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THE RELATIONSHIP OF FOOT CARE WITH THE INCIDENT OF DIABETIC FOOT ULCERS IN DIABETES MELLITUS PATIENTS

Kharina Indira Astuti, Okti Sri Purwanti*
School of Nursing, Universitas Muhammadiyah Surakarta, Gatak, Pabelan, Kartasura, Sukoharjo, Central Java 57169, Indonesia
*Osp136@ums.ac.id

ABSTRACT
Diabetes mellitus is a non-communicable disease which ranks 6th as a cause of death in developing countries. Diabetics are at risk of complications if blood glucose is not controlled. High glucose levels can damage the nerves, blood vessels and arteries leading to the heart. This condition causes an increased risk of heart attack, stroke, kidney failure, peripheral vascular disease and other complications. In severe cases, diabetes can cause blindness, amputation, and even death. Objective to determine the relationship between foot care and the incidence of diabetic ulcers in diabetes mellitus sufferers at RSUD Dr. Soehadi Prijonegoro Sragen. This research uses quantitative methods with a cross sectional approach. The population in this study were all diabetes mellitus sufferers at RSUD Dr. Soehadi Prijonegoro Sragen in January-November 2023 with a total of 1565 patients. The sample in this study consisted of 66 diabetes mellitus patients who were selected using a purposive sampling technique. Data collection was carried out using the Nottingham Assessment of Functional Footcare (NAFF) questionnaire and observation sheets. The data analysis test in this study used a univariate test and a bivariate test using the chi square test. The majority of diabetes mellitus sufferers who were respondents in this study were female with the majority aged > 60 years, had a high school education level and had suffered from diabetes mellitus for a period of between 6-10 years. The majority of diabetes mellitus sufferers who were respondents in this study experienced diabetic ulcers. The majority of respondents in this study had good foot care. There was a significant relationship between foot care and the incidence of diabetic ulcers in diabetes mellitus sufferers at Dr. Soehadi Prijonegoro Hospital, Sragen. with a p-value of 0.009 (P<0.05). There is a significant relationship between foot care and the incidence of diabetic ulcers in diabetes mellitus sufferers at Dr. Soehadi Prijonegoro Hospital, Sragen.

Keywords: diabetes mellitus; diabetic ulcers; foot care

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INTRODUCTION

Non-communicable diseases (NCDs) or often called chronic diseases are a combination of genetic, behavioral, physiological and environmental factors that tend to last a long time (Mona et al., 2022). Non-communicable diseases are the biggest cause of death in the world. The increased risk of death from NCDs is caused by dangerous alcohol use, tobacco use, lack of physical activity and an unhealthy diet (WHO, 2021). Risk factors for death caused by NCDs are expected to continue to increase, such as heart disease, stroke, cancer and diabetes (Kemenkes RI, 2018). Diabetes mellitus (DM) or diabetes itself is a heterogeneous group of disorders characterized by increased blood glucose levels or hyperglycemia(Nurlaela & Purwanti, 2020).Diabetes Mellitus ranks 6th cause of death in developing countries. Diabetics are at risk of complications if blood glucose is not controlled. High glucose levels can damage the nerves, blood vessels and arteries leading to the heart. This condition causes an increased

risk of heart attack, stroke, kidney failure, peripheral vascular disease and other complications. In severe cases, diabetes can cause blindness, amputation, and even death (Everett E, 2018). Therefore, serious and appropriate treatment is needed to overcome this disease (Maulida, 2020).

Based on data from the International Diabetes Federation (IDF) between 2030 and 2045, it is estimated that 578 to 700 million people will suffer from diabetes worldwide (IDF, 2021). Indonesia is ranked 5th out of 10 countries with a population of 19.47 million people with a total population of 179.72 million, which shows that Indonesia has a diabetes prevalence of 10.6% (IDF, 2021). Meanwhile, based on data released by the Ministry of Health of the Republic of Indonesia (2020), the incidence of diabetes is increasing in all provinces in Indonesia, making Indonesia rank 5th with the largest number of diabetes sufferers in the world. The prevalence of diabetes mellitus sufferers in Central Java Province in 2020 was 528,559 cases (13.67%), in 2021 it was 467,365 cases (11%), and in 2022 it was 163,751 (15.6%). According to data from the Sragen District Health Service, Sragen City had a varying incidence of diabetes in the past 5 years, diabetes increased by 5,223 cases in a year (Dinas Kesehatan Jawa Tengah, 2022).

Efforts that can be made to reduce the prevalence of diabetes mellitus are by carrying out comprehensive management. Improper diabetes management can actually cause complications in diabetes mellitus sufferers (PERKENI, 2021). A chronic complication in diabetes sufferers that causes internal tissue damage or tissue death is diabetic ulcers (Manungalit, 2020). Diabetic ulcers that are not treated immediately can lead to leg amputation which has negative impacts from a psychological, social or economic perspective (Anggraeni, 2020). To prevent this, preventive measures or efforts are needed to reduce the number of diabetic foot ulcers in people with diabetes mellitus.

Primary prevention efforts that can be made to reduce the occurrence of diabetic ulcers are by implementing The Summary of Diabetic Self-Care Activities by Tobert, et all (2009) which includes diet, blood glucose monitoring, drug therapy, physical exercise, and foot care (Manungalit, 2020). Carrying out good and correct foot care can reduce the potential for amputations that occur in DM sufferers (Octorina & Wahyuni, 2019). In research (Indarwati, 2019) which discussed factors related to the incidence of diabetic ulcers, it was found that 80 people (74%) received poor care and experienced diabetic ulcers, while 29 people (26%) did not experience diabetic ulcers. %). This shows that there is a relationship between foot care and the occurrence of diabetic ulcers. Poor foot care is 3.5 times more susceptible to developing diabetic ulcers.

Based on the results of reports from the medical records of RSUD dr. Prijonegoro Sragen from January to December 2022 there were 212 diabetes mellitus patients with diabetic ulcers undergoing outpatient care and from January to November 2023 the number of outpatient visits for diabetes mellitus patients with diabetic ulcers was 345 patients. Based on a preliminary study conducted by researchers at RSUD dr. Soehadi Prijonegoro Sragen, by interviewing 5 DM sufferers, said that he had not received any information about DM foot care and prevention of foot wounds and that the hospital for sufferers diagnosed with Diabetes Mellitus had not yet carried out a DM foot screening examination when the sufferer came for outpatient control. Based on the above background, this research aims to determine the relationship of foot care with the incident of diabetic ulcers in diabetes mellitus patients at Dr. Soehadi Prijonegoro Sragen.

METHOD

This research was conducted at Dr. Soehadi Prijonegoro Hospital, Sragen in February 2024. The population in this study were all diabetes mellitus sufferers with foot ulcers or without foot ulcer at Dr. Soehadi Prijonegoro Hospital, Sragen in January-November 2023 with a total of 1565 patients. The sample in this study was calculated using the sample formula for case control research. The number of samples in this study was 66 people who were selected using purposive sampling techniques. Data collection was carried out using the foot ulcer observation sheet of the Nottingham Assessment of Functional Footcare (NAFF) questionnaire with a validity value of r ≥0.444 and a reliability value of 0.830. The data analysis test in this study used a univariate test and a bivariate test using the chi square test.

RESULTS

Table 1.
Respondent characteristics (n= 66)

Respondent characteristics	f	%
Gender		
– Male	17	25,8
– Female	49	74,2
Age		
– 18-40 years	1	1,5
– 41-60 years	35	53,0
– >60 years	30	45,5
Employment		
– Civil servants	5	7,6
– Self-employed	1	1,5
– Not Working	21	31,8
– Labor	6	9,1
– Housewife	3	4,5
Education		
– No school	6	9,1
– Elementary school	14	21,2
– Middle school	6	9,1
– High school	37	56,1
– College	3	4,5
Duration of DM		
– 0-5 years	10	15,2
– 6-10 years	43	65,2
– > 10 years	13	19,7

Table 1, it is known that the majority of respondents in this study were female with a total of 49 people (74.2%). Based on age categories, it is known that the majority of respondents in this study were aged between 41-60 years with a total of 35 respondents (53.0%). Based on job category, it is known that the majority of respondents in this study work as housewives (IRT) with a total of 40 respondents (45.5%). Based on the education category, it is known that the majority of respondents had a high school education with a total of 37 (56.1%). Furthermore, based on the category of duration of suffering from DM, it is known that the majority of respondents in this study had suffered from DM for between 6-10 years with a total of 43 people (65.2%).

Table 2 shows that the majority of respondents in this study have regular foot care with a total of 44 respondents (66.7). Based on the incidence of diabetic ulcers, it is known that the number of diabetes mellitus patients who experience diabetic ulcers is the same as the number of diabetes mellitus patients who do not experience diabetic ulcers, each with a total of 33 patients (50.0%).

Table 2.
Variable description (n= 66)

Variable	f	%
Foot care		
– Irregularly	22	33,3
– Regularly	44	66,7
Diabetic ulcer		
– Diabetic ulcers	33	50,0
– No Diabetic ulcers	33	50,0

Table 3.
The relationship between foot care and the incidence of diabetic ulcers

Foot care	Diabetic ulcers				*P-value*
	Diabetic ulcers		No Diabetic ulcers		
	f	(%)	f	(%)	
Irregularly	16	24,2	6	9,1	0,009
Regularly	17	25,8	27	40,9	

Based on the results of the Chi square test, it is known that the number of respondents who did irregular foot care and experienced diabetic ulcers was 16 people (24.2%). Meanwhile, the number of respondents who did irregular foot care but did not experience diabetic ulcers was 6 people (9.1%). The number of respondents who carry out regular foot care, but 17 people (25.8%) experienced diabetic ulcers. Meanwhile, the number of respondents who carried out regular foot care and did not experience diabetic ulcers was 27 people (40.9%). Then, based on the results of the analysis, it is known that the p-value in the chi-square test is 0.009 ($P<0.05$). So it can be concluded that there is a significant relationship between foot care and the incidence of diabetic ulcers in diabetes mellitus sufferers at Dr. Soehadi Prijonegoro Hospital, Sragen.

DISCUSSION

Based on the research results, it is known that the majority of diabetes mellitus sufferers at RSUD Dr. Soehadi Prijonegoro Sragen who were respondents in this study were female. The diabetes mellitus can occur in anyone, both men and women (Musdalifah & Nugroho, 2020). However, in women, the risk of developing diabetes is higher than in men. This is because physically women experience monthly cycle syndrome (premenstrual syndrome) and post-menopausal which makes the distribution of body fat easy to accumulate. As a result of this hormonal process, the risk of developing diabetes mellitus is higher compared to men (Michille & Situmorang, 2021).

The results of this study also found that the majority of diabetes mellitus sufferers at RSUD Dr. Soehadi Prijonegoro Sragen who were respondents in this study were aged between 41-60 years. The risk factor age is included in the risk factors that cannot be modified (cannot be changed). Increasing blood glucose levels are closely related to increasing age, so that with increasing age the prevalence of diabetes and impaired glucose intolerance increases (Cahyono & Purwanti, 2019).Therefore, the older a person is, the greater the chance of developing diabetes mellitus.. This is because as we age there are changes in carbohydrate metabolism and changes in insulin release which are influenced by glucose in the blood (Susilawati & Rahmawati, 2021). Apart from that, increasing a person's age also causes a decline in all body systems, including the endocrine system which can result in insulin resistance. This can cause blood sugar levels in the body to become unstable, thereby increasing the risk of diabetes mellitus (Isnaini & Ratnasari, 2018).

Based on job characteristics, it is known that the majority of diabetes mellitus sufferers at RSUD Dr. Soehadi Prijonegoro Sragen who were respondents in this study work as housewives (housewives). Occupational factors are one of the factors that influence the occurrence of diabetes mellitus. The work status itself will influence an individual's physical activity which influences the management of a healthy lifestyle to prevent diabetes (Pahlawati & Nugroho, 2019). In someone with a job who has light physical activity, this will cause a lack of energy burning by the body so that excess energy in the body will be stored in the form of fat in the body, resulting in obesity, which is one of the risk factors for diabetes mellitus (Arania, 2021). The results of this research are in line with the results of research conducted by (Ramadhani, 2022) which states that the majority of DM sufferers are housewives.

Based on educational characteristics, it is known that the majority of respondents in this study had a high school education. The higher the level of education will increase awareness of healthy living (Notoatmodjo, 2018). Individuals with a low level of education are at risk of paying less attention to lifestyle and diet as well as actions to prevent the occurrence of DM. There is an association between higher levels of education in accepting themselves as sick if they experience symptoms related to an illness compared to groups with lower education (Pahlawati & Nugroho, 2019). Groups with higher levels of education are also indicated to have better awareness of maintaining their health and seek health services more quickly compared to groups with lower education. In comparison to people with lower education levels, those with higher education levels will find it easier to access information, meaning that they typically have a better understanding of the significance of 70 self-care behaviors and the self-management skills to use diabetes care information from various media (Abbasi, 2018). However, it turns out that in the article that the author found, there is still a higher incidence of T2DM at higher education levels such as university level (Isnaini & Ratnasari, 2018).

Based on the category of duration of suffering from diabetes mellitus (DM), it is known that the majority of respondents in this study had a duration of suffering from diabetes mellitus between 6-10 years. The longer a person suffers from DM, the greater the chance of suffering from chronic hyperglycemia which will ultimately cause DM complications in the form of retinopathy, nephropathy and diabetic ulcers (Muhdar, 2018). The long duration of someone experiencing DM also causes a prolonged state of hyperglycemia. A continuous state of hyperglycemia initiates hyperglycolia, which is a condition where cells are flooded with glucose(Sendi R, 2020). Chronic hyperglossia will change the biochemical homeostasis of the cells, which then has the potential to cause changes in the basis for the formation of chronic complications of DM (Suryati, 2019).

The results of this study also found that the majority of respondents in this study had good foot care. Based on the researchers' observations, although the majority of respondents in this study had good foot care, there were still many respondents who had poor foot care. Foot care is one aspect of self-management behavior carried out by diabetes mellitus sufferers. This foot care is carried out by diabetes mellitus sufferers regularly to delay and prevent diabetic foot complications (Sari, 2020). The goal of foot care is to prevent injuries. Foot care for diabetics needs to be carried out so that the incidence of complications and diabetic ulcers on the feet of diabetics is reduced and can prevent amputations (Munthe, 2022).

Based on the research results, the p-value obtained in the chi-square test was 0.009 ($P<0.05$). So it can be concluded that there is a significant relationship between foot care and the

incidence of diabetic ulcers in diabetes mellitus sufferers at Dr. Soehadi Prijonegoro Hospital, Sragen. Diabetic ulcers are a complication of diabetes mellitus which is characterized by open wounds on the surface of the skin or mucous membranes accompanied by extensive tissue death and bacterial invasion and if care and treatment are not received, the infection will spread and deepen so that it can result in amputation . The detrimental impact of diabetic foot ulcers is from a biological, psychological, socio-economic and spiritual perspective (Manto, 2023).

One intervention that can be made to prevent diabetic ulcers is by improving foot care behavior. Foot care behavior is an action taken to ensure the cleanliness of the feet of diabetes mellitus patients is maintained and as an early effort to prevent wounds on the feet which result in the risk of infection. Foot care is an aspect of self-management that needs to be done, such as washing your feet every day, drying your feet after washing and always checking the inside of your footwear (Ningrum, 2022). The results of research by (Tjomiadi, 2020) found that the better foot care for people with type 2 DM, the risk of diabetic ulcers will decrease. So it can reduce the risk of ulcers and amputation. The results of this study are in line with the results of research conducted by (Yoyoh & Mutaqqin, 2022) which found that there was a relationship between foot care and the incidence of diabetic ulcers in people with diabetes mellitus, where poor foot care had a 3,267 times greater risk of developing diabetic ulcers.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that: the majority of diabetes mellitus sufferers who were respondents in this study were female with the majority age > 60 years, had a high school education level and had suffered from diabetes mellitus between 6-10 years. The majority of diabetes mellitus sufferers who were respondents in this study experienced diabetic ulcers. The majority of respondents in this study carried out regular foot care. There was a significant relationship between foot care and the incidence of diabetic ulcers in diabetes mellitus sufferers at Dr. Soehadi Prijonegoro Hospital, Sragen.

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