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Correlation of Total Cholesterol Levels with Fasting Blood Sugar in Adolescents

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Abstract **Original Research Article**

Nowadays, teenagers have a habit of eating ready-to-eat food or drinks such as fast food and instant food which can be a problem for health [1]. The state of insulin resistance or metabolic syndrome and type 2 DM can cause lipid metabolism disorders such as increased blood cholesterol levels [2]. The purpose of this study was to determine the correlation between total cholesterol and fasting blood sugar levels in adolescents. This study was conducted in the form of an analytic survey with a cross-sectional study design. Data were processed using the SPSS program. The study population was all students of SMAN 1 Amurang, South Minahasa Regency, samples were taken by total sampling. From 87 samples, the minimum total cholesterol level was 125 mg/dL and the maximum cholesterol level was 143 mg/dL. The average total cholesterol level was 185.97 mg/dL. The average fasting blood sugar level is 92.60 mg/dL. Based on the results of the Pearson correlation test, the correlation coefficient (R = 0.210) was obtained with a significance of 0.051 for the correlation between total cholesterol levels and fasting blood sugar levels. These results show that there is no statistically significant relationship between total cholesterol levels and fasting blood sugar. It can be concluded that there is no relationship between total cholesterol levels and fasting blood sugar levels in adolescents in Amurang, South Minahasa Regency.

Keywords: Total cholesterol, fasting blood sugar, and adolescents.

INTRODUCTION

Degenerative diseases such as diabetes are increasing sharply, which is a concern for the government [3]. Elevated total cholesterol is a risk factor for cardiovascular diseases such as ischemic heart disease and stroke in both developed and developing countries [4]. The global prevalence of elevated total cholesterol levels in 2008 among adults was 39% (37% for men and 40% for women) [5]. About 38% of American adults have high cholesterol (total blood cholesterol ≥ 200 mg/dL) [6]. Elevated cholesterol can occur if a person has other risk factors such as Diabetes Mellitus (DM), resulting in a condition where cholesterol accumulates in the walls of arterial blood vessels (atherosclerosis) [7].

MATERIALS AND METHODS

This study was an analytic observational study with a cross-sectional design. Research permit and Ethical Clearance were obtained from the Research Ethics Committee of the Faculty of Medicine, Sam Ratulangi University, Manado. The research was conducted at SMAN 1 Amurang, South Minahasa Regency, and was conducted from May 2023 to October 2023. The population in this study were all students of SMAN 1 Amurang. The study subjects were students who met the following inclusion criteria: 12-24 years old, willing to be respondents and signed informed consent. The sampling technique was non-random sampling (purposive sampling). The examination of total cholesterol and blood sugar levels was carried out by taking blood samples in a rapid test from the capillary. Measurement of total cholesterol and fasting blood sugar levels using Autocheck.

RESULTS AND DISCUSSION

The study was conducted on 87 adolescents aged 15-17 years attending SMAN 1 Amurang who had signed the informed consent. The minimum age of respondents was 16 years old, the maximum was 18 years old. The average age was 16.37 years. The minimum respondent height was 144 cm, the maximum was 171 cm. The average height was 158.57 cm. The minimum respondent weight was 40 kg, maximum 0f 75 kg. The average body weight was 52.66 kg. The

minimum Body Mass Index (BMI) was 14.02 and the maximum was 29.27. The mean BMI was 21.0093. The lowest total cholesterol level was 125 mg/dL, and the highest was 143 mg/dL. The average total cholesterol level was 185.97 mg/dL. The lowest fasting blood sugar level was 80 mg/dL, and the highest was 125 mg/dL. The average fasting blood sugar level was 92.60 mg/dL.

Table 1: Characteristics of respondents

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Age	87	16	18	16.37	.573
Height	87	144	171	158.57	6.133
Weight	87	40	75	52.66	8.921
Body Mass Index	87	14.02	29.27	21.0093	3.78754
Cholesterol level	87	125	243	185.97	23.460
Glucose level	87	80	125	92.60	
Valid N (listwise)	87				

Gender				
		Frequency	**Percent**	**Valid Percent**
Valid	**Man**	**31**	**35.63**	**35.63**
	Woman	**56**	**64.37**	**64.37**
	Total	**87**		

The relationship between total cholesterol and fasting blood sugar levels;

Based on the results of the Spearman correlation test, the correlation coefficient (R = 0.210) was obtained with a significance of 0.051 for the correlation between total cholesterol and fasting blood sugar levels. These results indicate that there is no statistically significant relationship between total cholesterol levels and fasting blood sugar levels. These results also show that there is no statistically significant relationship between total cholesterol levels and fasting blood sugar levels.

Correlation				
			Cholesterol level	**Glucose level**
Spearman's rho	Cholesterol level	Correlation Coefficient	1.00	.210
		Sig (2-tailed)	-	.051
		N	87	87
	Glucose level	Correlation Coefficient	.210	1.00
		Sig (2-tailed)	.051	-
		N	**87**	**87**

CONCLUSION

Based on the results of the study, it is concluded that there is no relationship between total cholesterol levels and fasting blood sugar levels in adolescents in South Minahasa Regency.

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