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Dietary Intake and Nutritional Knowledge: Study in Haemodialysis Patients with Hypertension and Diabetes Mellitus in RUSD Dr. Saiful Anwar Malang

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ABSTRACT

Hypertension and Diabetes Mellitus are the most common causes of Metabolic Syndrome, one of which leads to Chronic Kidney Disease (CKD). Risk factors associated with this condition are diet and nutritional knowledge. This study aims to determine differences in nutritional intake and nutritional knowledge in patients with kidney disease on hemodialysis who have comorbid hypertension and/or diabetes mellitus and/or both. The number of respondents in this cross-sectional study was 27 outpatients undergoing hemodialysis at RSUD Dr. Saiful Anwar Malang, taken by consecutive sampling which met the inclusion criteria. The variables studied were dietarily obtained from the SQ-FFQ and nutritional knowledge was obtained from interviews using a questionnaire form containing questions related to diet, food consumed, restricted foods, and foods to avoid. The results showed that 17 hemodialysis patients suffered from hypertension and 10 patients with hypertension and diabetes mellitus. There was no difference in dietary intake between the hypertension group and hypertension and the diabetes mellitus group ($p>0.05$), the results of the analysis of nutritional knowledge also showed no difference between the two groups ($p>0.05$). This study concluded that hemodialysis patients who experienced hypertension and hypertension with Diabetes Mellitus did not show differences in dietary intake and nutritional knowledge.

Keywords: *Dietary; Knowledge; Hemodialysis; Hypertension; Diabetes Mellitus.*

INTRODUCTION

Based on The Third National Health and Nutrition Examination Survey (NHANES

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III), Metabolic Syndrome (Mets) is an independent factor associated with chronic kidney disease (CKD). Research conducted by Ayu et al (2011) found that each addition of one component of the metabolic syndrome (hypertension, obesity, hypertriglyceridemia, high blood sugar, hypo-HDL) will increase the risk of CKD by 10% (Ayu et al., 2011). The Indonesian Nephrology Association (Pernefri), stated that the progression of CKD is highly dependent on basic diseases such as hypertension, diabetes, dyslipidemia, and albuminuria. They were the components of the metabolic syndrome which lead to the cause of chronic kidney disease in patients with hemodialysis (PERNEFRI, 2011).

Diet influences the occurrence of hypertension and diabetes mellitus (DM) (Subkhi, 2016; Susanti & Bistara, 2018). An erroneous diet such as the habit of consuming fatty foods can cause an increase in blood pressure. Based on research conducted by Mahmudah et al (2015), it shows that respondents who have excessive sodium intake have a 4.627 times greater risk of experiencing hypertension than respondents who have good sodium intake (Mahmudah et al., 2015). Besides that, a diet high in fat, salt, and sugar can also increase blood glucose levels (Gultom et al., 2016).

Another factor that can impress the incidence of hypertension and diabetes mellitus is nutritional knowledge. This is because the better one's knowledge, the better impact on his life behaviour (Fitriana et al., 2015). Some studies stated that most of the respondents who had good knowledge of nutrition were classified as obedient to the recommended diet. Conversely, the less knowledge a person has, the more this can be one of the factors that cause disease in that individual (Fitriana et al., 2015; Isnaini & Ratnasari, 2018; Wulansari et al., 2013). In addition, in DM sufferers, a lack of knowledge can cause complications (Isnaini & Ratnasari, 2018). Therefore, this study aims to determine differences in diet and knowledge in the incidence of hypertension and hypertension-diabetes mellitus in hemodialysis patients at RSUD Dr. Saiful Anwar Malang.

METHOD

This quantitative study is an observational study with a cross-sectional study design, carried out in June 2019 in patients with Hemodialysis Outpatient Polyclinic at RSUD Dr. Saiful Anwar Malang. Primary data displayed the characteristics of respondents including age, gender, occupation, education, body mass index, and diet for the last 3 months which are translated into an analysis of nutrient intake using the semi-quantitative food frequency (SQ-FFQ) form and nutritional knowledge data were obtained from interviews using a

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questionnaire including dietary knowledge, foods that should be consumed, limited, and avoided. Knowledge is then assessed and categorized into good knowledge (score 80-100%), sufficient (score 79-60), and poor (score <60) (Nursalam, 2008). Respondents were then divided into 2 groups, the Hypertension (HT) group and the Hypertension with Diabetes Mellitus (HTDM) group.

This study used a consecutive sampling technique, the number of respondents who were recorded was 31 patients, but the data that could be analyzed were 27 respondents who met the inclusion criteria, were diagnosed with kidney disease and had undergone hemodialysis ≤1 year, diagnosed with hypertension with or without a diagnosis of type Diabetes Mellitus 2, aged 30-60 years, and willing to voluntarily become research subjects by filling out informed consent. The statistical analysis used in this study was the analysis of different tests using the Kolmogorov-Smirnov test for categorical data, the independent t-test and the Mann-Witney test for numerical data using the SPSS 16 program. This research was ethically sound by obtaining ethical clearance No. 400/108/K.3/302/2019 issued by the Ethics Commission of RSUD Dr. Saiful Anwar Malang.

RESULTS AND DISCUSSION

Respondents to this study were 27 people who were hemodialysis patients at the Outpatient Clinic of RSUD Dr. Saiful Anwar Malang. In addition to the diagnosis of CKD, 17 respondents were also diagnosed with hypertension which subsequently entered the HT group and 10 others suffered from CKD, hypertension and diabetes mellitus and were included in the HTDM group.

Diabetes and high blood pressure tend to coexist because they have certain physiological properties. Diabetes causes hyperinsulinemia and increases the risk of hypertension. This condition increases the amount of sodium absorbed by the body. It also promotes stimulation of the sympathetic nervous system. This is thought to cause changes in the structure of blood vessels, which affect heart function and blood pressure (Anwer et al., 2011). Based on the American Heart Association (AHA) 80% of adults with Diabetes Mellitus have Hypertension (AHA, 2017).

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Respondent Characteristics

Table 1.
Frequency Distribution of Respondents by Gender, Age, Occupation, and Education

Characteristics		Groups				*P**
		HT (n=17)		HTDM (n=10)		
		(n)	%	(n)	%	
Gender	Male	9	52.9	3	30	0.251[a]
	Female	8	47.1	7	70	
Occupation	Farmer	1	5.9	1	10	0.672[a]
	Laborer	1	5.9	0	0	
	Private employees	4	23.5	1	10	
	Enterpreneur	2	11.8	0	0	
	Military/Police	1	5.9	1	10	
	Sivil Servant	3	17.6	0	0	
	House Wife	5	29.4	7	70	
Education	Elementary school	4	23.5	5	50	0.895[a]
	Junior High School	3	17.6	2	20	
	High School	6	35.3	3	30	
	Diploma/Bachelor	4	23.5	0	0	

P (<0.05) [a]Kolmogorov Semirnov*

Detailed characteristics of the respondents can be seen in Table 1. Respondents in the HT group were mostly male (52.9%) and in the HTDM group most were women (70%). The majority of respondents are housewives (HT: 29.4% and HTDM: 70%). As described in different studies, men and women have the opportunity to suffer from hypertension and diabetes with the same tendency but through different physiological mechanisms (Isnaini & Ratnasari, 2018; Kusumawaty et al., 2016; Yosmar et al., 2018).

The education level of most of the respondents was high school grade (35.5%) in the HT group and elementary school graduates (50%) in the HTDM group. Level of education will affect the incidence of hypertension and diabetes mellitus. several studies also mention the same thing, the higher the level of education, the better a person is at maintaining his diet to stay healthy. This relates to the knowledge possessed, the higher the education, the easier it is for someone to accept the information provided (Allorerung et al., 2016; Hakim, 2018; Trianni, 2011).

Table 2.
Frequency Distribution of Respondents by Aged, Body Mass Index, and Blood Pressure

Characteristics		Groups		P*
		HT (n=17)	HTDM (n=10)	
Age (year)		48 (29-70)[1]	53.5 (47-67)[1]	0.268[c]
BMI (kg/m^2)		21.87 (16.85-27.68)[1]	23.1 (21.33-27.98)[1]	0.167[c]
Blood Pressure (mmHg)	Systolic	150 (120-180)[1]	150 (140-160)[1]	0.756[c]
	Dyastolic	94.11±6.18[2]	90.00±6.66[2]	0.117[b]

[1]Median (min-max); [2]Mean±SD; P(<0.05) [b]Independent Sample t-test, [c]Mann Whitney*

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Other characteristics shown in Table 2 are the median age of the respondents was 48 years in HT and 53.5 years in HTDM, the median Body Mass Index (BMI) of respondents was 21.87 kg/m2 in HT and 23.1 kg/m2 in HTDM, and the median systolic blood pressure in HT and HTDM patients was 150 and the mean diastolic blood pressure in HT patients was 94.11 and HTDM patients was 90.00. The characteristics of the respondents did not show any difference between the hypertension (HT) group and hypertension and diabetes mellitus (HTDM) group.

The results showed that the median age of respondents in the HT group was 48 years and in the HTDM group was 53.5 years. Similarly, Widjaya et al (2018) stated that hypertension is most commonly experienced by the age group over 40 years and its incidence will increase with increasing age (Widjaya et al., 2018) Rabrusun's research (2015) also shows that people aged > 45 years have a 1.69 times greater risk of causing Type 2 Diabetes Mellitus (DMT2) (Rabrusun, 2014). This is because increasing age causes physiological changes in the body such as thickening of the arterial walls due to the accumulation of collagen in the muscle layer which causes the blood vessels to narrow and become stiff starting at the age of 45 years. This study also showed that the median age of the HTDM group was higher than that of the HT group, although it was not significantly different because hypertension is a major vascular risk factor in elderly diabetes (Rabrusun, 2014; Widjaya et al., 2018).

The results of this study indicated that the median BMI of the HTDM group was higher (23.1 kg/m2) compared to the HT group (21.87 kg/m2) although not significantly different. Based on the research of Chung et al (2012) showed that there was a significant relationship between BMI and the occurrence of insulin resistance which causes an increase in fasting blood sugar levels (Chung et al., 2012). According to Rabrusun (2015), people with BMI in the fat category are 1.49 times more likely to have DMT2 (Rabrusun, 2014).

Table 3.
Differences in Nutrient Intake of the Hypertension Group and Hypertension and Diabetes Mellitus Group

Variables	Groups		P*
	HT (n=17)	HTDM (n=10)	
Energy Intake (kkal)	1234.67±304.5[2]	1113.15±211.6[2]	0.278[b]
Protein Intake (gram)	53.12±24.86[2]	46.81±15.24[2]	0.600[b]
Fat Intake (gram)	37.92±17.59[2]	37.47±13.08[2]	0.945[b]
Carbohydrat Intake (gram)	172.51±47.59[2]	150.14±48.06[2]	0.152[b]
Sodium Intake (mg)	1390.6 (1212.8-2498.4)[1]	1396.3 (1207.6-2353.2)[1]	0.309[c]

[1]Median (min-max); [2]Mean±SD; P(<0.05) [b]Independent Sample t-test, [c]Mann Whitney*

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Dietary patterns translated into nutrient intake based on the SQ-FFQ results showed that the average energy intake of respondents was 1234.67 kcal in the HT group and 1113.15 kcal in the HTDM group, while the average protein intake was 53.1 g in the HT group and 46.81 g in HTDM group. For fat intake, the two groups had the same trend, namely 37.92 g (HT) and 37.47 g (HTDM). Meanwhile, the average carbohydrate intake in the HT group was 172.51 g, which was higher than the HTDM group, which was 150.14 g. For sodium intake, the median results were not much different between the HT group (1390.6 g) and the HTDM group (1396.3 g). Furthermore, a different test analysis was carried out on the intake of respondents in both groups, the results obtained both energy, protein, fat, carbohydrate, and sodium intake did not show significant differences between the hypertension and hypertension groups with diabetes mellitus (Table 3).

The results showed a tendency for the intake of nutrients in the HT group higher than the HTDM group for intake of energy, protein, and carbohydrates, although it did not show a significant difference, this could be related to the diabetic condition experienced by the respondent.

Arviani's research (2015) stated that 70.95% of respondents who are DMT2 sufferers have a deficit carbohydrate intake (Arviani, 2015). The amount of carbohydrates consumed from main meals and snacks can affect blood glucose levels and insulin secretion (Fitriana et al., 2015). The Hypertension with Diabetes Mellitus group assumed that most patients had received nutrition education regarding diet for diabetics. Controlling blood sugar levels in patients with Diabetes Mellitus through dietary adjustments will of course also have an impact on eating arrangements for people with hypertension and controlling blood pressure in patients (Winta et al., 2018).

Respondents' sodium intake showed that the median intake value for the two groups was around 1390 mg and showed no significant difference. One of the recommended eating patterns for people with hypertension with diabetes is the dash diet which focuses on sodium intake (1500 mg). Likewise, the diet recommended by the American Diabetes Association (ADA) and the National Kidney Foundation for diabetics accompanied by kidney disease is advised to consume less than 1500 mg of sodium (Campbell, 2017; Ko & Kalantar-Zadeh, 2017).

Based on the results of the patient's sodium intake, according to the recommended dietary recommendations (≤1500 mg), this occurs because most respondents realized that consumption of sodium, in this case, salt and other packaged foods, will harm blood pressure and the condition of kidney disease that they are currently experiencing. , so that

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the respondent's intake began to limit sodium intake. Excessive salt consumption can increase blood volume in the body, which means the heart has to pump harder, causing blood pressure to rise. This increase results in the kidneys having to filter out more salt and water. The walls of the blood vessels then react by thickening and narrowing, thereby increasing resistance which in turn requires higher pressure to move blood to the organs and the result is hypertension (Mahan & Raymond, 2017).

Table 4.
Differences in Nutritional Knowledge of the Hypertension Group and the Hypertension and Diabetes Mellitus Group

Variables		Groups				P*
		HT (n=17)		HTDM (n=10)		
		(n)	%	(n)	%	
Nutritional Knowledge	Poor	4	23.5	2	20	0.280[a]
	Sufficient	6	35.3	5	50	
	Good	7	41.2	3	30	

P (<0.05) [a] Kolmogorov Semirnov*

Knowledge is divided into 3 categories, good (80-100%), sufficient (60-79%), and poor (<60%). The knowledge in question is related to diet, food ingredients that should be consumed, restricted and avoided food or food ingredients for Hypertension and Diabetes Mellitus patients undergoing hemodialysis. In the HT group, the average patient was included in sufficient nutritional knowledge (35.5%) and good (41.2%). This is the same as in the HTDM group where the average patient is included in sufficient (50%) and good (30%) knowledge.

The results of the different tests conducted on nutritional knowledge showed that there was no significant difference (p>0.05) in the two groups (HT and HTDM) in all categories. This could be because the average patient in both the HT and HTDM groups had received nutrition education from doctors and hospital nutritionists. This is following the research of Wulansari et al (2013) which states that increasing one's knowledge regarding the illness will encourage a person to behave well in controlling his food. A person's knowledge of food can also be affected by the length of time a person suffers from the disease. The average patient's illness is > 1 year old so it affects the knowledge they have (Wulansari et al., 2013).

Limitations

The number of respondents in this study (n = 27) who did not meet the minimum number of quantitative samples could be the reason for the insignificant test results. Another limitation is the confounding variable where the respondents generally had

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received nutrition education before the research was conducted, so the test results for differences in dietary and nutritional knowledge did not show a significant difference.

CONCLUSIONS AND SUGGESTIONS

Dietary and nutritional knowledge in patients with hemodialysis at RSUD Dr. Saiful Anwar Malang, both those who experienced hypertension and hypertension with diabetes mellitus did not show significant differences.

Suggestions for nutritionists to be able to provide nutritional care and nutritional education for hemodialysis patients with hypertension to increase nutritional knowledge and efforts to help improve patient eating habits. In addition, it is recommended for future researchers. conduct research with a more significant number of samples for better results by considering confounding variables to obtain more relevant research.

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