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Self-Care Knowledge and Self-Care Activities of Patients with Type 2 Diabetes Mellitus in Thai Nguyen Province, Viet Nam

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Abstract

Purpose: The study was conducted to investigate the status self-care knowledge and self-care activities of patients with type 2 diabetes mellitus.

Methodology: A cross-sectional descriptive study was conducted on 408 patients diagnosed with type 2 diabetes mellitus at Thai Nguyen National Hospital through a questionnaire to assess Self-care Knowledge (DSCK-30) and Self-care activities in people with diabetes mellitus (SDSCA).

Findings: Patients with type 2 diabetes mellitus had good self-care knowledge; the mean total score of knowledge was 21.20 ± 5.25 out of 30 scores. Self-care knowledge scores ranged from 7 to 30. The percentage of patients with self-care knowledge was still low, accounting for 53.9%. The highest percentage of patients who performed good self-care behaviors (from 5 to 7 days) was physical activity (88.0%) and the lowest was blood glucose level testing (2.7%); the rates of patients who followed the diet well, took care of their feet, and adhered to medication was 62.3%, 17.6%; and 13.0%, respectively.

Unique contribution to theory, practice and policy: This study has proven that people with diabetes mellitus had low self-care knowledge and self-care activities in many areas. Therefore, health workers need to personalize in counseling, health education, and provide knowledge and self-care activities of people with diabetes mellitus.

Keywords: *Type 2 Diabetes Mellitus, Self-Care Knowledge, Self-Care Activities.*

BACKGROUND INFORMATION

Type 2 diabetes mellitus (T2DM) causes a heavy burden on individuals, patients' families and communities because it affects quality of life, requires a long-term and holistic health care. Knowledge on diabetes mellitus is considered an essential prerequisite for effective self-care activities, is an important predictor of glycemic self-management and self-care practices[27]. Furthermore, 95% of T2DM self-care behaviors are mainly performed by patients and families. Self-care comes with many challenges and is difficult to maintain in the treatment of T2DM[25]. Self-care activities are still not properly focused in patients with T2DM. The rate of patients adhering to self-care activities in terms of diet, physical activity, medication adherence, blood sugar control, foot care is still quite low[4,19].

Thai Nguyen province, Vietnam is a province with a high rate of DM patients, however there have been no studies evaluating the current status of self-care knowledge and self-care activities of DM patients here. Doctors and nurses need to clearly understand the self-care knowledge and self-care activities of DM patients in Thai Nguyen province to help patients practice better care to minimize complications and improve quality of life. Therefore, the study was conducted with the following objectives: Survey the current status of self-care knowledge and self-care activities for people with type 2 diabetes in Thai Nguyen province, Vietnam.

LITERATURE/THEORETICAL

Self-care activities require patients to have a better understanding of their disease. Knowledge about DM is considered an essential prerequisite for effective self-care activities and favorable health outcomes [8]. Knowledge about DM is an important predictor of self-management of blood glucose monitoring and T2DM self-care practices [15, 16]. Knowledge about DM and self-care activities were both significantly associated with glycemic control – a diabetes outcome measure [6, 26]. Knowledge about DM has the potential to inform patients about specific actions in the DM disease management process. The more patients know about their disease, the more they engage in self-care activities such as diet, exercise, and blood sugar testing than other patients. Understanding DM is an indicator of knowledge that has been shown to influence self-care activities in people with DM[28]. In the study by Van Der Heide and colleagues, they examined the role of knowledge about DM and self-care activities and found that low knowledge of the disease led to lack of knowledge about DM, higher HbA1c, and less self-care. better glycemic control and less physical activity [60]. Studies conducted with people with DM in the United States and the Netherlands also found a possible relationship between DM knowledge and self-care activities [6, 10]. Although there have been many studies on self-care knowledge and self-care activities in people with DM in the past, there are still some gaps in the research. First, no research has been conducted in Thai Nguyen province, Vietnam. Second, because the amount of research conducted to date does not reflect the diversity of ethnic minorities, further research is needed in Thai Nguyen province where many ethnic minorities live. Self-care knowledge is measured using different tools and culturally appropriate tools need to be used. It is clear that due to a lack of patient knowledge, it is questionable whether patients believe they are taking care of themselves.

With these gaps, a study in Thai Nguyen province, Vietnam to evaluate self-care knowledge and self-care activities was conducted.

Orem's (2001) self-care theory[23] was used to develop a theoretical framework to understand caregiving knowledge and caregiving in people with DM. This theory is useful in understanding and expecting personal care knowledge and self-care activities related to glycemic control and identifying ways in which care practices can be modified.

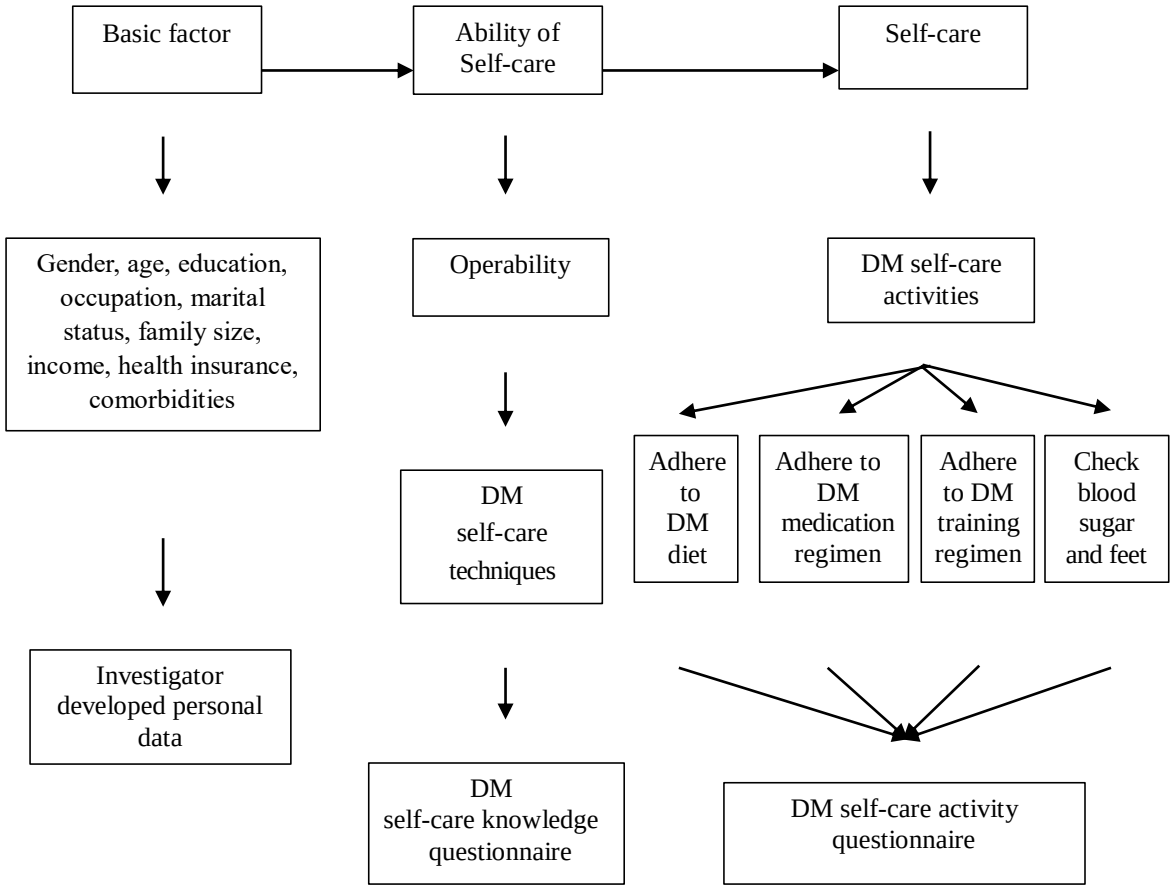

Figure 1: Theoretical framework of the study

MATERIALS AND METHODS

Research locality and time

Locality: Thai Nguyen National Hospital (TNNH) is a special-class hospital under the Ministry of Health, the last-line hospital of the Ministry of Health in the Northern Midlands and Mountains region.

Research time: It was from January 2021 to December 2021.

Study design: It was a cross-sectional descriptive study.

Research subjects

They were patients with T2DM at the Outpatient Clinic of Thai Nguyen National Hospital.

Selection criteria: T2DM patients aged 18 years or older were being managed and treated as outpatients at TNNH.

Exclusion criteria: Patients with a physical or mental condition were unable to perform self-care activities

Sample size: There were T2DM 408 patients who met the criteria to participate in the study. The sample size formula was applied to determine a ratio[11].

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{d^2}$$

In which,

n = the sample size of the study

α = 0.05 (95% confidence level); $Z_{1-\alpha/2}$ = 1.96

d = absolute error of 0.05

p = 0.57

Sampling method

The random sampling technique would be used in this study to obtain a representative sample from the total number of T2DM patients. 408 patients were the desired number of participants in this study. Each day, participants were randomly selected according to this formula k = N/n (k: sampling interval or jump, n: the sample size and N: the total number of outpatients with type 2 diabetes in the Outpatient Clinic). Therefore, the interval between selected patients was 4000/408 ~ 10 (k=10). That was to say, each day before data collection, researchers would randomly select a number (R) from the list and then select the participants by jump k (R, R + k, R) + 2k, R + 3k,..., R + (n-1)k).

Research content, variables and data collection methods

General information about research subjects: General information about patients participating in the study included: age, gender, duration of illness, marital status, educational level, occupation, income, number of family members, health insurance and comorbidities.

Clinical features included: blood pressure index, body mass index (BMI), waist circumference (WC).

Clinical features include: fasting blood glucose (FBG) level (mmol/L), HbA1c (%), total cholesterol (mmol/L), Triglycerides (mmol/L), HDL Cholesterol (mmol/L), LDL Cholesterol (mmol/L).

Self-care knowledge: It used the VietnameseTranslated Diabetic Self-care Knowledge Questionnaire-30 (DSCKQ-30) questionnaire, a self-care knowledge assessment toolkit of diabetes patients, has been tested for reliability, consistency and stability results in terms of high content value and consistency (Cronbach's alpha: 0.899), good stability (Kappa > 0.700).

Self-care Activities: Data were collected using the Summary of Diabetes mellitus Self-Care Activities (SDSCA). This toolkit developed by Toobert and Glasgow involves 5 areas including diet (5 questions), physical activity (2 questions), checking blood glucose (2 questions), medication adherence (2 questions) and foot care (5 questions). The high reliability questionnaire in the current study with Cronbach's alpha is 0.81.

Evaluation criteria

Clinical and preclinical features: Evaluation and classification of clinical characteristics were, according to control groups prescribed by the Ministry of Health on T2DM[20].

Self-care knowledge of patients with T2DM: The total score of the self-care knowledge assessment toolkit was 30. Knowledge was classified based on the percentage of correct answers, specifically[13]:

Correct answer ≥ 70% of the questions, equal to ≥ 21 points: Good knowledge.

Correct answer < 70% of the questions, equal to < 21 points: Poor knowledge.

Self-care activities of patients with T2DM: Each question has 8 levels of choice about the frequency of performing self-care activities in a week from 0-7 days, corresponding to a score of 0-7 points. Average days of doing all the content are equal to the total number of days of doing the content divided by the total number of questions. People who performed self-care behaviors for 4 days or more were assessed as regularly performing and had good self-care activities, those who performed 4 days or less were assessed as having poor self-care activities[29].

Data processing methods

EpiData and SPSS softwares were used for Data entry and analysis, respectively.

Data analysis of clinical and laboratory characteristics: Descriptive statistical analysis used frequency and percentage values for categorical variables, and mean and standard deviation for normally distributed quantitative variables.

Ethics in research

This study was approved by the Ethics Committee of Thai Nguyen National Hospital (No. 234/HDĐ-BVTWTN dated March 25, 2021).

RESULTS

Survey results on clinical and preclinical characteristics of patients with T2DM

General information and disease status of study subjects

Female accounted for 63.5%. The female to male ratio was 1.74. The age group was mainly 65 and older (accounting for 63.5%); only 2.7% of patients were 45 years of age or younger, with a mean age of 66.14 ± 8.32. Qualification of high school education accounted more than 50% of the research patients. Most of the research patients were pensioners (75.7%); the marriage rate accounted for the majority (89.0%). Studied patients living alone accounted for only 2.5%.

Most of the patients had diabetes for ≤ 5 years (40.2%); prevalence of diabetes was over 10 years (28.9%). Patients only taking oral medicine, only injected insulin and combined both oral drugs and insulin injection were 72.8%, 14.0% and 13.2%, respectively. The rate of diabetic complications of the studied subjects was 32.1%.

Outcomes of clinical and subclinical characteristics

The BMI of the patients was in a good and acceptable level (14.7%); obesity rate was high in the study (46.8%); patients with good blood pressure control accounted for a low rate (9.8%); More than half of patients had poor control of blood pressure (53.4%).

Fasting blood glucose level was poorly controlled at a high rate (55.1%); HbA1c was poorly controlled (36.5%); Total cholesterol controlled at a good and acceptable rate (72.5%); the rate of Triglyceride controlled at a good level accounted for a low rate (26.5%); Good and acceptable HDL cholesterol accounted for a high rate (92.7%), and LDL cholesterol controlled at a good and acceptable level (82.9%). Patients with poor control of the HbA1c account for a high percentage (36.5%); in which, male patients accounted for 30.1%, female patients accounted for 28.9%.

Survey results on factors related to self-care knowledge of T2DM patients

Results of self-care knowledge

Table 1: Score of self-care knowledge of patients with T2DM

Self-care knowledge	Attained score		
	Medium (Mean ± SD)	**The lowest** (Min)	**The highest** (Max)
General knowledge	5.24 ± 1.80	0	8
Physical activity	2.04 ± 0.79	0	3
Diet	1.37 ± 0.73	0	2
Prevention form complications	4.02 ± 1.02	1	5
Blood glucose monitoring	3.47 ± 1.25	0	5
Drug compliance	2.65 ± 0.86	0	4
Consequences of uncontrolled blood glucose level	2.04 ± 0.79	0	3
Sum	21.20 ± 5.25	7	30

The total mean score of general self-care knowledge of T2DM patients of the studied group was 21.20 ± 5.25. In which, the mean score of general knowledge was 5.24 ± 1.80 and that of complication prevention was quite high, 4.02 ± 1.02.

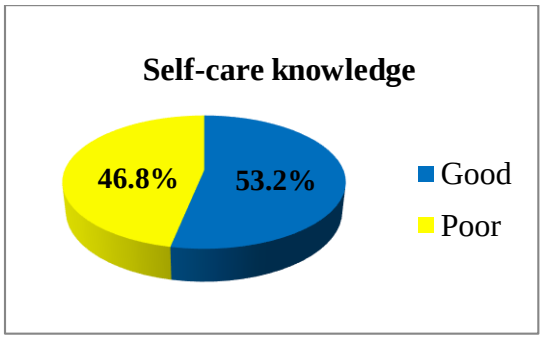

Chart 1: Classification of self-care knowledge of patients

The rates of patients with good self-care knowledge and poor self-care knowledge were 53.2% and 46.8%, respectively.

Table 2: Percentage of patients with good knowledge according to the content of care

Content	n (%)
General knowledge	
Strictly following medication instructions and self-care practice	302 (74.0)
Understanding subjects to plan for the patient to achieve his or her goals	105 (25,7)
Understanding your health condition when you need help from your care team	193 (47.3)
Importance of medication, diet and physical exercise	294 (72.1)
When you feel well, still needing to have regular health check-ups	208 (51.0)
General agreement of patients and doctors about lifestyle changes	300 (73.5)
Knowing yourself when your blood glucose is stable	352 (86.3)
Understanding the impact of smoking on diabetes mellitus	386 (94.6)
Physical activity	
Relationship between times for blood glucose monitoring and physical activity	257 (63.0)
Understanding the frequency of physical activity	392 (96,1)
Knowledge of physical activity and medication	320 (78.4)
Diet	
Having a specific diet	293 (71.8)
Maintaining ideal weight	269 (65.9)
Prevention from Complications	
Needing to take care of your feet carefully	301 (73.8)
Use soft, elastic socks	250 (61.3)
Daily dental care is essential	402 (98.5)
Having an eye care plan is essential	339 (83.1)
Medicines and reduction of the risk of heart disease, stroke	352 (86.3)
Blood glucose monitoring	
Understanding subjects checked blood glucose and blood pressure for patients	217 (53.2)
Frequency of self-monitoring of blood glucose levels	222 (54.4)
Understanding what it means to check your doctor's blood glucose level	374 (91.7)
Understanding the meaning of blood glucose testing for the patient himself/herself	327 (80,1)
Understanding the importance of blood glucose and blood pressure monitoring	279 (68,1)

Good knowledge about frequency of physical activity, knowledge of oral care to prevent complications, and understanding subjects checked blood glucose and blood pressure for patients accounted for 96.1%, 98.5% and 91.7%, respectively. The percentage of good knowledge with understanding about the purpose of blood glucose testing is the lowest (53.2%). Understanding health status when needing help from the care team and that about subjects of planning for patients to achieve goals accounted for 47.3% and (25.7%), respectively.

Table 3: Percentage of patients with good knowledge about drug adherence

Content	Ratio (%)
Drug compliance	
The use of medication needs to be maintained for a lifetime	364 (89.2)
When you feel well, continue to take your medication	368 (90.2)
Serious problems of drinking alcohol while on medication	87 (21.3)
Patient's knowledge when starting insulin treatment	263 (64.5)

The proportion of patients with good knowledge about medication adherence in this study was high. However, there were only 21.3% of patients recognizing a serious problem of drinking while taking medication.

Table 4: Percentage of patients with good knowledge about the consequences of uncontrolled blood glucose

Content	Ratio (%)
Consequences of uncontrolled blood glucose level	
Signs of hypoglycemia	171 (41.9)
High blood glucose levels can cause eye complications	322 (78.9)
High blood glucose can cause heart and kidney complications	340 (83.3)

Patients with good knowledge about the signs of hypoglycemia accounted for a low rate (41.9%); however, patients had good knowledge about cardiovascular and renal complications (83.3%), eye complications (78.9%).

Self-care activities of patients with T2DM

Outcomes of self-care activities in patients with T2DM

Table 5: Frequency of self-care activities in patients with T2DM

Self-care activities under SDSCA		Frequency	%	Mean ± SD
Diet	1-4 days/week	154	37.7	21.33 ± 5.60
	5-7 days/week	254	62.3	
Physical activity	1-4 days/week	49	12.0	11.6 ± 2.84
	5-7 days/week	359	88.0	
Medication adherence	1-4 days/week	355	87.0	7.86 ± 2.35
	5-7 days/week	53	13.0	
Foot care	1-4 days/week	336	82.4	13.76 ± 6.45
	5-7 days/week	72	17.6	
Checking blood glucose	1-4 days/week	397	97.3	1.49 ± 2.66
	5-7 days/week	11	2.7	

The highest percentage of patients who performed good self-care activities (from 5 to 7 days) was physical activity (88.0%) and the lowest was blood glucose testing (2.7%), rates of patients who followed the diet well, took care of their feet, and adhered to medication were 62.3%, 17.6%, and 13.0% respectively.

Table 6: Frequency of Self-care activities in T2DM patients in each specific area

Self-care activities (SDSCA) (n = 408)	Implementation frequency				Mean±SD
	14 days		5-7 days		
	n	%	n	%	
Diets					
Following the diet	103	25.2	305	74.8	5.41 ± 1.86
Adhering to the meal/drink plan for the past month	91	22.3	317	77.7	5.49 ± 1.73
Eating five or more servings of fruits and vegetables	107	26.2	301	73.8	5.36 ± 1.64
Eating foods rich in fat	389	9.3	19	4.7	1.31 ± 1.47
Distribute the amount of carbohydrates evenly	260	3.7	148	36.3	3.77 ± 1.61
Physical activity					
Exercising at least 30 minutes of physical activity	49	12.0	359	88.0	5.94 ± 1.46
Exercising specialized physical activities	78	19.1	330	80.9	5.67 ± 1.69
Checking blood glucose					
Testing blood glucose level at home	393	96.3	15	3.7	0.77 ± 1.44
Checking your blood glucose levels at the recommended frequency	398	97.5	10	2.5	0.73 ± 1.33
Medication adherence					
Taking oral medications as directed	299	73.3	109	26.7	1.88 ± 3.08
Injecting insulin as indicated	58	14.2	350	85.8	5.99 ± 2.42
Foot care					
Checking patient's feet	304	74.5	104	25.5	2.36 ± 2.75
Checking the inside of a patient's shoes	238	58.3	170	41.7	3.44 ± 2.80
Performing foot wash	23	5.6	385	94.4	6.55 ± 1.19
Doing a foot bath	403	98.8	5	1.2	0.71 ± 1.11
Performing dry cleaning between toes	404	99.0	4	1.0	0.72 ± 1.13

Most of the patients in the study followed a diet (74.8%), adhered to the meal/drink plan (77.7%), and did not eat high-fat foods (95.3%). However, patients performed the distribution of carbohydrates evenly accounted for only 36.3%. People with diabetes mellitus were physically active, performed at least 30 minutes of physical exercise (88.0%), and performed specialized exercises (80.9%). The rate of regular blood glucose testing was very low, over 96.3% of patients did not check their blood glucose levels at home. The rate of patients with good adherence to medication in the group taking orally medicines was still low (26.7%), but the insulin injection group had a high rate (85.8%). The patient did not perform better foot care activities, dry between the toes (99.0%), soak the feet (98.8%), check the feet (74.5%); it was only the foot washing activity performed well (94.4%).

DISCUSSION

Self-care knowledge of patients with T2DM

The total mean score of general self-care knowledge of T2DM patients of the studied group was 21.20 ± 5.25. In which, the mean score of general knowledge was 5.24 ± 1.80 and that of complication prevention was quite high, 4.02 ± 1.02. The rates of patients with good self-care knowledge and poor self-care knowledge were 53.2% and 46.8%, respectively. This result was higher than that of the study of Nguyen Vu Huyen Anh in Dien Bien (2016) with 37.4% having knowledge at the satisfied level, that of the study of Vu Thi Huong Nhai in Yen Bai (2018) with 19.4% having self-care knowledge at the satisfied level[30]. This difference may be due to: the high proportion of study patients having bachelor's degrees or higher (37.7%) and mostly retired (75.7%) that will affect the ability to access better self-care knowledge for T2DM patients.

The high mean score of general knowledge was 5.24 ± 1.8. In which, patients with good knowledge about the impact of tobacco on diabetes accounted for 94.6%; understanding of self-knowledge when stable blood glucose accounted for 86.3%. Low percentage of patients with good knowledge about the subjects of planning for patients to achieve goals in treatment and care; health status when needing help from the care team were 25.7% and 47.3% respectively. They often understood that only the doctor should make a plan for people with diabetes to achieve their treatment goals. People were also afraid to go to medical facilities for examination, partly because there were many obstacles: geographical obstacles, fear of losing time because they have to wait at medical facilities which are often overloaded, afraid of costly. etc.

The mean score of physical activity was 2.04 ± 0.79. Percentages of patients with high physical activity knowledge about the frequency of physical activity, those with understanding about physical activity and medication use and the relationship between blood glucose level monitoring and physical activity were 96.1%, 63.0% and 78.4% respectively. Patients were conscious of physical exercise to improve health throughout their lives, when sick, they were more conscious to learn about physical activities suitable for their diseases. The physical activity in this study was consistent with the study of Vu Thi Huong Nhai[30]. The mean score on diet was 1.37 ± 0.73. Percentages of patients with good knowledge about specific diet and maintain ideal weight was 71.8% and 65.9%, respectively. T2DM patients were directly received nutritional advices from doctors and nurses, and from distributed leaflets; In addition, patients could have information about their diet from people around them, from patients in the diabetes club and on the mass media every day.

The mean score on complication prevention was 4.02 ± 1.02. Patients with good knowledge about the prevention of complications account for a high percentage: daily oral care (98.5%) was very necessary, needing careful foot care (73.8%), use soft socks with good elasticity (61.3%). During the treatment process, people with diabetes would often receive support from medical staff involved in diabetes treatment for them such as doctors, nurses, nutritionists, etc. The patient learnt all knowledge about diabetes, especially knowledge about prevention of complications to treat better diabetes. The mean score of blood glucose monitoring was 3.47 ± 1.25. Patients with good knowledge about blood glucose monitoring accounted for a high percentage: Understanding the meaning of blood glucose testing by treating doctors (91.7%), understanding the meaning of blood

glucose testing with patients (80.1%), understand the importance of blood glucose and blood pressure monitoring (68.1%). Patients were received advice from the medical team and had knowledge from information on newspapers, radio, and television. The proportion of patients with good knowledge about blood glucose monitoring was still low: knowledge of the subjects to be checked blood glucose and blood pressure for patients (53.2%), frequency of self-monitoring of blood glucose (54, 4%). Patients in the study were outpatients, they would be tested for blood glucose, so they were not interested in knowledge about self-monitoring of blood glucose.

The mean score of studying patients on drug adherence was 2.65 ± 0.86. The high rate of patients with good knowledge of drug adherence: When feeling well, they continue to take medication (90.2%), the use of medication needing to be maintained throughout life (89, 2%), understanding of knowledge of patients when starting insulin treatment (64.5%). The patients in the study had a high level of education, had the disease for many years, and were also regularly counseled on drug adherence through many sources, especially every month when the patients came for regular check-ups, they were counseled on compliance. Due to the adherence of doctors and nurses, patients with good knowledge about drug adherence accounted for a high percentage. Alot of patients had good knowledge about medication adherence[24]. Kakumani's study in people with diabetes mellitus living in rural areas found that more than 70% of patients lacked knowledge about drug adherence[13]. Patients had good knowledge about the serious problem of drinking alcohol while taking therapeutic drugs (21.3%). Due to the proportion of women (36.5%), who did not drink alcohol, so they were less interested in the impact of drinking alcohol during the use of therapeutic drugs. Moreover, male subjects accounted for twice as much but did not pay attention to the health effects of alcohol to justify their drinking.

A high proportion of patients had good knowledge about the consequences of uncontrolled blood glucose: high blood glucose was able to cause cardiovascular and kidney complications (83.3%), high blood glucose were able to cause eye complications (78.9%). Patients with a good understanding of the signs of hypoglycemia accounted for a low rate (41.9%). Patients learnt about complications of diabetes from many different sources, from medical staff, internet, mass media, diabetes clubs, etc., so patients had good knowledge about complications of diabetes when blood glucose control was not good. The signs of hypoglycemia are similar to those of other diseases, so the patients were not able to distinguish them.

Self-care activities in patients with T2DM

Diet: The results of the study showed that patients with DM regularly followed a diet (74.8%), adhered to a meal/drink plan (77.7%) and ate five or more servings of fruit and vegetables (73.8%) from 5-7 days. However, 95.3% of the patients ate foods rich in fat and 63.7% of them did not even distribute carbohydrates during the week. According to a study of Mi Nguyen (2017), patients followed an average diet of 4.2 days/week, only 4.7% of patients met all dietary requirements during the whole week; 37.8% of patients did not ensure compliance with a healthy diet for people with DM. The percentage of patients who ate enough vegetables for at least one day or more was quite high (74.7%). However, 59.1% of patients did not regularly eat enough

vegetables/fruits during the day[19]. According to Vivian, 54.7% of people followed a healthy diet, 50.7% of people ate enough or more than 5 servings of vegetables/fruits, and 40.0% of patients abstained from foods rich in fat[29]. In patients with DM, the most common problem when implementing dietary self-care activities was failure to distribute amounts of carbohydrates evenly and to eat less high-fat foods as recommended.

Physical activity: Research results showed that 88.0% of patients exercised at least 30 minutes a day, and 80.9% of patients performed specialized exercises daily. However, 12.0% still performed at least 30 minutes of physical activity and 19.1% performed specialized exercises for 1-4 days. Research results of Mi Nguyen (2017) showed that rates of people who performed at least 30 minutes of physical activity for 5 days or more and regularly performed specialized exercises accounted for 72.5% and 30.8% respectively. Some patients think that they did not have time to practice or that the energy consumption in chores and housework was enough to compensate for specific exercises[19]. In Vivian's study in 2014 the rate of performing specific exercises for 5 days or more was only 10.7%[29]. In our study, the rate of patients who performed specialized exercises was higher, they had diabetes mellitus over 5 years, accounting for two-thirds, mainly retired, so they had time for physical activities; They had good self-care knowledge about physical activity, high self-confidence, so patients understood the benefits of exercise and were motivated to perform, especially specific exercises for patients with DM.

Blood glucose test: Research results showed that the patient's blood glucose test at home was very low 3.7 days; the rate of patients checking their blood glucose levels as recommended was lower than 2.5%. A study in Gujarat showed that 16% of people performed self-control of blood glucose levels[24]. A study in India (2015) and a study in East Ethiopia gave quite positive results when rates of people self-controlled blood glucose levels at home was 54.0% and 57.7% respectively[5,18]. The main reason given by the patients was due to difficult economic conditions, no money to buy blood glucose meters and test strips (49.1%) and stable blood glucose without testing (47.5%)[22]. Their blood glucose levels will have checked every month at the outpatient clinic, so they all think it was not necessary to control their own blood glucose levels at home.

Medication adherence: According to the research results, the percentage of patients who adhered to drug treatment is high with prescribed oral medication (82.3%), insulin injection as indicated (98.4%). In Gujarat, 82% of patients followed their medication schedule, and 68% assured that they had never missed a dose in the past week[24]. In Kakumani's study, more than 70% of patients stopped treatment midway; the most common reasons for non-compliance was lack of motivation (61.4%), difficulty remembering taking medicine daily due to work or forgetting, lack of money (50%) and living far from the doctor (43%)[13]. In this study, the proportion of patients had a higher education qualification, most of them lived with relatives, had a long illness, so the patients were conscious and reminded by their family members about their adherence to drug treatment; An important reason was that patients had knowledge of drug adherence (mean score of 2.65 ± 0.86), so it will promote the patient's drug adherence behavior.

Foot care: Patients in the study performed foot self-care activities mainly from 1-4 days a week (82.4%); in which the high rate is to soak foot (98.8%) and dry between toes (99.0%). The percentage of patients who performed good foot care was mainly foot washing (94.4%); however, some foot care activities such as checking the inside of shoes, checking the feet, soaking the feet and drying between the toes are still low and accounted for 41.7%, 25.5%, 1.2%, and 1.0% respectively. This result was similar to the study in Brazil, most of the patients did not have the desired activities related to foot care[29]; foot self-care behaviors of patients with DM is low 33.9%[19]. The foot care behavior to prevent complications in patients with DM was not well performed, which can be explained by the lack of knowledge about foot care that has not motivated their behavior; The communication, education, and giving typical examples of foot complications are not good, so patients are subjective in preventing complications.

The results of the assessment of each area in the patients' self-care activities showed that patients performed good self-care activities in two areas of diet (62.3%), physical activity (88.0%). However, there were still many fields that T2DM patients did not perform well in self-care activities such as blood sugar control (97.3%), medication adherence (87.0%) and foot care (82.4). The result of this study was different from some studies, D'Souza et al assessed that the self-care activities of patients with diabetes mellitus are not good (20.6%)[9]. The study of Mi Nguyen (2017) on 513 T2DM patients in Thua Thien Hue showed that the rate of good implementation of self-care activities of people with DM accounted for 32.4%[19]. The difference in results on self-care behavior assessment can be explained by the difference in sample size, assessment methods, and subjects in the studies with different education qualifications, regions and duration of DM. These factors have also been shown by many studies to influence self-care activities in patients with DM.

CONCLUSION

This study has proven that people with DM had low self-care knowledge and self-care activities in many areas. Therefore, health workers need to personalize in provide knowledge and self-care activities of people with DM.

RECOMMENDATIONS

It is necessary to have a program of counseling and education on self-care knowledge for people with diabetes (drug compliance, diet, physical activity, blood glucose monitoring, prevention of complications and other essential self-care knowledge) for patients to raise awareness, thereby changing self-care behaviors to help patients control blood glucose level well, prevent complications and improve quality of life.

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