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RISK PERCEPTIONS AND SELF-CARE BEHAVIOR TOWARD CHRONIC KIDNEY DISEASE IN PEOPLE WITH TYPE 2 DIABETES MELLITUS IN LAO PDR

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Abstract: Diabetes mellitus (DM) is the second leading cause of chronic kidney disease (CKD) and related mortality worldwide. Previous reports indicated an increased risk of CKD in the Lao PDR due to poor diet and poor physical activity. The number of patients with CKD has increased, from 4.24% in 2020 to 8.55% in 2022. This cross-sectional study aims to examine factors in self-care behavior among people with type 2 DM who visited three tertiary care hospitals in Lao PDR. The study was conducted at the OPD of these hospitals. Face-to-face interviews were conducted to collect information using structured questionnaires from September to October 2024. A total of 433 subjects completed this study. Descriptive and multiple logistic regression analyses were conducted on the data. Only 41% of respondents demonstrated good self-care behavior. Those who were underweight and normal BMI (AOR: 1.72, 95% CI: 1.12 - 2.65), less knowledge of self-care practices (AOR: 0.49, 95% CI: 0.26-0.93), high perceived severity of CKD (AOR: 2.03, 95% CI: 1.32-3.14), low perceived barriers to performing self-care practices (AOR: 1.71, 95% CI: 1.09-2.69). Based on the findings, it is recommended that CKD prevention among individuals with Type 2 DM be enhanced. Culturally tailored awareness campaigns and health services specifically for high-risk groups are essential. Local healthcare authorities and relevant institutions are encouraged to implement targeted interventions to address these issues effectively. Policymakers and health officials should prioritise improving diabetes care and preventing CKD. Enhancing education about the risks of CKD for individuals with Type 2 DM is crucial. Furthermore, developing risk assessment tools that connect risk perception to health-related behavior could help reduce the burden of CKD and diabetes complications in Laos.

Keyword: risk perception, self-care behavior, chronic kidney disease, type 2 diabetes mellitus, obesity, Lao PDR

Introduction

Diabetes mellitus (DM) is a metabolic disorder characterised by persistent hyperglycemia and altered fat and carbohydrate metabolism. It is caused by a malfunction in insulin production, its action, or both, and, over time, it can cause significant damage to several organs (Rossing, Hansen, & Kümler, 2024). DM, especially Type 2 DM, is the second leading cause of chronic kidney disease (CKD) worldwide (Fenta et al., 2023) when DM patients do not perform good self-care behavior. CKD is expected to increase from 10% in 2022 to 12% in 2030 and 13.8% in 2045. Of these cases, 95% are expected to be in low- and middle-income countries (Hasan, Sutradhar, Gupta, & Sarker, 2018; Suriyong, Ruengorn, Shayakul, Anantachoti, & Kanjanarat, 2022). In the Lao PDR, 8.55% of the population had CKD in 2022 (Liyanage et al., 2022). Poorly treated Type 2 diabetes mellitus can lead to an increased risk of complications, including diabetic nephropathy, diabetic neuropathy, heart disease, stroke, leg amputation, and death (Shillah, Yahaya, Morgan, & Bintabara, 2024). Managing the progression of diabetes can enhance health and economic outcomes for patients, society, and the healthcare system (Liyanage et al., 2022; Suriyong et al., 2022).

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Numerous studies have demonstrated a significant link between self-care behavior and the control of haemoglobin A1c, which is crucial for achieving positive health outcomes related to diabetes. (Hoogeveen, 2022). To maintain optimal haemoglobin A1c control, the patient should follow a healthy diet, engage in physical activity, monitor their blood glucose, and adhere to their treatment plan. Self-care practices are essential for effectively managing Type 2 diabetes (Haileamlak, 2018; Kovesdy, 2022). Controlling glucose levels is challenging due to various clinical, psychological, and sociodemographic factors (Kovesdy, 2022). Identifying factors associated with poor glycaemic control requires combining various elements, including time devoted to self-care behavior. Moreover, self-care behavior significantly affects the knowledge related to the risk of CKD control (Francis et al., 2024). In addition, the risk perception toward CKD was significantly affected by various sociodemographics, perceptions toward the risk of CKD, clinical measurement, and medication-related characteristics (Akokuwebe & Idemudia, 2022). A lack of knowledge is linked to lower income, lower levels of education, and higher unemployment rates (Educators, 2020; Isa, Norliana Ja, I, Yusof, & Hami, 2023). Obesity, longer duration of diabetes, and high perceived barriers to performing self-care practices were significantly associated with poor self-care practices (Liyanage et al., 2022) and inadequate self-care behavior.

The Laotian literature has shown self-care behavior and risk perception toward CKD in Type 2 DM patients (Badran et al., 2023), however, poor self-care practices, glycaemic control in Laotian with Type 2 DM cause kidney failure. Additionally, Previous studies on self-care behavior relied on validated tools that were developed externally to the Lao PDR; the current study utilised tools that were locally validated to measure self-care behavior in individuals with Type 2 DM. Therefore, this study evaluated the association between risk perception of CKD and self-care behavior among people with Type 2 DM in selected Vientiane capital public tertiary hospitals. Determining how each self-care behavior affects glycaemic control in individuals with Type 2 diabetes mellitus is particularly beneficial for policymaking. It helps prioritize diabetes self-care interventions aimed at improving glycated hemoglobin A1c levels, and addressing cultural factors and limitations within the healthcare system is crucial. Many individuals experience delays in seeking care, often relying on home remedies or local healers before visiting clinics, which typically occurs only when symptoms worsen. Financial barriers also contribute to this issue, as high out-of-pocket costs deter hospital visits. Self-medication, such as purchasing antibiotics without prescriptions, is common. Additionally, managing chronic diseases like diabetes can be challenging due to poor adherence to treatment; this is often a result of a lack of noticeable symptoms and a cultural emphasis on treating acute illnesses.

Research Objective

To determine the predictors of self-care behavior among people with type 2 diabetes mellitus in Vientiane capital, Lao PDR.

Materials and Methodology

This study used a cross-sectional design to examine the protective measures, risk perceptions of CKD, and self-care behaviors among individuals diagnosed with Type 2 diabetes mellitus (DM) in Vientiane Capital, Lao PDR. The study area data collection was done from three public tertiary hospitals among people diagnosed with Type 2 DM in Vientiane capital, Laos. A quantitative face-to-face interview was conducted using a questionnaire featuring closed-ended questions. This study included Lao citizens aged 18 years and above who have been diagnosed with Type 2 DM for at least one year, currently living in Vientiane, and have visited the three public tertiary care hospitals. However, individuals who are not available and those who refuse to participate at the time of the interview period are excluded, this study used a multi-stage sampling method across three public tertiary hospitals in the capital of Laos. The hospitals included Mahosot Hospital, Setthatthirath Hospital, and Mitthaphab Hospital. There were 211, 127, and 84 participants from Mahosot Hospital, Setthathirath Hospital, and Mitthaphab Hospital, respectively. The number of cases was proportionally allocated to each hospital. Patients with type 2 diabetes mellitus were selected using a systematic random sampling method, and data collection combined simple random sampling with proportional-to-size sampling.

Research instrument

A quantitative face-to-face interview questionnaire with closed-ended questions was used to collect data. This standardized instrument is comparable to those used in earlier research that analyzed the risk perception of chronic kidney disease and self-care behaviors in individuals diagnosed with Type 2 diabetes mellitus. The questionnaire comprised five sections, with a total of 50 items, of which five were completed by a research assistant using information from medical records, which included age (18-45 years, 46-60 years vs ≥ 61 years) sex (male vs female), occupation (civil servant vs retired/unemployed), family history of CKD (grandparents vs parents), knowledge related to the risk of CKD (yes vs no), perception towards the risk of CKD (strongly agree vs strongly disagree) and clinical measurement (poor vs good) were the independent variables. Self-care behavior categorised into drug adherence, diet, and individual lifestyle is classified as never to always (poor vs good).

Validity was refined based on previously utilised questionnaires, and operational definitions were crafted using structured formats. Initially composed in English, the questions were subsequently translated into the local language and validated by an expert. A reliability test was conducted through a pilot test study involving 30 individuals from both the outpatient and inpatient departments of diabetes at the military hospital. These individuals displayed varying levels of risk perception regarding CKD and self-care behavior. The reliability scores, measured using Cronbach's Alpha, ranged from 0.75 to 0.86. To streamline the data collection process, IRB approval was requested from three public tertiary care hospitals involved in this study. Trained research assistants and data collectors introduced themselves and explained the purpose of the study to the respondents. The participants were assured that their responses would remain confidential, researcher and data collectors reviewed the statements in the consent form and obtained written consent from the participants. If the participants agreed to take part in the interview, it was conducted using a standard questionnaire designed to last no longer than 20

minutes. The researchers and data collectors made sure participants understood that they could withdraw from the interview at any time if they felt uncomfortable.

Data analyzed

Statistical analysis was performed using IBM SPSS software, version 25. The collected data were analyzed descriptively, focusing on frequency, percentage, median, quartile deviation, minimum, and maximum. The descriptive statistical analysis explored the relationship between risk perception of CKD and self-care behavior, including socio-demographic factors, knowledge related to CKD, perceptions toward the risk of CKD, and clinical measurements using the chi-square test, binary logistic regression and multiple logistic regression. Before carrying out the multivariate analysis, the researcher checked for multicollinearity among the variables using the Spearman rank correlation test. Before administering any questionnaires for face-to-face interviews, the researcher sought ethical approval for the entire study and all of the instruments. The ethics review committee approved the study, obtained from MU-CIRB 2024/322.0708, Mahidol University, and the Ministry of Health, University of Health Sciences Research Ethics Committee No: 848/REC. A certificate of ethics review approval was issued, and comprehensive information regarding the study objectives, methods, potential risks, harm, and benefits ways to contact the research team was provided to respondents before the interview. All participants provided informed consent before taking part in the survey, and their participation was completely voluntary.

Results and Discussion

The study involved 433 participants, as detailed in Table 1. Results indicated that 67.0% of the participants were female, and the majority were of working age, ranging from 25-89 years, with a median age of 58. The largest group was 46-60 years old, and 26.6% had completed at least primary school level education. Notably, 13.4% had attained a university-level education or higher. Additionally, approximately 32.3% of the respondents were either retired or unemployed. The reported median monthly income was 2,800,000 LAK, with 49.9% earning above the median. Approximately USD 127 at the time of data collection (WHO, 2023). About 9.0% of participants reported having more than five million kips of monthly income. Of those participants, 71.6 % lived in urban areas. 36.7% of respondents were civil servants and had health insurance coverage. The majority (87.5%) utilised outpatient department services. Most participants (90.3%) indicated there was no family history of CKD. Notably, 8.8% of those with a known familial history of CKD were from their parents. More than half (64.7%) of participants living with Type 2 DM had less than or equal to nine years, and 43.6% of respondents were obese.

Table 1: Frequency and percentage of sociodemographic characteristics

Socio-demographic characteristics	**Frequency (n)**	**Percentage (%)**
Sex		
Male	143	33.0
Female	290	67.0
Age group (years)	64	14.8
18-45	194	44.8
46-60	175	40.4
≥61		
(Median 58; QD 14; Min-Max 25-89)		
Education level		
Illiterate	21	4.8
Primary school	115	26.6
Lower secondary school	98	22.6
Upper secondary school	59	13.6
Tertiary/College	82	18.9
University	58	13.4
Occupation		
Civil servant	70	16.2
Farmer	34	7.9
Labour	20	4.6
Merchant	74	17.1
Unemployed	95	21.9
Retired	140	32.3
Income level	178	41.1
100,000-2000,000 LAK (USD 4.6-91)	216	49.9
2,100,000-5,000,000 LAK (USD 96-228)	39	9.0
>5,000,000 LAK (USD >228)		

(Median 2,800,000; QD 2,000,000; Min-Max 100,000-13,000,000)		
Living area		
Urban	310	71.6
Rural	123	28.4
Type of health insurance		
Uninsured	123	28.4
Private insurance	117	27.0
Civil servants	159	36.7
Enterprises	9	2.1
CBHI	25	5.8
Department		
OPD	379	87.5
IPD	54	12.5
Family history of CKD		
No	391	90.3
Yes	42	9.7
If yes, who had been CKD		
Grandparents	4	0.9
Parents	38	8.8
Duration of Type 2 DM (Years)		
≤ 9	280	64.7
>10	153	35.3
BMI (kg/m2)	26	6.0
Underweight (<18.5)	120	27.7
Normal (18.5-22.9)	98	22.6
Overweight (23-24.9)	189	43.6
Obese (≥25)		
(Median 24.5; QD 5.25; Min-Max 8.4-41.4)		

The result shows that the proportion of respondents demonstrating good self-care behavior was significant among those without family history members with CKD (37.1%) of participants, compared with those with family history members of CKD (16.7%) of participants, and 44.5% of respondents with underweight or normal BMI demonstrating good self-care behavior compared to those overweight

or obese. A strong connection was identified between knowledge of self-care practices and the behavior of self-care. The percentage of respondents exhibiting good self-care behaviors was 37.8%, and 21.1% among those with low and high self-care practices, respectively (p-value = 0.01). The results were found between the perceived severity of CKD and self-care behavior. The percentage of respondents who exhibited good self-care behavior was 29.6% for one group and 40.5% among those with perceived low and high severity of CKD, respectively (p-value=0.02). The perceived barrier to performing self-care practices and self-care behavior. The percentage of respondents demonstrating good self-care behavior was 39.7% and 26.5% among those with perceived barriers, low and high barriers to performing self-care practices, respectively (p-value=0.08), as shown in Table 2.

Table 2: Characteristics of respondents based on self-care behavior

Characteristics	**Poor self-care behavior**	**Good self-care behavior**
	n (%)	**n (%)**
Sex		
Male	99 (69.2)	44 (30.8)
Female	182 (62.8)	108 (37.2)
Age group (years)		
18-59	154 (65.5)	81 (34.5)
≥60	127 (64.1)	71 (35.9)
(Median 58; QD 6.25; Min-Max 25-89)		
Occupation		
Civil servant/Farmer/Laboure/Merchant	164 (69.8)	71 (30.2)
Retired/Unemployed	117 (59.1)	81 (40.9)
Family history of CKD		
No	246 (62.9)	145 (37.1)
Yes	35 (83.3)	7 (16.7)

BMI (kg/m^2)		
Underweight/Normal	81 (55.5)	65 (44.5)
Overweight/Obese	200 (69.7)	87 (30.3)
Knowledge related to self-care practices		
Low	225 (62.2)	137 (37.8)
High	56 (78.9)	15 (21.1)
Perceived of the severity of CKD		
Low	150 (70.4)	63 (29.6)
High	131 (59.5)	89 (40.5)
Perceived barriers to performing self-care practices		
Low	170 (60.3)	112 (39.7)
High	111 (73.5)	40 (26.5)

Binary logistic regression analysis assessed the relationship between socio-demographic characteristics and self-care behavior, as shown in Table 3. Results indicated that self-care behavior had a significant association with occupation (COR: 1.59, 95% 1.07-2.37). Those working, such as farmers/labourers/ merchants, and civil servants, were 1.59 times more likely to perform good self-care behavior compared to those who were retired or unemployed. Additionally, the findings indicated a significant association was observed for the BMI respondents, with underweight and normal being 1.84 times more likely to perform good self-care behavior compared to those who were overweight or obese (COR: 1.84; 95% CI: 1.22-2.78). individuals with self-care practices were 21.1% less likely to perform self-care behavior than people with no self-care practices. Regarding perceptions toward the risk of CKD and self-care behavior, a statistically significant association was observed for the perceived severity of CKD. The respondents with a high perception of the severity of CKD were 1.61 times more likely to perform good self-care behavior compared to those with a low perception of the severity of CKD (COR: 1.61, 95% CI: 1.08-2.41). Moreover, individuals with low perceived barriers to self-care practices were 1.82 times more likely to engage in good self-care behaviors compared with high perceived barriers (COR: 1.82, 95% CI: 1.18-2.81).

Multivariate logistic regression. Independent variables with a p-value less than 0.25 from the binary logistic regression analysis were used to evaluate their predictive power in the multiple logistic regression analysis. The results indicated that those who were underweight and had normal BMI were 1.72 times more likely to perform good self-care behavior than those who were overweight and obese (AOR: 1.72, 95% CI: 1.12 - 2.64). Respondents, with knowledge of self-care practice, were 21.1% less likely to perform self-care behavior than people with no self-care practices (AOR: 0.49, 95% CI: 0.26-0.93). Additionally, those who had a high perceived severity of CKD were 2.03 times more likely to perform good self-care behavior than those who had a low perceived severity of CKD (AOR: 2.03, 95% CI: 1.32-3.14). Furthermore, Respondents who perceived low barriers to practicing self-care were 1.71 times more likely to engage in good self-care behavior compared to those who perceived high barriers (AOR: 1.71, 95% CI: 1.09-2.69).

Table 3: Multivariate logistic regression for the final model and self-care behavior, last step (step 4a)

Characteristics	**Bivariate Analysis**		**Multivariable Analysis**	
	COR (95% CI)	**p-value**	**AOR (95% CI)**	**p-value**
Occupation				
Farmer/Laboure/Marchant/	1.59 (1.07-2.37)	0.021	1.42 (0.94-2.16)	0.093
Civil servant				
Retired/Unemployed	1		1	
BMI (kg/m^2)				
Underweight/Normal	1.84 (1.22-2.78)	0.004	1.72 (1.12-2.64)	0.013
Overweight/Obese	1		1	
Knowledge related to self-care practices				
Low	1		1	
High	0.44 (0.23-0.80)	0.008	0.49 (0.26-0.93)	0.031
Perceived of the severity of CKD				
Low	1		1	

High	1.61 (1.08-2.41)	0.018	2.03 (1.32-3.14)	0.001
Perceived barriers to performing self-care practices				
Low	1.82 (1.18-2.81)	0.006	1.71 (1.09-2.69)	0.019
High	1		1	

Discussion

The results from the current study indicated that the majority of participants were female, with a median age of 58 years, and had primary school education. This finding 44.8% of participants were aged 46-60 years old, and more than one-third (40.4%) of participants were over 60 years old. Furthermore, research in India found that self-care behavior were statistically significant among individuals aged 60 years and above. Previous studies on subjects over 60 years old identified factors affecting the risk of CKD in Type 2 DM patients (Albuquerque et al., 2023; Mielenz, Kannoth, & Xue, 2021; Sağlam & Bektas, 2023). The identified average monthly income level of 2-5 million LAK, at the time of data collection, this amount was roughly equivalent to 96-228 USD monthly, based on the average exchange rate from the Bank of Laos on June 28, 2024 (WHO, 2023). Study in Iran, the influence of age on self-care behaviors in patients with Type 2 diabetes mellitus was examined. The findings indicated that the age group had a significant relationship with self-care behavior. Ageing may have good self-care behavior among people with Type 2 DM and CKD patients (Montazeri et al., 2023). Similar findings in the previous study in Laos reported that patients with CKD who also had diabetes, and adults aged 46-65 years, tended to demonstrate high levels of self-care behavior (Tsai et al., 2021).

Individuals in this age group were often more aware of the potential consequences of unmanaged chronic conditions. They may have experienced severe health outcomes in others, which can encourage improved self-care. However, regular health screenings and medical checkups were also more common in these age groups, which allows for earlier interventions and ongoing monitoring of their health. Individuals in their late 40s to early 60s tend to be more disciplined than younger adults when it comes to maintaining routines such as meal planning, medication adherence, and exercise. Many of them have a stable lifestyle, which enables them to prioritise health management over other competing demands in their lives. These age groups typically enjoy greater financial stability and better access to healthcare resources than younger individuals. This leads to more consistent medication use, regular medical visits, and improved access to healthier food options. At this age, many individuals have gained more knowledge about their conditions and the significance of managing them effectively to prevent complications such as cardiovascular disease, kidney failure, and neuropathy.

The finding indicated that the occupation of 30.2% of participants were working. In the study, farmers, labourers, merchants, and civil servants were 1.59 times more likely to perform good self-care behavior. In previous research in Pakistan, findings showed that those who were working and received financial support performed good self-care behavior (Babazadeh et al., 2017; Bukhsh et al., 2018). A study in Indonesia found that those who were employed tended to perform better self-care behaviors (Ghaljaei,

Rezaee, & Salar, 2017). Similarly, a study in Korea found that those working performed good self-care behavior (Jang et al., 2023). A study in China found that employed perform good self-care behavior more than people not working (Luo & Wang, 2022). In a similar previous study in Vietnamese, those who were employed generally established a structured routine, which can help ensure regular mealtimes, consistent medication schedules, and planned physical activity. Many employees have access to health insurance provided by their employers, which often covers doctor visits, medications, and other essential treatments (Hariati, Syam, & Bakri, 2023; Ulfah et al., 2022). This financial support can enhance adherence to self-care practices. Additionally, workplace wellness programs may encourage healthy behaviors. Laotian employers may provide resources such as health workshops, nutrition guidance, or access to fitness facilities, which can enhance self-care knowledge and practices. Moreover, working individuals were often driven to effectively manage their health to maintain energy levels, productivity, and job performance. By avoiding absenteeism and upholding their work duties, they can foster consistent self-care behaviors. In addition, being employed usually provides a stable income, enabling individuals to afford medications, regular checkups, and healthy food options, all of which are essential for managing T2DM and CKD.

A statistically significant relationship was found between body mass index (BMI) and self-care behavior through multiple logistic regression. Results indicated that nearly half (44.5%) of participants had an underweight or normal BMI. Moreover, based on the study's key findings, participants reported that underweight and normal BMI were 1.72 times more likely to perform good self-care behavior. Regarding a previous study in Iran, the BMI was found to be significantly normal BMI in nutritional performance and good self-care behavior (Huang et al., 2021; Karimi et al., 2024). In the previous study, a correlation between self-care behavior and BMI based on weight and height (Modarresi, Gholami, Habibi, & Ghadiri-Anari, 2020). A similar previous study indicated that BMI plays a crucial role in predicting particular chronic diseases, and BMI values (Ahn, Lee, & Seo, 2022). BMI, which indicates overweight and obesity was a frequent association between this condition an increased risk of hypertension, Type 2 diabetes mellitus, and heart disease, which significantly contribute to illness. BMI has shown that both high and low values are associated with various health issues: obesity is linked to cardiovascular diseases, diabetes, certain types of cancer, hypertension, hyperlipidemia, and sleep apnea. whereas being underweight often correlates with a risk of malnutrition.

Based on these data, a significant number of patients with Type 2 DM and self-care behavior participants had a solid understanding of their roles and responsibilities in preventing and controlling CKD. This enhanced knowledge seemed to be connected to their self-care behavior, likely influenced by the guidelines and training offered by government and public health officials. Our analysis of the survey data has significant limitations. For instance, only one-third of the participants demonstrated good self-care behavior, which means that a small proportion of the total participants were analyzed. Additionally, this study focused on only a few variables, leaving out many others that could be relevant. To gain a better understanding of the factors that contribute to self-care behavior further research is needed with a larger sample size and a wider range of variables.

Conclusion

This study found a high success rate for self-care behavior with Type 2 diabetes mellitus being a positive predictor. Patients being female, middle age, having a normal BMI, understanding self-care practices, the perceived severity of CKD, and barriers to performing these practices all impact the success of self-care behavior. Collaboration across multiple sectors is essential for managing Type 2 diabetes and enhancing self-care practices among participants, especially to increase prevention and monitor younger participants, and improve the health provider service system. Patients with Type 2 DM should understand the risk of developing CKD. Patients should learn about CKD and recognise early signs like swelling, fatigue, and changes in urine output. Control blood sugar levels to prevent kidney damage. Seek information and consult healthcare providers for resources on CKD prevention.

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Declaration of Interest Statement

The authors declare that they have no conflict of interest.

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