COMPARISON OF HEMOGLOBIN LEVELS IN ACTIVE AND PASSIVE SMOKERS OVER THE AGE OF 17 YEARS IN SUWAWA DISTRICT, BONE BOLANGO DISTRICT

Putri Ayu Ningsih Yusuf[1)],Arpin[2)],Yolan Dunggio[3)],
[1,2,3)] Bina Mandiri Gorontalo University
Email: ayuningsihyusufputri@gmail.com, arpin300491@gmail.com, yolan@ubmg.ac.id

ABSTRACT

Smokers are people who smoke cigarettes either directly or indirectly. Smoking is one of the incomplete combustion that produces white smoke (carbon particles) and carbon monoxide. High levels of carbon monoxide in the body can affect the work of hemoglobin to bind to oxygen. This study aims to determine the comparison of hemoglobin levels in active smokers and passive smokers over the age of 17 years in Suwawa District, Bone Bolango District. The method in this study uses a quantitative approach with the type of cross-sectional research and data analysis used, namely the T-Test Sample Test. The results of hemoglobin levels in active smokers from 16 samples obtained normal results as many as 7 samples and abnormal as many as 9 samples. In passive smokers from 16 samples, normal results were obtained as many as 8 samples and abnormal as many as 8 samples. The accepted hypothesis is the Alternative Hypothesis (Ha), and the rejected hypothesis is the null hypothesis (H0).

Keywords : Haemoglobin Levels, Active Smokers, Passive Smokers.

INTRODUCTIO

1. Overview of Cigarettes

Cigarettes are processed wrapped tobacco including cigars or other forms produced from the plants Nicotiana tabacum, Nicotiana rustica and other species or synthetically containing nicotine and tar with or without additives. Cigarettes are processed from tobacco that has been dried and processed in such a way that it is a roll coated with white paper on the outside. Cigarettes are used by burning at one end and smoking at the other end [1].

A cigarette is a roll of tobacco (about the size of a pinky) wrapped in nipah leaves, paper, or other materials. Cigarettes are one of the processed tobacco using additional ingredients or without additional ingredients. Cigarettes contain addictive substances that when used can result in health hazards to individuals and society [8].

As is well known that cigarettes can cause various kinds of dangerous diseases when used. In cigarettes there are many chemicals. Our substances can enter the body through smoke released from the combustion of cigarettes which are then smoked. In cigarette smoke contains about 3,800 chemicals. About 40 chemicals of which are toxic and carcinogenic chemicals or cancer triggers [1].

Submit: Feb 26th, 2024 Accepted: Augst 14th, 2024 Published: Sep 27th, 2024

2. Overview of smokers

Smoking is a process of burning tobacco that has previously been processed into cigarettes, as well as the process of sucking smoke produced from the combustion. Smoking is the activity of burning cigarettes and or smoking cigarettes [1].

While smoker has a very broad meaning. Smokers are people who smoke cigarettes either directly or indirectly. Directly here, it is interpreted as someone who smokes cigarettes because that person is indeed someone who consumes cigarettes. While indirectly is someone who smokes cigarette smoke not because someone consumes cigarettes, but because someone is in a place or environment surrounded by people who consume cigarettes, so indirectly someone will smoke or will be exposed to cigarette smoke. Smokers are divided into two groups, namely:

An active smoker is someone who consumes cigarettes regularly, even if only one cigarette a day or people who smoke cigarettes even though it is not routine or just try and how to smoke cigarettes by exhaling smoke and not entering the lungs [4].

Passive smoking is someone who does not have the habit of smoking, but is forced to smoke cigarettes exhaled by other people who happen to be nearby. In his daily life, he has no intention and does not have the habit of smoking. If he does not smoke, he does not feel anything and is not disturbed by his activities [9].

3. Overview of Blood

Blood is a special organ that is different from other organs, because this organ is in the form of liquid, blood is a transport medium in the body. Human blood volume is about 7%-10% of normal body weight and amounts to about 5 liters in the body. The condition of blood in each individual's body is not the same, depending on age, occupation, and the condition of the heart or blood vessels [3].

The human body contains between 5-6 liters (1.3 and 1.5 gallons) of blood, which represents between 7%-8% of the average body weight. Half of the blood is made up of a liquid or a liquid part called the Yang (Liquid Section). plasma. Meanwhile, the other half consists of cells and molecular molecules with various functions. A drop of blood coming out of a small wound contains 5 million red blood cells, 10 thousand white blood cells and 250 thousand platelets [11].

4. Overview of hemoglobin

Hemoglobin is a compound globular protein composed of simple proteins (globins) and heme cytotic radicals. One of the most important functions of hemoglobin is to transport oxygen from both lungs to body tissues, and to transport carbon dioxide from body tissues to both lungs [10].

Hemoglobin is a molecule formed by 4 sub-units The hemoglobin molecule contains a protein consisting of four chains known as globin. Each globin binds to another molecule called the heme group, which is very important in binding oxygen to hemoglobin. Each heme group carries one iron ion, which means that four heme groups carry four iron ions Hemoglobin plays an important role in binding oxygen so that it will form oxyhemoglobin, this oxyhemoglobin bond is what causes the red color in blood [5].

Hemoglobin is composed of two constituent components, namely heme and globin. Heme is a pigment that contains iron (Fe), this heme is what causes the red color of the blood. While globin is a type of protein composed of two pairs of chains, namely alpha and beta [2].

Each red blood cell contains about 200 million hemoglobin molecules. Hemoglobin (Hb) is a protein compound containing iron (Fe). Hemoglobin has a binding power

(affinity) to oxygen and carbon dioxide However, there is a difference between the affinity power possessed by hemoglobin to bind oxygen with the affinity possessed by hemoglobin to bind carbon dioxide. Hemoglobin has a higher affinity for carbondiccide compared to oxygen. For determination of hemoglobin levels based on age members [2].

Newborn : 14-24 gr/dl,
Baby : 10-17 gr/dl,
Child: 11-26 gr/dl,
Adult Male : 13,5-17 gr/dl,
Adut Female: 12-15gr/dl,
[7].

5. The Relationship of Smoking with Hemoglobin

Smoking is one of the factors that can cause hemoglobin levels in the blood to be abnormal. The content of chemicals in cigarettes is very diverse. Cigarette smoke that comes out when a smoker is smoking contains a lot of chemicals, one of which is carbon monoxide (CO). Smoking is one of the incomplete combustion that produces white smoke (carbon particles) and carbon monoxide. High levels of carbon monoxide in the body can affect the work of hemoglobin to bind to oxygen [1].

Carbon monoxide in cigarette smoke produced from incomplete combustion when inhaled and enters the body in large quantities will inhibit the work of hemoglobin to bind oxygen. This is because the affinity power possessed by carbon monoxide is stronger than the affinity power possessed by oxygen to be able to bind to hemoglobin. Inhaling cigarette smoke will increase carbon monoxide (CO) in the blood. Hemoglobin is a component of blood that transports oxygen from the lungs to all tissue organs. Hemoglobin has an affinity for oxygen and carbon monoxide, but hemoglobin's affinity for carbon monoxide is stronger than hemoglobin's affinity for oxygen. If hemoglobin binds more carbon monoxide, then the oxygen supplied to the heart will decrease, so the heart works harder to get the same energy weight [6].

If carbon monoxide enters the body very much, this will greatly interfere with hemoglobin to bind to oxygen, which in turn hemoglobin will bind more to carbon monoxide. states that in heavy smokers there is an increase in hemoglobin levels. This increase occurs due to a reflex of the body's compensation mechanism for low levels of oxygen binding to hemoglobin due to being shifted by carbon monoxide (CO) which has a stronger affinity for hemoglobin, so that the body will increase the process of hematopoiesis, which will then increase hemoglobin production due to low partial pressure of oxygen in the body [1].

RESEARCH METHODS

Approaches and Types of Research. This study uses a quantitative approach, which emphasizes more information expressed in the form of numbers, where the number represents a variable. This study was intended to compare hemoglobin levels in active and passive smokers over the age of 17 years in Suwawa District, Bone Bolango Regency. And this type of research uses cross sectional. Cross sectional is a way of comparing samples momentarily at the same time and data collection is done together at once. This cross-sectional study was used to see the comparison of hemoglobin levels in active and passive smokers over the age of 17 years in Suwawa District, Bone Bolango District.

Time and Location of Research The research time has been carried out from September 20 to September 21, 2023. and The sampling location was carried out in Bubeya Village, Suwawa District, Bone Bolango District. The reason for choosing this location

is because based on the observation of many men over the age of 17 years who often consume cigarettes when gathering.

Data Type and Source. Primary data were obtained from the results of hemoglobin examination using the EASY TOUCH GCHb tool, secondary data were obtained from literature search, and data from previous researchers and Data sources collected include respondent data obtained from interviews with questionnaire tools and obtained directly at the research site.

Population and Sample The population used in this study was male residents over the age of 17 years active and passive smokers in Bubeya Village in Suwawa District, Bone Bolango Regency totaling 65 people and the sample was part of the population that had characteristics. The samples used in this study were active and passive smoking men. The samples used in this study were 32 samples, which were taken in Bubeya Village, Suwawa District, Bone Bolango Regency with inclusion and exclusion criteria.

Questionnaire Data Collection Technique is a way of collecting data carried out by asking a number of written questions to respondents to obtain a number of information or data. Filling out the questionnaire is done first, the researcher distributes the questionnaire and explains how to fill it out to the respondents, and after the filling is complete the researcher rechecks the questionnaire and laboratory examination is an action and examination procedure with the aim of determining the diagnosis.

The data analysis technique used in the study is the T-Test Sample Test.

A statistical hypothesis is a statistical test of a statement or comparison between two variables. Paired Sample t-Test which is a difference test between two paired samples serves as a statistical hypothesis in this study. The statistical test parameters of paired two samples difference test (Paired Sample t-Test) show that the data is distributed normally, so the procedure begins with a normality test. In addition, if the sample does not follow the normal distribution, the mann-Whitney test, which is a non-premetric statistical test, should be used.

RESEARCH RESULT

Based on research for 2 (two) days conducted in Bubeya Village, Suwawa District, Bone Bolango Regency, starting from September 20, 2023 to September 21, 2023, samples in the form of patient capillary blood were obtained and hemoglobin levels were checked. The samples obtained were 32 samples. Based on the results obtained, it is described in the form of a table along with the following narrative:

Table 4.1. Sample Distribution Based on Passive and Active Smoking

Smokers	Smokers	Frequency	average
active smokers	Usual	7	13.942
	Abnormal	9	11.345
passive smoking	Usual	8	11.9
	Abnormal	8	11.712

Source: Primary Data, 2023

Based on table 4.1 above, it shows that of the 32 respondents examined, the amount of hemoglobin levels from men active smokers and passive smokers each amounted to 16 people. In active smokers who have normal hemoglobin levels of 7 people and abnormal 9 people, and in passive smokers who have normal hemoglobin levels of 8 people and abnormal 8 people.

Table 4.2. Sample distribution by age

Age	Frequency	preaentase
18-24	16	50.0%
25-21	10	31.3%
32-38	6	18.8%
Total	32	100%

Source: Primary Data, 2023

Based on table 4.2 above, the youngest respondents were 18 years old and the oldest

were 38 years old. The most respondents were 18-24 years old, totaling 16 people.

Table 4.3. Distribution of Mann-Withney Test Results Distribution of Mann-Withney Test Results

Metode Pemeriksaan Hemoglobin Levels	Value N	P
Quantitative	32	0.706

Source: Primary Data, 2023

Based on table 4.3 Distribution of Mann-Withney Test Results on hemoglobin level examination using quantitative methods, the results obtained from the mann-withney test are 0.706, which means that based on statistical tests, there is a comparison of hemoglobin levels in active smokers and passive smokers.

DISCUSSION

In this study, hemoglobin levels were compared in active smokers and passive smokers over the age of 17 years in Suwawa sub-district, Bone Bolango district. This research was conducted in Bubeya Village. With a total sample of 32 samples of active smokers and passive smokers, then respondents were given questionnaires where the questionnaire was as supporting data for respondents. after that, blood is drawn and immediately checked hemoglobin levels using the Easy Touch Hemoglobin tool. after obtaining the results the data was tested using the Mann-Withney test.

This study used primary data in the form of questionnaires to obtain data on cigarette consumption and blood tests.the data obtained from the questionnaire also depends on the honesty of respondents and respondents' understanding of the questions asked.

In this study, researchers used capillary blood samples, capillary blood itself, which is blood obtained from very small capillaries where the capillaries end. Blood capillaries are high, heels, fingertips. In this study, researchers used the Mann-Withney Test, which is to find out the presence and absence of differences between the two samples.

Based on the sample of active and passive smokers, it showed that from 32 respondents examined the amount of hemoglobin levels from men active smokers and passive smokers, each amounted to 16 people. In active smokers who have normal hemoglobin levels of 7 people and abnormal 9 people, and in passive smokers who have normal hemoglobin levels of 8 people and abnormal 8 people. There are several factors that affect hemoglobin levels in each individual, namely, USI, gender, nutritional intake, physical activity, and the habit of smoking cigarettes. This study is in line with research conducted by Makawekas this study there is a significant difference where hemoglobin levels are higher in passive smokers, this is because the carbon monoxide content in cigarettes has a binding power to hemoglobin that is greater than oxygen.

Based on the sample of active and passive smokers, it showed that from 32 respondents examined the amount of hemoglobin levels from men active smokers and passive smokers, each amounted to 16 people. In active smokers who have normal hemoglobin levels of 7 people and abnormal 9 people, and in passive smokers who have normal hemoglobin levels of 8 people and abnormal 8 people. There are several factors that affect hemoglobin levels in each individual, namely, USI, gender, nutritional intake, physical activity, and the habit of smoking cigarettes. This study is in line with research conducted by Makawekas this study there is a significant difference where hemoglobin levels are higher in passive smokers, this is because the carbon monoxide content in cigarettes has a binding power to hemoglobin that is greater than oxygen.

Based on the results of the normality test of hemoglobin level examination, passive smokers have higher blood hemoglobin levels than active smokers have hemoglobin levels (0.937) and active smokers (0.396). In research conducted by Wulandari which found that exposure to cigarette smoke can cause a decrease in the number of erythrocytes and hemoglbobin levels. This shows the chemical content contained in cigarette smoke, Carbon Monoxide and Tar can reduce hemoglobin levels. The main component in cigarette smoke is carbon monoxide which can cause tissue hypoxia even if CO2 levels in the air are very high and can cause death. While tar in cigarette smoke for a long time can cause damage to the bone marrow.

Based on the results of the mann-withney text test, the results (0.706) of this examination panda There are several factors that affect hemoglobin levels in each individual, namely: age, sex, nutritional intake, physical activity, altitude of the area where they live, old habits of smoking cigarettes, drugs consumed, and tools and test methods used. Researchers did not review further about several factors that can affect blood hemoglobin levels such as nutritional intake, degree of physical activity, altitude of the area of residence and drugs that have an impact on the value of respondents' hemoglobin levels. Carbon monoxide (CO) has a strong tendency to bind to hemoglobin in red blood cells, this bond is 210-300 times stronger than the bond of hemoglobin with oxygen (oxyhemoglobin). Should

hemoglobin ini berikatan dengan oksigen yang sangat penting untuk pernapasan sel-sel tubuh. Kadar gas CO dalam darah bukan perokok kurang dari 1 persen, sementara dalam darah perokok mencapai 4-15 perse. Penelitian ini sejalan dengan penelitian yang dilakukan oleh Makawekas (2016), terdapat perbedaan yang signifikan antara kadar hemoglobin pada perokok aktif dan perokok pasif mahasiswa semester tujuh Fakultas Kedokteran Universitas Sam Ratulangi Manado.Berdasarkan penelitian ini maka didapatkan ada perbandingan kadar hemoglobin pada perokok aktif dan pasif diatas 17 tahun di kecamatan suwawa, kabupaten bone bolanggo.

CONCLUSION

Based on the results of research that has been conducted, it can be concluded that from 32 respondents consisting of each active and passive smoker, 16 samples were obtained:

1. Active smokers have an average hemoglobin level of 12,481 (g / dL) where normal hemoglobin levels have 7 samples and abnormal there are 9 samples.
2. Passive smokers have an average hemoglobin level of 12,812 (g / dL) where normal hemoglobin levels have 8 samples and abnormal ones have 8 samples.
3. Based on this study, it was found that there was a comparison of hemoglobin levels in active and passive smokers over 17 years old in Suwawa District, Bone Bolanggo Regency. The accepted hypothesis is the Alternative Hypothesis (Ha) and the rejected hypothesis is the null hypothesis (H0)

REFERENCES

[1] Dedy 2021, Gambaran Kadar Hemoglobin (Hb) Pada Perokok Aktif Systematic Review, Karya Tulis Ilmiah, PoltekkesKemenkes Medan Prodi Analis Kesehatan, Medan.
[2] Firmansyah, Rikky 2021, Mudah dan Aktif Belajar Biologi, Setia Purna, Jakarta.
[3] Handayani, Wiwik 2022, Buku Ajar Asuhan Keperawatan pada Klien dengan Gangguan Sistem Hematologi, Salemba Medika, Jakarta.

[4] Kementrian Kesehatan RI 2019, *Jangan Biarkan Rokok Merenggut Nafas Kita*
[5] Kanmanna, Oman 2020, Buku Ajar Biologi, Gravindo Media Pratama, Bandung.
[6] Muttaqin, Arif 2021, Pengantar asuhan Keperawatan Klien dengan Gangguan Sistem Kardiovaskular, Salemba Medika, Jakarta.
[7] Nugraha, Gilang 2015, Panduan Pemeriksaan Laboratorium Hematologi Dasar. Jakarta: CV Trans Info Medika.
[8] Putri 2022, Gambaran Kadar Hemoglobin Pada Perokok Aktif di RT 02 Dusun Wanasari Desa Dauh Puri Kaja Kecamatan Denpasar Utara , Karya Tulis Ilmiah, PoltekkesKemenkes Denpasar Jurusan Teknologi Laboratorium Medis, Denpasar.
[9] Sodikin, 2019, Buku Saku Perawatan Tali Pusat, Buku Kedokteran egc, Jakarta.
[10] Sumardjo, Djamin 2022, Pengantar Kimia Buku Panduan Kuliah Mahasiswa Kedokteran dan Program Strata I Fakultas Bioeksakta, Buku Kedokteran egc, Jakarta.
[11] Yahya, Harun 2020, Ensiklopedia Mukjizat Ilmiah Al-qur'an Keajaiban Darah dan Jantung, Sygma Creative Media Corp, Bandung.