MUKHTABAR
JOURNAL OF MEDICAL
LABORATORY TECHNOLOGY

Overview of Total Cholesterol Levels at Productive Age in the Imbanagara Health Center Working Area

Intan Fandini[1], Undang Ruhimat[1], Rivana Ariyadi[1], Rahayu Nirmatul Mutmainah[1*]

[1] Department of Medical Laboratory Technology, STIKes Muhammadiyah Ciamis, West Java, Indonesia
*Corresponding author: rahayunmutmainah30@gmail.com

ABSTRACT

Background & Objective: Total cholesterol is the total amount of HDL, LDL, and VLDL cholesterol in each deciliter of blood. Risk factors that can affect total cholesterol levels are age, gender, sleep patterns, genetics, physical activity, and body mass index. This study aims to determine the description of total cholesterol levels in productive age in the Imbanagara Health Center Working Area.
Method: This research method is descriptive research with a purposive sampling technique and involves 31 respondents the instrument used is a photometer. This research was conducted in the Imbanagara Health Center working area from May to June 2023.
Result: The results showed that the total cholesterol levels of 31 respondents, were 25 people (81%) with normal total cholesterol levels, 5 people (16%) with high threshold total cholesterol levels, and 1 other person (3%) with high total cholesterol levels.
Conclusion: It can be concluded that of the 31 respondents in the Imbanagara Health Center work area, the average has normal Total Cholesterol results.

Keywords: Physical Activity; Cholesterol; Lipids; Degenerative Diseases; Productive Age.

Introduction

Modern advancements continue to cause changes in people's lifestyles, especially in urban areas. Here are some foods that can cause high cholesterol, such as meat, milk, fried foods, offal, and fast food. Consuming these foods puts you at risk of developing degenerative diseases, one of which is coronary atherosclerotic heart disease. A heart attack is caused by a disease that attacks the blood vessels. Factors that cause heart attack disease with increased cholesterol levels. Cholesterol that accumulates in the blood vessels causes a

disease called atherosclerosis, which is a condition in which the arteries become thinner and stiffer. The impact of narrowing and blockage is that blood circulation to the heart muscle stops, death occurs due to the inability of the heart to continue pumping blood throughout the body (Kamila, 2018). According to WHO, the mortality rate from non-communicable diseases (NCDs) in 2016 was 71%, killing 36 million people per year (WHO, 2016). Non-communicable diseases (NCDs) cause 73% of deaths, from global data in Indonesia 26% occur in productive age (Lestari, 2020).

Productive age is the age when a person is in the optimal physical condition and few are aware or care to take care of their body. The productive age group includes those aged 15-59 years. Lifestyles such as diet and exercise are rarely practiced at this vulnerable age because people generally feel healthy and rarely get serious diseases. In productive age, people are at the peak of their activity. Unconscious hormonal changes in the body, if consumption is not followed properly, can trigger the development of degenerative diseases due to an unhealthy lifestyle (Watuseke, 2016).

The World Health Organization (WHO) states that high cholesterol can increase heart disease and the prevalence of total cholesterol in Southeast Asia increased by 29% (WHO, 2017). The Ministry of Health of the Republic of Indonesia announced through the results of cholesterol coverage that there were 1,297 cases of high cholesterol in West Java province in Indonesia in 2016 at 33.1% (Kemenkes, 2018).

Elevated cholesterol levels lead to coronary heart disease, hypercholesterolemia, atherosclerosis, stroke, and high blood pressure. Cholesterol is influenced by several risk factors, including family history of hyperlipidemia, age, gender, obesity, alcohol consumption, smoking, lack of exercise, and body mass index (Al-Rahmad AH, 2018).

Total cholesterol and increased BMI are interrelated. The prevalence of hypercholesterolemia in men in Indonesia is 11.4% and for women, it is 13.4% (Musdalifa, 2017). Hypertension is now more common, rising from 25.8% in 2013 to 34.1% in 2018. West Java with a frequency of 1.6% has the highest rate. This prevalence shows that the level of hypertension has increased every year (Riskesdas, 2021). Based on data from the health profile of Ciamis Regency in 2022, hypertension ranked first among the 10 most common diseases at the Ciamis Regency Health Center in 2022 as many as 46,476, the prevalence with the number of patients in the work area of UPTD Puskesmas Imbanagara was 7,981 hypertensive patients, Tambaksari as many as 7,356, Cimaragas as many as 5,243 patients. This shows that there is a need to suppress the incidence of hypertension in the UPTD Puskesmas Imbanagara. One of the causes of hypertension is high total cholesterol (Dinkes Ciamis, 2022).

Preliminary studies that have been conducted at the Imbanagara Health Center show that in addition to infectious diseases, people must also prevent non-communicable diseases such as hypertension with 7,981 cases. One of the causes of hypertension is high blood cholesterol. The results of observations and interviews with several people in the Imbanagara Health Center Working Area show that many consume cholesterol foods, such as fatty foods, fast food, poor sleep patterns, and lack of exercise they are not aware of cholesterol with its dangers. So they ignore the signs and symptoms they know.

Objective
To determine the picture of total cholesterol levels in productive age in the Imbanagara Health Center Working Area, Ciamis District.

Metode
The research design used was descriptive and conducted in May-June 2023. The population of this research is people of productive age in the working area of the Imbanagara Health Center as many as 31 samples. Respondents aged 30-50 years old and determined by purposive sampling.
Total cholesterol examination was conducted by the GOD-PAP method with End Point reaction using a photometer 5010 with a wavelength of 546 nm.

Result
Based on the research data regarding the description of total cholesterol levels in productive age, the researchers describe the results of the study as follows.

TABLE 1. Characteristics of Respondents

Characteristic	Σ	Percentage (%)
Gender		
Male	6	19,4
Female	25	80,6
Age		
30-39	8	25,8
40-50	23	74,2
Body Mass Index		
Skinny	1	3,2
Normal	22	71,0
Fat	8	25,8
Physical Activity		
Lightweight	8	25,8
Medium	14	45,2
Heavy	9	29,0
Sleep Pattern		
Less	6	19,4
Simply	25	80,6

TABLE 2. Overview of Total Cholesterol Levels of Respondents

Respondents	Σ	Percentage (%)
Normal	25	81
High Threshold	5	16
High	1	3

Based on Table 2, the results showed that the number of respondents with high threshold total cholesterol (200-239 mg/dL) was 5 people (16%) and high total cholesterol was 1 person (3%).

Discussion
It is known that the results of measuring high total cholesterol levels are as many as 1 person (3%). While the high threshold cholesterol level is as many as 5 people (16%). Normal cholesterol levels were 25 people (81%). This study relates age to cholesterol levels, of the 31 respondents reported who had high threshold cholesterol levels and high cholesterol with age characteristics of 33-50 years totaling 6 respondents (19%). Respondents aged > 33 years have a higher risk of abnormal total cholesterol than the age group < 33 years. The age group between 30 to 59 years is one of the risk factors for cardiovascular disease. The results of other studies show that age affects total cholesterol levels. (Musdalifa, 2017).
According to Jirna Nyoman (2017) Cholesterol levels in the body are affected by a variety of circumstances, both under control and outside of it. Being overweight, lack of physical activity, eating a high-fat diet, stress, and leading an unhealthy lifestyle are examples of controllable factors. On the other hand, nothing can be done about factors like age and genetics. Healthy lifestyle changes and regular exercise can lower the body's overall cholesterol levels.

The results of this investigation show that most productive age people in the Imbanagara Health Center Working Area in Cibodas hamlet RW 24 have normal total cholesterol levels. This is influenced by several other aspects of the response that cannot be seen by researchers, such as how they consume food. One of the risk factors that affect total cholesterol levels is gender.

The study showed that of the 31 respondents, the most women-dominated 26 people (84%) with high and high threshold cholesterol levels, namely as many as 6 people. Indicates that women are at risk of having high cholesterol compared to men. According to research Ritan (2018), states that women dominate compared to men because women produce more heterogenous hormones resulting in the accumulation of fat in the formation of hips and breasts. On average women have higher fat reserves compared to men, this problem causes the potential for obesity which will result in the formation of high cholesterol levels in the body.

Four samples had a low body mass index and one sample had high total cholesterol. There were 21 samples with normal body mass index and 2 samples with high threshold cholesterol levels. The later sample consisted of 3 people with high threshold cholesterol levels and 6 people with obese BMI. In other words, there was no relationship between total cholesterol levels and body mass index. According to Shabah & Dhanny (2021), Body mass index shows that obesity does not always lead to high cholesterol. Eating foods high in cholesterol is more likely to result in high cholesterol than obesity. Physical activity can reduce total cholesterol levels in the body.

Respondents who did moderate and heavy physical activity totaled 25 people, with normal cholesterol levels due to frequent physical activity so that fat burning occurs under the skin and a healthy lifestyle. Respondents who did light physical activity amounted to 6 people and had high cholesterol levels of 1 person and high threshold cholesterol levels of 5 people.

Based on the results of research conducted by Zahroh (2021), the more physical activity, the more ATP while exercising which can increase HDL cholesterol while lowering total and LDL cholesterol. The observed correlation was in the opposite direction suggesting that the lower the intensity of physical exercise, the higher one's blood cholesterol levels. Respondents who performed light physical activity showed higher cholesterol levels than those who increased heavy physical activity and adequate sleep patterns.

It is known that the sleep pattern < 7 hours (less) in as many as 5 people who have high threshold total cholesterol levels and high total cholesterol 1 person. Samples who have a short sleep duration are at three times the risk of high cholesterol compared to samples with a long sleep time. Sleep patterns <7 hours can disrupt the endocrine system, resulting in decreased reprin secretion and increased ghrelin, which can lead to increased appetite. Excessive appetite triggers fat storage, increasing total cholesterol levels. As a result of disrupted sleep, it leads to increased psychosocial stress and changes in diet (Alefishat, 2018).

Sample examination using the CHOD-PAP method. The pre-analytic stage records the patient's identity, fills out the questionnaire, approves the sampling sheet, and special preparation for the respondent, namely fasting for 10-12 hours. After fasting, the researcher starts taking the patient's blood, recording the sampling time, and preparing tools and materials. The analytical stage, namely conducting quality control on the examination of control materials, obtained results with a value of 184 mg/dL between

the range of 151-197 mg/dL. The quality control results are used to ensure that the instrument used to test the sample complies with the specification requirements and provides reliable laboratory results. After the tool system is validated, the results issued are good for diagnosis (Wicaksono, 2019). Lipemic serum was not examined because of the high level of fat in the blood, appearing milky white. Next, for total cholesterol examination after blood clotting, the blood sample was centrifuged for 10 minutes at 3000 rpm. Separate the serum then check the total cholesterol according to the attached insert kit procedure. The post-analytical stage is recording and reporting the results of the examination.

One of the difficulties and challenges faced in this study was not analyzing several factors that affect the results of the total cholesterol examination including the type of food and the nutritional value of the food consumed. The existence of food types such as fatty foods, offal, and fast food becomes recall bias, which occurs when interview data is collected because respondents have difficulty remembering actions from seven days ago, which is one of the elements that determine total cholesterol levels.

Conclusion
The results can be concluded that showed that the total cholesterol levels of 31 respondents, 25 people (81%) with normal total cholesterol levels, 5 people (16%) with high threshold total cholesterol levels, and 1 other person (3%) with high total cholesterol levels.

Conflict of Interest
There is no conflict of interest in this study.

Reference

1. Al-Rahmad AH. (2018). Faktor resiko kadar kolesterol darah pada pasien rawat jalan penderita jantung koroner di RSUD Meuraxa. *Action: Aceh Nutrition Journal*, *3*(2), 132-135. https://doi.org/10.30867/action.v3i2.113

2. Firmansyah, A., Setiawan, H., & Ariyanto, H. (2021). Studi Kasus Implementasi Evidence-Based Nursing: Water Tepid Sponge Bath Untuk Menurunkan Demam Pasien Tifoid. *Viva Medika: Jurnal Kesehatan, Kebidanan Dan Keperawatan*, *14*(2), 174–181.

3. Kamila, L., & Salim, M. (2018). Hubungan Kadar Kolesterol Total Dan Hipertensi Dengan Kejadian Penyakit Jantung Koroner DI RSUD dr. Soedarso Pontianak. *Jurnal Laboratorium Khatulistiwa*, *1*(2), 99-101 https://doi.org/10.30602/jlk.v1i2.144

4. Kemenkes. (2018). *Hipertensi Membunuh Diam-diam Ketahui Tekanan Darah Anda*.

5. Lestari, R., Warseno, A., Trisetyaningsih, Y., Rukmi, D. K., & Suci, A. (2020). Pemberdayaan Kader Kesehatan Dalam Mencegah Penyakit Tidak Menular Melalui Posbindu Ptm. *Adimas: Jurnal Pengabdian Kepada Masyarakat*, *4*(1), 48-51. https://doi.org/10.24269/adi.v4i1.2439

6. Musdalifa, N. R., S. Wicaksono, & Tien. (2017). Hubungan Indeks Massa Tubuh dengan Kadar Kolesterol Total pada Staf dan Guru SMA Negeri 1 Kendari. *E-Journal UHO*, *4*(2), 361–367. http://ojs.uho.ac.id/index.php/medula/article/view/2813. diakses pada tanggal 14 April 2021.

7. Riset Kesehatan Dasar (Riskesdas). (2021). *Penyakit Jantung Koroner Didominasi Masyarakat Kota*. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembagan Kesehatan. 482-483. https://sehatnegeriku.kemkes.go.id/baca/umum/20210927/5638626/penyakit-

jantung-koroner-didominasi-masyarakat-kota/

8. Setiawan, H., Ariyanto, H., Firdaus, F. A., & Khaerunnisa, R. N. (2021). pendidikan kesehatan pencegahan skabies di pondok pesantren al-arifin. *Martabe*, *4*(1), 110–117.

9. Theofanidis, D. (2007). Chronic illness in childhood: psychosocial adaptation and nursing support for the child and family. *Health Science Journal*, *1*(2), 1–9.

10. Watuseke, A. E., Polii, H., & Wowor, P. M. (2016). Gambaran kadar lipid trigliserida pada pasien usia produktif di. *Jurnal E-Biomedik*, *4*(2), 2–6.

11. WHO. (2017). *Cardiovascular diseases (CVDs)*. http://www.who.int/mediacentre/factsheets/fs317/en/

12. World Health Organization. (2016). Global Report on Diabetes. *Isbn*, *978*, 88. https://doi.org/ISBN 978 92 4 156525 7