



The Knowledge of Diabetic Foot Exercise on Diabetes Mellitus Patients at Peusangan Public Health Center, Aceh

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ABSTRACT: Diabetes mellitus is the most common cause of death worldwide. Uncontrolled diabetes mellitus can cause complications, including diabetic ulcers. The precautionary effort required to reduce the risk of complications is diabetic foot exercise. One of the factors influencing the application of diabetic foot exercises is the knowledge of diabetics regarding foot exercise techniques. The purpose of this research was to identify the knowledge of patients with diabetes mellitus on diabetic foot exercise techniques. The research design used in this research was descriptive. The population consisted of 217 respondents suffering from diabetes mellitus. And the total sample count was 68 respondents selected using the object-based sampling technique. The research instrument used a questionnaire and data analysis used univariate analysis. Based on the results of the research, it was found that the majority of respondents who had knowledge of diabetic foot exercise techniques in the good category were (45.6%), in the enough category was (30.9%) and in the low category was (23.5%). It can be concluded that patients with diabetes mellitus have a good understanding of diabetic foot training techniques. Respondents are advised to maintain and enhance their knowledge by searching for more information on diabetic foot exercise techniques and do regular foot exercises to prevent diabetic complications.

KEYWORDS: Knowledge, Diabetes Mellitus, Diabetic Foot Exercise

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I. INTRODUCTION

Changes in disease patterns in Indonesia have undergone a change from infectious diseases to non-communicable diseases. One type of non-communicable disease is a degenerative disease caused by a decrease or decline in body functions such as diabetes mellitus. Diabetes mellitus is a chronic disease caused by a lack of effective insulin in the body that involves abnormalities in carbohydrate, fat and protein metabolism [1].

Diabetes mellitus is the silent killer because almost a third of people with diabetes are not aware that they have diabetes mellitus until the disease develops very seriously which affects other organs or body systems and causes complications, which can be in the form of damage to blood vessels, nerves and other internal structures [2]. Diabetes mellitus is the most important public health problem and one of the four priority non-communicable diseases that is the target of follow-up by world leaders and the number of cases and prevalence of diabetes has been steadily increasing for decades latest [3].

The increasing prevalence of diabetes mellitus in the world, both in developed and developing countries has resulted in diabetes mellitus being a global health problem in society that must receive special attention to reduce its incidence [4]. The International Diabetes Federation (IDF) organization states that in 2019 there were 463 million people aged 20-79 years in the world suffering from diabetes or equivalent to a prevalence rate of 9.3% of the total population at the same age. Based on gender, the IDF stated that the prevalence of diabetes in 2019 was 9% in women and 9.65% in men [5].

The prevalence of diabetes is estimated to increase with the increasing age of the population at the age of 65-79 years to 19.9% or 111.2 million people. This figure is predicted to continue to increase to reach 578 million in 2030 and 700 million in 2045. IDF also projects the number of people with diabetes in the population aged 20-79 years in several countries in the world and there are 10 countries with the highest number of

sufferers. China, India and the United States are in the top three with the number of sufferers in China reaching 116.4 million, India reaching 77 million and the United States 31 million. Indonesia is ranked 7th among 10 countries with the highest number of sufferers, namely 10.7 million. Indonesia is the only country in Southeast Asia on the list, so it is estimated that Indonesia's contribution to the prevalence of diabetes cases in Southeast Asia is estimated [5].

The results of the 2018 Basic Health Research (Riskesdas) show that the prevalence of diabetes mellitus in Indonesia at the age of 15 years increased from 1.5% in 2013 to 2% in 2018. However, the prevalence of diabetes mellitus according to the results of blood sugar examination increased from 6.9% in 2013 to 8.5 % in 2018 [6]. According to the Aceh Health Profile, Aceh Province is ranked 4th with the prevalence of diabetes mellitus reaching 138,291 patients and those receiving services according to standards as many as 95,005 sufferers or 69%. North Aceh ranks first with an incidence of 29,703 and Banda Aceh ranks second with an incidence of 14,052 sufferers. Meanwhile, Bireuen was ranked 4th with an incidence of 11,809 cases [7]. The initial data collection at the Peusangan Health Center Since the January-December 2020 period, 217 cases of diabetes mellitus were recorded with the average number of visits per month reached 75 visits, both old and new cases. The prevalence in women was 115 people, higher than in men as many as 102 patients [8].

Diabetes mellitus requires proper management in order to control blood sugar levels in a normal and stable state. Prevention is needed earlier to overcome complications and is expected to be very beneficial to avoid the occurrence of various unfavorable things. There are four pillars of handling diabetes mellitus in Indonesia, including: education, meal planning or diet, pharmacological interventions and physical activity tailored to the patient's body abilities [9]. One of the physical activities that can be done to treat diabetes is diabetic foot exercise. Diabetic Foot Gymnastics is an activity or exercise performed by people with diabetes mellitus to prevent injuries. Foot gymnastics can improve blood circulation in the legs, improve blood circulation, strengthen leg muscles and facilitate leg joint movement. Thus, it can manifest in the feet of diabetics, can be well maintained and can improve the quality of life of diabetics and can prevent complications [10].

The Description of Knowledge of Diabetes Mellitus Patients on Diabetic Foot Gymnastics at IPI Medan General Hospital. The results showed that the distribution of respondents with knowledge in the good category was 8 respondents (26.7%), with sufficient knowledge as many as 18 respondents (60%) and knowledge in the low category as many as 4 respondents (13.3%) [11]. Study conducted by July, regarding Knowledge and Actions of People with Diabetes Mellitus in performing Diabetic Foot Exercises at the Asri Wound Care Center Clinic in Medan. The results showed that 19 respondents (63.3%) had sufficient knowledge about diabetic foot exercises and the majority of respondents who were unable to do diabetic foot exercises according to the SOP were 20 respondents (66.7%), who were able to do diabetic foot exercises according to the SOP as many as 10 people. (33.3%) [12]. Study by Desiana Sampuala regarding the Relationship of Knowledge of Diabetes Mellitus Patients about Diabetic Foot Exercises with the Implementation of Diabetic Foot Exercises at Labuang Baji Hospital Makassar shows that the majority of respondents have good knowledge as many as 18 respondents (60%) with the implementation of foot exercises in the good category as many as 12 respondents (40%) and the implementation of foot exercises as poor as 3 respondents (10%). Some of the respondents who had poor knowledge were 12 respondents (40%) with 9 respondents (30%) poor foot exercise and 6 (20%). The results of the spss test obtained a $p\text{-value} = 0.030 < 0.05$ which indicates that there is a significant relationship between the knowledge of diabetes mellitus patients and the implementation of diabetic foot exercises [13].

Based on a preliminary study at the Peusangan Health Center, the results of an interview with one of the nurses found that diabetic foot exercises have been programmed to be taught to people with diabetes mellitus who come for treatment at the public health center. The exercise is carried out once a week every Wednesday and once a month before doing the exercise, all diabetic patients are checked for blood sugar. After interviewing 5 DM patients seeking treatment at the public health center, it was found that 2 out of 3 patients claimed to have known about diabetic foot gymnastics and routinely participated in diabetic gymnastics activities once a week held at the public health center and the other 3 still did not know about diabetic foot exercises. because they have never participated in a gymnastics program on the grounds that they do not have time and access to the health center is far away.

II. METHOD

The study was use a descriptive approach. The population in this study consisted of all patients with diabetes mellitus who attended at the Peusangan Public Health Centre for a total of 217 cases. The sample size for this study was 68 persons with diabetes mellitus, using purposive sampling technique.

The questionnaire used to collect the data was developed by the researcher based on a literature review of the basic concepts of diabetic foot exercise techniques. The questionnaire of this study was composed of demographic data, a questionnaire on the knowledge of diabetics on diabetic foot exercise techniques. Demographic data include the identity of respondents in terms of age, gender, education, occupation, duration of

diabetes, and acquisition of foot exercise information. A knowledge questionnaire about the diabetic foot exercise technique consisting of 22 statement items and using the Gutmann scale with alternative answers "True" given a score of 1 and "False" given a score of "0".

The knowledge measurement criteria are good if the score is 76-100%, sufficient, if the score is 56-74% and lower if the score is <56%. The criteria for measuring knowledge are good, if the score (15-19), enough, score (11-14) and low, score (1-10).

III. FINDINGS

Based on table 1, can be seen that of the 68 respondents studied, the majority of respondents are aged 45-55 years, namely 56 respondents (82.4%), female sex as many as 40 respondents (58.8%) and high school education level as many as 30 respondents (44.2%). Most of the respondents with employment status as IRT were 27 respondents (39.7%), 60 respondents (88.2%) had suffered from DM for 1-5 years, and 50 respondents (73.5%).

Table 1. Frequency Distribution of Demographic Data of Diabetes Mellitus Patients

No	Demographic	Frequency (F)	Percentage (%)
Age			
1	45-55 Years	56	82.4
2	56-65 Years	12	17.6
Gender			
1	Man	28	41.2
2	Woman	40	58.8
Education			
1	Elementary School	12	17.6
2	Junior High School	16	23.5
3	Senior High School	30	44.2
4	College	10	14.7
Profession			
1	IRT	27	39.7
2	civil servant	6	8.8
3	Trader	14	20.6
4	Farmer	21	30.9
Long suffering			
1	1-5 Years	60	88.2
2	6-10 Years	8	11.8
Information Acquisition			
1	Exist	50	73.5
2	There is no	18	26.5

Based on table 2, showed that of the 68 respondents studied, the majority of respondents have good knowledge of diabetic foot exercise techniques as many as 31 respondents (45.9%), enough knowledge about diabetic foot exercise techniques as many as 21 respondents (30.9%) and respondents are knowledgeable low about diabetic foot exercise techniques as many as 16 respondents (23.5%).

Table 2. Frequency Distribution of Knowledge of Diabetes Mellitus Patients about Diabetic Foot Exercises

	Knowledge	f	%
Good		31	45.6
Enough		21	30.9
Low		16	23.5

IV. DISCUSSION

Characteristics of Respondents

Based on the results of data analysis, it was found that the age characteristics of people with diabetes mellitus were in the range of 45-55 years (82.4%). Age from 45 years and over is an age group at risk for diabetes mellitus caused by a decrease in insulin production in the body [9].

The age of 45-55 years, glucose tolerance disorders tend to occur. This is because at this age range the aging process occurs which results in changes in the anatomy, physiology, and biochemistry of the body which greatly affects the decline in body functions and work which has an impact on insulin resistance [14]. According to Sutanto, the increasing age, the higher the possibility of insulin retention, where insulin is still being produced but in insufficient quantities caused by a decrease in the work of the pancreas [15]. Smimilar to Imelda, which also explains that the age of 45-64 years begins to increase blood sugar due to the degenerative process of the body. Changes occur from the cellular level, continuing at the tissue to organ level, resulting in decreased activity and sensitivity of pancreatic beta cells in producing insulin, resulting in insulin resistance [16].

This is in line with research conducted Tular, found that the majority of respondents who had diabetes mellitus aged 45 years were higher than those aged <45 years. The results showed that there was a significant relationship between age and the incidence of diabetes mellitus with a p-value of 0.000 <0.05 and an Odds Ratio value of 7.6. This means that people aged 45 years have 8 times the risk of developing diabetes compared to people aged less than 45 years [17]. Based on the researcher's assumptions, age 45-55 years is one of the risk factors for diabetes associated with the aging process and the body's degenerative process causing changes and decreases in body function in insulin production resulting in insulin resistance which manifests as an increase in blood sugar or hyperglycemia. Based on the results of data analysis, it was found that the characteristics of people with diabetes mellitus at the Peusangan Health Center UPTD were female (58.8%).

Women have risk factors that cause diabetes mellitus. The risk factors are BMI (Body Mass Index), Monthly Cycle Syndrome (Premenstrual Syndrome) and Pregnancy. Respondents who suffer from diabetes mellitus in the working area of the Tigo Baleh Health Center, data obtained are more women than men. Meanwhile, several female respondents provided information that before suffering from diabetes mellitus the respondents had a fat body. In women withobesity can cause insulin resistance which can lead to dysmetabolic syndrome (dyslipidemia, hyperglycemia, hypertension) [18]. Luthfa and Fadhilah's states that women who have a history of giving birth with large babies (more than 4 kg) have a 7 times greater risk of developing DM [19].

Furthermore, women also occurs manopause which results in a decrease in insulin production due to hormones so that the distribution of body fat becomes easy to accumulate due to hormonal processes. Women also tend to have higher LDL cholesterol or triglyceride levels than men. This causes women to have a higher risk of developing diabetes than men and is influenced by lifestyle and different physical activities in men and women [16]. According to the researcher's assumptions, women are more at risk of developing diabetes mellitus than men. Women tend to have risk factors such as obesity, menstrual cycle, pregnancy and menopause that affect hormone production which results in impaired and decreased insulin production. Women also tend to have less physical activity than men. Physical activity is one of the risk factors for diabetes.

Based on the results of data analysis, the characteristics of DM sufferers with a high school education level (44.2%). Level of education is very influential on health. Individuals who have a high level of education usually have more knowledge and information about their health so as to create awareness and good motivation in their health [20]. The education will affect a person's knowledge regarding his health and will have the awareness to maintain his health with the knowledge he has [21]. There was a positive influence between education and diabetes management. Education has an effect on controlling blood sugar, how to overcome the symptoms of the disease that arise and prevent complications by doing physical activity, one of which is diabetic foot exercises and can prevent various complications so that the health status of diabetics is increased [22].

Similar to Annisa which states that people with diabetes mellitus with a higher education level have better knowledge in dealing with diabetes and its effects on health so that sufferers will respond positively and find solutions to their health problems such as being able to regulate their health patterns better. life and a good diet in relation to the acceptance and absorption of information obtained from health workers. It is different with individuals with low education who tend to be less able to pay attention to good diet and lifestyle because of difficulties in absorbing and interpreting the information provided so that the application of diabetic foot exercises is not optimal [23]. The incidence of diabetes was more in people with primary education than secondary education, with a p-value of 0.005 <0.05 and an Odd ratio value of 3.400, where good knowledge had a chance of 3.400 times. to be good at leg gymnastics [24].

In my opinion, education is a risk factor for diabetes. This relates to the absorption of information about the regulation of a good and healthy lifestyle. Individuals with higher education are easy to receive and absorb information so that they behave according to the information received in the management of a healthy lifestyle to minimize the risk of diabetes.

Based on the results of data analysis, it was found that the characteristics of people with diabetes mellitus with work status as housewives (39.7%). Work is closely related to the incidence of diabetes mellitus. Someone who does not work tends to be at risk of developing diabetes mellitus which is associated with a lack of physical activity so that the burning of calories in the body or metabolism does not go well [25]. According to Ratnasari, housewives carry out several activities at home such as cooking, washing and cleaning the house as

well as many activities that cannot be described. The work of housewives is included in light activities. Physical activity will have an effect on increasing insulin so that blood sugar levels will decrease. If there is not enough insulin to convert glucose into energy, diabetes will occur[26].

Physical activity tends to increase insulin sensitivity and has a direct effect on reducing blood sugar levels. This is in line with research conducted Sipayung at the Sidrap District Hospital, it was found that respondents who suffered from diabetes had the status of housewives or retirees. This is related to physical activity with a p-value of $0.000 < 0.05$ [27]. Researchers assume that housewives has risk of developing diabetes associated with physical activity. It is undeniable that IRT tend to carry out various activities at home which are categorized as light activities which have an impact on the inadequacy of the body's metabolic processes in converting food into energy.

Based on the results of data analysis, it was found that the characteristics of people with diabetes mellitus in Peusangan Health Center suffered from DM 1-5 years (88.2%). Diabetics for one to five years tend to adhere to the good process in managing their diabetes, because their curiosity and desire to recover is very high. Patients suffering from the disease for 6-10 years tend to have poor adherence due to more experience, where these patients have complied with the treatment process but did not get satisfactory results and patients tend to surrender and do not fulfill the recommended process [23]. Similar to Aisyah (2018), suffering from diabetes can affect depression in patients such as experiencing boredom and despair in managing their diabetes. Time suffering from diabetes is associated with complications that can occur, such as ulcers. Complications can be prevented if individuals carry out good diabetes management such as routine sugar control, diet and physical activity such as diabetic foot exercises. Diabetic foot gymnastics is a physical activity that can be done regularly which is useful for improving blood circulation in the legs so as to prevent complications [22].

Study conducted by Yessi (2020) at the Sudomulyo Health Center in Pekanbaru found that the majority of people with diabetes <5 years tend to be more obedient in managing diabetes as recommended compared to patients >10 years. This is related to the enthusiasm in seeking information and the motivation to recover is still high [24]. According to the researcher's assumption, the duration of suffering from diabetes greatly affects how a person manages his diabetes and performs the management as recommended. Individuals who suffer from diabetes for 1-5 years tend to still have high motivation to recover compared to old patients who feel bored and bored with diabetes treatment. Whether or not a person suffers from diabetes is closely related to how a person's perception of diabetes is experienced, which in turn will shape behavior in choosing diabetes management.

Based on the results of data analysis, it was found that the characteristics of people with diabetes mellitus at the Peusangan Health Center had received information about diabetic foot exercises (73.5%). Information as a notification to someone about something in the context of the diabetic foot exercise technique that provides a new cognitive foundation for the formation of an attitude towards it. A positive attitude will certainly form positive behavior in the application of diabetic foot exercises to individuals [2]. Information about diabetic foot exercises can be obtained from health workers, books, mass media and the internet. The more information someone gets, the better it is in applying diabetic foot exercises to manage so that blood sugar stability is maintained. Sources of information obtained and provided can be manifested in the form of high awareness of diabetics towards diabetic foot exercise which is manifested in the form of good behavior [13].

According to the researcher's assumptions, information about diabetic foot exercises is very important for the public to know so that they can apply it properly to prevent complications such as ulcers. Submission of information from health workers can be disseminated through health education and counseling. The more information obtained about foot exercise, the more effective and efficient it will be in its implementation in the daily life of diabetics.

Knowledge of Diabetic Foot Exercise on Diabetes Mellitus Patients

Based on the results of data analysis, it was found that the characteristics of people with diabetes mellitus at Peusangan Health Center with knowledge about diabetic foot exercises were in the good category (45.6%). Knowledge is the result of knowing and this happens after people sense certain objects and most of the knowledge is obtained through the senses of sight and hearing [28]. Knowledge plays an important role in determining behavior because knowledge will form beliefs which then shape perceptions in reality, provide a basis for decision making and determine behavior towards certain objects and a person's actions are usually strongly influenced by knowledge of the health problems they experience, such as preventing diabetes complications by diabetic foot exercise[12].

Knowledge of people with diabetes mellitus about diabetic foot exercise is an understanding and knowledge possessed by people with diabetes mellitus about the meaning, purpose of exercise, indications, contraindications, things that must be studied before the action and techniques of diabetic foot exercise which can be done by standing, sitting and lying down[26]. The level of knowledge is a person's knowledge of an object that has different levels of intensity so that a person can be said to know, understand, be able to analyze

and apply it in its application [23]. The level of knowledge of diabetics about foot exercise techniques includes knowing, understanding, application, synthesis, analysis and evaluation. Knowledge of foot exercise techniques is very important to be mastered in order to get the right and accurate action regarding the application of diabetic foot exercise techniques [28].

The better a person's level of knowledge about diabetic foot exercises, the better the management and application in daily life. And vice versa, the more the lack of knowledge that someone has about foot gymnastics techniques causes in its application to be lacking because they do not understand the technique and misunderstand the instructions so that the management is not effective and efficient [11]. Similar to Desiana (2019), the majority of respondents had good knowledge of diabetic foot exercises as many as 18 respondents (58.1%), lack of knowledge as many as 12 respondents (38.7%) [13]. This study used an analytical observational research design, a sample of 30 respondents, a purposive sampling technique with inclusion criteria: patients with diabetes mellitus, able to carry out diabetic foot exercises, inpatients and outpatients and willing to be respondents in the study. This study used a research design, sample and sample inclusion criteria that were different from the research conducted at the Peusangan Public Health Center, Bireuen Regency.

Researchers assume that good knowledge of diabetic foot exercises is the first step for preventing diabetes complications. Good knowledge tends to lead someone to be good in their management because they understand the technique of applying according to the recommended procedures. Good management will certainly provide benefits for people with diabetes such as improving blood circulation in the legs to be able to control blood sugar so that it is always stable. A person cannot do gymnastics well without knowledge of the technique.

V. CONCLUSION

Based on the results of the study, it was found that:

- a. The distribution of the highest frequency of demographic data on diabetes mellitus patients according to age characteristics 45-55 years (82.4%), female (58.8%), high school (44.2%), housewife (39.7%), duration of diabetes 1-5 years (88.2%) and information about diabetic foot exercises (73.5%).
- b. Highest distribution respondents have good knowledge of diabetic foot exercise techniques as many as 31 respondents (45.9%).

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