Original Research

The Relationship of Self-Care Activities with Blood Pressure of Diabetes Mellitus Type II Patients

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Article Info	ABSTRACT
	Diabetes mellitus (DM) and hypertension are diseases that often appear together. DM patients with hypertension are at risk for microvascular and macrovascular complications. Self-care activities that are carried out regularly will improve the health condition of DM patients, thereby reducing the risk of complications. This study aims to determine the relationship between self-care activities and blood pressure in type II DM patients at the BPJS Kesehatan Palangka Raya Prolanis Club. The research design uses correlation analysis with a cross-sectional approach; the research population is all members of the Prolanis Club BPJS Kesehatan Palangka Raya. The number of samples was as many as 35 people with the purposive sampling technique. The research instrument used a questionnaire, The Summary of Diabetes Self-Care Activities Measure (SDSCA); the collected data was analyzed using the chi-square test. The results showed that as many as (51.4%) of diabetic patients had good self-care activity status, totaling 18 respondents. As many as 51.4% of respondents have normal blood pressure status. The statistical results of this study obtained p value = 0.028 (p <0.05), and r = 6.240, meaning that there is a relationship between self-care activities and blood pressure in type II DM patients. It means that the higher the self-care activity in diabetic patients, the blood pressure tends to be normal. Recommendations for further research are identifying the inhibiting factors in self-care activities for type II DM patients.

Introduction

Diabetes mellitus (DM) and hypertension are closely related diseases that often appear together (Grossman & Grossman, 2017). Cardiovascular disease has a significant risk factor, one of which is DM, with cardiovascular mortality rates 2-3 times higher than non-DM. Patients with DM often experience hypertension. DM patients with hypertension more often suffer from cardiovascular disease than DM patients with normal blood pressure (normotension) (Suyono, S., Waspadji, S., Soegondo, S., 2018). Hypertension is twice as common in DM patients than in non-diabetics. A study by the San Antonio Heart states that 85% of patients with type II DM have hypertension after five years of illness, while 50% of hypertensive patients have impaired glucose tolerance or type II DM. In general, the causes of diabetes and hypertension are closely related because they have similar risk factors, such as endothelial dysfunction, vascular infection, arterial remodeling, atherosclerosis, dyslipidemia, obesity, and insulin resistance (Petrie et al., 2018).

The comorbidity between DM and hypertension significantly increases the risk of coronary heart disease, left ventricular hypertrophy, congestive heart failure, and stroke compared to the two conditions alone. The most significant cause of morbidity and mortality in diabetic patients is cardiovascular disease, which is exacerbated by hypertension. Microvascular complications such as retinopathy and nephropathy often occur in diabetic patients with hypertension (Grossman & Grossman, 2017). Therefore, for diabetic patients, blood pressure must also be considered in addition to blood glucose to reduce the risk of complications.

One way for DM patients to prevent the risk of complications is to implement self-care activities regularly. DM is a disease that cannot be cured, and in its development, the longer a person suffers from DM, the more at risk of complications, one of which is hypertension, so self-care needs to be done routinely for the life of the patient, although it is not easy to do. Several factors influence DM sufferers in rural areas to be not disciplined in carrying out self-care activities, including insufficient knowledge, lack of family support, and utilization of health services that are not optimal (Luthfa, 2019). Therefore, good self-care is needed by DM patients (Surucu, Kizilci, 2017). There are five forms of self-care activities in DM patients, including nutritional therapy, physical or occupational exercise, drug management, monitoring blood glucose levels, and preventing the risk of complications (Educators, 2017).

Garcia et al. (2014) stated that the intervention group given a self-management education program showed significant changes, one of which was blood pressure. Indirectly indicates that self-care activities affect blood pressure control in DM patients. (Wang & Fang, 2017a) reinforce that improving self-care management in type II DM patients can improve blood glucose and blood pressure control and inhibit the development of microalbumin. Nurses are essential in enhancing self-care for diabetic patients in managing their disease to achieve optimal body conditions and prevent complications (Meleis, 2016). The nurse's role includes providing information about diabetes management, conducting scheduled examinations, and fostering and motivating diabetes patients to carry out self-care activities independently.

Method

The research design used in this study is correlation analytic with a cross-sectional approach. The sample in this study was type II DM patients in 2 Prolanis Club BPJS Kesehatan Palangka Raya, namely Al-Fajar and Sanang Barigas, totaling 35 people. The sampling technique is a purposive sampling technique. The research instrument used was The Summary of Diabetes Self-care Activities Measure (SDSCA) questionnaire. This questionnaire was used to measure the level of self-care in diabetic patients. A Statistical test with chi-square correlation aims to determine the correlation between two variables, which seeks to determine the correlation between two variables, namely self-care activity and blood pressure in type II DM patients. This research has passed the ethical review of the Polytechnic Ethics Committee of the Palangka Raya Ministry of Health.

Results and Discussion

The analysis result in table 1 shows that the average age of the respondents is 52.29 years. The average length of suffering from DM is 7.74 years. The results of table 2 analysis show that most of the respondents are female (65.7%), and 34.3% are male. The number of respondents based on occupation is almost evenly distributed, respondents who work are 51.4%, and those who do not work are 48.6%. Respondents with high-income status with a value of Rp. 2,500,930, as many as 57.1%, while 42.9% have low income with a minimum wage value of < Rp. 2,500,930. The education level of respondents with low classification is 54.3%, while 45.7% are highly educated. Most of the respondents with non-smoking status were 82.9% and smoking 17.1%. Blood pressure with normal category < 140/90 mmHg consists of 18 people; 17 people are categorized as having high blood pressure 140/90 mmHg. Respondents with a high level of self-care activity comprised 18 people, while respondents with a low level of self-care activity comprised 17 people.

Table 1. Distribution of Respondents by Age and Length of Suffering from DM

Variable	Mean	SD	95% CI
Age	52.29	9.721	48.95-55.63
Length of Suffering from DM	7.74	2.454	6.90-8.59

Table 2. Distribution of Respondents by Gender, Occupation, Income, Education Level, Smoking Status, Blood Pressure, and Self-Care Activity Level

Characteristic	N	(%)
Gender		
Female	23	65.7
Male	12	34.3
Occupation		
Work	18	51.4
Not Working	17	48.6
Income		
High	20	57.1
Low	15	42.9
Education Level		
High	19	54.3
Low	16	45.7
Smoking Status		
Non-Smoking	29	82.9
Smoking	6	17.1
Blood Pressure		
Normal < 140/90 mmHg	18	51.4
High ≥ 140/90 mmHg	17	48.6
Self-Care Activity Level		
Low	18	51.4
High	17	48.6

Table 3. Distribution of Respondents and Analysis of the Relationship of Self-Care Activities with Blood Pressure of DM Type II Patients

Self-Care DM Type II patient	Blood Pressure					ρ value	OR (95% CI)
	Normal < 140/90 mmHg		High ≥ 140/90 mmHg		Total		
	N	%	N	%	N		
High *self-care* Level	13	72.2	5	27.8	18	0.028	6.24
Low *self-care* Level	5	29.4	12	70.6	17		
Total	18	51.4	17	48.6	35		

The results showed that the average age of the respondents was 52.29 years, followed by the results of Riskesdas in 2018, which obtained the prevalence of DM based on a Doctor's Diagnosis in a Population of All Ages, with the highest age being in the range of 55-64 years, which was 6.29% and age 65-74 years by 6.03. One of the factors that can cause DM is the population over 40 years which continues to increase (Suyono, S., Waspadji, S., Soegondo, S., 2018). Age is included in the factors that influence the decline in function in all systems of the human body, one of which is the endocrine system. Increasing age can cause carbohydrate metabolism to change and insulin release and inhibit glucose release into cells (this is because it is influenced by insulin). The occurrence of insulin resistance causes unstable blood glucose levels (the effect of increasing age), resulting in decreased body functions and a higher risk of DM (Smeltzer, S., Bare, B.G., Waluyo, A., 2013).

The gender of the respondents is primarily female (65.7%); this is following the results of the 2018 Riskesdas, namely the prevalence of DM based on a doctor's diagnosis in the population of all ages according to the characteristics found that female is mostly (1,78%) while the male is 1,21%. Likewise, the study's results (Andriani, R., Yulia., Maria, 2022), found that most respondents were women (52.3%). More women suffer from DM because of different body compositions, different levels of sexual hormones between women and men, different lifestyles, and stress levels (Hassanein, 2016).

The results showed that 18 people worked (51.4%) and 17 people (48.6%) did not work. The prevalence of DMM based on a doctor's diagnosis in the population of all ages according to characteristics found that the most jobs were PNS/TNI/Polri/BUMN/BUMD at 4.17%; other jobs at 2.64% and self-employed at 2.59% (Riskesdas, 2018). A study by (Natalansyah, and Dewi Fitriyani, 2020) found that respondents who did not work were 57.5% more than respondents who worked (42.5%). Work status is associated with daily physical activity; activity is one way to prevent DM. Physical activity can cause insulin to increase so that blood glucose levels decrease and membrane permeability to glucose in contracting muscles increases.

Insulin resistance decreases in exercise conditions, but there is an increase in insulin sensitivity so that glucose use will be fulfilled (Suyono, S., Waspadji, S., Soegondo, S., 2018).

As 57.1% of respondents have high incomes, namely income equal to or above the Regional Minimum Wage (≥ Rp. 2,500,930); (Musdalifah., Nugroho, 2020) found that 49.5% of respondents with income above the minimum wage and 50.5% with income below the minimum wage, it appears that in terms of income, it is not much different. So it can be concluded that there is a significant (meaningful) relationship between the economic level and the incidence of DM in the Palaran Health Center, Samarinda City. This can be attributed to high economic status, a tendency to change in diet, and nutritional values that are not balanced or excessive.

Most of the respondents have a high level of education (54.3%). The results of the study (Ahsan, Rahmawati & Kartika, 2022) showed that most of the respondents had a high school education (41.5%). The quality of human resources can be improved through education. The level of education plays a role in the patient's ability to receive, understand and apply the information received so that it can affect a person's lifestyle (Rahman, 2017 in Ahsan, Rahmawati & Kartika, 2022). Low levels of knowledge about diabetes mellitus can increase the risk of diabetes and complications in diabetic patients. Low knowledge of how diabetic patients manage diabetes will increase the risk of complications and reduce their quality of life.

Most respondents do not smoke (82.9%); this is the same as the study (Sihombing, 2017); from 5253 respondents of DM patients, there are 74.3% do not smoke. A study by (Maddatu, J., Baucum, E.A., Molina1, 2018) found that smoking and nicotine affect body composition, insulin sensitivity, and pancreatic-cell function, which adversely affects blood glucose homeostasis; this is what causes an increased risk of developing DM.

The respondents' self-care activity levels are not very different; respondents with high self-care levels are 51.4%, and respondents with low self-care levels are 48.6%. This study is in line with research (Putri, L.R., Hastuti., Dwi, 2016) found that between poor self-care behavior (49.6%) and

good self-care behavior (50.4%) the results are not too different. Self-care is to maintain life, optimal physical and psychological functions, and maintain the integrity of one's function and development within the framework of optimal conditions in life (Meleis, 2016). Therefore, good self-care is needed by diabetes mellitus patients to improve their quality of life, optimal body condition can be maintained, and complications can be prevented (Surucu, Kizilci, 2017).

Blood pressure in patients with DM shows an almost equal number in each category, respondents with normal blood pressure are 51.4%, and those with high blood pressure are 48.6%. This result is in line with a study (Setiyorini, E., Wulandari, N.A., Efyuwinta, 2018) which explained that as many as 56% of diabetic patients had normal blood pressure. One of the complications that often occur in diabetic patients is hypertension. Hypertension can coincide (comorbid) with DM (Ayuthayya, S.S., Adnan, 2020). DM patients' blood pressure should be measured at every routine check. Diabetic patients with high blood pressure ($\geq$ 140/90 mmHg) with no known hypertension should have their blood pressure checked again on separate days of the month to confirm the diagnosis of hypertension.

The study found a relationship between self-care activities and blood pressure (p-value = 0.028). The results of the analysis obtained OR = 6.240, meaning that respondents with low levels of self-care have a 6.240 times chance of experiencing high blood pressure compared to respondents with high levels of self-care. These results align with the study by (Wang & Fang, 2017b) that effective diabetes self-management is beneficial for improving the health condition of diabetic patients. He stated that in addition to helping control glucose in the blood, it turns out that self-management can also help control blood pressure, thereby delaying the occurrence and development of chronic complications of diabetes. A study by García et al. (2014) found that in the intervention group with a self-management education program, there was a change in the level of self-care activity after being exposed to information about self-management so there was a significant change in improving glycemic control. Blood pressure

of diabetic patients, thereby improving the patient's quality of life.

Some of the studies above show that lifestyle dramatically influences the health condition of diabetic patients. Tracey et al. (2016) said that lifestyle factors are one of the keys to preventing complications, one of which is high blood pressure. Kumari et al. (2018) showed that diabetic patients who underwent lifestyle modification interventions significantly increased diastolic blood pressure. Rizvi (2017) stated that lifestyle-based interventions are a pillar of early and continuous treatment in controlling blood pressure for diabetic patients, and continuous treatment in controlling blood pressure for diabetic patients, both to prevent cardiovascular disease and minimize the development of nephropathy and retinopathy. Non-pharmacological methods include weight loss, dietary modification by increasing consumption of fruits and vegetables and low-fat dairy products, engaging in physical activity, avoiding processed foods high in sodium, and avoiding tobacco and excess alcohol consumption. The same thing is explained by (Sami, W., Ansari, T., Butt, N.S., Hamid, 2017), who states that lifestyle modification by increasing the consumption of eating vegetables and fruit affects on weight loss, blood pressure control, and lipid levels.

Self-care activity is a lifestyle modification term for diabetic patients in managing their disease to improve their management to improve their quality of life. Self-care activities consist of five items, namely nutritional therapy, physical or occupational activity, drug management, monitoring blood glucose levels, and preventing the risk of complications. It has been arranged in a scientific and structured way to create behavioral patterns that can guide diabetic patients in behaving in a healthy way to maintain their health status as much as possible. A healthy lifestyle applied through self-care activities for diabetic patients is proven to improve metabolic status. One of them is blood pressure, which is the main focus that is applied through self-care activities for diabetic patients. Blood glucose control remains the main focus in managing patients with type II diabetes. In terms of prevention programs for cardiovascular risk complications, treatment must be carried out comprehensively, one of

which pays attention to blood pressure control (Kementrian Kesehatan Republik Indonesia, 2020). Therefore, a balance between lifestyle changes, diet, exercise, and regularity of medication that is applied through self-care activities is a way to reduce the risk of cardiovascular complications.

Conclusion

The conclusions obtained are as follows: Characteristics of DM patients in the working area of the Prolanis Alfajar and Sanang Barigas Club BPJS Kesehatan Palangka Raya in the majority indicate that the average age is 52.29 years, most of them are female, have a job, income is higher than regional minimum wage, graduated from high school and university, did not smoke and the average length of suffering from DM was 7.74 years.

The analysis of self-care activities shows that most results of the study of self-care activities show that most respondents have a high level of self-care. Blood pressure analysis results show that most effects of blood pressure analyses show that most respondents have normal blood pressure. There is a relationship between self-care activities and blood pressure in type II diabetes mellitus patients, meaning that the higher the self-care activities in diabetic patients, the blood pressure tends to be normal.

Limitation of The Study

In collecting data through questionnaires, subjective data from respondents sometimes does not show the respondents' valid opinions, which are valid opinions of respondents. This is influenced by the age factor, considering that the average age of respondents is already advanced.

Acknowledgment

The author expresses his gratitude to the Director of Poltekkes Palangka Raya, who has provided support; to the head of PKM Pahandut and his staff, respondents, and all parties who have assisted in data collection.

Conflict of Interest

In writing this research, there is no conflict of interest.

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