LIGHTHOUSE

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The Influence of Lifestyle on Cholesterol Levels

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ABSTRACT

The Epidemic of Non-Communicable Diseases (NCD) Obesity has doubled since the 1980s, rapidly becoming the largest global public health challenge. Obesity is the third leading cause of death in the world. The increase in obesity rates is associated with an individual's habit of consuming food with more energy than the body needs. Risk factors that can influence the increase in the prevalence of heart disease involve individuals with hypertension, diabetes mellitus, dyslipidemia, lack of physical activity, poor lifestyle habits such as consuming fast food, an unhealthy diet, and experiencing prolonged stress. This can be changed with a better lifestyle, while some risks that cannot be changed are congenital or genetic heart disease. Research Objective: reduce the death rate caused by heart disease by reducing the risk of heart disease. The sampling technique used is random sampling with a cross-sectional approach, and the examination sample consists of capillary blood, measurements, and interviews using questionnaires. Out of 130 people in Nisa Village, a significant relationship was found between an increase in cholesterol levels and respondents who frequently consume fast food. Subjects who were active/passive smokers had a significance value of 0.65 ($p>0.05$), indicating a strong relationship according to correlation guidelines. Subjects who frequently experienced stress also had a strong relationship with an increase in blood cholesterol levels, with a significance value of 0.34 ($p>0.05$). The variable of subjects who rarely exercised was found to have a significance value of 0.38 ($p>0.05$), meaning that the habit of infrequent exercise has a strong relationship with an increase in cholesterol levels

Introduction

The Epidemiology of Non-Communicable Diseases (NCDs) Obesity has doubled since the 1980s, with obesity rapidly becoming the biggest global public health challenge. Obesity is the third leading cause of death worldwide. Generally, the increase in obesity rates is associated with individuals' habits of consuming food with energy amounts exceeding bodily needs. According to a survey by the Ministry of Health, in 2023, 23.4% of the adult population in Indonesia (aged >18 years) will be obese. In previous research, Eka and Husna, 2016, stated that there is a relationship between lifestyle and the ability to control cholesterol levels in hypercholesterolemia patients. According to Rikesda 2016, cited by WHO, adults aged 18 and above in Indonesia have an obesity prevalence of 28.7% with Body Mass Index (BMI) > 25, and 15.4% are obese (BMI > 27). Based on SIRKESNAS 2016 dalam Edi Ardiansyah 2021 data, obesity remains uncontrolled, with BMI > 27 rates increasing to 20.7%, while BMI > 25 has increased to 33.5%. Obesity can be caused by various factors, including genetic factors, environmental/lifestyle factors (dietary patterns and physical activity), and medication factors such as the use of steroid and osteoarthritis medications, which can increase the risk of obesity if consumed over a long period. The metabolic impact of obesity will have an impact on increasing triglycerides and decreasing HDL cholesterol, increasing blood pressure, which is called metabolic syndrome. Other impacts that can be experienced are asthma, osteoarthritis in the knees and hips, gallstone formation, sleep apnea, low back pain. (Ministry of Health of the Republic of Indonesia, 2018).

According to doctor diagnoses in Indonesia in Windy et al. (2018), the prevalence of coronary heart disease in individuals aged over 15 years was 0.5%, estimated at around 883,447 individuals, with severe symptomatic patients accounting for 1.5%, totalling approximately 2,650,340 diagnosed individuals. Based on the Basic Health Research data from the Ministry of Health and population data from West Java, the highest number of coronary heart disease patients is 160,812, followed by Central Java and East Java populations. West Nusa Tenggara has 6,405 cases of coronary heart disease. Meanwhile, provinces with low prevalence of coronary heart disease are found in North Maluku and West Papua According to data from the Central Bureau of Statistics in 2020. In West Nusa Tenggara, particularly in Bima, District of Woha, Tente Village, services like GoFood have not yet reached but the number of coronary heart disease cases is very high, this must be overcome immediately because it provides a greater opportunity in the next 10 years when go-food has started to be actively used. Therefore, this study was conducted to see the effect of lifestyle on increasing cholesterol levels.

Literature review

Plaque buildup in the coronary arteries carrying oxygen to the heart muscle usually causes coronary heart disease (CHD) (Wahidah and Harahap, 2021). There are some key points about coronary heart disease: the primary cause of CHD is the buildup of atherosclerotic plaques (narrowing of blood vessels by fats, cholesterol, and other substances) on the walls of the coronary arteries. This can impede blood flow to the heart muscle. Risk Factors: Non-modifiable Factors: Age, gender (men have a higher risk), and family history. Modifiable Factors: Smoking, high blood pressure, high cholesterol, diabetes, obesity, lack of physical activity, and unhealthy eating habits. Symptoms experienced include chest pain (angina) that may radiate to the arms, neck, or back. Shortness of breath. Unusual fatigue. Nausea and vomiting. Cold sweats, myocardial infarction, and ischemia. (Wahidah and Harahap, 2021).

Diagnosis that can be conducted includes an Electrocardiogram (EKG) examination. Blood tests to measure heart enzyme levels. Imaging tests such as coronary angiography to assess blood vessel conditions. Prevention and Management include adopting a healthy lifestyle, including a balanced diet and regular exercise. Controlling risk factors such as blood pressure, cholesterol, and diabetes. Quitting smoking. Medications are prescribed by doctors to manage symptoms and control risk factors. Importance of Early Detection: Early detection and appropriate intervention are crucial to prevent serious complications, such as heart attacks. Importance of Healthy Lifestyle: Adopting a healthy lifestyle is a key step in preventing coronary heart disease. (Hasanah, et al., 2023).

Coronary Heart Disease (CHD) is a condition that arises due to the accumulation of plaque in the coronary arteries that supply oxygen to the heart muscle. CHD is not an infectious disease, but if left untreated, it can lead to decreased community productivity because individuals may not be able to participate in activities. CHD is not fully known to be curable; however, pain and heart attacks can be controlled. (Wahidah and Reni, 2021). Cardiovascular Disease (CVD) is a health problem that causes failure or damage to heart function and blockage of blood flow. CVD often occurs in developed countries or countries with advanced industry and technology due to the prevalence of unhealthy lifestyles. Heart disease has several types, one of which is caused by the narrowing of coronary arteries due to the accumulation of fat deposits within and around the cells lining the coronary artery walls, leading to blockage of blood flow. (Alham et al., 2021).

Classification of Coronary Heart Disease risk factors according to Ghani et al. 2016 categorizes Coronary Heart Disease risk factors into 2 main factors: Modifiable and Non-modifiable factors. Non-modifiable factors include gender, age, race, and family history of heart problems. Meanwhile, controllable risk factors are divided into 2 main factors (Primary Risk Factors): lack of physical activity, high blood pressure (Hypertension), abnormal blood lipid levels (Dyslipidemia), smoking habits, history of obesity (Obesity), unhealthy eating patterns, and Diabetes Mellitus according to Narun Pakay, 2022.

Method

The method used in this study is descriptive-analytical with an observational approach using purposive sampling method. The participants used in this research sample are residents of Desa Nisa, Kec. Woha, Kab. Bima, Nusa Tenggara Barat. The total population used is 130 samples based on the total population in Desa Nisa. Data collection was carried out in Desa Nisa, Kec. Woha, Kab. Bima, Nusa Tenggara Barat because based on a survey in 2021, the Go-Food application could not be accessed in Desa Nisa, but the obesity rate in Bima is quite high. The data collection techniques for cholesterol levels were measured using POCT, BMI using a digital BMI tool by comparing weight and height. Additionally, a questionnaire was used to collect more in-depth data to delve into their lifestyle. The data collected were analyzed descriptively to obtain the characteristics of cholesterol levels and BMI of the participants. Statistical analysis was then conducted to determine the relationship between lifestyle and cholesterol, using tests for normality, followed by homogeneity tests and Two-way ANOVA tests. The characteristics examined in this study are related to factors influencing lifestyle in Desa Nisa.

Results

The results of the study using a sample of 130 samples conducted in Nisa Village, Woha District, Bima Regency, West Nusa Tenggara Province. Of the 130 samples obtained, 83 samples had cholesterol levels above normal values and 47 samples from 130 samples were obese. In this study, research was conducted by linking five habits from lifestyle, namely body mass index, fast food consumption habits, smoking habits, stress control habits, and routine exercise habits. The test was continued with Homogeneity tests are conducted to assess respondent homogeneity. Dilanjtukan dengan Two-way ANOVA tests are conducted to evaluate the influence of lifestyle on cholesterol level increases.

Table 1. Homogeneity test of respondent characteristics

Habit Factor	Sig.
Body Mass Index	0.452
fast food consumption habits	0.568
Smoking Habit	0.084
habit of having difficulty controlling stress	0.044
Regular Exercise Habits	0.200

From the homogeneity data, a significant value of more than 0.005 was obtained, which means that the data is normally distributed and an ANOVA test will be carried out to see the effects that occur.

Table 2. ANOVA test of the influence of lifestyle on cholesterol levels

Habit Factor	Sig.
Body Mass Index	0.007
fast food consumption habits	0.655
Smoking Habit	0.579
habit of having difficulty controlling stress	0.117
Regular Exercise Habits	0.003

From Table 2, the results of the mass index value are 0.007, fast food consumption habits 0.655, smoking habits 0.655, habits of having difficulty controlling stress 0.117 which shows that it is greater than 0.005 and regular exercise habits 0.003 which is smaller than 0.005.

Discussion

In Table 1, regarding the homogeneity test characteristics using 130 samples, a significance value greater than 0.005 was obtained, indicating homogeneity for all samples tested. Thus, the two-way ANOVA test can proceed to determine the test results. In Table 2, a two-way ANOVA test was conducted with 130 samples. The criteria given for this test state that if the significance value is less than 0.005, it can be concluded that lifestyle influences cholesterol levels.

For the first criterion, body mass index (BMI) yielded a significance value of 0.007, which is greater than 0.005, indicating no influence of increased cholesterol levels with BMI. This aligns with the study by Wahyuni Tri and Diansabila (2020), which found no significant relationship between increased BMI and cholesterol levels. High cholesterol levels are not always influenced by BMI but can be affected by other factors such as smoking, long-term medication use, physical activity, and others. However, the study by Musdalifah et al. (2017) on the relationship between BMI and total cholesterol levels among staff and teachers at SMA Negeri 1 Kendari showed significant differences due to excessive BMI or obesity. This indicates that more fat is stored in the body, and more fat is found in the blood. This factor contributes to the differences in measurements with other studies.

Similarly, for the second criterion, consuming junk food resulted in a value of 0.655, also greater than 0.005, indicating no influence on cholesterol levels. This study does not align with the study by Aisya et al. (2021) on the relationship between the habit of consuming junk food and the incidence of coronary heart disease in outpatients at Dr. Moewardi Hospital. The habit of consuming junk food, which is low in fiber, high in calories, high in fat, high in protein, and high in salt, can influence cholesterol buildup and result in coronary heart disease. The type of junk food, duration, or frequency of consumption can affect the differences in this study.

The third criterion, smoking categorized as light, moderate, and heavy, yielded a significance value of 0.579, again greater than 0.005, suggesting no influence on cholesterol levels. This study does not align with the study by Fahmawati Dina (2019) on the differences in consumption levels and blood cholesterol levels between smokers and non-smokers. However, it aligns with the study by Lestari et al. (2020) on the relationship between exercise habits, waist-hip ratio, and smoking habits with total cholesterol levels in cardiac clinic patients, which found no significant influence on cholesterol increase in smokers. The increase in cholesterol levels in smokers depends on the number of cigarettes smoked per day; the higher the number consumed, the higher the cholesterol levels. Additionally, the duration of smoking also affects this, contributing to differences in this study.

The fourth criterion, stress categorized as mild, moderate, and severe, resulted in a significance value of 0.117, still greater than 0.005, indicating no influence on cholesterol levels. This study aligns with the study by Lainsamputty et al. (2022) on the correlation between lifestyle and stress in hypercholesterolemia patients, which stated that there is no significant relationship between increased cholesterol and stress. However, this study is not supported by the study by Anakonda S et al. (2019) on the relationship between exercise activity and cholesterol levels in coronary patients, which found that high or low cholesterol levels are also influenced by unstable emotional conditions or stress. High-stress levels are associated with increased free fatty acids in plasma blood. Increased triglycerides and cholesterol transported by VLDL contribute to increased cholesterol levels in blood circulation. However, it is also supported by the study by Thristy Isra et al. (2020) on the depiction of stress levels and HDL cholesterol blood levels in medical students, which found no increase in cholesterol in stressed students before exams. Individuals with psychological disorders do not pay attention to their physiology and do not manage their food intake well, not increase cholesterol levels.

However, for the fifth criterion, regular exercise with the same categories yielded a significance value of 0.003, which is less than 0.005, suggesting an influence between increased cholesterol levels and the lifestyle of regular exercise. This study aligns with the study by Hengkengbala et al. (2013) on the effect of aerobic exercise on high-density lipoprotein (HDL) cholesterol in overweight men, which found an increase in HDL levels. It also aligns with the study by Anakonda S et al. (2019) on the relationship between exercise activity and cholesterol levels in coronary patients, which found a relationship between exercise activity and cholesterol levels where exercise can increase HDL and decrease LDL due to increased production and activity of enzymes involved in cholesterol transport. Increasing the activity of lipoproteins that carry triglycerides speeds up the transfer of components from other lipoproteins to HDL. This factor contributes to differences in this study.

Conclusion

Develop a habit of regularly checking cholesterol levels, at least every month, to control and stabilize cholesterol levels for overall body health. Although this study did not find a correlation between increased cholesterol and the consumption of fast food or junk food, it is advisable to reduce the consumption of fast food. Engage in regular exercise at least once a week, manage stress by following tutorials available on YouTube, books, or articles and journals internally, and reduce or eliminate smoking habits to maintain metabolic stability. Increase physical activity because based on this research, physical activities like regular exercise can help lower cholesterol levels in the blood. In future research, it would be beneficial to conduct comparative studies based on age and gender.

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