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Factors Related to Self-Care Knowledge of Patients with Type 2 Diabetes Mellitus in Thai Nguyen Province

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ABSTRACT

Introduction: Type 2 diabetes millitus causes a heavy burden on individuals, their families and the community because it affects quality of life and requires long-term and comprehensive health care. Self-care knowledge is an important factor influencing patients' self-care behavior to reduce the impact and progression of the diabetes mellitus.

Objectives: The study was conducted to find out some factors related to self-care knowledge of patients with type 2 diabetes in Thai Nguyen province tool such as the 30-item Diabetes Self-care Knowledge (DSCK-30).

Methods: A cross-sectional descriptive study, using the toolkit to assess the 30-item Diabetes Self-care Knowledge (DSCK-30) of patients with diabetes mellitus, was conducted on 408 2TDM patients at Thai Nguyen National Hospital.

Results: 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%. Educational qualification (t-test = -6,522; p = 0.000) and income (t-test = -2.32; p = 0.009) were related to self-care knowledge of patients with diabetes mellitus

Conclusion: It is necessary to have a program of counseling and education on self-care knowledge for people with diabetes mellitus (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.

KEY WORDS: Type 2 diabetes, self-care knowledge, blood glucose, diet, complications.

ARTICLE DETAILS

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INTRODUCTION

According to the International Diabetes Federation (IDF), in 2017 there were 425 million people with diabetes in the world, of which, people with type 2 diabetes accounted for approximately 90%. It is forecasted that in 2045 this number will be 629 million VND [6] Diabetes is a pandemic, killing more than 5million people every year and every 6 seconds, one person dies from the disease. In Viet Nam, there are 3.53 million people living with diabetes, at least 80 people die every day. Costs increase with disease severity and complications[6].

Type 2 diabetes mellitus (T2DM) causes a heavy burden on individuals, their families and the community. T2DM is manageable with a focus on factors such as medication regimen, diet and physical activity[5]. 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[10]. Some studies have shown that self-care knowledge of people with diabetes was influenced by many factors such as gender, age, educational level and duration of diabetes mellitus[3]. Good self-care behavior of T2DM patients requires patients to have good knowledge about their disease to control blood

glucose level well, prevent complications and improve quality of life.

There have been many studies on self-care knowledge in people with diabetes in Vietnam[14,16,17]. The identification of factors affecting self-care knowledge in T2DM patients has not been found in many studies in Vietnam. Therefore, we carried out "Research on factors related to self-care knowledge of patients with type 2 diabetes mellitus in Thai Nguyen province, with 2 goals as follows:

To describe the status of self-care knowledge of patients with type 2 diabetes mellitus in Thai Nguyen province.

To find out some related to self-care knowledge of people with type 2 diabetes mellitus.

METHODOLOGY

Research locality and time

Locality: Thai Nguyen National Hospital 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.

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

RESEARCH METHODS

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

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[15].

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

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 Vietnamese Translated 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).

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[13].

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[12]:

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

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

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.

Data analysis of factors related to self-care knowledge: Statistical description: it was used to describe self-care knowledge of T2DM patients.

The relationship between the independent variables and self-care knowledge of T2DM patients was determined using statistical tests: T-test was used to test the difference in mean values between the 2 study groups. ANOVA test tested the difference in mean value of 3 study groups.

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.

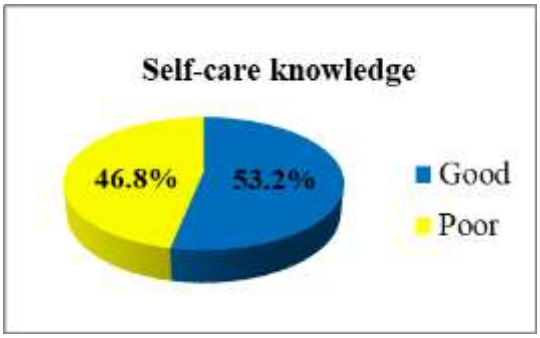

Chart 1: Classification of self-care knowledge of patients

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%).

Factors related to self-care knowledge of T2DM patients

Table 5: Checked results of factors related to self-care knowledge of patients with T2DM

Characteristics	Frequency	Medium score	±SD
Gender t* = -0.282; *p* = 0.778			
Male	259	21.14	5.23
Female	149	21.29	5.29
Age F **= 0.668; *p* = 0.513			
< 45	11	22.63	5.62
45-65	138	20.90	5.35
> 65	259	21.29	5.18
Educational Qualification t* = -6,522; *p* = 0.000			
Completed high school	254	19.94	4.95
Professional secondary school, college, university or higher	154	23.27	5.08
Occupation F = 2,242; *p* = 0.108**			
Office staff	18	21.88	6.03
Retiree	309	21.44	5.15
Other professions	81	20.19	5.37
Marital status F = 0.134; *p* = 0.874**			
Single	363	21.22	5.25
Married	ten	21.60	5.44
Widowed, divorced	35	20.80	5.32
Number of people in the family t* = -0,460; *p* = 0.646			
01 person	13	20.53	5.30
> 01 person	395	21.22	5.25
Duration of diabetes F = 0.370; *p* = 0.691**			
5 years	164	21.01	5.14
5-10 years	126	21.11	5.41
> 10 years	118	21.54	5.23
Income t* = -2.32; *p* = 0.009			
≤ 5 million	259	20.68	5.09
> 5 million	149	22.09	5.41
Health insurance t* = 0.188; *p* = 0.851			
Yes	406	21.20	5.24
No	2	20.5	9.19
Comorbidities t* = 0.449; *p* = 0.654			
Yes	363	21.23	5.20
No	45	20.86	5.66
Complications t*= 0.726; *p* = 0.468			
Yes	131	21.47	5.26
No	277	21.06	5.24

** standard distribution, T-test*

** standard distribution, Anova test*

Educational qualification (t-test = -6,522; p = 0.000) and income (t-test = -2.32; p = 0.009) were related to self-care knowledge of patients with diabetes mellitus.

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[16]. 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 Vivian in 2014[11]. 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. In Gujarat, 82% of patients had good knowledge about medication adherence[4,9]. Kakumani's study in people with diabetes mellitus living in rural areas found that more than 70% of patients lacked knowledge about drug adherence[7]. 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.

Factors related to self-care knowledge of patients with T2DM

Educational qualification (t-test = -6,522; p = 0.000) and income (t-test = -2.32; p = 0.009) was related to self-care knowledge of people with diabetes. People with a higher education qualifications had better self-care knowledge than those with a lower education qualification. Educated people are knowledgeable, thinking and intellectual, so they can make information choices to improve knowledge useful for themselves and their lives. In the study, patients with a high level of education (intermediate, college, and university) had better self-care knowledge (mean score of 23.27) than those with lower levels of education (mean score of 19.94). People with higher education had a deeper understanding in many areas including their disease field. Highly educated patients had the skills to collect and process accurate, complete and comprehensive information to get self-care information to serve the patients themselves in controlling diabetes mellitus, preventing complications and improving quality of life. People with a high level of education also had an information-gathering attitude and were more likely to be assertive than those with a lower level of education[1]. People with higher incomes also had better self-care knowledge than those with lower incomes. High incomes will help patients to have conditions and means to absorb and receive information from many different sources to improve knowledge in all aspects[12]. Patients also understood that they must have a lot of knowledge about their disease, this group of patients will learn information related to their disease to be more able to take care of themselves in the future, to reduce depression and discomfort related to diabetes mellitus[12]. The results of this study were similar to the studies of some authors such as Al-Adsani AM who conducted a study on 5144 T2DM patients in 2009 and showed that education and complications were factors related to knowledge of people with diabetes mellitus[2], Kassahun in 2016 found that illiterate people (AOR = 3.1; 95%; CI: 1.03-9.3) was significantly associated with knowledge level on diabetes mellitus[8]. A study by Adibe et al in 2011 had contradictory results that the patient's educational status was not related to self-care knowledge (F = 2.775; p = 0.0639)[1].

Gender, age, occupation, marital status, number of family members, disease duration, comorbidities, complications were not related to self-care knowledge of T2DM patients. Similarly, clinical and laboratory factors (BMI, waist circumference, blood pressure, fasting blood glucose level, HbA1c, total cholesterol, Triglycerides, HDL cholesterol, LDL cholesterol) were not associated with self-care knowledge of T2DM patients. Male or female and of any age or profession when they were sick, they were all received advices from doctors and nurses, they learnt about their disease to have better knowledge to take care of themselves when they were sick. No matter how many people in the family were, family members' shares and exchange information about diseases. The Vietnamese culture was to help, share and overcome difficulties, especially illness, so one member of the family had a disease, the rest of the family members come together to learn and help other members to have the best care knowledge and behaviors. Whether they had diabetes for a few years or many years, they also needed to take care of themselves; When suffering from diabetes, patients were treated and cared for outpatients. They had regular checkups every month and were consulted, so the knowledge that they received was the same about drug use, diet, exercise regimen, blood glucose test, complications, etc. In our study, there were differences with some studies. Kassahun's study was shown that the duration of diabetes was < 5 years (AOR = 9.8; 95%; CI: 3.2-30.2), occupations related to diabetes knowledge at a moderate level; merchants with moderate diabetes knowledge and good glycemic control were associated with low adherence to medication[8]. Al-Adsani AM' study showed that income was a factor related to the patient's knowledge[2]. Lidya Zerihun Sahile et al in 2020[12] showed that occupation (AOR = 0.146, 95%; CI: 0.18-0.94), place of residence (AOR = 0.27; 95%; CI: 0.099-0.532) were related to diabetes self-care knowledge. Clinical and subclinical factors only improved for people with T2DM when they had good self-care and behavior throughout their illness.

CONCLUSION

T2DM patients had good knowledge about self-care. The mean knowledge score 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%.

Educational qualification (t-test = -6,522; p = 0.000) and income (t-test = -2.32; p = 0.009) were related to self-care knowledge of T2DM patients.

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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CONFLICT OF INTEREST

There is no conflict of interest

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