Medical Sains : Jurnal Ilmiah Kefarmasian
Vol. 9 No. 3, July - September 2024
https://ojs.stfmuhammadiyahcirebon.ac.id/index.php/iojs

ANALYSIS OF FACTORS AFFECTING THE QUALITY OF LIFE OF PROLANIS PATIENT WITH TYPE 2 DIABETES MELLITUS

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Submitted: May 25, 2024 ***Revised: July 22, 2024*** ***Accepted: August 8, 2024***

ABSTRACT

Diabetes mellitus is an infectious disease characterized by hyperglycemia due to abnormalities in insulin secretion action or both. The goals of diabetes mellitus therapy include reducing symptoms and complications, reducing mortality, and improving the quality of life of patients with diabetes mellitus. This study aimed to provide an overview of the quality of life and the correlation between the characteristics of respondents and the quality of life of patients with type 2 diabetes mellitus who received oral antidiabetics. This study used observational analytics with a cross sectional design of 84 respondents. Patients' quality of life was measured using the *Diabetes Quality of Life Clinical Trial Questionnaire* (DQLCTQ). Data analysis was performed using an Independent Sample T-test. The results of this study showed that the quality of life of patients with type 2 diabetes mellitus was classified as good (56%) and there were significant differences between the two groups in the domains of health pressure, personal satisfaction, and trial effects on the DQLCTQ questionnaire; there were significant differences in BMI, duration of DM, and treatment type on the quality of life of prolanis patients with type 2 diabetes mellitus.

Keywords: type 2 diabetes mellitus, quality of life, DQLCTQ

INTRODUCTION

Diabetes mellitus is a noninfectious disease characterized by hyperglycemia due to abnormalities in insulin secretion, insulin action, or both. Hyperglycemia is a medical condition in which blood sugar levels increase above normal, and is one of the characteristics of diabetes mellitus (PERKENI, 2021). According to statistical data from the International Diabetes Federation (2021), the number of people with diabetes mellitus continues to increase annually. In 2021, at least 537 million adults (age 20-79 years) or 1 in 10 people worldwide will develop diabetes mellitus. The Bengkulu Provincial Health Office recorded the number of people with diabetes mellitus, especially in Bengkulu City, reaching 19.353 people by 2018 (Dinkes Provinsi Bengkulu, 2019).

The goal of diabetes mellitus treatment is to reduce the risk of microvascular and macrovascular disease complications, improve symptoms of complications, lower mortality, and improve the quality of life of patients with diabetes mellitus (Wahyuni, Nursiswati and Anna, 2014). Quality of life in patients with diabetes mellitus is very important because it is used to assess the consequences and effectiveness of the management of health condition problems or chronic diseases (Al-Aboudi *et al.*, 2015). According to research conducted by Pranata, Nugraha and Handayani (2022), the average quality of life of patients with diabetes mellitus is still classified as good, and there is a relationship between quality of life in the

domain of treatment satisfaction and length of diabetes mellitus. To achieve optimal quality of life with effective and efficient health service costs, the Indonesian Government through the BPJS Kesehatan has introduced the *Program Pengelolaan Penyakit Kronis* (PROLANIS), also known as the Chronic Management Program, for BPJS Kesehatan participants suffering from chronic disease (Rosdiana, Raharjo and Indarjo, 2017).

Based of previous research by Irawan, A Fatih and Faishal (2021), the factors with affect the quality of life of patients with diabetes mellitus include gender, duration of suffering, cognition, anxiety, family support, and self care. A similar study by Khamilia and Yulianti (2021) showed that there was an influence of gender, age, BMI, education, occupation, income, duration of DM, monotherapy/combination treatment, number of drugs consumed, and complications of the patient's disease on the patient's quality of life.

RESEARCH METHODS

This was an analytical observational study with a cross sectional design. The study population included 322 patients undergoing treatment at the Sawah Lebar Health Center, Bengkulu City. Purposive sampling was used for sample collection in this study. The number of samples was calculated using the Slovin formula and a total sample of 84 respondents was obtained.

$$n=\frac{N}{Nd^2+1}$$

Information:
n = number of sample
N = total population
d = specified precision (10% accuray limit)

$$n=\frac{322}{322(0,1)^2+1}$$

$$n=\frac{322}{4,22}$$

$$n = 76,30 \approx 76$$

$$76 + 10\ \%\ (76) = 76 + 7,6 = 83,6 \approx 84$$

Primary and secondary data were used for the data collection. Primary data were obtained through interviews and filling out the DQLCTQ questionnaire, and secondary data were obtained from medical records of patients with type 2 diabetes mellitus at the Sawah Lebar Health Center (Puskesmas Sawah Lebar), Bengkulu City. The DQLCTQ is a specific instrument in the form of a questionnaire with 8 domains containing questions about physical function, energy, health stress, mental health, mental satisfaction, personal satisfaction, treatment effects, and disease symptoms, which can be used to measure the quality of life of patients with diabetes mellitus.

Inclusion Criteria

1. Type 2 diabetes mellitus patients who are members of PROLANIS program
2. Male or female
3. Type 2 diabetes mellitus patients who are undergone treatment for ≥ 5 months
4. Geriatric (≥ 60 years old) andnon geriatric (<60 years old)
5. Type 2 diabetes mellitus patients who are receiveed oral antidiabetic drugs either single or combination

6. With or without complications
7. Willing to be a respondent

Exclusion Criteria

1. Type 2 diabetes mellitus patients who are have hearing loss and communication difficultties
2. Pregnant or breastfeeding
3. Type 2 diabetes mellitus patients who are receiving insulin therapy
4. Not willing to be a respondent

Research Procedure

1. Ethical clearance process. This study has obtained ethical permission from the University of Jember Health Research Ethics Committee, Faculty of Nursing, No. 170/UN25.1.14/KEPK/2022.
2. Observation of the total number of patients and medical records of patients (weight, height, anamnesis, and medications used by the patients) with type 2 diabetes mellitus at Sawah Lebar Health Center, Bengkulu City.
3. Data were collected from the DQLCTQ questionnaire to measure the quality of life of patients with DM containing 8 domains and the medical records of patients with type 2 diabetes mellitus undergoing treatment at the Sawah Lebar Health Center, Bengkulu City.

Data Analysis

The study data were analyzed using univariate analysis to determine the characteristics of each variable, including age, gender, body mass index (BMI), duration of illness, type of treatment, amount of drug use, and complications. Bivariate analysis was used to determine the relationship between the characteristics of the respondents and the quality of life of patients with type 2 diabetes mellitus.

RESULTS AND DISCUSSION

Respondent Characteristics

The respondents used in this study were 84 patients undergoing treatment at Sawah Lebar Health Center, Bengkulu City. The characteristics of the respondents were analyzed using univariate analysis to determine the frequency of respondent characteristics in the form of type of humanity, age, BMI, duration of diabetes mellitus, and type of treatment, as shown in **Table I**.

Table I. Distribution of Respondent Characteristics of Type 2 Diabetes Mellitus Prolanis Patients at Sawah Lebar Health Center

Respondent Characteristics	Frequency (N)	Percentage (%)
Gender		
Male	34	40.5
Female	50	59.5
Total	84	100
Age		
< 60 years	38	45.2
≥ 60 years	46	54.8
Total	84	100
BMI		
< 25	54	64.3
≥ 25	30	35.7
Total	84	100

Duration of Illness		
< 5 years	61	72.6
≥ 5 years	23	27.4
Total	84	100
Type of treatment		
Monoterapy	69	82.1
Combination	15	17.9
Total	84	100

Based on the results of this study, it is known that patients who suffered from type 2 diabetes mellitus at the Sawah Lebar Health Center, Bengkulu City, were mostly female (50 respondents, 59.5%), while 34 respondents (40.5%) were male. This is contrary to *the International Diabetes Federation* (2021) data, which states that the estimated prevalence of diabetes mellitus in women aged 20-79 years is slightly lower than that in men (10.2% vs. 10.8%), and in 2021, there are 17.7 million more men than women living with diabetes mellitus. The results of this study are in line with those of several studies, including Istianah, Septiani and Dewi (2020), and Kriswiastiny *et al.* (2022), which show that the number of female patients with type 2 diabetes mellitus is higher than male. The high rate of diabetes mellitus in women may be due to the differences in body composition and sexual hormone levels between adult men and women. In this study, most patients with type 2 diabetes mellitus were women because they are physically more susceptible to an increase in body mass index, which causes fat accumulation, resulting in decreased sensitivity to insulin action. In women, the process of fat distribution in the body accumulates more easily due to hormonal processes, premenstrual syndrome, and post-menopause; therefore, women are at a risk of developing diabetes mellitus (Imelda, 2019).

Most of the respondents with type 2 diabetes mellitus were aged ≥ 60 years (geriatric) and 46 respondents (54.8%). While respondents aged < 60 years (non geriatric) were 38 respondents (45.2%). This is in line with the research conducted by Dinata *et al.* (2023), which showed that the majority of diabetes mellitus patients are elderly. Age factors affect the decline in cell and organ function, and pancreatic β-cells responsible for producing insulin are impaired and cannot function optimally, ultimately impacting glucose intolerance (Widiyoga, Saichudin and Andiana, 2020).

The respondents' Body Mass Index (BMI) was mostly < 25 for 54 respondents (64.3%), while for respondents with BMI ≥ 25, it was as many as 30 respondents (35.7%), which means that most of the respondents were included in the normal and thin categories. These results contradict the research conducted by Luthansa and Pramono (2017), which states that people with excess or obese BMI have a greater risk of developing diabetes mellitus than people with low BMI. This is thought to be due to research conducted on respondents who have had diabetes mellitus for several months or even several years, where diabetes mellitus over time can lead to weight loss. In people with diabetes mellitus, the body is unable to obtain sufficient energy from sugar owing to insulin deficiency (Simatupang, 2017).

The duration of diabetes mellitus in a patient indicates the duration of the disease since the diagnosis. This duration is related to the risk of future complications. The longer a person has diabetes mellitus, the greater the likelihood of complications (Kriswiastiny *et al.* 2022). In this study, respondents were dominated by patients with diabetes mellitus prolanis with a duration of < 5 years, with an interval of 6 months-3 years as many as 61 respondents (72.6%), while 23 respondents (27.4 %) had a duration of ≥ 5 years with an interval of 5 years-20 years. Research conducted by Pranata, Nugraha and Handayani (2022) showed different results, where 62 (63.9 %) patients with diabetes mellitus for ≥ 5 years had a good quality of life and 24.7% had a poor quality of life.

The success of therapy for the treatment of diabetes mellitus is greatly influenced by the precise selection of medications (DepKes RI, 2005). Based on the results of this study, respondents were dominated by diabetes mellitus prolanis patients with monotherapy treatment types, while respondents with combined treatment types comprised 15 respondents (17.9%). These results are in line with research conducted by Rahmadani, Purwanti and Yuswar (2022), which shows the use of monotherapy more than combination therapy. Researchers assume that the use of more monotherapy in this study is related to the majority of patients with diabetes mellitus, namely <5 years, which means that these patients have not been undergoing diabetes mellitus treatment for a long time, as the longer the duration of a disease suffered by the patient, the more the frequency of drugs and the more complex the drug regimen (Jasmine, Wahyuningsih and Thadeus, 2020).

Quality of Life Overview

In **Table II**, the quality of life for the patients involved as respondents was divided into two categories: good quality of life and poor quality of life. Based on the results of the study of 84 respondents, 47 (56%) had a good quality of life and 37 (44%) had a poor quality of life. This means that the majority of patients with type 2 diabetes mellitus at Sawah Lebar Health Center, Bengkulu City, have a good quality of life. Poor quality of life in patients with type 2 diabetes mellitus cannot be defined definitively. However, according to research conducted by Khamilia andYulianti (2021), several factors affect the quality of life of patients with type 2 diabetes mellitus, including gender, income, and complications of other diseases. Another study conducted by Irawan, A Fatih and Faishal (2021) stated that there was a significant relationship between gender, duration of suffering, awareness, anxiety, stress, family support, and self-care regarding quality of life.

Table II. Distribution of Quality of Life for Type 2 Diabetes Mellitus Prolanis Patients at Sawah Lebar Health Center

Quality of Life	Frequency (N)	Percentage (%)
Good	47	56.0
Poor	37	44.0
Total	84	100

The Diabetes Quality of Life Clinical Trial Questionnaire (DQLCTQ) used to assess the quality of life of patients with diabetes mellitus who had been completed by patients, was categorized into the domains of physical function, energy, health distress, mental health, personal satisfaction, medication satisfaction, medication effects and frequency of symptoms. These domains were analyzed using the Independent Sample T-test. **Table III** shows the mean value of each domain of the Diabetes Quality of Life Clinical Trial Questionnaire (DQLCTQ) instrument that has been categorized in patients with good and poor quality of life. The average value of patient quality of life based on eight domains that fall into the good category was 74.03 ± 24.63, while the average value of poor quality of life was 66.88 ± 23.67 (p = 0.025). The results of this study indicate that most patients with type 2 diabetes mellitus prolanis have a good quality of life. In addition, there was a significant difference in the quality of life of patients with type 2 diabetes mellitus in the good category compared to the quality of life of patients with type 2 diabetes mellitus in the poor category of the eight domains of the DQLCTQ questionnaire.

Table III. Quality of Life of Type 2 Diabetes Mellitus Prolanis at Sawah Lebar Health Center Based on the DQLCTQ Questionnaire Domain

Domain	Quality of Life (x ± SD)		*p-Value*
	Baik	Kurang Baik	
Physical Function	51.90 ± 13.16	41.47 ± 16.25	0,225
Energy	71.71 ± 24.17	65.35 ± 29.25	0,988
Health Pressures	83.54 ± 22.54	76.12 ± 30.45	0,020*
Helath Mental	64.25 ± 20.48	58.11 ± 27.64	0,307
Personal Satisfaction	95.32 ± 35.82	82.23 ± 30.38	0,004*
Treatment Satisfaction	55.70 ± 18.37	59.97 ± 12.92	0,551
Treatment Effects	87.23 ± 32.45	78.30 ± 23.32	0,007*
Symptoms Frequency	82.59 ± 30.12	74.56 ± 19.19	0,689
Average of Quality of Life	**74.03 ± 24.63**	**66.88 ± 23.67**	**0,025***

Based on the results of the study, the mean value of the personal satisfaction domain has the highest average compared to other domains in the category of patients with good quality of life 95.32 ± 35.82 and patients with poor quality of life 82.23 ± 30.38 (p = 0.004). This illustrates that most patients with diabetes mellitus at Sawah Lebar Health Center in Bengkulu City are not discouraged and tend to feel satisfied with their current health condition. Researchers assume that this is due to the influence of good support factors from the patient's family and the patient's knowledge of the disease. This is because in the DQLCTQ questionnaire, especially in the personal satisfaction domain, there are questions that refer to the patient's family support. In their research, Suwanti, Andarmoyo and Purwanti (2021) stated that family support from the closest people contributes to the successful management of diabetes mellitus therapy. Research conducted by Pranata *et al.* (2022) showed that the results of the analysis of family support in the emotional, appreciation, and information domains on quality of life had a significant value (p <0.05). The higher the family support, the lower the degree of depression experienced by patients with type 2 diabetes mellitus (Parinduri, Ria and Asma, 2016).

The physical function domain has the lowest mean value among other domains in the category of patients with good quality of life 51.90 ± 13.16 and patients with poor quality of life 47.41 ± 16.25 (p = 0.225). This illustrates that most patients with diabetes mellitus at Sawah Lebar Health Center in Bengkulu City experience a decrease in physical function. Researchers suspect that the decline in physical function in patients with diabetes mellitus is influenced by complications and uncontrolled blood sugar levels. In the physical function domain, patients with diabetes mellitus with microvascular and macrovascular complications and patients with poorly controlled blood sugar levels are more limited in carrying out daily activities or work (Ratnasari, Andayani and Endarti, 2019). Patients with diabetes mellitus who experience complications with other diseases have a lower quality of life than patients who do not experience complications. This is because physical function tends to be poor in patients with complications (Ikaditya, Handayani and Rahman, 2019). Blood sugar control is one of the factors that affect the quality of life of patients with diabetes mellitus (Umpierrez and P. Kovatchev, 2018).

Correlation between Respondents' Characteristics and Quality of Life

Based on the results of the study, the average score for quality of life of male patients was slightly higher at 81.65 ± 14.384 than that of female patients at 77.88 ± 15.172 (p=0.277). This shows that there is no significant difference in the quality of life of patients by gender. The results of this study are in line with those conducted by Pasha and Fatin (2021), namely that there was no significant difference between the quality of life scores of men and women; this is also supported by the research of Prajapati *et al.* (2017), which states that there were no significant differences between the quality of life scores of the patients by gender, which means that the quality of life decreased in general regardless of gender.

However, other studies have reported that overweight and obesity are negatively associated with health-related quality of life in women, which is thought to be related to women's vulnerability to pressure on weight or body image (Zhang *et al*., 2019).

Based on the results of this study, non-geriatric patients had a slightly higher average quality of life (81.34 ± 16.054) than geriatric patients (77.80 ± 15.006 (p=0.300), indicating that there was no significant difference between the two groups. In general, as a person ages, there is a decrease in the quality of life because of physical decline, mental health, and psychosocial changes, so that someone of geriatric age feels dissatisfied with their condition (Ariyanto, Puspitasari and Utami, 2020). Similar research conducted by Khamilia and Yulianti (2021) also stated that there was no significant difference between geriatric and non geriatric patients regarding their quality of life.

Table IV. Correlation Between Type 2 Diabetes Mellitus Prolanis Patients Respondenr Characteristics and Quality of Life

Characteristic	N(%)	Quality of Life (x ± SD)	*p-Value*
Gender			
Male	34 (40,5)	81,65 ± 14,384	0,277
Female	50 (59,5)	77,88 ± 16,172	
Age			
< 60 years	38 (45,2)	81,34 ± 16,054	0,300
≥ 60 years	46 (54,8)	77,80 ± 15,006	
BMI			
< 25	54 (64,3)	85,87 ± 12,842	0,000*
≥ 25	39 (35,7)	67,77 ± 12,958	
Duration of Illness			
< 5 years	61 (72,6)	83,90 ± 14,309	0,000*
≥ 5 years	23 (27,4)	67,48 ± 11,946	
Type of Treatment			
Monoterapy	69 (82,1)	82,28 ± 14,781	0,000*
Combination	15 (17,9)	66,20 ± 11,620	

Body Mass Index (BMI) is used to identify the ideal weight range and project the risk level of health problems (Mahfud, Gumantan and Fahrizqi, 2020). Based on the results of the study, patients with BMI < 25 had a higher average quality of life of 85.87 ± 12.842 compared to patients who had a BMI ≥ 25, which was 67.77 ± 12.958 (p = 0.000). This shows that there was a significant difference between the two groups of patients' quality of life. According to Rwegerera *et al* (2017), higher BMI has been shown to be associated with a higher number of chronic and somatic diseases and lower quality of life related to physical health.

Based on the results of the study, patients with a duration of illness from diabetes mellitus less than 5 years had an average quality of life that tended to be higher 38.90 ± 14.309 compared to patients with illness duration ≥ 5 years 67.48 ± 11.946; p = 0.000). This shows that there are significant differences in the characteristics of illness duration among patients with diabetes mellitus. The longer the patient suffers from type 2 diabetes mellitus, the lower the quality of life. This condition occurs because patients who have suffered from diabetes for a long period of time tend to feel frustrated and give up on their health condition (Mulia, Diani and Choiruna, 2019). Mildawati, Diani and Wahid (2019) in their research stated that the longer suffering from diabetes mellitus, the higher the risk of complications.

The mean value of QoL for patients who received monotherapy was higher at 82.28 ± 14.781 compared to patients with combined treatment 66.20 ± 11.620 (p = 0.000), which means that there are significant differences in the type of treatment for patients with type 2

diabetes mellitus. The results of measuring quality of life based on treatment type are in line with a similar study by Rahmadani, Purwanti and Yuswar (2022), which also showed a higher average quality of life value in patients with type 2 diabetes mellitus who received oral antidiabetic monotherapy. In this study, the treatment of patients with monotherapy mostly used metformin. Metformin is the first-line drug recommended because it does not cause weight gain or hypoglycemia. This allows the use of metformin in people who have not achieved the desired glycemic control through diet and physical activity (WHO, 2020). According to Ratnasari, Andayani and Endarti (2019), patients receiving oral antidiabetic monotherapy have a better quality of life because they have more controlled blood sugar, so they only need one type of drug. In addition, patients who undergo monotherapy have fewer side effects, so their quality of life is better than that of patients who use a combination of oral antidiabetics to control blood sugar levels.

CONCLUSION

From the results of this study, it can be concluded that the quality of life for patients with type 2 diabetes mellitus in Puskesmas Sawah Lebar Bengkulu City was classified as good (56%) and there were significant differences between the two groups in the domains of medical pressure, personal satisfaction, and treatment effects based on the DQLCTQ questionnaire. The characteristics of respondents in the form of factors with significant influence on the quality of life for PROLANIS patients with type 2 diabetes mellitus at Puskesmas Sawah Lebar, Bengkulu City, included BMI, duration of suffering, and type of treatment.

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