

Correlation of Serum Sodium Levels with Blood Pressure in Adolescents in Amurang, South Minahasa District

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DOI: [10.36347/sjams.2022.v10i12.008](https://doi.org/10.36347/sjams.2022.v10i12.008)

| Received: 17.10.2022 | Accepted: 29.11.2022 | Published: 03.12.2022

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Abstract

Original Research Article

Sodium intake is very important in the mechanism of increasing blood pressure [1]. The effect of sodium intake in increasing blood pressure is through an increase in plasma volume (body fluid) and blood pressure [2]. The research was conducted in the form of an analytic survey with a cross-sectional study design. The data were processed using the SPSS program. The population is all students of SMAN 1 Amurang, South Minahasa District, the sample is taken by total sampling. From 67 samples, the minimum sodium content was 137 mEq/L and the maximum sodium content was 164. The average Na content was 143.54 mEq/L. The average systolic blood pressure was 119.04 mmHg and the average diastolic blood pressure was 79.70 mmHg. Based on the results of the Spearman correlation test, the correlation coefficient value ($R = 0.069$) with a significance of 0.579 for the correlation between sodium levels and systolic pressure. These results indicate that there is no statistically significant relationship between Na levels and systolic blood pressure. For the other Spearman correlation test results, the correlation coefficient value ($R = -0.089$) with a significance of 0.473 for the correlation between sodium levels and diastolic pressure. These results also show that there is no statistically significant relationship between sodium levels and diastolic blood pressure. It can be concluded that there is no relationship between serum sodium levels and blood pressure in adolescents in Amurang, South Minahasa District.

Keywords: Sodium, Blood pressure, and Adolescent.

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INTRODUCTION

Blood pressure is the force required for blood to flow in the blood vessels and circulate to all tissues of the human body [3]. Systolic blood pressure is defined as blood pressure when the heart is constricted, while diastolic blood pressure is defined as blood pressure when the heart relaxes again [4]. Sodium intake is very important in the mechanism of increasing blood pressure [5]. The effect of sodium intake on increasing blood pressure is through an increase in plasma volume (body fluid) and blood pressure [6]. Consuming salt (sodium) causes thirst and encourages us to drink. This increases the volume of blood in the body which means the heart has to pump harder so that blood pressure rises [7].

MATERIALS AND METHODS

This research is an analytic observational study with a cross-sectional design. Research permits 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 District, and carried out from March 2022 to October 2022. The population in this study were all students of SMAN 1 Amurang. Subjects were students who met the following inclusion criteria: 12-24 years old, willing to become respondents, and signed the informed consent. The sampling technique was non-random sampling (purposive sampling). Examination of serum sodium levels is done by taking a blood sample from a vein in the cubital fossa. Measurement of blood pressure using a sphygmomanometer while measurement of sodium levels using an electrolyte analyzer.

RESULTS AND DISCUSSION

Blood samples were taken from 67 adolescents aged 15-17 who studied at SMAN 1 Amurang signed and informed consent. The Normal sodium level is 135-145 mEq/L. Blood pressure is normal if the systolic blood pressure is 120-130 mmHg and the diastolic pressure is 80-85 mmHg. Adolescents in this study followed the WHO criteria, aged 12-24 years.

Table 1: Characteristics of respondents by Age

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	67	15	17	16.30	.798
height	67	137	174	153.33	6.531
weight	67	30	97	55.24	14.764
Body Mass Index	67	9.91	41.08	23.7166	6.90778
Sodium level	67	137	164	143.54	4.943
Systole	67	90	140	119.04	9.632
Diastole	67	60	105	79.70	9.663
Valid N (listwise)	67				

Gender				
		Frequency	Percent	Valid Percent
Valid	Man	31	46.3	46.3
	Woman	36	53.7	53.7
	Total	67	100.0	100.0

The lowest respondent's age is 15 years, the highest is 17 years. The average age is 16.30 years. The lowest sodium level is 137 meq/L, and the highest is 164 meq/L. Mean serum sodium level 143.54 meq/L. The lowest systolic blood pressure was 90 mmHg, and

the highest was 140 mmHg. The mean systolic blood pressure was 119.04 mmHg. The lowest diastolic blood pressure was 60 mmHg, and the highest was 105 mmHg. The average diastolic blood pressure is 79.70 mmHg.

Correlations						
			IMT	Kadar Na	Sistole	Diastole
Spearman's rho	Body Mass Index	Correlation Coefficient	1.000	-0.419**	-0.074	-0.120
		Sig. (2-tailed)	.	0.000	0.550	0.335
		N	67	67	67	67
	Sodium level	Correlation Coefficient	-0.419**	1.000	0.069	-0.089
		Sig. (2-tailed)	0.000	.	0.579	0.473
		N	67	67	67	67
	Systole	Correlation Coefficient	-0.074	0.069	1.000	0.053
		Sig. (2-tailed)	0.550	0.579	.	0.673
		N	67	67	67	67
	Diastole	Correlation Coefficient	-0.120	-0.089	0.053	1.000
		Sig. (2-tailed)	0.335	0.473	0.673	.
		N	67	67	67	67

Relationship of Sodium (Na) Levels with Blood Pressure (Systole and Diastole):

Based on the results of the Spearman correlation test, the correlation coefficient value ($R = 0.069$) with a significance of 0.579 for the correlation between Na levels and systolic pressure was obtained. These results indicate that there is no statistically significant relationship between Sodium levels and systolic blood pressure. For the other Spearman correlation test results, the correlation coefficient value ($R = -0.089$) with a significance of 0.473 for the correlation between Sodium levels and diastolic pressure was obtained. These results also show that there is no statistically significant relationship between Na levels and diastolic blood pressure.

CONCLUSION

Based on the results of the study, it was concluded that there is no correlation between serum

sodium levels and blood pressure in adolescents in South Minahasa District.

ACKNOWLEDGMENTS

Acknowledgments to Sam Ratulangi University which has provided grants for the implementation of this research, as well as to all students at SMAN 1 Amurang who have been the subjects of this research.

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