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The Relationship between Diabetes Self-Management Education and Health-Related Quality of Life (HRQoL) among Patients with Type 2 Diabetes Mellitus

Neni Probosiwi[1]*, Arifani Siswidiasari[2]
Universitas Kadiri University
Corresponding Author: Neni Probosiwi neniprobosiwi@unik-kediri.ac.id

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A B S T R A C T

Diabetes Mellitus (DM) is a chronic metabolic condition marked by elevated blood glucose levels, leading to damage in critical organs. This study aimed to evaluate the relationship between diabetes self-management education (DSME) and health-related quality of life (HRQoL) in type 2 diabetes patients at the Balerejo Community Health Center. A prospective cross-sectional study was conducted, collecting data from 50 patients using consecutive sampling and analyzed through the Chi-Square test. The demographic profile showed that 60% of participants were female, 60% were aged 36-45, and 56% had a normal BMI. Most patients had good dietary management (64%) but poor physical exercise habits (84%). HRQoL results indicated that 64% scored high in physical functioning, with other domains such as vitality (56%) and social functioning (56%) also showing positive outcomes. A significant relationship was found between DSME and HRQoL, with a P-value of 0.002 and an odds ratio of 7.2. These findings underscore the crucial role of DSME in enhancing the quality of life for type 2 diabetes patients by promoting better disease management practices.

INTRODUCTION

According to the International Diabetes Federation (IDF) in 2021, diabetes is classified as one of the fastest-growing global health emergencies of the 21st century. The prevalence of diabetes mellitus continues to rise globally each year. In 2021, approximately 537 million people worldwide were living with diabetes, and this number is projected to reach 643 million by 2030 and 783 million by 2045. Indonesia ranks fifth among countries with the highest number of diabetes cases, with 19.5 million affected individuals in 2021, a figure expected to rise to 28.6 million by 2045 (IDF, 2021).

Diabetes mellitus is a leading cause of disability, mortality, and economic burden. Therefore, efforts to control diabetes are crucial in mitigating the impact of complications that impose significant burdens on individuals, families, and governments, affecting the quality of human resources and substantially increasing healthcare costs (PERKENI, 2021). One of the key strategies for diabetes management is education. Education serves as the cornerstone for managing diabetes mellitus, aimed at changing patient behaviors and lifestyles. Educating patients with type 2 diabetes mellitus is essential for diabetes control, as it enhances their knowledge and skills, enabling them to manage their condition independently and sustainably—known as Diabetes Self-Management Education (Rahmawati et al., 2016).

Diabetes self-management education is an ongoing process that facilitates the acquisition of knowledge, skills, and abilities for individuals with diabetes mellitus. One of the factors believed to influence the quality of life of individuals with diabetes is their self-management ability. Individuals with diabetes mellitus require continuous care to control blood glucose levels and prevent long-term complications. Those who fail to practice effective self-management are at greater risk of complications, which can negatively affect their quality of life. In this context, self-management plays a crucial role, encompassing various aspects such as dietary management, regular physical activity, blood glucose monitoring, and stress management (Putri et al., 2021).

Health-Related Quality of Life (HRQoL) can be defined as the sense of happiness and satisfaction experienced by individuals with diabetes mellitus, allowing them to perform daily activities independently and without difficulties. HRQoL reflects an individual's level of peace and contentment. Quality of Life is influenced by physical health, particularly in individuals with type 2 diabetes mellitus, many of whom experience excessive fatigue, poor sleep, and medication dependency. HRQoL is also a significant factor impacting an individual's overall health condition. A low Quality of Life can exacerbate disease severity, while poor health can lead to a decline in Quality of Life, especially in chronic diseases that are challenging to treat (Indah et al., 2023).

Previous research has indicated that the majority of patients exhibited poor self-management (36.7%) and good self-management (63.3%), while Quality of Life was categorized as poor in 63.3% of cases and good in 36.7%. Bivariate analysis revealed a significant relationship between self-management and Quality of Life in patients with diabetes mellitus, showing a positive association (p-value 0.023, OR 2.314) (Susilowati et al., 2024). Another study found that most

patients had moderate self-management (48%), while Quality of Life was similarly moderate (57.1%). Bivariate analysis using Spearman Rank indicated a p-value of 0.000 ($p < 0.05$), signifying a significant relationship between self-management and Quality of Life in diabetes mellitus patients at the Landasan Ulin Health Center in 2019. Effective self-management practices, such as regular blood glucose monitoring, medication adherence, dietary management, and physical activity, are essential for preventing complications in patients with diabetes mellitus and improving their Quality of Life (Solikin & Heriyadi, 2020).

LITERATURE REVIEW

According to data from other studies, the majority of participants exhibited good self-management, with 32 respondents (32.7%) classified as good, 47 respondents (48%) as moderate, and 19 respondents (19.4%) as poor. Regarding quality of life, the questionnaire results indicated that 23 respondents (23.5%) were in the good category, 56 respondents (57.1%) in the moderate category, and 19 respondents (19.4%) in the poor category. Statistical analysis using the Spearman Rank test showed a p-value of 0.000, which is statistically significant ($p < 0.05$), indicating a relationship between self-management and quality of life in diabetes mellitus patients at the Landasan Ulin Health Center in 2019 (Solikin & Heriyadi, 2020).

Another study revealed the following age distribution: ≤ 50 years 9 respondents (25.7%), 50-65 years 20 (57.2%), and ≥ 65 years 6 (17.1%). Educational levels included elementary school 5 (14.3%), junior high school 11 (31.4%), high school 15 (42.9%), and diploma/bachelor 4 (11.4%). Employment status showed that 23 respondents (65.7%) were unemployed, 3 (8.6%) were civil servants, 2 (5.7%) were farmers, 2 (5.7%) were private employees, and 5 (14.3%) were traders. The self-management questionnaire indicated that 7 respondents (20.0%) had poor self-management, 15 (42.9%) had moderate self-management, and 13 (37.1%) had good self-management. In terms of quality of life, 18 respondents (51.4%) were classified as poor and 17 (48.6%) as good. Statistical analysis yielded a p-value of 0.000 and a significance level of 0.648, indicating a significant relationship between self-management and quality of life in diabetes mellitus patients (Puspitasari et al., 2024).

A different study found the following age distribution: 45-59 years 59 (60.2%), 60-74 years 29 (29.6%), and >74 years 10 (10.2%). Gender distribution was 37 (37.8%) male and 61 (62.2%) female. Educational levels were elementary school 14 (14.3%), junior high school 36 (36.7%), high school 36 (36.7%), and bachelor's degree 12 (12.2%). Employment status revealed that 58 respondents (29.2%) were unemployed, while 40 (40.8%) were employed, with incomes ≤ 4,600,000 reported by 62 (67.3%) and > 4,600,000 by 57 (32.7%). The self-management questionnaire indicated that 36 respondents (36.7%) had poor self-management, while 62 (63.3%) had good self-management. Quality of life results showed that 62 respondents (63.3%) had poor quality of life, while 36 (36.7%) had good quality of life. The analysis revealed an Asymp. Sig (2-Sided) value of 0.023, indicating a significant relationship between self-management and quality of life in type II diabetes mellitus patients (Susilowati et al., 2024).

Another study indicated that among respondents with good self-care (31 respondents), 21 (67.7%) had high quality of life, and 10 (32.3%) had low quality of life. Conversely, among respondents with poor self-care (51 respondents), 16 (31.4%) had high quality of life, and 35 (68.6%) had low quality of life. Chi-square statistical testing indicated a significant relationship between self-care and quality of life in type 2 diabetes mellitus patients, with a p-value of 0.003 (Luther et al., 2022).

METHODOLOGY

This study is an observational research with a cross-sectional design conducted prospectively on patients with type 2 diabetes mellitus at the Balarejo Health Center. The inclusion criteria for this study included patients diagnosed with type 2 diabetes mellitus who are 18 years of age or older, willing to participate as respondents by signing an informed consent form, and able to read and write. The exclusion criteria included patients who had never undergone regular check-ups and patients who had passed away. Sampling was performed using consecutive sampling, which involved collecting data from patients who met the inclusion criteria available at the outpatient department of the Balarejo Health Center. A total of 50 patients were included in this study. Data analysis was conducted using the Chi-Square test.

RESEARCH RESULT

The results of the demographic data analysis of type 2 diabetes mellitus patients can be seen in the following table 1.

Table 1. Demographics of Patients with Type 2 Diabetes Mellitus

Demographics of Patients	f	%
Gender		
Male	20	40
Female	30	60
Age		
26-35 years	7	14
36-45 years	30	60
46-55 years	13	26
Education		
No formal education	4	8
Primary school	7	14
Junior high school	8	16
Senior high school	9	18
Higher education	22	44
Occupation		
Housewife	8	16
Farmer/Livestock keeper/Trader	14	28
Entrepreneur/Self-employed	5	10
Private employee	5	10
Civil servant	10	20
Others	8	16
BMI		
Underweight (<18.5 kg/m^2)	6	12
Normal (18,5-22,9 kg/m^2)	28	56
Overweight (23-29,9 kg/m^2)	13	26
Obesity (>30 kg/m^2)	3	6

Based on the obtained data table 1, 60% (30 patients) were female, while 40% (20 patients) were male. The majority of patients were aged 36-45 years (30 patients, 60%), followed by 46-55 years (13 patients, 26%) and 26-35 years (7 patients, 14%). In terms of education level, 44% (22 patients) had a higher education, 18% (9 patients) had completed high school, 16% (8 patients) had completed middle school, 14% (7 patients) had completed elementary school, and 8% (4 patients) had no formal education. Regarding occupation, 28% (14 patients) were farmers/livestock traders/merchants, 20% (10 patients) were government employees, 16% (8 patients) were in other occupations, 16% (8 patients) were housewives, 10% (5 patients) were private-sector employees, and 10% (5 patients) were self-employed/entrepreneurs. For body mass index (BMI), 56% (28 patients) had a normal BMI (18.5-22.9 kg/m²), 26% (13 patients) were overweight (23-29.9 kg/m²), 12% (6 patients) had a low BMI (<18.5 kg/m²), and 6% (3 patients) were classified as obese (>30 kg/m²).

Table 2. Analysis of DSME Dimensions

DSME	f	%
Diet		
Good	32	64
Poor	18	36
Physical Activity		
Good	8	16
Poor	42	84
Foot Care		
Good	34	68
Poor	16	32
Medication Therapy		
Good	34	68
Poor	16	32
Glucose Monitoring		
Good	17	34
Poor	33	66

The results of the Diabetes Self-Management Education (DSME) questionnaire revealed five domains table 2. In the diet domain, 32 patients (64%) demonstrated good management, while 18 patients (36%) were categorized as poor. In the physical activity domain, 8 patients (16%) showed good management, while 42 patients (84%) were categorized as poor. In the foot care domain, 34 patients (68%) exhibited good practices, whereas 16 patients (32%) were categorized as poor. In the medication therapy domain, 34 patients (68%) managed well, while 16 patients (32%) were categorized as poor. Finally, in the glucose monitoring domain, 17 patients (34%) showed good management, while 33 patients (66%) were categorized as poor.

The results of the Health-Related Quality of Life (HRQOL) questionnaire indicate eight domains table 3. In the domain of physical functioning, 32 patients (64%) rated their status as high, while 18 patients (36%) rated it as low. For physical limitations, 26 patients (52%) reported high levels, and 24 patients (48%) reported low levels. In terms of bodily pain, 26 patients (52%) indicated high pain levels, while 24 patients (48%) indicated low levels. Regarding general health, 26

patients (52%) rated their health as high, and 24 patients (48%) rated it as low. For vitality, 28 patients (56%) rated their vitality as high, compared to 22 patients (44%) who rated it as low. In the social functioning domain, 28 patients (56%) reported high functioning, while 22 patients (44%) reported low functioning. For emotional limitations, 25 patients (50%) rated their emotional functioning as high, while another 25 patients (50%) rated it as low. Lastly, regarding mental health, 28 patients (56%) reported high mental well-being, while 22 patients (44%) reported low mental well-being.

Table 3. Analysis of HRQOL Dimensions

HRQOL	f	%
Physical Function		
High	32	64
Low	18	36
Physical Limitations		
High	26	52
Low	24	48
Bodily Pain		
High	26	52
Low	24	48
General Health		
High	26	52
Low	24	48
Vitality		
High	28	56
Low	22	44
Social Function		
High	28	56
Low	22	44
Emotional Limitations		
High	25	50
Low	25	50
Mental Health		
High	28	56
Low	22	44

The table 4 presents the results of the Diabetes Self-Management Education (DSME) questionnaire, showing that 31 patients (62%) fell into the "good" category, while 19 patients (38%) were categorized as "poor." In terms of Health-Related Quality of Life (HRQOL), 28 patients (56%) reported a "high" quality of life, compared to 22 patients (44%) who reported a "low" quality of life. Statistical analysis using the Chi-Square test indicated a significant relationship between Diabetes Self-Management Education and Health-Related Quality of Life, with a p-value of 0.002. This suggests that there is a meaningful association between DSME and HRQOL. The Odds Ratio (OR) of 7.2 indicates that patients who received Diabetes Self-Management Education were 7.2 times more likely to have a better quality of life compared to those who did not receive such education.

Table 4. Analysis of the Relationship between DSME and HRQOL

DSME	HRQOL		Total		OR
	High	Low			
Good	24 48%	10 20%	34 68%	0.002	7.2
Poor	4 8%	12 24%	16 32%		
Total	**28** **56%**	**22** **44%**	**50** **100%**		

DISCUSSION

Diabetes Self-Management Education (DSME) is a crucial element in the treatment of patients with Diabetes Mellitus. It is essential for enhancing patients' health status by providing knowledge on implementing self-care strategies to optimize metabolic control, prevent complications, and improve the quality of life (Rahmawati et al., 2016). Several factors influence diabetes self-management, including age, gender, education level, diabetes history, and family support (Ningrum et al., 2019). Health-related quality of life (HRQOL) can be defined as the sense of happiness and satisfaction in individuals with Diabetes Mellitus, enabling them to perform daily activities independently without any hindrance. Factors that impact the quality of life for Diabetes Mellitus patients include knowledge level, physical activity, dietary compliance, medication adherence, and family support (Mulyani et al., 2023).

Based on the data analysis of the DSME dimensions in Table 4, it can be seen that the majority of respondents exhibited good self-management, with 31 patients (62%). This is supported by the data in Table 2, which indicates that 32 patients (64%) reported good dietary patterns. This finding aligns with the research conducted by Susilowati et al. (2024), which shows a significant relationship between dietary patterns and quality of life, with an asymptotic value of 0.038. A similar study by Purwandari & Susanti (2017) found that 31 respondents had a sufficient dietary category, indicating a relationship between dietary adherence and quality of life in diabetes patients.

In terms of physical activity, 42 patients (84%) were categorized as having poor exercise habits. Research by Susilowati et al. (2024) indicated an Odds Ratio of 3.656, meaning that individuals with low physical activity have a 3.6 times higher risk of experiencing poor quality of life, with an asymptotic value of 0.018 demonstrating significance in this relationship. Additionally, a study by Eltrikanawati et al. (2020) reported that 23 patients had low physical quality, primarily due to insufficient activity, including household chores, exercise, and other general activities.

Regarding foot care, 34 patients (68%) were categorized as good. Susilowati et al. (2024) found a significant relationship between foot care and quality of life, with an asymptotic value of 0.023. This is supported by research by Safitri et al. (2022), which indicated that 27 patients exhibited positive or good foot care behaviors, reflecting a relationship between foot care practices and quality of life in diabetes patients.

For medication therapy, 34 patients (68%) reported good. The relationship between medication therapy and quality of life was significant, with an

asymptotic value of 0.020 Susilowati et al. (2024). Fitriani et al. (2022) also found that among 75 respondents, those with moderate adherence to medication demonstrated a significant relationship with quality of life in Type 2 diabetes patients.

In the dimension of blood glucose monitoring, 33 patients (66%) were categorized as poor. According to Susilowati et al. (2024), blood glucose management showed a significant relationship with quality of life, with an asymptotic value of 0.025.

From the analysis of the health-related quality of life dimensions in Table 4, it can be observed that the majority of respondents reported high quality of life, with 28 patients (56%). This correlates with the supporting theory that self-management is the ability of an individual to recognize and manage themselves (physically, emotionally, mentally, spiritually) and to manage others and various resources to control and create life realities according to their mission and life goals (Prijosaksono & Sembel, 2002).

The relationship between diabetes self-management education and health-related quality of life showed a significant association, with a p-value of 0.002. This is supported by research from Hartati et al. (2019), which indicated that poorer self-management correlates with lower quality of life among patients. This is because self-management serves as a foundational intervention for patients with Type 2 Diabetes Mellitus. When self-management is inadequate, patients may experience unstable blood glucose levels, leading to numerous potential complications. This can be prevented with proper and regular monitoring through appropriate and permanent lifestyle changes.

There is a significant relationship between Diabetes Mellitus complications and quality of life, with patients experiencing complications having lower quality of life compared to those without. This is due to patients' inability to manage themselves effectively in controlling Diabetes Mellitus, both in treatment actions and complication prevention (Yusra, 2011).

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the Diabetes Self-Management Education questionnaire, 31 patients (62%) were categorized as having good self-management, while 19 patients (38%) were categorized as having poor self-management. In the Health-Related Quality of Life questionnaire, 28 patients (56%) reported a high quality of life, and 22 patients (44%) reported a low quality of life. The analysis using the Chi-Square test revealed a significant relationship between Diabetes Self-Management Education and Health-Related Quality of Life, with a p-value of 0.002. The Odds Ratio (OR) of 7.2 indicates that patients who received Diabetes Self-Management Education are 7.2 times more likely to have a better quality of life compared to those who did not receive such education.

ADVANCED RESEARCH

For future research, it would be valuable to explore the long-term effects of Diabetes Self-Management Education (DSME) on Health-Related Quality of Life (HRQoL) across a larger and more diverse population. Further studies could

examine how specific components of DSME, such as dietary management, physical activity, and glucose monitoring, independently influence HRQoL outcomes. Additionally, investigating the role of personalized education programs tailored to patients' socio-economic backgrounds, education levels, and cultural contexts could provide deeper insights into optimizing DSME effectiveness. Longitudinal studies tracking patient progress over several years would also help determine the sustained impact of DSME on quality of life and diabetes-related complications. Exploring the integration of digital tools or mobile health interventions in DSME could also offer innovative approaches for improving self-management and health outcomes in diverse patient populations.

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