

LEUKOSITE IMAGES IN ADOLESCENT SMOKERS IN THE TINGKOHUBU VILLAGE REGION, SUWAWA DISTRICT

Mohamad Sarif Hulopi¹⁾, Rita Amini Warastuti²⁾, Agusrianto Yusuf³⁾

^{1).2).3).} Bina Mandiri University Gorontalo

E-mail:hulopiipong137@gmail.com

ABSTRACT

Smoking is a habit and even part of a need that cannot be avoided by individuals who experience a tendency towards smoking. Smoking behavior is found among adolescents to adults. Cigarettes contain dangerous substances including nicotine which can cause leukocytosis. This study aims to determine the levels of leukocytes in adolescent smokers.

The research location is in Tingkohubu Village, Suwawa District, Gorontalo. Research time is June-October 2020. Respondents were 26 people. This research is a descriptive study with a quantitative approach and a cross-sectional design. Examination of the leukocyte count was using the Dirui BCC-3600 Hematology Analyzer.

The results showed that as many as 81.8% of respondents had a high leukocyte count or leukocytosis, which was in the range of 11,000-12,000 cells / mm³, while 60% of the leukocytes count was normal.

Keywords : cigarettes, smoking, adolescence, leukocytes

INTRODUCTION

Smoking is widely promoted as a masculine habit, linked to health, happiness, fitness, wealth, strength, and virility. But in reality, smoking causes illness, premature death, sexual impotence, and infertility. And nearly 1 billion men in the world smoke about 35% of men in high-resource countries, and 50% of men in developing countries. [28].

Tobacco use is a major risk factor for cardiovascular disease, cancer, chronic respiratory disease, and has negative social, environmental, and economic consequences. In 2016, globally more than 1.1 billion people aged ≥ 15 years smoked tobacco (34% of all men and 6% of all women in the early age group) [29].

Indonesia is currently facing a serious threat due to the increasing number of smokers, the prevalence of male smokers

in Indonesia is the highest in the world and it is predicted that more than 97 million Indonesians are exposed to cigarette smoke [22]. The trend of increasing smoking prevalence was seen to be greater in children and adolescents [23]. This shows that there is an increase in the smoking prevalence of the population aged 10-18 years from 7.2% to 9.1% [15].

The proportion of the population aged ≥ 10 years according to the province that has a smoking habit is among the 34 provinces that occupy the first position as smokers every day, namely Lampung Province which has 28.1%, then the second largest Province is Bengkulu with 27.8% and the Province which occupies the position The third largest out of 34 provinces in Indonesia that have a daily

smoking habit is Gorontalo Province, amounting to 27.4% [23].

Classifying smokers consists of three categories, according to the number of cigarettes consumed per day, namely light smokers (1 - 10 cigarettes), moderate smokers (11-19 cigarettes), and heavy smokers (more than the same as 20 cigarettes). A person is categorized as an active smoker if he smokes at least 2 years non-stop during his life [30]. Adolescence is the period between 12-21 years with the details of 12-15 years being early adolescence, 15-18 years of middle adolescence, and 18-21 years of late adolescence. Smoking behavior in adolescents is all forms of individual activity in burning and then inhaling and exhaling the smoke, which can be observed or measured by looking at the volume or frequency of smoking carried out by individuals aged 12-21 years [10].

The proportion of people aged ≥ 10 years for the first time smoked, according to districts / cities in Gorontalo Province, as many as 2,082 people, spread over five districts and one city. At the age of 15-19, the highest district was Boalemo with 55.8%, Gorontalo district with 52.42%, Pohuwato district with 51.97%, and Bone Bolango district with 55.19%. 23].

Data from the Bone Bolango District Health Office in 2019. The population with smoking factors was 6,509 people. Based on the data obtained, the community health center with the highest smoking factor was Puskesmas Suwawa with 197 people [7].

Data obtained at the Tingkohubu Village Office, Suwawa District. The total population according to sex and age group in February 2020 was 1,467, the data shows that in the 10-14 year age group the number of male smokers was 48.43%, and the number of female smokers was 51.56%. In the 15-19 age group, the number of male smokers was 46.42%, and the number of female smokers was

53.57%. In the 20-24 year age group, the number of male smokers was 55.65% and the number of female smokers was 44.34%

Smoking can cause various health problems because the content of cigarettes has a variety of substances that can damage the body and trigger disease. Cigarettes contain various kinds of harmful substances including carbon monoxide, nicotine and tar which play a big role as a source of disease. Several components in cigarettes cause leukocytosis, one of the most important is nicotine. Nicotine in cigarettes is absorbed through the bloodstream quickly, this nicotine can affect blood cells. The consequences of nicotine in the blood include: stimulating hormone secretion that causes leukocytosis, being able to release catecholamines and epinephrine secretion which also cause leukocytosis, and stimulating the adrenal glands to secrete corticosteroid hormones causing neutrophilia,

In active smokers as much as 3.6% high leukocyte count (leukocytosis) and 3.6% also low leucocytes (leukopenia). In addition, an abnormal (low or high) leukocyte count was obtained, especially in eucinophil, neutrophil, lymphocyte, and monocyte cells, which are the marker cells of inflammation. So that smokers who are exposed to nicotine continuously will make serious inflammatory inflammation characterized by an increase in the number of leukocytes [4].

The number of respondents with normal leukocytes (4,000-10,000 cells / mm³) was as much as 45% and experienced an increase in the presentation of the number of leukocytes more than normal (leukocytosis) > 10,000 cells / mm³ of blood, namely as much as 50%. The content contained in cigarettes directly causes serious inflammatory inflammation characterized by an increase in the number of leukocytes [27].

According to previous studies stated, one of the indirect effects of smoking is to cause mortality by increasing various degenerative diseases in several organ systems [1].

So based on the above problems, the researcher is interested in conducting research on "The Image of Leukocytes in Adolescent Smokers in Tingkohubu Village, Suwawa District".

RESEARCH METHODS

This research uses descriptive research with a quantitative approach which aims to see the results of the examination of leukocyte levels in adolescent smokers in Tingkohubu village, Suwawa district. The design used in this study was a cross-sectional design. This research was conducted in October 2020.

The sampling location was carried out in the Tingkohubu Village Area, Suwawa District, Bone Bolango Regency and the sample examination site was carried out at the Toto Kabila Hospital Laboratory, Bone Bolango Regency.

The variable in this study was leucocytes in adolescent smokers in the Tingkohubu Village, Suwawa District.

The population in this study were 65 teenage smokers in the Tingkohubu Village, Suwawa District, February 2020.

The sample in this study were adolescent smokers in the Tingkohubu Village, Suwawa District. The sample size in this study was 26 people.

In this study, researchers used a sampling technique, namely Simple Random Sampling, where all elements in the population were taken into account and each element had an equal chance of being selected as an object / sample.

The inclusion criteria in the study were subjects who were willing as respondents, men who smoked ≥ 12 cigarettes per day, subjects who smoked ≥ 2 years, subjects aged 12-21 years. The

exclusion criteria were subjects who were not willing as respondents, men who smoked ≤ 12 cigarettes per day, subjects who smoked ≤ 2 years, subjects aged less than 12 years and over 21 years.

The tools and materials used in this study were the Hematology analyzer, EDTA tube, tourniquet, tube rack, cooling box sample, blood sample, 3cc disposable, handscoon, mask, and alcohol cotton.

Analysis of the data in this study using univariate descriptive statistics, and processed with SPSS (Statistical Package for Social Science).

RESEARCH RESULTS

This research was conducted in Tingkohubu Village, Suwawa District, from June to October 2020. With the aim of knowing the picture of leukocytes in adolescent smokers, the sample used in this study was 26 people with certain criteria. Respondent data based on age is presented in table 1.

Distribution of leukocyte levels based on age and category of smokers in adolescent smokers in the Tingkohubu Village, Suwawa District.

Table 1. Age of respondent to teenage smoker in Tingkohubu village, Suwawa district.

Age (Year)	Smoker category	amount	Percentage (%)
Early Adolescence (12-15 years)	Moderate	2	7.7%
Middle Teen (15-18 years)	Moderate	6	23.1%
Late Youth (18-21 years)	Moderate	18	69.2%
Total	26	26	100%

Source: Primary data 2020

Based on table 1, it shows that all respondents are included in the medium category of smokers, respondents who include early adolescents aged 12-15 years, namely 2 respondents with a presentation of 7.7%, middle adolescent respondents aged 16-18 years with a total of 6 respondents with 23 presentations. , 1%, while most of the late adolescent

Leukocyte Picture in Adolescent Smokers in Tingkohubu Village, Suwawa District

respondents aged 19-21 years, namely the number of 18 respondents with a percentage of 69.2% in the Tingkohubu Village Area, Suwawa District.

The distribution of leukocyte levels in adolescent smokers in the Tingkohubu Village Area, Suwawa District is presented in table 2.

Table 2 *The results of the examination of the respondent's leukocytes in adolescent smokers in the village of Tingkohubu, Suwawa district.*

Age (Year)	Leukocyte Levels				Total
	Normal		High		
	amount	%	amount	%	
Early Adolescence (12-15 years)	2	13.3%	0	0%	7.7%
Middle teens (15-18 years)	4	26.7%	2	18.2%	23.1%
Late Youth (18-21 years)	9	60%	9	81.8%	69.2%
	15		11		100%

Source: Primary data 2020

Based on table 2, it shows that respondents with normal leukocyte levels (4,000-10,000 cells / mm³), namely early adolescents (12-15 years) with 2 respondents with a percentage of 13.3%, then middle adolescents, namely 4 respondents with a percentage of 26.7 %, and in late adolescence as many as 9 respondents with a percentage of 60%, while respondents who had high levels of leukocytes or leukocytosis ($\geq 10,000$ cells / mm³) were 0% in early adolescents (12-15 years), then 2 respondents with a percentage of 18, 2% in middle aged adolescents (15-18 years) and more in late adolescence (18-21 years) as much as 81.8%.

DISCUSSION Teen Smoker

Smoking is a habit and even part of the needs that cannot be avoided by individuals who experience a tendency towards smoking. Cigarettes are one of the addictive substances in the form of nicotine which can cause dependence on

smokers because after inhaling cigarette smoke, nicotine is absorbed by body tissues to the brain [24].

Smokers are classified into three groups based on the number of cigarettes smoked per day, namely someone who consumes cigarettes (1-10 cigarettes per day) is called a light smoker, (11-20 cigarettes per day) is called a moderate smoker, and (more than 20 cigarettes per day). days) are called heavy smokers [21].

In this study, all teenage smoker respondents in the Tingkohubu Village Area, Suwawa District, were included in the moderate category of smokers because they consumed 11-19 cigarettes per day, respondents were 12-21 years old and smoked for ≥ 2 years because someone was said to be a smoker. active if the person smokes for more than 2 years. This study is similar to previous studies, showing that 39.4% of respondents have smoking behavior and are included in the moderate category of smokers [9].

There are 26 male teenage smokers in Tingkohubu Village, Suwawa District. The results showed that most of the smoking behavior was in the late adolescent category, namely 19-21 years old with a percentage of 69.2%. This research is supported by previous research, which states that respondents who are over 16 years of age are more courageous to smoke because they have the right to do whatever they want to do, including smoking, while respondents who are under 16 are still in the trying phase and have not entered the smoking habit behavior category. [6].

Environmental factors that influence smoking habits include family, friends, and advertisements that can affect smoking adolescents [26]. Based on the research results showed that (96.2%) respondents were influenced by environmental factors, while (3.8%) were not affected. That the smoking behavior of respondents who is influenced by family

and friends is at a moderate level and the highest effect is due to advertising [16]. This study is in line with previous studies, showing that as many (98.2%) of respondents who smoked had been exposed to cigarette advertisements, respondents stated that cigarette advertisements could encourage someone to smoke [25].

Previous studies have (68.0%) had negative environmental factors and (32.0%) had positive environmental factors. This means that the more negative environmental factors, the higher the smoking behavior of teenage boys. So that there is a very strong relationship between environmental factors and smoking behavior in adolescent boys [18].

Picture of Leukocytes in Smokers

Leukocytes or white blood cells are the body's most important defense system to ward off the intrusion of foreign objects that trigger debilitating diseases. Leukocytosis is a condition in which white blood cells increase or exceed normal limits [2].

Based on the results of the study that the leucocyte levels in adolescent smokers in the Tingkohubu Village Area, Suwawa District, obtained a normal leukocyte count, namely 13.3% in early adolescents, then 26.7% in middle adolescents and more often found in late adolescents as much as 60%, namely in the normal range of 4,000-10,000 cells / mm³, while a high leukocyte count or leucocytosis > 10,000 cells / mm³ was found in mid adolescents as much as 18.2% and in late adolescence as much as 81.8%, which is in the range of 11,000-12,000 cells / mm³. Normal leukocyte levels are probably caused by physical activity because based on the results of the questionnaire, respondents who have normal leukocytes are respondents who often do sports.

Previous studies have shown that lymphocytes increase after maximal physical exercise due to lymphocyte

activity that produces immune defense and exercise triggers lymphocytes to exit the spleen into the bloodstream due to stimulation of the hormone cortisol [12]. This study is in line with previous studies, that physical activity with moderate intensity can increase the immune system, reduce susceptibility to diseases that can be observed by the number of lymphocytes in the blood [14]. Similar research with previous studies, states that one of the factors that causes the average leukocyte level to be normal is by doing regular, measured, and planned exercise and doing it according to ability [13].

The body has the ability to repair damage, including responding to changes in normal cells that become abnormal due to smoking. The ability is not the same for everyone. That is why the immune system in a smoker is different. Many factors can affect the immune system, for example, family history, environmental factors and place of residence can affect the immune system [2]. This is in accordance with previous studies, which stated that the number of leukocytes in respondents who smoked was still within normal limits [8]. The study was similar to previous studies, that the number of leukocytes in respondents who smoked as much as 88.9% had normal leukocyte results from 54 respondents [5].

In addition to normal leukocyte levels, 81.8% of respondents found high leukocyte levels or leucocytosis > 10,000 cells / mm³. This is known to be due to smoking. Because smoking can cause an increase in peripheral blood leukocytes, the local recruitment of leukocytes to the surface of endothelial cells leads to narrowing of blood vessels as a result of increased resistance of peripheral blood vessels by inhibition of circulation to small blood vessels. The risk of narrowing of blood vessels due to exposure to harmful cigarette smoke, especially

nicotine and free radicals, can cause an inflammatory response [27].

Inflammation can also occur due to the induction of cigarette smoke that is formed, this smoke will irritate breathing which also contributes to an increase in leukocytes. Inflammatory stimulation of the airways induces an increase in circulating inflammatory markers, such as cytokines which can also affect the leukocyte count [17]. This is supported by previous research, that the number of respondents who smoked with normal leukocytes 4,000-10,000 cells / mm³ was as much as 45% and had an increase in the percentage of leukocyte counts more than normal (leukocytosis) > 10,000 cells / mm³ of blood, namely 50% [27]. A similar study with previous studies, stated that a high leukocyte count was found in active smokers as much as 19.23% [2].

Respondents who experienced an increase in leukocyte levels could be caused by nicotine content. According to previous research states, the nicotine present in cigarettes induces catecholamines and steroid hormones from the adrenal glands. This can lead to an increase in the levels of a number of endogenous hormones such as epinephrine and cortisol, which have an effect on increasing the number of leukocytes [17]. The entry of nicotine in the body is caused by the circulation of catecholamines due to the increase in hormones such as epinephrine and cortisol by nicotine. So that it can cause leukocytosis [19].

A person has been continuously exposed to cigarette smoke and nicotine every time he consumes cigarettes, thus the leukocytes carry out a defensive and reparative function to defend the body against foreign objects which is marked by an increase in the number of leukocytes [20]. Cigarettes have different amounts of nicotine depending on the type of cigarette. The type of cigarette that is often consumed is the type of

conventional cigarette because the largest content in conventional cigarettes is nicotine. The amount of nicotine in conventional cigarettes is different from e-cigarettes because of the higher nicotine content found in conventional cigarettes [3]. The nicotine content in cigarettes directly delivers nicotine faster from the lungs to the heart and brain. Nicotine is a key chemical compound that can induce and support the strong addictive effects of smoking. So that direct exposure to nicotine will lead to serious inflammation characterized by an increase in leukocytes [27].

The average smoker in Tingkohubu Village, Suwawa Subdistrict, is a smoker with a length of smoking for 2 years. The increase in the number of leukocytes in active smokers can be caused by one of the reasons for consuming cigarettes. This is because when a smoker has a long-term smoking habit this means more damage, both the risk and severity of disease caused by smoking are directly related to the length of time the smoker has been smoking. This is supported by previous studies, that the duration of smoking can increase the high leukocyte count or leukocytosis [5]. One of the indirect effects of smoking is to cause mortality by increasing various degenerative diseases in several organ systems [1].

Researchers did not further examine some of the factors that can affect leukocyte levels in the study such as history of illness, nutritional intake, and life habits, for example, such as adolescents who consume alcohol, which can affect the results of the leukocyte count and the type of leukocytes of the respondent [2].

In this study, a questionnaire was used as primary data to obtain data on the amount of cigarette consumption, duration of smoking, smoking category, and reasons for smoking for the first time. From the data obtained from this

questionnaire, all were answered and filled in accordance with the respondent's honesty and understanding of the respondents' questions given by the researcher to respondents who met certain criteria in this study.

CONCLUSION

Based on the results of the study it can be concluded that the number of leukocytes in adolescent smokers in the Tingkohubu Village Area, Suwawa District, as many as 26 respondents, obtained a normal leukocyte count of 4,000-10,000 cells / mm³ in early adolescents (12-15 years) as much as 13.3%, middle adolescents. (15-18 years) as much as 26.7% and late adolescents (18-21 years) as much as 60% while the high leukocyte count or leukocytosis $\geq 10,000$ cells / mm³ in early adolescents 0%, middle adolescents as much as 18.2%, and Late adolescence as much as 81.8% which is in the range of 11,000-12,000 cells / mm³.

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