels in people with HIV/AIDS may help to maintain normal platelet counts.[8] If thrombocytopenia is found, it is one of the complications caused by an immune mechanism that results in the clearance of platelets by the reticuloendothelial system.[19] In this research, the prevalence of thrombocytopenia was found at 2.9%. The presence of myelodysplasia in people with age >40 years can also cause thrombocytopenia.[20] The theory is appropriate with this research, where the incidence of thrombocytopenia was found in the 40-59 age group.

This result research found that leukocyte counts were mostly normal, with 22 people (71%). These results is appropriate with the findings of a research conducted by Kothari et al which found that leukocyte counts were mostly normal at 85% compared to leukopenia or leukocytosis.[21] The research result are also appropriate with other conducted at RSUD Koja, which found that leukocyte counts were mostly within the normal range.[22] If the HIV infection has not yet caused bone marrow suppression, which will lead to a decrease in granulocyte stimulating factor, then leukocyte counts will remain in normal range. In addition, antiretroviral therapy can help maintain the number of leukocyte counts in the normal range. However, antiretroviral therapy can also cause leukopenia.[23] It can be said, that theory is appropriate to the findings of this research, which found that the prevalence of leukopenia was 16.1%. This can be influenced by various factors, such as patient compliance with treatment and the patient's overall health condition. This research showed that, as age increases, the risk of leukopenia increases too. This can be influenced by natural aging which causes the function of the immune system to decrease, causing the production and decreased response of white blood cells.[24]

Based on the lymphocyte percentages examination, mostly decreased with the prevalence of 54.8%. The research by Amran & Al Qarni found that 73.33% of patients most experienced a decrease in lymphocytes, which is appropriate with the results of this research.[25] The research by Soraya & Artika also found that most patients experienced a decrease in lymphocyte percentages, specifically 48.1%.[26] Lymphopenia occurs in HIV/AIDS because it involves CD4 T helper cells and is considered a primary indication of HIV infection, where HIV infection will infect and destroy CD4 Helper T lymphocyte cells gradually so the immune system in the body will decrease and unable to fight HIV infection until the lymphocyte cells in the blood decrease.[6] Based on age, lymphopenia is mostly in the age group of 40 – 59 years, this can happen because of thymic involution associated with increasing age, which leads decrease in the production of T lymphocytes. This generally begins to occur when the patient reaches the age of ≥ 45 years.[27]

CONCLUSIONS AND SUGGESTION

Based on the research, showed that the prevalence of anemia and lymphopenia was more common than the prevalence of leukopenia and thrombocytopenia in people with HIV/AIDS. As age increases, the risk of anemia, thrombocytopenia, leukopenia, and lymphopenia increases too, mostly in the 40 – 59 age group. However, there is a decrease in the >60 age group.

Hematological examinations are important for HIV/AIDS patients to prevent severity, complications, and even death by providing appropriate management according to the results of hematological examinations. In addition, it is hoped that future research will be able to provide more information about the relationship between hematological parameter variables and other variables such as patient nutritional status, HIV stage, and patient ARV treatment history with a larger sample size

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