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Relationship between Nutritional Status and Dietary Intake with Tooth Loss on Hypertension Patients at Padongko Health Center of Barru Regency

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Abstract

Objective: The biggest problems of oral and dental health in Indonesia are the ignorance on the dental and oral hygiene leading to tooth loss, so can highly affect the nutritional status and dietary intake. To discover the relationship between the tooth loss and the hypertension case at Padongko health center of Barru regency.

Methods: The research is analytic observation using cross-sectional method. The population of the research is the respondents suffering from the hypertension and tooth loss to determine their nutritional status and dietary intake. The population was the patients with primary hypertension, a purposive sampling technique was applied through path analysis test.

Results: Based on the path analysis results, the relationship between nutritional status and hypertension revealed p value=0,562>α=0,05; dietary intake and hypertension showed p value=0,377>α=0,05; therefore, the Ha obtained indicated the existing relationship but not significant. The relationship between nutritional status and tooth loss obtained p value=0,065>α=0,05; dietary intake and tooth loss obtained p value=0,499, in which the Ha obtained had a relationship but not significant. Meanwhile, the relationship between hypertension and tooth loss was indicated by p value=0,001<α=0,05 showing a significant relationship.

Conclusion: There is a relationship between nutritional status and dietary intake with tooth loss on hypertension patients, but insignificantly shown.

Keywords: Nutritional Status; Dietary Intake; Hypertension; Tooth Loss

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Introduction

Hypertension or famously known as the silent killer is a condition where the increase of blood pressure above normal. Increased age is one factor causing the occurrence of hypertension, this is due to the increasing age of organ function decreased marked by decreased elasticity of the arteries and stiffness occurs blood vessels so vulnerable to an increase in blood pressure. Hypertension is defined as persistent blood pressure where the systolic pressure is above 140 mmHg and diastolic over 90 mmHg [1-3]. One of the major risk factors of hypertension is stroke, heart failure, chronic kidney disease, visual impairment, and hypertension is often called the silent killer. Hypertension is a condition when a person experiences a rise in blood pressure either slowly [4-6].

Foods that are not digested properly will not be absorbed properly by the body, so it also influences the intake of nutrients the body needs. Nutritional status can be measured using an anthropometric index, one of which is the Body Mass Index (BMI). BMI is a simple tool for monitoring adult nutritional status specifically related to underweight and overweight [7].

Unhealthy eating habits or diet can be triggered due to masticatory disorders. Changes in the function of mastication due to tooth loss will encourage people to change their food intake as compensation for the difficulty of consuming these foods. Individuals without teeth (edentulous) have difficulty in chewing compared to individuals who have teeth, so they make changes in the diet, namely the choice of food variations [8].

Edentulous (partial or complete tooth loss) is an indicator of the oral health of a population [9]. This is a reflection of the success of various prevention and treatment that is implemented by a health service. Many patients consider edentulous as a reason for dental treatment [10]. Tooth loss is a dental and oral health problem that often arises in the community because it often interferes with the function

of mastication, speech, aesthetics, and even social relations [11]. Based on the 2018 National Health Research (RISKESDAS) report, the prevalence rate for dental and oral health recorded a proportion of dental and oral problems of 57.6% and those receiving services from dental medical personnel was 10.2%. Tooth loss according to WHO at the age of 35-44 years is 17.5% which is increasing at the age of 65 years and over 30.6% [12].

Oral teeth and soft tissues are the parts that are damaged by smoking. Dental caries, dental hygiene, periodontal disease, tooth loss, slow healing, precancerous lesions, and oral cancer are all cases [13]. Teeth have a very important role and function [14]. The function of the teeth for mastication, aesthetics (beauty) and phonetics (speaking of dental health and supporting tissues) also determines overall oral health including general health conditions, poor oral conditions causing caries and disease periodontal causes tooth loss [15].

Tooth loss is a condition of one or more teeth detached from the gum or its place. Incidence of loss of teeth usually occurs in children from the age of 6 years who experience loss of deciduous teeth and then replaced by permanent teeth. Permanent tooth loss in adults is very undesirable usually tooth loss occurs due to periodontal disease, trauma, and caries. Tooth loss is usually caused by caries and periodontal disease which is influenced by several factors. The percentage of involvement of tooth loss due to caries and periodontal disease depends on the age where tooth loss in the elderly is mostly caused by periodontal disease whereas tooth loss at a young age is usually caused by caries [8].

This situation greatly affects the quality of life of a person. The loss of one or several teeth can cause dysfunction that has a very negative impact on quality of life. The World Health Organization (WHO) defines that quality of life is a person's perception of life in a cultural context in which they live and in relation to their goals, expectations, standards and concerns. Quality of life can be affected due to a disruption in the health of one's oral cavity. Teeth are very instrumental in the process of human digestion. Tooth loss will certainly greatly affect a person both in terms of functional, aesthetic, and social. The situation of severe tooth loss will certainly greatly affect the decline in the quality of life of a person and also disrupt their survival [16].

Hypertension is known as the silent killer, so the treatment is often too late. Based on the WHO report, out of 50% of hypertension sufferers, 25% are known to receive treatment, but only 12.5% are treated well. The number of people with hypertension in Indonesia is 70 million people (28%), but only 24% of them are controlled hypertension [17]. Results of Basic Health Research in 2007 showed the prevalence of hypertension in Indonesia is very high, which is 31.7% of the total adult population. The prevalence of hypertension in Indonesia is higher when compared to Singapore which reaches 27.3%, Thailand with 22% and Malaysia reaching 20%. Hypertension or high blood pressure is a condition where systolic pressure ≥ 140 mmHg and or diastolic pressure ≥ 90 mmH [18].

Methods

The design of this study used analytic observational research and included in the cross-sectional study design; the study conducted at Padongko Public Health Center in Barru Regency in September to November 2019. The sample used in this study was 61 patients with primary hypertension with an appropriate purposive sampling method with the criteria that researchers had determined before. The population was the patients with primary hypertension, a purposive sampling technique was applied through path analysis test.

Result

There were 61 patients in Padongko Public Health Center in Barru District who checked up with a diagnosis from a hypertension doctor and the sampling was adjusted according to inclusion criteria. Data collection for quantitative approaches uses questionnaires and direct observation while data collection for qualitative approaches uses interview techniques from both the direct respondent and the respondent's family.

Model-I Regression

Table 1: Model-I Regression variables X2 and X1.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	145a	021	-014	2,190,280

Predictors: (Constant), Diet (X2) and Nutritional Status (X1)

Table 2: Contribution of variable X to Z.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressin	575,638	2	287,819	600	552b
	Residual	26865,0	56	479,733		
		40				
	Total	27440,6	58			
		78				

Dependent Variable: Hypertension
Predictors: (Constant), Diet, Nutritional Status

Table 3: Coefficients of variables X1 and X2.

Model	Unstandardized Coefficients B	Standardized Coefficients Std. Error	Beta	T	Sig.	
1	(Constant)	128,542	25,411		5,059	000
	Nutritional Status	463	794	077	583	562
	Diet	355	399	118	890	377

Dependent Variable: Hypertension

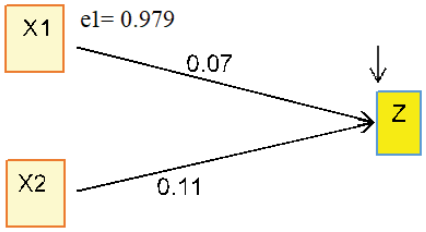

Figure 1: Path Diagram of Model-II Regression.

Table 4: Model-II Regression variables X3, X1, X2, and Z.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	464a	216	173	710,020

Predictors: (Constant), Hypertension (Z), Nutritional status (X1), and Diet (X2)

Tabel 5: Contribution of variable X and Z toward Y.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regressin	762,143	3	254,048	5,039	004b
	Residual	2,772,705	55	50,413		
	Total	3,534,847	58			

Table 6: Coefficient of Variable X and Z toward Y.

Model	Unstandardized Coefficients B	Standardized Coefficients Std. Error	Beta	T	Sig.	
1	(Constant)	31,874	9,943		3,206	2
	Nutritional Status	486	258	226	1,882	65
	Diet	-89	130	-82	-681	499
	Hypertension	-147	43	-409	-3,392	1

Dependent Variable: Tooth Loss

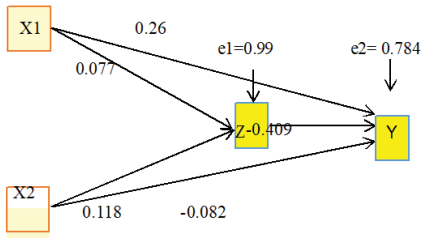

Figure 2: Path Diagram of Structure Model-I.

Discussion

Based on the characteristics of the subject, the average age of the sample taken at Padongko Public Health Center in Barru Regency is 32 to 80 years. Tables 5.3, 5.4, and 5.5 explain the relationship of variable X1 (nutritional status) to variable Z (hypertension), from the analysis using pad analysis that the effect of X1 (nutritional status) on Z (hypertension) is obtained a significance value of X1 of 0.562> 0.05, so it can be concluded that there is a direct influence of the X1 variable on Z but it is not significant.

The results of the analysis found that when a person whose conditions of nutritional status is lacking or more can be seen by consuming food for example foods with fat content so that food intake and nutrients exceed or less for body needs, and the results of this analysis also explain that it can be caused by psychological factors, socioeconomic factors, and occupational factors. Some of these results in older women who have normal nutritional status tend to be higher in blood pressure, because the hypertension they experience comes from the amount of energy and thought expenditure on the problems faced. So that hypertension they experience is not only caused by excessive nutritional status thereby increasing the risk of hypertension due to several reasons.

The greater the body mass, the more blood is needed to supply oxygen and food to body tissues. This means that the volume of blood circulating through the blood vessels increases so that it puts greater pressure on the walls of the arteries, which will cause an increase in blood pressure. In addition, being overweight also increases the frequency of the heart rate. By increasing age, usually a person will experience systemic diseases, one of which is high blood pressure or hypertension, one of the causes of hypertension is consuming foods that are high of salinity levels.

The results of this study are also in line with the research of Alfanatin, et al. (2007), the results obtained showed that 21 elderly women with a blood pressure range of 140-170mmHg than respondents who were overweight and severe who were hypertensive, i.e. 15 elderly women with a range of pressure blood 140-160 mmHg. This is due to the fact that respondents who are overweight light have hypertension that have not been exposed to drugs, so that it can affect the high blood pressure measurement results compared to respondents who have moderate excess weight who have hypertension, and are exposed to drugs [19]. Fauziah NY, et al. (2013) which states that there is no relationship between nutritional status and diastolic blood pressure in hypertensive patients (with p-value = 0.827 and r = -0.030. Most hypertensive patients have more nutritional status, but patients who are having a normal weight may also suffer from hypertension [11].

Results of analysis of the effect of X2 (diet) on Z (hypertension): the results of the analysis obtained a significance value of X2 (diet) of 0.377> 0.05, so it can be concluded that there is a direct influence of the variable X2 (diet) on Z (hypertension) but not significant. From the results of the analysis that respondents in Padongko Public Health Center in Barru Regency can adjust their diet, it can be seen from the table above that the number of respondents with adequate diet is 78% compared to respondents whose diet is lacking namely 13 respondents (22%).

Stated that diet consists of frequency of eating, type of food and level of consumption. Frequency of eating is the amount of food eaten daily naturally processed foods in the body through digestive devices from the mouth to the small intestine. Duration of food in the stomach depends on the nature and type of food. If averaged, generally the stomach is empty between 3-4 hours. Types of food are variations of food ingredients that when eaten, digested, and absorbed will produce the least amount of healthy and balanced menu arrangements. Providing food variations is one way to eliminate boredom. Someone will feel bored when served just the same menu, thereby reducing appetite. The Balanced Nutrition Principle consists of 4 (four) Pillars which are basically a series of efforts to balance between nutrients that come out and nutrients that come in by monitoring body weight regularly [20,21].

This study was also supported by Neil, et al. (2004) that elderly hypertension sufferers may not comply with the management of dietary diets because they do not know the purpose of management or may simply forget or have understood the instructions given but not implemented. Witjaksono, et al. (2009) found that the role of family or group as a support is proven to be successful in changing one's diet pattern to prevent hypertension. Soesetyo B, et al. (2002) also believes that failure to establish good communication relationships leads to non-compliance with diet and unsatisfactory control of hypertension [22].

Analysis of the effect of X1 (nutritional status) on Y (tooth loss): the results of the analysis obtained a significance value of X1 of 0.065> 0.05, so it can be concluded that there is a direct influence of the X1 variable on Y but not significantly. It means that tooth loss is caused by an increasing age experienced by respondents. The aging process experienced by respondents caused changes in oral tissue in the form of decreased adaptation mechanisms and the potential for tissue regeneration, tooth supporting tissue, oral cavity mucosa, tongue, saliva and dental tissue changes. Other causes of tooth loss are also caused by dental caries experienced by some respondents. The average nutritional status of respondents in Padongko District Health Center as measured by BMI 71.2% normal nutritional status, 10.2% underweight nutritional status, and 18.2% over nutritional status. The results showed that the majority of respondents were of normal nutritional status. The results of this analysis found that there is a direct influence of variable X1 on Y but not significantly.

This study is in line with what was done by Ridwan, et al. (2015) that there is no significant relationship between tooth loss and nutritional status. And this research contradicts conducted by Darwita,

et al. (2011) which states that there is a significant relationship between tooth loss and nutritional status [11]. Analysis of the effect of X2 (diet) on Y (tooth loss): the results of the analysis obtained a significance value of X2 of 0.499> 0.05, so it can be concluded that there is a direct influence of the X2 variable on Y but not significantly. It is found that related to tooth loss that is experienced by many respondents, allows the tendency of respondents to choose foods that are soft or easy to chew. This is consistent with the statement of Sheiham, et al. (2001) in his research on the relationship of dental health, nutritional intake and nutritional status in Brazilian parents that dental health status is related to nutritional intake [23].

Results of the analysis of the effect of Z (hypertension) on Y (tooth loss): the results of the analysis obtained a significance value of Z of 0.001 <0.05, so it can be concluded that there is a significant direct effect of the Z variable on Y. The results of this study are supported by Ettinger, et al. (1998), Hutton, et al. (2002) agree that individuals who have no teeth, lack specific nutrients needed because of decreased mastication function. The loss of teeth without the use of prostheses will reduce the intake of vitamin B, C, fiber, Ca, and Fe. This will increase the risk of "cardiovascular disease", "myocardial infarction" and "hypertension" which is in accordance with the results of our study, that tooth loss in the elderly who did not use prostheses was significantly associated with hypertension (p = 0.000) with a RR value of 1.72. Tooth loss was also significantly correlated with hypertension (p = 0.043), although it was only 31% while the difference was influenced by other factors [24].

The results of the analysis of the effect of X1 on Y through Z: it is found that the direct effect given by X1 on Y is 0.226. While the indirect effect of X1 on Y through Z is the result of the multiplication between the beta value of X1 against Z with the beta value of Z against Y, namely: 0.077 x -0.409 = -0.03. Then the total effect given by X1 on Y is the direct effect added (+) with an indirect effect, namely: 0.226 + (-0.03) = 0.19. Based on the results of the previous analysis, it can be explained that the direct effect is 0.226 and the indirect effect is -0.03 which means that the direct effect is greater than the indirect effect. This is indicated that the indirect effect of the X1 on Y through Z appears insignificant. This study also has the characteristics of respondents, namely diet to its relationship with tooth loss. The results of the study showed as many as 46 respondents (78%), which mean that the majority of respondents' eating patterns were sufficient. This can be seen based on the dietary statement item that most respondents always choose to consume healthy foods such as vegetables and fruits. In increasing age, certain things that need to be considered is how we regulate a balanced diet and what is needed by the body so that it can avoid one of the diseases, namely hypertension, a factor that causes hypertension, one of which consumes salty or fatty foods. One way to overcome hypertension is by consuming healthy foods such as vegetables and fruits because one of the natural treatments compared to consuming blood pressure-reducing medication can make the respondent or patient addicted.

Analysis of the influence of X2 toward Y through Z: note the direct effect given X2 on Y of -0.082. While the indirect effect of X2 on Y through Z is the result of the multiplication between the value of beta X2 against Z with the beta value of Z against Y, namely: 0.118 x -0.409 = -0.04. Then the total effect given X2 on Y is the direct effect added (+) with an indirect effect, namely: -0.082 + (-0.04) = -0.12. Based on the results of the previous analysis, it can be explained that the direct effect of -0.082 and the indirect effect of -0.04 which means that the indirect effect is greater than the direct effect, but the indirect effect still does not significantly influence, because the analysis results obtained score - 0.04.

Conclusion

The direct effect of this research is:

- Nutritional status on hypertension is influential but not significant as well as nutritional status on tooth loss is influential but not significant.
- Diet for hypertension has an effect but is not significant as well as a diet with tooth loss has an effect but is not significant.
- Tooth loss in hypertension has a significant direct effect.

The indirect effect of this research is:

- Nutritional status for tooth loss where the subject involves hypertension is not seen significantly.
- Diet for tooth loss where the subject involves hypertension is not seen significantly.

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