CORRELATION BETWEEN BEHAVIOR AND BLOOD PRESSURE AND BLOOD GLUCOSE LEVEL IN TADUKAN RAGA VILLAGE, STM HILIR DISTRICT, DELI SERDANG IN 2019

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ABSTRACT

This study was conducted to determine the correlation between behavior and blood pressure and blood glucose level inTadukan Raga village population, STM Hilir District, Deli Serdang. This is a quantitative study that used a descriptive method and cross-sectional approach with dependent and independent variables. The samples were collected at the same time to determine the effect of the independent variable onthe dependent variable. This study used a total sample of 100 participants. The location taken for this study was Tadukan Raga Village, STM Hilir District, Deli Serdang, North Sumatera. This study was conducted from November 2019 until the end of the study. Data were collected using a structured interview based on a previously compiled questionnaire guide and measurement of blood glucose and blood pressure. The data were analyzed using chi-square and obtained a p-value of 0.013. The p-value was < 0.05, thus Ho was rejected, and Ha was supported. There was a correlation between behavior and blood glucose level in Tadukan Raga population, STM Hilir District, Deli Serdang. The conclusion of this study was there was a correlation between behavior and blood pressure and blood glucose level in Tadukan Raga population, STM Hilir District, Deli Serdang.

Keywords: *Behavior, Blood Pressure, Blood Glucose Level*

1. Introduction

Blood pressure is a factor that can be utilized as an indicator to assess the cardiovascular system. Blood pressure is affected by several factors, including changes in body position and physical activities. According to WHO (World Health Organization), hypertension is a condition of increased blood pressure above the normal threshold of 120/80 mmHg. The limit of normal blood pressure is less than 130/85 mmHg. Blood pressure that surpasses 140/90 mmHg is considered hypertension (Manembu, Rumampuk, and Danes, 2015).

Another frequent disease other than hypertension is high blood glucose level (hyperglycemia), which can be a sign of diabetes mellitus. Blood glucose levels can be affected by various factors, including physical activity. Lack of physical activity can be affected by occupation (Ugahari, Mewo, and Kaligis, 2016).

Glucose is the most important carbohydrate and mostly absorbed into the blood flow as glucose and other sugars changed into glucose in the liver. Glucose is the main fuel of the body tissues and acts in producing energy. Blood glucose level is highly associated with diabetes mellitus (DM). Random blood glucose increases≥ 200 mg/dL accompanied by polyuria, polydipsia, polyphagia, and unexplained weight loss are enough to establish the diagnosis of DM. The normal glucose level in blood is 70-100 mg/dl within 2 hours. A postprandial glucose level of 140 mg/dl and a random glucose level of 140 mg/dl (Lande, Mewo and Paruntu, 2015).

Diabetes mellitus is a risk factor for several cardiovascular diseases. Unhealthy lifestyles that correlate with increased blood glucose in diabetes mellitus patients include lack of physical exercise, unhealthy diet, smoking habits, and alcohol consumption. Other than lifestyle, a factor that affects blood glucose in diabetes mellitus patients istherapeutic compliance (Juwita and Febrina, 2018).

According to the theory of Lawrence Green, behavior is formed by the combination of three factors, i.e. predisposing factors (community attitude/education toward health, community traditions and beliefs), enabling factors (residence, availability of appropriate health facilities, and economic ability to pay for health

services), and reinforcing factors (type of health services, or healthcare staffs as a part of reference group from the local community).

2. Methods

This is a quantitative study with a cross-sectional approach. The measurement of independent and dependent variables was conducted at the same time in order to explain the effect of the independent variable on the dependent variable. This study was conducted in Tadukan Raga Village, STM Hilir District, Deli Serdang, North Sumatera. This study began in November 2019 until the end of the study.

The sample size was calculated using Slovin formula as follows:

$$n = \frac{N}{N(d^2) + 1}$$

Description:

n = Sample

N = Population

d = Precision/error estimation (10%)

Based on the formula above, the sample size in this study was:

$$n = \frac{N}{N(d^2) + 1}$$

$$= \frac{5066}{5066(0.1^2) + 1}$$

$$= 99.98$$

$$= 100 \text{ people}$$

The result of the calculation was 100 people. The sampling technique used in this study was simple random sampling, in which samples were randomly collected from the

population (Sugiyono, 2001). The variables in this study used dependent and independent variables. The dependent variables in this study were blood pressure and blood glucose level. Meanwhile, the independent variable in this study was behavior toward blood pressure and blood glucose level.

Operational Definition

No.	Variable	Operational Definition	Measurement Method	Measurement Tool	Measurement Result	Measurement Scale
Independent (Behavior)						
1.	Behavior	Knowledge, attitude and behavior of an organism related to things related to blood pressure and blood glucose level.	Questionnaire-based interview	Questionnaire with 30 items and 3 answers, with the correct answer weighted 2, and wrong answer weighted 1	1.n: 46-60 = Good 2.n: 30-45 = Poor	Ordinal
Dependent (Blood pressure & Blood glucose level)						
1.	Blood pressure	Pressure on the blood vessel when blood is pumped by the heart to the rest of the body.	Measurement is structurally performed using a blood pressure monitor before participants work.	Riester mercury blood pressure monitor	1.Normal ≤139/89 mmHg 2.High ≥140/90 mmHg	Ratio

	Blood glucose level	Random glucose concentration in blood.	Measurement is conducted by taking blood from the tip of the finger and placed on a special strip and inserted to the glucometer and let still for 40-60 seconds.	Glucometer	1.Normal ≤200 mg/dl 2.High >200 mg/dl	Ratio

Data Analysis Methods

Univariate Analysis. This analysis was used to describe each variable investigated, in this case, the dependent variables were blood pressure and blood glucose level and the independent variable was behavior.

Bivariate Analysis. Bivariate analysis was used to determine the correlation between two variables, which include the correlation between independent and dependent variables.

This analysis was used to determine the correlation between the independent variable and dependent variable using chi-square test at a 95% confidence interval, with the criteria as follows:

1. Ho supported if $p > \alpha$ (0.05), there was no correlation between the independent variable and the dependent variable.
2. Ho rejected if $p < \alpha$ (0.05), there was a correlation between the independent variable and the dependent variable.

1. Results and Discussion
Results
Univariate Analysis

Distribution of Participants Based on Blood Pressure

Category	Distribution of Participants Based on Blood Pressure	
	Participants	
	n	**%**
Normal	74	74.0
High	26	
Total	**100**	**100**

Source: Primary data, 2019

Based on the table above, out of 100 participants, most had normal blood pressure with 74 participants (74.0%), compared to participants with abnormal blood pressure with 26 participants (26.0%).

Distribution of Participants Based on Mean Blood Pressure		
	Participants		
Category	**Highest Value**	**Lowest Value**	**Mean**
Systole	190 mmHg	90 mmHg	130.95
Diastole	110 mmHg	60 mmHg	82.01

The table above showed that out of 100 participants, the highest systolic blood pressure was 190 mmHg with a mean value of 130.95 mmHg, while the highest diastolic blood pressure was 110 mmHg with a mean value of 82.01 mmHg.

Distribution of Participants Based on Blood Glucose Level		
	Participants	
Category	**n**	**%**
Normal	56	56.0
High	44	54.0

Total	100	100

Source: Primary data, 2019

The table above described that out of 100 participants, 56 (56%) had normal glucose levels, while 44 participants (44.0%) had abnormal blood glucose levels.

Distribution of Participants based on Mean Blood Glucose Level

| Category | Participants | | |
	Highest Value	Lowest Value	Mean
Blood glucose level	486 mg/dl	100 mg/dl	186.50

Based on the table above, the highest glucose level of 100 participants was 486 mg/dl with a mean value of 186.50 mg/dl.

Bivariate Analysis

Correlation between Behavior and Blood Pressure

| Behavior | Blood pressure | | | | Total | | Statistic |
| | Normal | | High | | | | |
	n	%	n	%	n	%	
Good	49	83.1	10	16.9	59	100	
Poor	25	61.0	16	39.0	41	100	0.013
Total	**74**	**74.0**	**26**	**26.0**	**100**	**100**	

The table showed that abnormal blood pressure was more commonly found in poor behavior with 16 participants (39.0%) compared to good behavior group with 10 participants (16.5%).

Based on the Chi-Square analysis, the p-value obtained was 0.013. Because the p-value was < 0.05, thus Ho was rejected, and Ha was supported. It was interpreted that there

was a correlation between behavior and blood pressure in Tadukan Raga Village, STM Hilir District, Deli Serdang.

Correlation between Behavior and Blood Glucose Level

Behavior	Blood glucose level				Total		Statistic
	Normal		High				
	n	%	N	%	n	%	
Good	28	47.5	13	31.7	59	100	
Poor	28	68.3	31	52.5	41	100	0.039
Total	**56**	**56.0**	**44**	**44.0**	**100**	**100**	

The table above described that high blood glucose level was found more in poor behavior with 31 participants (52.5%) compared to good behavior group with 13 participants (31.7%).

Chi-Square analysis showed that the p-value was 0.039. The p-value was < 0.05, thus Ho was rejected, and Ha was accepted. It was interpreted that there was a correlation between behavior and blood glucose level in Tadukan Raga Village, STM Hilir District, Deli Serdang.

Discussion

Correlation between Behavior and Blood Pressure

Based on Lawrence Green theory on Notoadmodjo (2014) which stated that behavior is formed due to a combination of three factors, i.e. predisposing factors (community attitude/education toward health, community traditions and beliefs), enabling factors (residence, availability of appropriate health facilities and economic ability to pay for health services), and reinforcing factors (type of health services, or healthcare staffs as a part of a reference group of the local community).

A poor daily habit is a factor that can increase blood pressure. Knowledge as a factor that forms behavior showed that the higher the knowledge of the community of hypertension will reinforce someone to behave better in controlling hypertension in order to maintain blood pressure. Good behavior can be implemented by several means, include changing lifestyle, such as limiting fatty and salty foods, not smoking, not consuming alcohol, routinely exercising, and avoiding stress, consuming antihypertension drugs according to the dose, and routinely performing health check-up to healthcare facilities. The knowledge of people regarding hypertension also influenced therapeutic compliance. People with good knowledge of hypertension will comply with therapy. Along with increasing knowledge of hypertension, people with hypertension can do well and control their disease.

Based on the results of frequency distribution, out of 100 participants, 74 of them (74.0%) had normal blood pressure, compared to abnormal blood pressure with 26 people (26.0%). The results of cross-tabulation showed that out of 100 participants, the people with good behavior and normal blood pressure consisted of 49 participants (83.1%) and poor behavior and normal blood pressure consisted of 25 participants (61.0%). Meanwhile, people with good behavior and abnormal blood pressure consisted of 10 participants (39.0%) and people with poor behavior and abnormal blood pressure consisted of 16 participants (16.9%). The results of the chi-square analysis showed p-value = 0.013. This value was < 0.05, thus Ho was rejected, and Ha was supported and there was a correlation between behavior and blood pressure in Tadukan Raga Population, STM Hilir District, Deli Serdang.

This study showed a correlation between behavior and blood pressure. This was due to a triggering factor or a risk of blood pressure increase, which was daily activities. Alexander *et al.* (2002) stated that the knowledge and awareness of people of hypertension was an important factor in obtaining blood pressure control and played an important role in the ability to control hypertension.

Correlation between Behavior and Blood Glucose Level

According to Notoatmodjo (2005), the behavior is an activity performed by living things, which consisted of activities that can be observed by other people, such as walking and singing, and activities that cannot be observed by other people, such as thinking and

fantasizing. There are several factors that affect behavior on blood glucose levels, include knowledge, attitude, and action. To improve the behavior on blood glucose levels, a direction and support from the family regarding a healthy lifestyle are needed.

Based on the results of frequency distribution, out of 100 participants, 56 (56.0%) had normal blood glucose levels compared to abnormal blood glucose level which consisted of 44 people (44.0%). The results of cross-tabulation showed that out of 100 participants, the people with good behavior and normal blood glucose level consisted of 28 participants (47.5%) and people with poor behavior and normal blood glucose level consisted of 28 participants (68.3%). Meanwhile, there were more people with poor behavior and high blood glucose level, which consisted of 31 participants (52.5%), compared to people with good behavior and high blood glucose level, which consisted of 13 participants (31.7%). The results of chi-square analysis obtained p-value = 0.039. Because the p-value was < 0.05, thus Ho was rejected, and Ha was supported. Therefore, there was a correlation between behavior and blood glucose level of Tadukan Raga Population, STM Hilir District, Deli Serdang.

This study showed a significant correlation between behavior and blood glucose level. Based on the results of interview using questionnaires, the people understood blood glucose level. However, they could not avoid the causing factors or risks of diabetes mellitus due to daily habits. Notoatmodjo (2003) stated that the factors affecting behavior include internal factors: awareness, encouragement, understanding, and external factors: environment, socio-culture, economy, and politics. Thus, the results of this questionnaire were not optimal, and this study showed an insignificant correlation between behavior and blood glucose level.

2. Conclusion

Based on the results of this study regarding the correlation between behavior and blood pressure and blood glucose level in Tadukan Raga Village, STM Hilir District, Deli Serdang in 2019, it can be concluded that:

1. The mean blood pressure of the people in Tadukan Raga Village, STM Hilir District, Deli Serdang was 130.95 and blood glucose level was 185.15.

2. There was a correlation between behavior and blood pressure of people in Tadukan Raga Village, STM Hilir District, Deli Serdang.

3. There was a correlation between behavior and blood glucose level of people in Tadukan Raga Village, STM Hilir District, Deli Serdang.

4. There was a higher percentage of people with poor behavior compared to good behavior in Tadukan Raga Village, STM Hilir.

1. Suggestion

The Health Office. The health office is expected to provide free blood pressure and blood glucose level monitoring once every month and provide health counseling to improve the community's knowledge and behavior.

The Community. The community is expected to improve a healthy lifestyle to avoid degenerative disease and other complications.

Further Studies. Further studies are expected to widen the search for the cause of poor behavior that can cause disease in Tadukan Raga Village, STM Hilir District, Deli Serdang.

2. Acknowledgment

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