ORIGINAL ARTICLE

Determining The Relationship Between Self Care on Chronic Kidney Disease Prevention and Quality of Life Among Diabetes Mellitus Type 2 Patients

Siti Salmah Mohamad Zaid[1], Ali Aminuddin Mohd Rasani [1], Kueh Yee Cheng[2] , Wan Faizah Wan Yusoff[1]

[1] School of Health Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia
[2] School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia

ABSTRACT

Introduction: Chronic kidney disease (CKD) in patients with T2DM accounts for most cases of End Stage Renal Failure. However, the level of self-care among individuals with CKD has been found to be relatively low. Furthermore, a patient's quality of life (QoL) can be affected. The study aimed to assess the self-care practices and to determine the relationship between self-care on CKD's prevention and QoL domains: satisfaction, impact and worry among patients with T2DM in Hospital Universiti Sains Malaysia (HUSM). **Material and methods:** Using a purposive sampling method, this study was carried out through a cross-sectional study among 400 respondents who attended Klinik Pakar and Klinik Rawatan Keluarga, HUSM. Self-care was measured by using a newly developed KAS_CKD questionnaire meanwhile QoL was obtained using The Revised Version Diabetes Quality of life (DQoL). **Results:** 88.0 % of respondents had high self-care behaviour in preventing CKD. A simple linear regression and multiple linear regression tests revealed an insignificant linear relationship between self-care and quality of life ($p > 0.05$). Individuals with diabetes mellitus have good self-care practices in most domains of self-care practice. Self-care shows no statistically significant effect on the quality of life within all domains. **Conclusions:** Although individuals with diabetes mellitus generally practice good self-care, this self-care does not significantly impact their quality of life. Self-care is essential for disease management but other factors may play a significant role in determining QoL. Future studies should explore additional factors that may influence QoL such as mental health or accessibility to healthcare providers.

Malaysian Journal of Medicine and Health Sciences (2025) 21(SUPP10):67-72. doi:10.47836/mjmhs.21.s10.14

Keywords: Chronic kidney disease, diabetes mellitus, quality of life, self-care, satisfaction

Corresponding Author:
Wan Faizah Wan Yusoff PhD
Email: faienur@usm.my
Tel : +609-7677540

INTRODUCTION

1.1 Global and local burden of T2DM

Type 2 Diabetes Mellitus (T2DM) is a widespread non-communicable disease (NCD) that is rising globally. It is estimated that 830 million individuals worldwide had diabetes in 2022 (1). The World Health Organization noted a rise in the number of individuals with diabetes, from 200 million in 1990 to 830 million in 2022, with a faster increase occurring in low- and middle-income countries compared to high-income nations (1). Projections indicated a substantial rise in diabetes prevalence between 2021 and 2045, with middle-income countries seeing an increase of 21.1%, compared to 12.2% in high-income and 11.9% in low-income nations (2). This global trend is also reflected in Malaysia, where the incidence of T2DM remains high, with approximately one out of every seven people in the country affected (3). The National Diabetes Registry Report 2020 in Malaysia indicated that almost all patients enrolled in the registry had T2DM (99.33%), followed by type 1 diabetes (0.59%) and other types (0.06%) (4).

1.2 CKD as complication of T2DM

Studies show that nearly 50% of individuals with T2DM develop Chronic Kidney Disease (CKD), making it one of the most prevalent complications (2). Accordingly, CKD in patients with T2DM also accounts for most patients with end-stage renal disease (ESRD) globally

and is associated with high morbidity, mortality, and poor quality of life (5). However, most T2DM patients are not aware that they are at risk for CKD. Among the 9.07% of adults with CKD in Malaysia, only 4% were aware of their diagnosis (6).

1.3 Role of self-care

Self-care is a behavior or the ability to care for oneself through awareness, self-control, and self-reliance in order to achieve well-being (7). It includes self-management of the illness. Improved self-care behavior is vital for CKD patients to ensure treatment adherence (8) and have a lower risk of rapid decline in renal function (9). However, the level of self-care among patients with CKD has been reported to be low as a result of a lack of recognition regarding the benefits of such behaviour (9). Poor self-care may due to low income and educational background of individuals (10) as well as family dynamics which may burden the patients (11). Education, counselling, and workshops are potential interventions to enhance patients' self-care behaviour (12).

1.4 Link to QoL

In the long term, T2DM patients who lack effective self-care management are at risk of developing CKD. Furthermore, as the disease progresses, the patient's quality of life (QoL) can be affected. The presence of CKD deteriorates Diabetes Quality of Life (DQoL) (13). Good nutrition, solving problems, managing stress, and reducing risks were identified as significant predictors of DQoL (14). Self-care plays an important role in preventing CKD progression but their relationship with QoL remains unclear. As increasing burden of diabetes-related CKD, understanding this relationship is essential for developing effective patient-centered interventions. This study aims to bridge this gap by examining the relationship between self-care and QoL among individuals with T2DM and providing insights for healthcare providers to optimize chronic disease management strategies.

MATERIALS AND METHODS

This study was carried out through a cross-sectional survey. The study was conducted among 400 Type 2 Diabetes Mellitus (T2DM) patients who came for routine follow-up at Klinik Pakar and Klinik Rawatan Keluarga, Hospital Universiti Sains Malaysia (USM). Respondents of this study were among T2DM patients who fulfilled these criteria: (a) aged 18 to 75 years old, (b) who have been diagnosed with T2DM, and (c) those who own a smartphone. Respondents were excluded if they had diagnosed cognitive impairments like dementia, intellectual disabilities, and stroke-related cognitive dysfunction. Respondents with severe hearing loss that hindered communication were also excluded. A purposive sampling method was used, and all eligible patients attending the clinic were included in this study (15). Sample size was calculated based on correlation by using Gpower 3.1.9.7. Based on the sample size calculation, the largest sample size is 400 (320/ (1-0.2) = 400).

This study was carried out by using a set of self-administered questionnaires using a newly developed KAS_CKD questionnaire (16). It was a self-care subscale with nine items. These items would be examined according to the Middle-Range Theory of Self-care of chronic illness (17). A score of '4' was given for 'Always', '3' for 'Most of the items', '2' for 'Sometimes', and '1' for 'Not at all'. The total score was calculated by summing all item scores as the total possible score ranged from 9 (minimum) to 36 (maximum). A score exceeding 70% of the maximum (>25) was classified as high self-care, while scores of 25 or below were categorized as low self-care. This scale was validated in three phases. Phase one assessed face and content validity, followed by a pilot study. Phase two involved Exploratory Factor Analysis (EFA) and reliability testing using SPSS. Phase three used Confirmatory Factor Analysis (CFA) in Mplus to evaluate construct validity and reliability (16). Data on respondents' quality of life was obtained using The Revised Version Diabetes Quality of life (DQoL) Malay-version (18). This questionnaire has 13 items with three domains: satisfaction (six items), impact (four items) and worry (three items). This questionnaire uses a five-point Likert scale. A score of '1' is given for 'very satisfied', '2' for 'moderately satisfied', '3' for 'neither satisfied or dissatisfied', '4' for 'moderately dissatisfied', and '5' for 'very dissatisfied'. This scale was validated with the three factors' structure measurement model based on Confirmatory Factor Fit (CF fit), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), and Tucker-Lewis Index (TLI). Each domain score is converted into a percentage by dividing it by the maximum possible score and multiplying by 100. The total DQoL score (ranging from 13 to 65) is also converted to a percentage (18).

This study is a part of a bigger research project under a Research University (Team) grant (1001/PPSK/858001). It was approved by Human Research Ethics Committee (HREC), USM (USM/JEPeM/22040254).

RESULT

Table I shows the extent of self-care of the respondents on CKD prevention. Majority of respondents demonstrated

Table I: Level of self-care variables of the respondents (N=400 respondents)

Variables	Mean (SD)	Frequency	Percentages (%)
Self-Care	0.88 (0.32)		
Low		48	12
High		352	88

SD= standard deviation

Table II: Relationship of self-care with three domains in quality of life of respondents

Variables	Satisfaction Domain (SLR)		Satisfaction Domain (MLR)		Impact Domain (SLR)		Impact Domain (MLR)		Worry Domain (SLR)		Worry Domain (MLR)	
	Crude b (95% CI)	p-value	Adjusted b (95% CI)	p-value	Crude b (95% CI)	p-value	Adjusted b (95% CI)	p-value	Crude b (95% CI)	p-value	Adjusted b (95% CI)	p-value
Self-care	-0.18 (-0.44, 0.08)	0.177	-1.24 (-4.87,2.39)	0.502	-0.10 (-0.39, 0.19)	0.510	-1.74 (-5.81, 2.32)	0.400	0.31 (-0.06, 0.70)	0.102	-0.41 (-5.63,4.80)	0.876
Age	-	-	-0.06 (-0.19, 0.06)	0.312	-	-	-1.77(-0.32,-0.03)	0.015	-	-	-0.28 (-0.46,-0.10)	0.002
Occupation	-	-	-0.56 (-1.49, 0.37)	0.239	-	-	-0.32 (-1.36, 0.72)	0.543	-	-	0.86 (-0.47, 2.20)	0.204
Gender	-	-	-2.82 (-5.22, -0.41)	0.021	-	-	-1.64(-4.33,1.04)	0.230	-	-	2.80 (-0.63,6.25)	0.110
Income	-	-	-1.24 (-4.87, 2.39)	0.826	-	-	0.00 (0.00,0.00)	0.308	-	-	0.00 (0.00,0.00)	0.113

b = regression coefficient.

a high level of self-care behaviour in prevention of CKD (88.0%) meanwhile 12.0% of respondents had low level of self-care.

The result from the simple linear regression and multiple linear regression test revealed insignificant linear relationship of self-care with all domains in quality of life ($p > 0.05$), as shown in Table II. Multiple linear regression was performed to adjust for potential confounders, including age, gender, occupation, and income. After adjusting for these variables, self-care remained an insignificant predictor of satisfaction, impact and worry domain in QoL. Among the confounders, gender showed a significant association with the satisfaction domain of QoL ($p = 0.021$), meanwhile age was significantly associated with impact ($p = 0.015$) and worry ($p = 0.002$) domain in QoL.

These findings suggest that self-care does not have a direct relationship with any of QoL domains even after adjusting the confounders. However, gender and age differences significantly related with quality of life.

DISCUSSION

The aim of this study was to identify the relationship between self-care on CKD prevention and quality of life among T2DM patients. The majority of respondents had high self-care behaviour in preventing CKD. Most respondents consistently take action to prevent kidney disease and do not face difficulties in doing so. These findings are consistent with a study in Thailand, which showed that most respondents practised good self-care when taking CKD preventive measures (19).

This study's findings revealed an insignificant linear relationship between self-care and quality of life ($p > 0.05$). Several studies may explain the lack of a significant relationship between self-care and quality of life. For instance, respondents' characteristics, including socio-demographic factors, may also influence this relationship (20). Additionally, the presence of multiple chronic conditions can adversely affect QoL, potentially overshadowing the impact of self-care behaviours and experience poor health-related QoL (21). Psychological factors, including resilience, self-efficacy, and social support, also significantly manage T2DM and can influence QoL (22). On the other hand, a study found limited evidence regarding the relationship between self-care and QoL, suggesting that this relationship may not always be significant across different populations or settings (23).

In contrast, other studies have reported a positive association between self-care and QoL. One study found that general self-care behaviours were significantly correlated with better QoL outcomes, although specific practices such as frequent self-monitoring of blood glucose were paradoxically linked to lower QoL, possibly due to increased psychological burden (24). Another study reported that self-care behaviour positively impacted QoL, with a standardized beta coefficient of 0.140 (25). Similarly, evidence suggests that self-care practices contribute positively to the quality of life of T2DM patients (26). This study also revealed that gender and age differences may play a role in affecting quality of life. Age-related variations in the satisfaction domain, as well as significant gender disparities, were evident in the findings and are consistent with previous studies that identified gender as a factor affecting QoL among individuals with chronic illnesses such as diabetes (27–29).

As with many observational studies, our research faces a few limitations that may have contributed to the insignificant relationships. First, the study population of T2DM patients may not be fully representative of the broader T2DM population, as the majority of respondents were older individuals. This age distribution may limit the generalizability of the findings, as younger T2DM patients might have different self-care behaviors, attitudes, or quality of life experiences. Elderly T2DM patients often face challenges in self-care behaviors which can impact their overall health outcomes (30)(31). Additionally, while our sample size met the required estimates which was determined based on correlation using Gpower 3.1.9.7., it remains relatively small which could further impact the generalizability of the findings. The sample size calculation accounts for an estimated 20% non-response rate, with an initial target of 400 individuals. A larger sample may be necessary to ensure the findings are representative and generalizable (32).

CONCLUSION

T2DM patients reported good self-care practices in CKD prevention. However, self-care is not significantly associated with quality of life in all domains. To further enhance self-care behaviour towards CKD prevention among T2DM patients in Kelantan, an appropriate health education and health promotion program roles involving interdisciplinary healthcare professionals with community-based strategies (33). These programs should be tailored to address local needs and delivered in an accessible format. Organising a workshop on CKD prevention, utilising local healthcare centres or community halls to disseminate CKD-related information, should be implemented (34). Additionally, mobile health apps should be introduced to guide patients on diet, medication adherence, and CKD risk factors (35). Since self-care alone did not independently predict QoL, interventions should focus on sociodemographic factors to improve QoL among T2DM patients in future research. More extensive, large-scale studies are required to gain more insight into this matter. Future studies should use a longitudinal design to track how gender differences in quality of life (QoL) evolve among T2DM patients (36). A qualitative study

could be conducted using in-depth interviews or focus groups to explore particular areas such as satisfaction and psychological impact on QoL (37).

ACKNOWLEDGEMENTS

This work was supported by Universiti Sains Malaysia, Research University Team (RU Team) Grant Scheme (Grant Number: 1001/PPSK/858001).

REFERENCES

1. World Health Organization. Diabetes. 2024. Available from: https://www.who.int/health-topics/diabetes
2. Sun H. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract. 2021;183:109119. Available from:https://doi:10.1016/j.diabres.2021.109119
3. Akhtar S, Nasir JA, Ali A, Asghar M, Majeed R, Sarwar A. Prevalence of type-2 diabetes and prediabetes in Malaysia: A systematic review and meta-analysis. PLOS ONE. 2022. Available from: https://doi.org/10.1371/journal.pone.0263139
4. National Diabetes Registry Report - Ministry of Health. Available from: https://www2.moh.gov.my/moh/resources/Penerbitan/Rujukan/NCD/Diabetes/National_Diabetes_Registry_Report_Vol_1_2009_2012.pdf
5. Khan M. Epidemiology of type 2 diabetes – global burden of disease and forecasted trends. J Epidemiol Glob Health. 2020. Available from: https:// doi:10.2991/jegh.k.191028.001
6. Ministry of Health Malaysia. Malaysian National Health and Morbidity Survey: Non-communicable Disease, Volume II. 2011. Available from: https://iku.moh.gov.my/images/IKU/Document/REPORT/NHMS2011-VolumeII.pdf
7. Martínez N. Self-care: A concept analysis. Int J Nurs Sci. 2021. Available from: https://doi:10.1016/j.ijnss.2021.08.007
8. Ahn JW, Lee SM, Seo YH. Factors associated with self-care behavior in patients with pre-dialysis or dialysis-dependent chronic kidney disease. PLoS One. 2022;17(10). Available from: https://doi.org/10.1371/journal.pone.0274454
9. Tsai YC, Wang SL, Tsai HJ, Chen TH, Kung LF, Hsiao PN, Hsiao SM, et al. The interaction between self-care behavior and disease knowledge on the decline in renal function in chronic kidney disease. Sci Rep. 2021;11(1). Available from: https://doi.org/10.1038/s41598-020-79873-z
10. Niguse H, Belay G, Fisseha G, et al. Self-care related knowledge, attitude, practice and associated factors among patients with diabetes in Ayder Comprehensive Specialized Hospital, North Ethiopia. BMC Res Notes. 2019;12:34. Available from: https://doi.org/10.1186/s13104-019-4072-z
11. Shirazian S, Crnosija N, Weinger K, Jacobson AM, Park J, Tanenbaum ML, et al. The self-management experience of patients with type 2 diabetes and chronic kidney disease: A qualitative study. Chronic Illn. 2015;12(1):18–28. Available from: https://doi.org/10.1177/1742395315614381
12. Moktan S, Leelacharas S, Prapaipanich W. Knowledge, self-efficacy, self-management behavior of the patients with predialysis chronic kidney disease. Ramathibodi Med J. 2019. Available from: https://doi:10.33165/rmj.2019.42.2.119901
13. Manjunath K, Christopher P, Gopichandran V, Rakesh PS, George K, Prasad JH. Quality of life of a patient with type 2 diabetes: A cross-sectional study in rural South India. J Fam Med Prim Care. 2014. Available from: https://doi:10.4103/2249-4863.148124
14. Alaofи H, Amoussa Hounkpatin W, Djrolo F, Ehiri J, Rosales C. Factors associated with quality of life in patients with type 2 diabetes of South Benin: A cross-sectional study. Int J Environ Res Public Health. 2022;19(4):2360. Available from: https://doi.org/10.3390/ijerph19042360
15. Etikan I, Musa SA, Alkassim RS. Comparison of convenience sampling and purposive sampling. Am J Theor Appl Stat. 2016;5(1):1-4. Available from: https://doi.org/10.11648/j.ajtas.20160501.11
16. Zuraini. Development and validation of knowledge, attitude and self-care on the prevention of chronic kidney disease (KAS-CKD) scale for people with type 2 diabetes mellitus [dissertation]. Universiti Sains Malaysia; 2024.
17. Lawless MT, Tieu M, Chan RJ, Hendriks JM, Kitson A. Instruments measuring self-care and self-management of chronic conditions by community-dwelling older adults: A scoping review. J Appl Gerontol. 2023;42(7):1687–709. Available from: https://doi.org/10.1177/07334648231161929
18. Bujang MA, Mohan K, Mohd Hatta NK, Baharum N, Ismail M. Quality of life and its associated factors among type 2 diabetes patients. Available from: https://seronjihou.files.wordpress.com/2021/03/282197-1.pdf
19. Komaratat C, Auemaneekul N, Kittipichai W. Quality of life for type II diabetes mellitus patients in a suburban tertiary hospital in Thailand. J Health Res. 2021;35(1):3–14. Available from: https://doi.org/10.1108/JHR-05-2019-0100
20. Al Qadire M, Alhosni F, Al-Daken L, Aljezawi M, Al Omari O, Khalaf A. Quality of life and its predictors among patients with selected chronic diseases. Nurs Forum. 2023. Available from: https://doi.org/10.1155/2023/6657164
21. Lee E, Cha S, Kim GM. Factors affecting health-related quality of life in multimorbidity. Healthcare (Basel). 2021;9(3). Available from: https://doi.org/10.3390/healthcare9030334
22. Pouw T, de Man-van Ginkel J, Hardeman JA, Mager JJ, Trapman L, Jaarsma T, et al. The association

of resilience with self-care and quality of life in people with chronic obstructive pulmonary disease: A cross-sectional study. Nurs Open. 2023;10(12):7738–48. Available from: https://doi.org/10.1002/nop2.2015
23. Seid SS, Amendoeira J, Ferreira MR. Self-care and quality of life among adult patients with heart failure: A scoping review. SAGE Open Nurs. 2023;9. Available from: https://doi.org/10.1177/23779608231193719
24. Gaffari-Fam S, Lotfi Y, Daemi A, Babazadeh T, Sarbazi E, Dargahi-Abbasabad G, et al. Impact of health literacy and self-care behaviors on health-related quality of life in Iranians with type 2 diabetes: A cross-sectional study. Health Qual Life Outcomes. 2020;18(1). Available from: https://doi.org/10.1186/s12955-020-01613-8
25. Cho SE, Kwon M, Kim SA. Influence of diabetes knowledge, self-stigma, and self-care behavior on quality of life in patients with diabetes. Healthcare (Basel). 2022;10(10). Available from: https://doi.org/10.3390/healthcare10101983
26. Ausili D, Bulgheroni M, Ballatore P, Specchia C, Ajdini A, Bezze S, et al. Self-care, quality of life and clinical outcomes of type 2 diabetes patients: An observational cross-sectional study. Acta Diabetol. 2017;54(11):1001–8. Available from: https://doi.org/10.1007/s00592-017-1035-5
27. Głowacka, M., Sienkiewicz, Z., Dykowska, G., & Haor, B. (2024). Dimensions of quality of life of older adults in relation to selected sociodemographic variables-a prospective cohort study. Frontiers in Public Health, 12, 1419008. https://doi.org/10.3389/fpubh.2024.1419008
28. Branquinho, C., Moraes, B., Noronha, C., Ferreira, T., Neto Rodrigues, N., & Gaspar de Matos, M. (2023). Perceived Quality of Life and Life Satisfaction: Does the Role of Gender, Age, Skills, and Psychological Factors Remain Relevant after the COVID-19 Pandemic? Children, 10(9). https://doi.org/10.3390/children10091460
29. Ko H, Park YH, Cho BL, Lim KC, Chang SJ, Yi YM, et al. Gender differences in health status, quality of life, and community service needs of older adults living alone. Arch Gerontol Geriatr. 2019;83:239–45. Available from: https://doi.org/10.1016/J.ARCHGER.2019.05.009
30. Amerzadeh M, Shafiei Kisomi Z, Senmar M, Khatooni M, Hosseinkhani Z, Bahrami M. Self-care behaviors, medication adherence status, and associated factors among elderly individuals with type 2 diabetes. Sci Rep. 2024;14(1). Available from: https://doi.org/10.1038/s41598-024-70000-w
31. Opoku R, Ackon SK, Kumah E, Botchwey COA, Appiah NE, Korsah S, et al. Self-care behaviors and associated factors among individuals with type 2 diabetes in Ghana: A systematic review. BMC Endocr Disord. 2023;23(1). Available from: https://doi.org/10.1186/s12902-023-01508-x
32. Tipton E, Hallberg K, Hedges LV, Chan W. Implications of small samples for generalization: Adjustments and rules of thumb. Eval Rev. 2017;41(5):472–505. Available from: https://doi.org/10.1177/0193841X16655665
33. ElSayed NA, Bannuru RR, Bakris G, Bardsley J, de Boer IH, Gabbay RA, et al. Diabetic kidney disease prevention care model development. Clin Diabetes. 2024;42(2):274–94. Available from: https://doi.org/10.2337/cd23-0063
34. Gatlin B, Miller J, Chang S. Optimizing collaborative care of patients with chronic kidney disease associated with type 2 diabetes: An example practice model at a health care practice in Kentucky, United States. Diabetes Ther. 2024;15(1):1–11. Available from: https://doi.org/10.1007/s13300-023-01500-7
35. Sze, W. T., Waki, K., Enomoto, S., Nagata, Y., Nangaku, M., Yamauchi, T., & Ohe, K. (2023). StepAdd: A personalized mHealth intervention based on social cognitive theory to increase physical activity among type 2 diabetes patients. Journal of Biomedical Informatics, 145, 104481. https://doi.org/10.1016/J.JBI.2023.104481
36. Shamshirgaran SM, Stephens C, Alpass F, Aminisani N. Longitudinal assessment of the health-related quality of life among older people with diabetes: Results of a nationwide study in New Zealand. BMC Endocr Disord. 2020;20(1). Available from: https://doi.org/10.1186/s12902-020-0519-4
37. Lafontaine S, Bourgault P, Ellefsen E. Acceptability of a self-management support intervention for people living with type 2 diabetes to promote a person-centered approach by nurses: A qualitative study. Collegian. 2022;29(2):168–78. Available from: https://doi.org/10.1016/J.COLEGN.2021.07.001