



# SELF-CARE AND QUALITY OF LIFE PEOPLE WITH TYPE 2 DIABETES DURING THE COVID-19: CROSS-SECTIONAL STUDY

Hema Malini<sup>1</sup> · Sonia Zhahara<sup>2</sup> · Devia Putri Lenggogeni<sup>1</sup> · Zifriyanthi Miranda Putri<sup>1</sup>

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## Abstract

**Background** . Social distancing and emotional stress during the COVID-19 pandemic have affected the self-care management of type 2 diabetes mellitus patients. There was a shift in self-care management during the COVID-19 that will impact the quality of life of type 2 diabetes mellitus (T2DM) patients. This study aims to determine the relationship between self-care management and quality of life of T2DM patients in the community health center during the lockdown.

**Methods** . This research was a quantitative study with a cross-sectional study approach. The sampling technique used a non-probability sampling with total sampling of 89 respondents. The instruments used in this study were WHO Quality of Life-BREF and Summary of Diabetes Self Care Activities.

**Findings** The results showed a significant relationship between self-care management and the quality of life of people with type 2 diabetes ( $p=0.000$ ) with moderate strength and a positive direction.

**Conclusions** People with diabetes coped well with their disease management which was supported by family and health professionals. Sustainable health education and motivation for patients and families are important so that the patients always carry out self-care management to improve the quality of life of type 2 diabetes mellitus patients.

**Keywords** T2DM · Self-care management · Quality of life · Health professional support · And family support

## Introduction

Corona Virus Disease 2019 (COVID-19) has emerged as a global pandemic. People with comorbidities have a higher risk of poor outcomes and experience severe illness when infected by COVID-19 than people without comorbidities (1,2). Furthermore, a study has shown that Diabetes Mellitus (DM) is one of the comorbidities associated with more severe illness and increased mortality (2–6).

Maintaining a well glycemic control is an effective way to prevent COVID-19 transmission in diabetic patients (7,8). Monitoring blood glucose throughout the day with daily physical activity, a healthy diet, and adherence to medication treatment is comprehensive of diabetes self-management and essential to achieving good glycemic control (9,10). These have become essential in reducing the risk of the COVID-19 and the severity of illness. During the COVID-19 pandemic, self-management has been challenged in numerous countries due to the lockdown policy to prevent the spread of the COVID-19 outbreak (11).

The COVID-19 pandemic has brought unusual consequences on social, economic, and psychological fronts. Social distancing and quarantine protocols during the COVID-19 pandemic have restricted type 2 DM (T2DM) patients from accessing health services (7). Also, the COVID-19 pandemic has restricted the delivery of health services in many ways. Social distancing protocol and emotional stress harm the comprehensive management of T2DM patients, including metabolic control, self-care behavior, and self-care management. Self-care management is positively correlated with good glycemic control, reduced

✉ Associate Professor Hema MaliniRN, PhD  
hemamalini@nrs.unand.ac.id

Sonia Zhahara  
soniazahara29@gmail.com

Devia Putri Lenggogeni  
deviaputri@nrs.unand.ac.id

Zifriyanthi Miranda Putri  
zifriyanthi@gmail.com

<sup>1</sup> Faculty of Nursing, Universitas Andalas,  
25163 West Sumatra, Indonesia

<sup>2</sup> Nurse, Bhayangkara Hospital, West Sumatra, Indonesia

complications, and improved quality of life in T2DM patients (12).

Quality of life is "...an individual perception of their position in life in the context of the culture and values systems in which they live and about their goals, expectations, standards, and concerns" (3). The quality of life of T2DM patients is an essential outcome used to evaluate the impact of the disease, treatment, and health care costs. Continuous daily treatment requirements affect the quality of life; a positive association between high perceived quality of life and good glycemic control has been reported.

Self-care management is a treatment carried out independently by patients to observe their own needs without depending on the surrounding environment. Self-care management of T2DM patients consists of adhering to a diet program, physical exercise, controlling blood sugar levels, medication, and foot care to prevent further complications and control blood glucose (13).

Maintaining self-care management on T2DM patients during the COVID-19 pandemic is essential to improve the coping mechanism and increase the confidence of type 2 DM patients to improve their health status and quality of life. The exacerbated circumstance on the COVID-19 pandemic was managing food consumption, doing physical activities, and routine monitoring of blood glucose(12). Therefore, this study aims to determine the correlation between self-management and quality of life T2DM patients during the COVID-19 pandemic.

## Materials and methods

This study is quantitative research with a cross-sectional design to explore the relationship between the independent and dependent variables: self-care management and the

quality of life of T2DM patients during the COVID-19 pandemic. The setting of this study took place in the community health centers. The population was people with T2DM in outpatient care at the health care centers. The total sampling technique was selected with 89 patients agreeing to participate in this study. The inclusion criteria were T2DM patients who were able to communicate verbally and were willing to be respondents. This study has been approved by the ethical research committee of the Faculty of Medicine, Universitas Andalas. The privacy of the data had been explained to the respondents and they had all signed the consent forms before participating in this study. All the data in this study was confidential and fulfilled the ethics code for human research based on the Declaration of Helsinki.

The instruments used in this study consisted of a self-care behavior and quality of life questionnaire. The self-care behavior questionnaire utilized the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire consisting of 12 questions about diet (3 items), physical activity (2 items), treatment (1 item), checking blood sugar levels (2 items), and foot care (4 items). This instrument had been tested for validity and reliability with the product-moment correlation formula. The validity test results showed that the  $r$ -value was above  $0.632 > 0.228$  ( $p < 0.05$ ), so it can be concluded that the SDSCA questionnaire was valid. The reliability test results showed that the Cronbach's alpha value was  $0.923 > 0.80$  ( $p < 0.05$ ), so it can be concluded that the SDSCA questionnaire was reliable. The Indonesian version of the SDSCA has been tested in the previous study with Cronbach's was 0.72 (14).

For measuring the quality, the instrument used for this study was World Health Organization (WHO) Quality of Life-BREF (WHOQOL-BREF) that had been translated into Bahasa Indonesia, with a previous validity test of  $r = 0.638$ – $0.879$  and reliability test of 0.9 (15). Four dimensions are combined to assess the quality of life-based on WHOQOL-BREF, namely physical dimensions, psychological well-being, social and environmental relationships; all of which were adjusted to the researcher's needs. The WHOQOL-BREF questionnaire had been tested for reliability and validity by using Pearson product-moment. The validity test result showed an  $r$ -value of  $0.419$ – $0.798$ , and the reliability test showed that the Cronbach's  $\alpha$  value was 0.810.

After all of the data were collected, they were processed using IBM SPSS Statistics for Windows version 22.0 (IBM Corp., Armonk, NY, USA). Uni-variate analyses and proportions were used to measure the demographic data, and a bivariate analysis was conducted using correlation Pearson Product moments to measure the relationship between independent and dependent variables.

**Table 1** Distribution Frequencies of Respondent Characteristics in Community Health Care Center (n = 89)

Respondents Characteristics	n	%
Ages	2	2.2
20–40 years	83	93.3
41–65 years	4	4.5
> 65 years		
Gender	30	33.7
Male	59	66.3
Female		
Level of Education	9	10.1
Elementary School	16	18
Junior High School	43	48.3
Senior High School	21	23.6
College		
Duration of Diabetes	67	75.3
1–10 years	18	20.2
11–20 years	4	4.5
21–30 years		

## FINDINGS

Table 1 shows that most of the respondents were aged 41–65 years (93.3%), with 66.3% female respondents. The most common level of education was senior high school (48.3%), and most of the respondents have had diabetes for a duration of 1–10 years (75.3%).

Table 2 shows The mean score of self-care management for the T2DM patients was 3.07 days per week with a standard deviation of 0.96 and the lowest and highest scores for self-care management were 1.1 and 5.8. These indicate that the T2DM patients' ability in take care of themselves was in moderate level. Meanwhile, the quality of life of the T2DM patients was 48.64, with a standard deviation of 6.99 and the lowest and highest scores were 32.50 and 61.25. These data show that the quality of life for T2DM patients is poor.

The highest aspect of the self-care management of T2DM was in the medication treatment aspect with a mean of 6.82 days per week and a standard deviation of 0.8 where the minimum score was 2, and the maximum score was 7. In contrast, the lowest aspect was blood glucose monitoring with a mean of 1.15 days per week and a standard deviation of 0.53 where the minimum score was 0, and the maximum score was 4. Meanwhile, the highest mean for quality-of-life T2DM was the psychological domain, with a mean of 53.02 and a standard deviation of 11.23 where the minimum score was 25, and the maximum score was 82. Meanwhile, the lowest domain was the social domain, with a mean of 42.71 and a standard deviation of 7.11. It was also known that the minimum score was 38, and the maximum score was 75.

The Pearson statistical test showed  $p$ -value=0.000 ( $p$ -value < 0.05), which means there is a significant relationship between self-care management behavior and the quality of T2DM patients' life. Furthermore, the Pearson correlation value was 0.438, meaning that it has a moderate relationship

**Table 2** Distribution Mean, Median, Standard Deviation and Minimum-Maximum Score of Self-Care Management Aspects of T2DM and Quality of Life in Community Health Care Center (n=89)

Variables	Mean	Median	SD	Min-Max
<b>Self-Care Management</b>	<b>3.07</b>	<b>3</b>	<b>0.96</b>	<b>1.1–5.8</b>
<b>Components:</b>	4.96	4.67	1.65	5.8
Diet	2.39	2	2.07	1–7
Physical Activity	6.82	7	0.81	0–7
Medication Treatment	1.15	1	0.53	2–7
Blood Glucose Monitoring	2.16	1.75	2	0–4
Foot Care				0–7
<b>Quality of Life</b>	<b>48.64</b>	<b>48.5</b>	<b>6.99</b>	<b>32.5–61.25</b>
<b>Components</b>	47.37	44	9.45	61.25
Physical	53.02	56	11.23	25–69
Psychological	42.71	44	11.47	25–81
Social	51.43	50	7.11	19–75
Environmental				38–75

strength with correlation (+) direction. Based on the results, the higher the self-care management, the higher the quality-of-life type 2 DM in the COVID-19 pandemic. Also, the results for  $R^2$  was 0.19, which means that 19% of self-care management affects the quality of life of T2DM patients. Since the measurement of the SDSCA and quality of life was taken during lockdown policy, it is concluded that self-care management and QOL impact each other during this COVID-19 pandemic.

## DISCUSSION

The strategies applied to reduce the spread of the virus are social distancing protocol and lockdown policy that create social restriction and emotional distress and affected the people with T2DM's access to health services. These also impact people with T2DM to manage their disease; including metabolic control, self-care behavior, and self-care management (12). Social restriction in the COVID-19 pandemic creates various obstacles in implementing self-care management, affecting blood glucose levels in T2DM patients.

This study shows that self-care management in patients with T2DM in the COVID-19 pandemic had a mean of 3.07 days per week, where self-care management was categorized as moderate (70.8%). The highest aspect of self-care management done by the respondents was the medication treatment with a mean of 6.88 (97%) days a week, followed by the diet aspect with 4.69 (67%) days a week. Then, the physical activity aspect had a mean of 2.39 (34%) days in a week and foot care aspect had a mean of 2.16 (31%) in a week. The lowest self-care management aspect was blood glucose monitoring, with 1.15 (16%) days a week.

Moreover, these results show that the aspect of blood glucose monitoring had a lower mean than the other aspects. It was known that 74 (83.1%) of the T2DM patients monitored their blood glucose only 1.15 days a week; 15% of them monitored blood glucose levels regularly for a week, and 17% of T2DM patients checked their blood glucose based on doctors' advice. The situation where the government policy is to implement lockdown, social distancing, and quarantine protocols would impact the accessibility of patients with diabetes in controlling their glucose level (7). A well-managed blood glycemetic control reduces the risk and severity of any infection, including COVID-19. Thus, T2DM patients need to have regular blood glucose check since it is crucial to know their condition whether or not they have a high risk of infection (10).

This study reveals that only 30% of T2DM patients examined their feet; 19% checked their shoes before wearing them; 25% dried the toes, and 49% used comfortable footwear in the last seven days. The mean for the foot care

aspect was 2.16 days a week (57.2%). Some recommendations for foot care that T2DM patients should consider are: regular foot inspection, preventing them from being harmed by sharp objects, and identifying the signs for peripheral vascular disease (PVD) and neuropathy (16). Also, T2DM patients need to avoid applying a direct heat source such as a heating pad, hot water bottle to their feet or walking on hot sandy beaches since some may experience peripheral neuropathy. Besides doing regular exercise to promote blood circulation and quitting smoking, patients also need to be aware that using traditional methods of self-medication might cause foot problems. Thus, it is vital for health professionals to educate patients to perform early detection for identifying signs of nerve damage.

Physical activity is a regular program that needs to be carried out by T2DM patients; 3–5 days a week for about 30–45 min, a total of 150 min per week. The data about the physical activity aspect show that 52 respondents (58.4%) had a mean of 2.39 days a week. This means that 35% of respondents did physical activity for 30 min, and 33% did an additional exercise in the last seven days. Physical activity, routine self-care for T2DM patients, that is recommended is aerobic exercise with moderate intensity (50–70% of maximum heart rate), such as walking, bicycling, jogging, and swimming (17). However, social distancing protocol has restricted T2DM patients from conducting their routines (10), potentially leading to a further decline in their rate of physical activity.

The results also show that the mean score for dietary was 4.69 days a week (56.5%); only 54% of respondents followed a healthy diet, 64% consumed fruits and vegetables, and 83% did not consume food containing high fat in the last seven days. According to Chen et al. (2020), the limitation of food supply during the lockdown and social distancing protocols in the COVID-19 pandemic changed the eating habits of T2DM patients associated with poor glycemic control. The restriction during the lockdown might cause interruption in the food supply chain, which might force T2DM patients to adapt to their dietary habits related to good glycemic control (19).

In medication treatment, self-care management was carried out on a mean score of 6.82; for example, 97% always consumed diabetes medication daily in the last seven days. People with T2DM could regularly obtain their medication from the community health centers weekly. The lockdown prevented type 2 DM patients from regularly visiting the health centers to have their anti-diabetes drugs. This condition caused hyperglycemia and possibly hypoglycemia due to drinking anti-diabetes without supervision. Also, T2DM might miss their regular meeting or appointment with the doctors or nurses in the health centers to have regular checks and consultations due to the imposed lockdown policy. The

situation resulted in sustained periods of unattended hyperglycemia and probably hypoglycemia (7).

The study showed that the quality of life of T2DM patients in the COVID-19 pandemic has a mean of 49.36, with 59 respondents (66.3%) had moderate quality of life. The analysis in each domain of quality of life is as follows; the mean of the physical domain was 47.37, the mean of the psychological domain score was 53.02, the mean of the social domain was 42.71, and the mean of the environmental domain was 51.43. Based on this study, the social domain had the lowest score compared to other domains; meanwhile, the psychological domain had the highest score.

The questionnaire of social domain consists of questions about how satisfied the respondent is with personal relationships, sexual life, and friend's support. From those three questions, sexual life had the lowest score (43%) with a mean score of 2.70, where 44 respondents said they were dissatisfied with their sexual lives. The dissatisfied sexual life experienced by the respondents could be due to the respondents' age; the majority of them are above 60 years old, resulting in a decrease in sexual activity.

In the psychological domain, it was found that the respondent's ability to concentrate had the lowest score (57%). As many as 53 respondents were sometimes able to concentrate, and 25 respondents rarely could concentrate. The question about respondents' negative feelings such as loneliness, hopelessness, depression, and anxiety during T2DM had the highest score (70%). As many as 38 respondents often experienced negative feelings, loneliness, and hopelessness. The significant increase in comorbidity risk in T2DM patients might be attributed to the psychosocial burden of the disease, poor social support, lack of awareness of chronic diseases, related complications and disabilities, and consequent psychological burden (20–23). All of these led the respondent to have negative thoughts about their disease.

In the physical activity domain, questions about energy sufficiency to carry out daily activities had the lowest score (48%). As many as 60 respondents reported that they did not have enough energy to carry out activities. T2DM patients have higher rates of complications, affecting their physical ability to do regular activities.

The lack of activities performed by T2DM patients as found in the physical domain are some of the aspects that can cause a declining quality of life, especially in diabetes mellitus. According to Maugeri et al. (2020), quarantine in the COVID-19 pandemic leads to a significant reduction in total energy on physical activity, which negatively impacts on the patients' psychological well-being. Therefore, maintaining regular physical activity is an essential preventive strategy for the T2DM patients' physical and mental health during the lockdown condition of the COVID-19 pandemic.

The study results on the environmental domain found that questions about recreation opportunities have the lowest score (48%). As many as 45 respondents reported that they did not have or rarely got recreation opportunities. The COVID-19 pandemic affected recreation activity because of activity restriction to reduce the outbreak. Also, the restriction implemented during the COVID-19 pandemic shifted social interaction from direct to indirect. Therefore, it is expected that the online communication of environmental domain shows an increase during the COVID-19 pandemic.

The results of bivariate data analysis using the Pearson correlation test showed that the p-value was 0.000 ( $p < 0.05$ ), the correlation value was 0.438, and the direction was positive. Thus, statistically, there is a significant correlation between self-care management and the quality of life of T2DM patients, with moderate correlation strength and positive direction. This means that the better the patient's self-care management, the better their quality of life.

The lockdown and social distancing protocols affected most of the community, including people with T2DM, and might impact them emotionally with anxiety, stress, and depression symptoms. Emotional stress harms the management of T2DM patients, including metabolic control, self-care behavior, and self-care management. Diabetes self-care activities are behaviors carried out by T2DM patients that contribute to successful self-care management. Self-care management is positively correlated with reasonable glycaemic control, reduced complications, and improved quality of life of T2DM patients. (12).

The questionnaire results also show that the 45 respondents who have moderate self-care management have a moderate quality of life. However, many respondents with poor self-care management expressed dissatisfaction with their ability to perform daily physical activities, such as working and sleeping. In line with this study, Silva-Tinoco et al. (2020) found that difficulties in self-care management of physical activity (40.5%) in T2DM patients had decreased their psychological well-being and quality of life. Low quality of life is associated with diabetes mellitus, such as hypertension, gangrene, cataracts, obesity, weight loss, and changes in sexual function. This complication causes a prolonged impact on patients, both physically and mentally, thereby reducing the quality of life of T2DM patients.

## Conclusions

It was the shift of self-care management on T2DM patients during the COVID-19 pandemic that impacted their quality of life. Self-care management is positively correlated with good glycaemic control, reduced complications, and improved quality of life of T2DM patients. Based on this

study, the highest aspect of self-care management during the COVID-19 pandemic is medication treatment, and the lowest aspect is blood glucose monitoring. Then, in the quality of life, the lowest score in the social domain is dissatisfied sexual life. Meanwhile, in the psychological domain, the lowest score is found in the ability to concentrate. In the physical activity, the lowest score is energy sufficiency to carry out daily activities, and in the environmental domain the lowest score is in getting recreation opportunities. Therefore, there is a correlation between self-care management and the quality of life of T2DM patients.

### List of abbreviations

COVID-19 Corona Virus Disease 2019.

T2DM Type 2 Diabetes Mellitus.

SDSCA Summary of Diabetes Self-Care Activities.

WHOQOL-BREF World Health Organization Quality of Life-BREF.

PVD Peripheral Vascular Disease.

PN Peripheral Neuropathy.

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**Authors' contributions** Hema Malini.

**Study conception and design:** developing a research proposal and report.

**Data analysis and interpretation:** Supervising data analysis and developing interpretation of the study.

**Drafting article:** Developing initial manuscript, translating, and conducting revision.

**Sonia Zahara.**

**Study conception and design:** developing a research proposal and report.

**Data Collection:** Conducting intervention and measuring an outcome.

**Data analysis and interpretation:** conducting data analysis and developing interpretation of the study.

**Devia Putri Lenggogeni.**

**Data analysis and interpretation:** developing interpretation of the study.

**Drafting article:** Developing initial manuscript, translating, and conducting revision.

**Zifriyanthi Miranda Putri.**

**Study conception and design:** developing a research proposal and report.

**Data analysis and interpretation: developing interpretation of the study.**

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## Declarations

**Ethics approval and consent to participate** This study has been approved by the ethical research Faculty of Medicine, Universitas Andalas. All the respondents have been explained and signed the informed consent before being involved in this study.

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