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Self-care behaviours and associated factors among adults with Type 2 Diabetes in Vietnam rural area

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ABSTRACT

Background: Diabetes is a long-term metabolic condition characterized by elevated blood glucose levels. In Vietnam, there has been a rising trend in the prevalence of Type 2 Diabetes.

Objectives: This study aimed to describe diabetes self-care behaviours and explore associated factors among Vietnamese adults with Type 2 Diabetes.

Methods: A cross-sectional descriptive survey was conducted among 418 outpatients with Type 2 Diabetes in rural area of Da Nang City, Vietnam. Data were collected using self-report questionnaires that covered demographics, clinical factors, and self-care behaviours. The collected data were analysed using descriptive statistics and multiple logistic regression.

Results: The study found that 70.1% of participants engaged in diabetes self-care practices, with an average score of 4.37 ± 1.11. The analysis revealed significant correlations between self-care behaviours and factors such as family history of Type 2 Diabetes (OR= 1.76, 95% CI: 1.03-3.00), use of a blood glucose meter at home (OR = 2.59, 95% CI: 1.22-5.49), receipt of diabetes self-care information (OR = 2.27, 95% CI:1.38-3.75), and regular health check-ups (OR= 2.98, 95% CI: 1.84-4.80).

Conclusion: These findings provide valuable insights for healthcare providers in developing targeted interventions to promote positive self-care practices among individuals with Type 2 Diabetes.

Keywords: Clinical factors, Rural area, Self-care, Type 2 Diabetes

1. Introduction

In Vietnam, there was an increasing trend in the prevalence of Type 2 Diabetes. According to the International Diabetes Federation, in 2021, there were 4 million people in Vietnam, between the ages of 20 and 79, living with diabetes. The number of people with diabetes is projected to rise to 5 million by 2030 and 6 million by 2045 [1]. A study in Da Nang city revealed that, among a total of 3,765 men and 9,149 women, the age-adjusted prevalence of diabetes was 11.4%, and the prevalence of prediabetes was 52.9% [2]. Type 2 Diabetes can cause significant damage to the body over time, primarily affecting nerves and blood vessels. In Vietnam, diabetes was one of the top 4 causes of death and disability in 2019 [3]. Type 2 Diabetes costs are driven by inpatient care for treatment of diabetes complications (40%–60% of total cost), with drug therapy for glycaemic control representing 18% of the total cost [4].

Studies suggest that self-care practices for individuals suffering from this disease have shown good outcomes [5, 6]. All of these practices have shown good results in maintaining blood glucose levels, decreasing side effects, and increasing life expectancy in people with diabetes mellitus. Those who have diabetes mellitus and practice self-care have shown positive results by reducing the complications of diabetes mellitus, decreasing its progression, and leading to a huge reduction in the burden due to diabetes mellitus [7].

Given the rising prevalence of diabetes, it is vital to promote health and quality of life among diabetic patients through self-care. Identifying barriers to engaging in diabetes self-care is crucial for developing intervention programs to improve self-care behaviours. This study aimed to examine self-care behaviour levels and identify factors influencing self-care among diabetic patients in Hoa Vang District Medical Centre, Da Nang City, Vietnam.

2. Methods

2.1 Study Area

The study targeted patients with diabetes receiving health services at the Out-patient Department of Hoa Vang District Medical Centre, Da Nang City. Inclusion criteria were adults (≥18 years old), willing to participate and able to communicate in Vietnamese. Patients with serious illnesses affecting communication were excluded.

2.2 Study Design

A cross-sectional study conducted from December 2022 to August 2023 at Hoa Vang District Medical Centre, Da Nang City, Vietnam.

2.3 Sample Size and Sampling

Sample size: To determine the appropriate sample size for this study, we utilized the single population proportion formula [8].

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

Where: n is minimum sample size, Z = 1.96 (for a 95% confidence level), d = 0.05 (desired absolute precision), p = 0.597 (proportion of patients with diabetes achieving self-care behaviours, based on previous study [9]. The minimum sample size is 370. In fact, a total of 418 patients were sampled using simple random sampling method.

2.4 Data Collection

The data collection tool for this study consists of 2 parts:

Part 1: General information of patients

The study collected general information from patients through an 11-item questionnaire that encompassed demographic characteristics and clinical factors related to diabetes management. The demographic characteristics included age, sex, educational status, occupation, income, and living status. Clinical factors included the duration since diagnosis, received Diabetes self-care information, family history of Type 2 Diabetes, frequency of regular health check-ups, the use of blood glucose meters and diabetes monitoring applications.

Part 2: Summary of Diabetes Self-care Activities-SDSC

The Vietnamese version of the Summary of Diabetes Self-care Activities (SDSCA) [10] was used to assess self-care behaviour of patients. It includes 14 questions related to healthy diet (4 questions), physical activities (2 questions), self-control of blood sugar (2 questions), medication adherence (2 questions) and foot care (4 questions). Each question has 8 levels (0 – 7 days) on the frequency of performing about patient's diabetes self-care activities during the past 7 days. 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 behaviours for 5 days or more were assessed as regularly performing and had good self-care behaviour, those who performed 4 days

or less were assessed as having poor self-care behaviour [10].

2.5 Data Analysis

Data were analysed using the Statistical Package for the Social Sciences. Descriptive statistics were employed to evaluate demographic data, and the levels of self-care behaviour were reported. Multiple logistic regression analysis was used to determine the factors that were associated with self-care behaviour level. The relationship between the dependent and independent variables was expressed through adjusted odds ratios (AORs), accompanied by 95% confidence intervals and P-values of less than 0.05.

3. Results

A total of 418 patients, females were slightly higher proportion (59.8%) compared to males (40.2%). The majority of patients (66.3%) were elderly, aged 60 years or older. Additionally, a significant percentage of patients (56.2%) were engaged in farming occupations, and a majority of them (55%) had a primary school education or were illiterate. Regarding living arrangements, most of the patients (91.6%) resided with their families. It is worth noting that 80.4% of these patients had an income level below 5 million Vietnam Dong. Out of the 418 patients, 99 individuals (23.7%) had a family history of Type 2 Diabetes. Moreover, more than half of the patients (52.4%) were diagnosed with the disease within a period of 5 years or less. In terms of medical care, the majority of patients (58.1%) underwent regular monthly follow-up examinations. Furthermore, a considerable proportion of patients (71.8%) received information on diabetes self-care from health care staff. However, it is concerning that a large percentage of patients (84.2%) did not possess a blood glucose meter at home, which is an essential tool for monitoring blood sugar levels. Additionally, a staggering 95% of patients did not utilize the Diabetes monitoring application (Table 1).

Table 1: General characteristics of diabetes patients (n=418)

Characteristics	Frequency (n)	Percent (%)
Sex		
Male	168	40.2
Female	250	59.8
Age		
< 60 years old	141	34.7
≥ 60 years old	277	66.3
Education status		
Illiteracy	44	10.5
Primary school	186	44.5

Characteristics	Frequency (n)	Percent (%)
Secondary school	95	22.7
High school	68	16.3
Intermediate, College	17	4.1
University or higher	8	1.9
Occupation		
Farmer	235	56.2
Worker/Official	35	8.4
Business/Freelance labour	103	24.6
Retire	45	10.8
Income (million VND)		
< 5	336	80.4
≥ 5	82	19.6
Living status		
Alone	35	8.4
Family	383	91.6
Duration of illness		
<5 years	219	52.4
5 -10 years	154	36.8
> 10 years	45	10.8
Family history of Type 2 Diabetes		
Yes	99	23.7
No	319	76.3
Received Diabetes self-care information		
Yes	300	71.8
No	118	28.2
Regular health check-ups		
Yes	243	58.1
No	175	41.9
Using blood glucose meter at home		
Yes	66	15.8
No	352	84.2
Using diabetes monitoring application		
Yes	21	5.0
No	397	95.0

Table 2 shows a significant proportion of study participants (60.3%) reported following a healthy eating plan in the last week and 57.9% of participants reported following an eating plan on average per week over the past month. Additionally, a majority of patients (78.0%) reported limiting their intake of high-fat foods such as red meat or full-fat dairy products while a large percentage of patients (76.8%) did not consume enough fruits and vegetables, failing to meet the recommended five or more servings per week. In terms of physical activity, 56.2% of patients reported participating in at least 30 minutes of physical activity every day but only a minority of patients (24.6%) engaged in specific exercise sessions. Among the patients who were prescribed oral medication, a high percentage (86.6%)

adhered to taking the recommended number of diabetes pills. Similarly, among the patients prescribed insulin injections, compliance was even higher at 96.3%. It is concerning to note that a significant proportion of patients (92.6%) did not regularly check their blood sugar at home. Additionally, a substantial majority of patients (91.9%) failed to check their blood sugar the recommended number of times. In terms of general self-care behaviour, it is worth noting that the majority of patients (70.1%) exhibited good levels of self-care behaviour, while the remaining 29.9% showed poor levels.

Table 2: Patients' Diabetes Self-care Behaviours (n=418)

Self-care Behaviours	0-4 days (Poor level)		5-7 days (Good level)	
	n	%	n	%
Diet				
Follow a healthy eating plan in the last week	166	39.7	252	60.3
Follow eating plan (on average per week, over the past month)	176	42.1	242	57.9
Eat five or more servings of fruits and vegetables	321	76.8	97	23.2
Eat high fat foods such as red meat or full-fat dairy product	326	78.0	92	22.0
Exercise				
Participate in at least 30 minutes of physical activity	183	43.8	235	56.2
Participate in a specific exercise session	315	75.4	103	24.6
Blood Sugar Testing				
Test blood sugar at home	387	92.6	31	7.4
Test blood sugar according to the number of times recommended by health care supervisor	384	91.9	34	8.1
Medication				
Take recommended number of diabetes pills (n=388)	387	92.6	31	7.4
Take recommended insulin injections (n=27)	384	91.9	34	8.1
Foot Care				
Inspect feet	227	54.3	191	45.7
Inspect the inside of shoes	244	58.4	174	41.6
Wash feet	92	22.0	326	78.0
Dry in between toes after washing	211	50.5	207	49.5
General Self-care Behaviours	**125**	**29.9**	**293**	**70.1**

Table 3 showed that educational status, family history of diabetes, using a blood glucose meter at home, receiving diabetes self-care information, and regular health check-ups were significant in the bivariate logistic regression. However, the multiple logistic regression analysis observed that family history of diabetes, using a blood glucose meter at home, receiving Diabetes self-care information, and regular health check-ups were independent predictors of self-care practices. The results indicated that individuals with a family history of diabetes exhibit significantly higher levels of self-care

practices (AOR=1.76, 95% CI: 1.03-3.00) compared to those without such a background. Moreover, patients who used blood glucose meters at home had higher self-care practices (AOR=2.59, 95% CI: 1.22-5.49) than those who did not. Additionally, patients who received information on self-care practices were found to exhibit higher levels of self-care (AOR=2.27, 95% CI: 1.38-3.75) compared to those who had not received such information. Patients who underwent regular monthly checkups had 3 times higher self-care behaviours level than those who received infrequent check-ups (AOR=2.98, 95%CI: 1.84-4.80).

Table 3: Factors associated to diabetes self-care behaviours

Factors	Diabetes Self-care behaviour		COR (95%CI)	P-value	AOR (95%CI)	P-value
	High N (%)	Low N (%)				
Sex				0.21		0.10
Male	112 (66.7)	56 (33.3)	1		1	
Female	181 (72.4)	69 (27.6)	0.76 (0.49-1.16)		0.67 (0.41-1.08)	
Age				0.97		0.47
< 60 years	99 (70.2)	42 (29.8)	1		1	
≥ 60 years	194 (70.0)	83 (30.0)	1.00 (0.63-1.54)		1.21 (0.72-2.03)	
Educational status				0.04		0.12
Below High school	220 (67.7)	105 (32.3)	1		1	
Above High school	73 (78.5)	20 (21.5)	1.74 (1.00-3.00)		1.77 (0.85-3.72)	
Occupation				0.23		0.64
Working	258 (69.2)	115 (30.8)	1		1	
Non – working	35 (77.8)	10 (22.2)	1.56 (0.74-3.25)		0.81 (0.33-1.95)	
Income (million VND)				0.49		0.40
< 5	233 (69.3)	103 (30.7)	1		1	
≥ 5	60 (73.2)	22 (26.8)	1.2 (0.7-2.1)		0.73 (0.35-1.51)	
Living status				0.55		0.43
Alone	23 (65.7)	12 (34.3)	1		1	
Family	270 (70.5)	113 (29.5)	1.24 (0.60-2.59)		1.37 (0.62-3.05)	
Family history of Type 2 Diabetes				0.03		0.03
Yes	61 (61.6)	38 (38.4)	1		1	
No	232 (72.7)	87 (27.3)	1.66 (1.03-2.66)		1.76 (1.03-3.00)	
Duration of illness				0.50		0.14
<5 years	195 (71.2)	79 (28.8)	1		1	
≥ 5 years	98 (68.1)	46 (31.9)	1.15 (0.74-1.79)		0.56 (0.25-1.22)	
Using blood glucose meter at home				0.01		0.01
Yes	55 (83.3)	11 (16.7)	1		1	

Factors	Diabetes Self-care behaviour		COR (95%CI)	P-value	AOR (95%CI)	P-value
	High N (%)	Low N (%)				
No	238 (67.6)	114 (32.4)	2.39 (1.20-4.75)		2.59 (1.22-5.49)	
Using diabetes monitoring application				0.05		0.14
Yes	19 (90.5)	2 (9.5)	1		1	
No	274 (69.0)	123 (31.0)	4.26 (0.97-18.59)		3.15 (0.67-14.63)	
Received Diabetes self-care information				0.006		0.001
Yes	222 (74.0)	78 (26.0)	1		1	
No	71 (60.2)	47 (39.8)	1.88 (1.20-2.95)		2.27 (1.38-3.75)	
Regular health check-ups				<0.001		<0.001
Yes	190 (78.2)	53 (21.8)	1		1	
No	103 (58.9)	72 (41.1)	2.50 (1.63-3.84)		2.98 (1.84-4.80)	

4. Discussion

Effective self-care behaviours are crucial for managing Type 2 Diabetes and improving health outcomes. Our research focused on examining the level of self-care behaviour among Type 2 Diabetes patients and exploring the factors associated with it. To achieve this objective, we carefully selected a sample of 418 patients who receiving health services in Da Nang City, Vietnam. By understanding these associations, healthcare providers can identify key determinants and develop targeted interventions to promote positive self-care practices.

This study found that 70.1% of participants engaged in diabetes self-care practices, with an average SDSCA score of 4.37 ± 1.11. This result contrasts with findings from several domestic and international studies. Previous research in Hue City, Vietnam conducted by *Mi et al.* [11] reported a significantly lower proportion of participants demonstrating good self-care behaviour, with only 32.4% exhibiting positive practices [10]. Similarly, Ethiopian studies [12, 13] documented a prevalence of poor self-care practices exceeding 50%. The variation in self-care behaviour levels between this study and previous research may be attributed to several potential reasons. These include differences in sampling techniques, research instruments, and population, all of which may contribute to the observed discrepancies. Additionally, cultural and contextual factors unique to each study's location may also account for such differences. Our findings revealed the lowest self-care scores in

medication adherence and blood sugar testing, with less than 10% of participants demonstrating good behaviours in these domains. This suggests a concerningly low level of adherence to crucial diabetes self-care practices. These results align with previous research by *Mi et al.* [10] and *Loi et al.* [14], which reported low compliance with home blood glucose testing and check blood glucose levels as recommended. This could be attributed to various socioeconomic and geographic factors, considering that our study participants were primarily from rural areas, with a majority employed in farming (56.2%), and possessing low levels of education (55% had a primary school education or were illiterate). The lack of access to affordable testing supplies, remembering to take medications, or finding time for regular blood sugar testing, amidst busy workdays, can create significant barriers to adherence.

The analysis results show significant statistical correlations between Family history of Type 2 Diabetes, using blood glucose meter at home, received Diabetes self-care information, regular health check-ups and Diabetes self-care behaviours. Patients with a family history of Type 2 Diabetes demonstrated higher self-care practices compared to those without a family history. This aligns with previous research suggesting that individuals with a family history of diabetes are more likely to adhere the healthy behaviours like exercise and diet [11]. Studies also suggested that individuals with a family history of disease may have a heightened perception of disease risk [12, 13]. This finding emphasizes the role of personal motivation and awareness in adopting and maintaining positive self-care behaviours. A heightened risk perception can lead to increased motivation to adopt and maintain self-care behaviours, as individuals feel a greater sense of urgency to manage their health and might be more receptive to health information.

Our study found a significant positive correlation between using blood glucose meters at home and self-care practices among participants. This aligns with findings from a study in Ethiopia, where having a personal glucometer was associated with better self-care behaviours (AOR = 6.1, 95% CI = 2.83–13.0) [15]. Similar, other study also show that respondents who have glucometer at home were nearly three times more likely to have good self-care practice when compared to those who didn’t [16]. This correlation likely reflects the empowering nature of self-

monitoring blood sugar levels. By having access to this data, patients can gain a better understanding of their condition and make more informed decisions about diet, exercise, and medication, ultimately leading to improved self-care management.

Additionally, this study also showed that participants who received diabetes self-care information exhibited higher self-care practices compared to those who did not receive such information. This aligns with previous research by *Getie et al.*[16], which found that individuals received diabetes self-care education from healthcare professionals were nearly twice as likely to have good self-care practices (AOR = 2.21, 95% CI: 1.35, 3.63). The correlation between healthcare professional education and self-care practices emphasizes the critical role of education and awareness campaigns in promoting positive self-care behaviours for diabetes management. Healthcare providers should prioritize patient education, offering comprehensive information and guidance on self-care practices.

Our study also revealed a significant positive correlation between the frequency of health check-ups and self-care practices. Patients who attended check-ups more regularly, particularly monthly visits, demonstrated higher self-care behaviours compared to those with less frequent check-ups. This aligns with research by *Yiğit et.al* [17], who found that routine medical check-ups were a significant determinant in self-care management. Regular check-ups likely play a crucial role by providing opportunities for feedback and guidance from healthcare professionals, potential medication adjustments based on monitored results, and potentially renewed motivation from consistent monitoring of the condition.

5. Conclusion

This study found that majority of participants engaged in diabetes self-care practices. The analysis results revealed significant statistical correlations between family history of Type 2 Diabetes, use of blood glucose meters at home, receiving diabetes self-care information, and regular health check-ups with diabetes self-care behaviour level. These findings provide valuable insights for healthcare providers in developing targeted interventions to promote positive self-care practices among individuals with Type 2 Diabetes. By addressing these factors, such as limited access to resources or education, and providing appropriate support, we can empower patients to effectively manage their condition and improve their overall health

outcomes. Future research efforts could explore the most effective intervention strategies to address these disparities and improve self-care behaviours in vulnerable populations.

While these findings provide valuable insights, some limitations are worth considering. The study focused on a specific population in rural areas, and the generalizability of the results to other populations might be limited. Additionally, the cross-sectional design can only establish correlations, not causal relationships. Future research efforts with larger, more diverse samples and potentially using objective measures of adherence could strengthen these findings and explore causal relationships between the identified factors and self-care behaviours.

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Author contributions

TCHT: Conceptualization, data curation, formal analysis, methodology, writing original draft, writing review and editing. VTQC: Conceptualization, methodology, supervision, writing original draft, writing review and editing. PHP: Conceptualization, methodology, supervision, writing original draft, writing review and editing. TTM: Conceptualization, supervision, writing review and editing.

Declaration

Ethics approval and consent to participate

This research received approval the Ha Noi University of Public Health, Institutional Review Board Committee, reference number 30/2023/YTCC-HD3, dated January 19th, 2023. All participants provided informed consent before participating in the survey.

Competing interests

The authors declare no competing interests.

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