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The Correlation between Resilience and Quality of Life in Type 2 Diabetes Mellitus Patients with Chronic Complications

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ABSTRACT

The emergence of complications in patients with type 2 DM significantly impacts the quality of life. Resilience as part of self-coping may be connected with the quality of life and the severity of the complications. This study analyzed the correlation between resilience and quality of life in type 2 DM patients with chronic complications. The method was an observational study with a cross-sectional approach. Thirty-five respondents were recruited in this study using a consecutive sampling technique. Data were collected using Connor Davidson Resilience Scale 25 (CD-RISC 25) and Diabetes Quality of Life (DQOL) questionnaires and analyzed by Pearson Product Moment ($p < 0.05$). The result showed that the mean value of resilience was 63.06 (±12.47), while the average value of quality of life was 72.46 (±11.78). A strong positive correlation existed between resilience and quality of life (p-value = 0.000; r = 0.782). Increased resilience score equals increased quality of life of type 2 DM patients with chronic complications. Providing interventions to increase resilience is essential to optimize the quality of life in type 2 DM patients with chronic complications. Increased resilience can support a better quality of life through the ability to survive and increase positive coping styles and self-care abilities in DM patients.

Keywords: type 2 diabetes mellitus; resilience; quality of life; chronic complications

INTRODUCTION

Uncontrolled Diabetes Mellitus (DM) can lead to complications that have a significant impact on quality of life (World Health Organization, 2016). Complications or comorbidities in T2DM patients will decrease their quality of life (Trikkalinou et al., 2017). The majority of T2DM patients with chronic complications have a poor quality of life (Kreider, 2017; Prajapati et al., 2018; Puspasari & Farera, 2021; Zakeri et al., 2021). Of the 30 DM patients who had more than one complication, it was found that 26 people (86.7%) had a low quality of life, and only four people (13.3%) had a high quality of life (Hutabarat et al., 2018).

DM is generally associated with many short-term complications and long-term complications that allow a reduction in the client's physical ability to carry out activities and work (Puspasari & Farera, 2021). Chronic complications can affect the quality of life due to limitations in managing lifestyle, side effects, and a high treatment burden (Levterova et al., 2016). The emergence of low-quality-of-life problems in T2DM patients is also be influenced by resilience. This resilience ability is related to how the effect of a person's adaptive mechanisms increases individual resilience (Liu et al., 2018). The lack of resilience in T2DM patients affects their overall quality of life (Yao et al., 2021). Resilience can affect patient self-efficacy and self-management processes in T2DM clients (Wang et al., 2022). There is a correlation between self-efficacy and coping mechanisms. The lower the self-efficacy, the less adaptive the coping mechanism (Kurniyawan et al., 2022). Multimorbid primary care patients with lower self-efficacy and a higher disease burden have a lower quality of life (Peters et al., 2019).

Chronic disease management can improve patients' quality of life and promote positive adaptations to help patients accept their physical and social situations and adhere to treatments that ultimately lead to healthier lives (Kim et al., 2019). Because of that, T2DM patients need resilience to adapt and overcome the difficulties inherent in chronic disease. Resilience will help these T2DM patients to be able to overcome the disease in T2DM patients and increase their treatment adherence (Ribeiro et al., 2017). So, T2DM patients with complications require good resilience as part of self-coping to

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maintain their quality of life. This study aimed to analyze the correlation between resilience and quality of life in type 2 DM patients with chronic complications.

METHOD

Research Design

The design of this research was observational analytic with a cross-sectional approach. This study analyzed the relationship between resilience and quality of life in type 2 diabetes mellitus patients with chronic complications.

Population, Samples, and Sampling

The population of this study was type 2 diabetes mellitus patients who visited the Internal Medicine Polyclinic at RSD Dr. Soebandi Jember, East Java. The inclusion criteria were being diagnosed with type 2 DM, having chronic complications, being able to communicate well, being between 18-79 years old, and being willing to participate in the study. Exclusion criteria were the insufficient mental capacity to consent and having a physical disability such as deaf and speech impaired. The number of samples was based on calculations made by researchers using the rule of thumb of the number of samples obtained from the total indicators in research multiplied by 5-10 (Hair et al., 2019), based on calculations made by researchers using the rule of thumb obtained a sample of 35 respondents that meet the provisions of the number of samples obtained from the total seven indicators in research multiplied by 5. The sampling technique was consecutive sampling, namely recruiting respondents who could be accessed and met the eligibility criteria for a specific time interval or a certain sample size (Polite & Beck, 2017). Data collection was carried out from February to March 2023.

Instruments and Measurement

A self-administered questionnaire was used to measure sociodemographic data, resilience, and quality of life. Sociodemographic data included age, gender, duration of diabetes, educational background, marital status, occupation, and type of chronic complications. The Connor Davidson Resilience Scale 25 (CD-RISC 25) was used to measure resilience. This questionnaire was the original questionnaire from Connor & Davidson (2003). Connor and Davidson carried out the construct validity of this questionnaire with a comparison value with other stress level questionnaires with the following details: Perceived Stress Scale (PSS-10) with r = -0.76; Sheehan Stress Vulnerability Scale (SVS) with r = - 0.32. These results indicate that the high resilience value obtained is inversely proportional to the stress values in the two questionnaires, so the CD-RISC questionnaire is valid. While the reliability test result using Cronbach's alpha was 0.89 (Connor & Davidson, 2003). The questionnaire contains 15 questions with five indicators, namely Personal competency, high standard, and tenacity (5 items), Trust of instincts and tolerance toward negative effects (6 items), Positive acceptance of changes, and good relations to the other (5 items), controls (5 items), spiritual influences (4 items). The total score of the questionnaire is between 0-100, while the score for each indicator is between 0-4. The higher the value, the better the resilience of type 2 DM patients with chronic complications. The Diabetes Quality of Life (DQOL) questionnaire measured quality of life. The DQOL questionnaire was translated and tested for validity and reliability by Rondhianto (2021). The validity test was r=0.876. Cronbach's alpha reliability test was 0.891 (Rondhianto, 2021). The instrument consists of 30 questions divided into two indicators: perceived satisfaction about the disease and treatment (13 items) and the impact of diseases (17 items). The total score range is between 30-120, while the score for each indicator is between 1-4. The higher the value, the better the quality of life for T2DM patients with chronic complications.

Data Analysis

Pearson product-moment analysis was used to determine the correlations between resilience and quality of life. Pearson Correlation, Spearman rank, and ETA test were carried out to determine the sociodemographic correlation to resilience and quality of life ($p< 0.05$). The correlation of age towards resilience and quality of life was analyzed using Pearson product moment. The correlation of gender, occupation, marital status, number of chronic complications to resilience and quality of life were analyzed using the Eta Test.

Ethical Consideration

This study was approved by the Research Ethics Committee of the Faculty of Nursing, Universitas Jember (No. 026/UN25.1.14/KEPK/2023).

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RESULTS

Characteristics of Respondents

The average age of respondents with T2DM is 60.20 (± 9.31) years. The duration of T2DM has a median value of 6 years. Most T2DM patients with chronic complications were male (51.4%). The most recent education of the respondents was a bachelor's degree (28.6%). Respondents were mostly retirees (31.4%). The majority of respondents' marital status was married (91.4%). The results also showed that the majority of T2DM chronic complications was diabetic neuropathy (80%), consisting of patients with diabetic neuropathy only (20%) and also patients with neuropathy and other comorbidities (60%).

Table 1. Characteristics of Respondents

Variables	Mean (SD)	Median (Min-Max)	n (%)
Age (Year)	60.20 (9.31)		
Duration of Diabetes (Year)		6 (1-20)	
Gender			
Male			18 (51.4)
Female			17 (48.6)
Educational Background			
No formal education			1 (2.9)
Primary school			8 (22.9)
Junior High School			8 (22.9)
Senior High School			8 (22.9)
Bachelor's degree			10 (28.6)
Occupation			
Housewife			9 (25.7)
Farmers			3 (8.6)
Civil servants			3 (8.6)
Retired			11 (31.4)
Nonemployment			6 (17.1)
Others			3 (8.6)
Marital status			
Married			32 (91.4)
Widowed			2 (5.7)
Divorced			1 (2.9)
Type of chronic complication			
Nephropathy, Coronary Heart Disease			1 (2.9)
Neuropathy			7 (20.0)
Neuropathy, Congestive Heart Failure			1 (2.9)
Neuropathy, Hypertensive Heart Disease			1 (2.9)
Neuropathy, Myocarditis			1 (2.9)
Neuropathy, Nephropathy			1 (2.9)
Neuropathy, Nephropathy, Congestive Heart Failure			1 (2.9)
Neuropathy, Nephropathy, Ulcer, Stroke			1 (2.9)
Neuropathy, Peripheral artery diseases			4 (11.4)
Neuropathy, Peripheral Artery Diseases, Ulcer			1 (2.9)
Neuropathy, Coronary Heart Disease			6 (17.1)
Neuropathy, Coronary Heart Disease, Retinopathy			1 (2.9)
Neuropathy, Retinopathy			3 (8.6)
Neuropathy, Ulcer			1 (2.9)
Coronary Heart Disease			1 (2.9)
Coronary Heart Disease, Hypertensive Heart Failure			1 (2.9)
Retinopathy			1 (2.9)
Ulcer			2 (5.7)

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Resilience of Type 2 DM Patients with Chronic Complications

Table 2 shows that the mean value of resilience of T2DM patients with chronic complications is 63.06 (±12.47). The indicator of positive acceptance of change and good relations with others has the highest achievement value (75.15%), and the indicator of control has the lowest (49.55%).

Table 2. Resilience on Type 2 Diabetes Mellitus Patients with Chronic Complications

Variables	Mean	SD	Achievement (%)
Resilience	63.06	12.47	63.06
Indicators			
Personal competency, high standards and tenacity	13.54	2.43	67.7
Trust of instincts and tolerance toward negative effects	13.31	4.34	55.46
Positive acceptance of changes and good relations to the other	15.03	1.89	75.15
Controls	9.91	3.37	49.55
Spiritual influence	11.26	2.21	70.38

Table 3. Correlation between Respondents' Characteristics and Resilience

Variables	r and η Value to Resilience
Age (Year)	-
Gender	0.218 (1.63)**
Educational Background	0.505***
Occupation	0.654 (42.77)**
Marital status	0.472 (22.27)**
Number of chronic complications	0.171(2.92)**

* Pearson Product Moment Test, p<0.05; ** Eta Test (Eta square) *** Spearman Rank Test, p<0.05

Table 3 indicates that gender has an effect of 1.63% on resilience. Educational background has a medium correlation with resilience (r=0.505). Occupations have an effect of 42.77% on resilience. Marital status can affect resilience by 22.27%. The number of chronic complications can also impact resilience by 2.92 %.

Quality of Life of Type 2 DM Patients with Chronic Complications

Table 4. Quality of Life on Type 2 Diabetes Mellitus Patients with Chronic Complications

Variables	Mean	SD	Achievement (%)
Quality of life	72.46	11.776	60.38
Indicators			
Perceived satisfaction with the disease and treatment	33.26	5.431	63.96
Impact of disease	39.20	6.859	57.64

Table 4 shows that the mean value of quality of life was 72.46 (± 11.776). The indicator of the impact of the disease had a lower achievement value (57.64%) than the indicator of satisfaction felt about the disease and treatment (63.96%).

Table 5. Correlation between Respondents' Characteristics and Quality of Life

Variables	r and η Value to the Quality of Life
Age (Year)	0.342*
Gender	0.028 (0.07)**
Educational Background	-
Occupation	0.483 (23.32)**
Marital status	0.357 (12.74)**
Number of chronic complications	0.133 (1.76)**

* Pearson Product Moment Test, p<0.05; ** Eta Test (Eta square) *** Spearman Rank Test, p<0.05

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Table 5 indicates that age affects the quality of life (r=0.342). Gender differences have an effect proportion of 0.07% on quality of life, while participants' occupations affect 23.32% on quality of life. Martial status can affect 12.74% of the quality of life. Finally, the type of chronic complications can also impact 1.76% of quality of life.

The Correlation between Resilience and Quality of Life in Type 2 DM Patients with Chronic Complications

Table 6. Correlation between Resilience and Quality of Life

Variables	p	r
Resilience and Quality of Life	0.000	0.782

Table 6 found that resilience and quality of life correlate significantly. The better the resilience, the better the quality of life in T2DM patients with chronic complications.

DISCUSSION

Resilience on Type 2 Diabetes Mellitus Patients with Chronic Complication

This study showed that the mean value of resilience was 63.06 (±12.469), and the achievement percentage was 63.06%. A previous study found a similar result, with the mean score of resilience of T2DM patients was 66.02 (± 7.18) (Zhang et al., 2023). In this study, the lowest score was in the control indicator (49.55%), and the highest score was in the indicator of positive acceptance of change and maintaining relationships (75.15%). Indicator of control includes individual abilities related to self-control and the ability to seek help regarding problems experienced. Deterioration in the control indicator can be due to poor adaptation, which worsens self-control. This is often found in patients with Type 2 DM who have difficulty in the adaptation process due to situations that are full of stress and produce fear, difficulty carrying out daily activities and resulting in inappropriate adjustments (Ribeiro et al., 2017). Meanwhile, indicator of positive acceptance of change and maintaining relationships relates to a person's ability to deal with difficult experiences and adapt and maintain existing relationships. The relationship between DM patients and the people around them will influence the patient's resilience (Pertiwi, 2020). Factors that contribute to the resilience of T2DM patients include supportive relationships, feelings of agency, and social acceptance (Jones et al., 2022). The results of this study indicate that increasing the patients ability to adapt to the disease is essential for type 2 DM patients with chronic complications so that they can have good self-control and appropriate adjustments. A good relationship between the patient and the people around them is also needed to increase feelings of security and support in the treatment process. This condition is expected to increase the resilience of the patients.

Factors that contribute to resilience have been identified in this study, such as gender, education level, occupation, marital status, and the number of complications ($p<0.05$). There was a weak relationship between gender and resilience ($\eta = 0.218$), with an influence percentage value of 1.63%. There is a difference in resilience in patients with T2DM related to male and female sex (3.9 ± 0.7 vs. 3.7 ± 0.8, $p < 0.01$) (Olson et al., 2023). Men are identified as having higher resilience (Ferreira et al., 2022) because men are more accepting of themselves and have positive tendencies that will affect resilience in their daily lives (Xiang et al., 2020). Occupation is considered to have a strong value related to resilience in this study ($\eta = 0.654$) with an influence percentage of 42.77%. In this study, many T2DM patients with chronic complications are retirees. Retirees were identified as having higher resilience and life satisfaction than non-retirees because this group can maintain their lifestyle (Mendiratta et al., 2022). These results emphasize that female patients and patients who are still working require increased resilience.

Educational level has a moderate strength with resilience in our study ($p = 0.02$; $r = 0.505$). In T2DM patients, a higher education level leads to a higher resilience (Ferreira et al., 2022). For chronic disease patients with the elementary school level, as many as 55.56% had high resilience. In contrast, in undergraduate education, as many as 81.82% of patients had high resilience (Siregar & Siregar, 2018). Marital status was also considered to have a moderate relationship with resilience in this study ($\eta = 0.472$) and showed an effect of 22.27%. This finding is supported by the relationship between resilience and well-being in a person who is described as having the support of loved ones, family, and friends (Ivankina et al., 2021). The family became the primary carer for patients with complications (Ginting et al., 2021). The existence of support from the closest family and the existing environment will support DM patients to become more resilient (Kusnanto et al., 2020). In addition, the coping strategies chosen in married individuals will be more positive and increase relational resilience (Aydogan et al., 2022). The result underlines that when providing interventions to increase the resilience of DM patients, it is necessary to consider their level of education and marital status.

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Complications increased the burden of resilience. The relationship between the number of complications and resilience in this study was very weak (η= 0.171), which showed an influence percentage of 2.92%. Patients with chronic health problems have a lower resilience value than those who are healthy (Gheshlagh et al., 2016). This is supported by findings that emotional distress due to pathophysiology in an older person is related to resilience, which increases the severity of complications (Trtica Majnarić et al., 2021). Therefore, increasing resilience is needed in DM patients with chronic complications.

Quality of Life on Type 2 Diabetes Mellitus Patients with Chronic Complication

This study found a mean value of 72.46 (± 11.776), and the achievement was 60.38%. The achievement of the indicator of perceived satisfaction with the disease and treatment (63.96%) is higher than the impact indicator (57.64%). It shows that most patients have a better quality of life in terms of satisfaction with the disease they are experiencing and the treatment they are undergoing. This satisfaction will affect treatment adherence and glycemic control (Khdour et al., 2021). Existing treatment adherence in T2DM patients will improve their quality of life (Mishra et al., 2021). The results of this study underline the importance of controlling the impact of the disease felt by the patient, such as pain, sleeplessness, limitations in social relationships, work, daily activities, and lifestyle, so that by reducing the impact felt by the patient, the patients can improve the quality of life.

This study showed the effect of age, marital status, number of complications, occupation, and gender on the quality of life in patients with T2DM with chronic complications. The relationship between the age of T2DM patients with chronic complications and quality of life in this study was weak (p = 0.044, r = 0.342). The age of T2DM patients with chronic complications was 60.20 years. There is a perception of a better quality of life in the elderly related to adapting to changes (Miranda et al., 2016). In addition, elderly patients may have better attitudes with more knowledge and comply with the recommendations (De Sousa et al., 2016). A weak relationship was also found between gender and quality of life (η = 0.218) and showed an influence of 0.07%. Men tend to have a higher quality of life value than women (Acharya Samadarshi et al., 2022). It is influenced by the role of men in maintaining the role of socio-economic activities in the family. Thus, a social role in men is active in improving the quality of life (Lee et al., 2020). In addition, in women, the adaptation model used and the coping strategies chosen are worse than in men (Hirani et al., 2016). Although age and gender had a weak relationship with quality of life in this study, these factors need to be considered in the care of DM patients with chronic complication to improve their quality of life.

In terms of marital status, the relationship between marital status and quality of life was also weak (η = 0.357), with an influence of 12.74%. Someone who lives with their partner allows them to have a good quality of life (Raj et al., 2018). Married patients will also receive better support from their partners and family regarding clinic attendance and adherence to recommended nutrition and prescribed medications (Agada et al., 2019). On the other hand, the result of this study shows a moderate relationship between work and quality of life (η=0.483) and an effect of 23.32%. The majority of T2DM patients with chronic complications in this study were retirees. The ease of living after retirement can increase life satisfaction in retirees due to the disappearance of work-related stress (Prakash et al., 2022). This result indicates the importance of intervention in improving the quality of life of DM patients with chronic complications who are still working.

Complications are the final factor affecting the quality of life in patients with T2DM. The relationship between quality of life and the number of complications was weak (η=0.133), with an influence of only 1.76%. The influence of complications causes an increase in the number of medical appointments and hospitalizations, which affects the quality of life and increases the burden of hospital care costs on patients (Zurita-Cruz et al., 2018). Therefore, increasing quality of life is needed in DM patients with chronic complications.

Correlation between Resilience and Quality of Life

The results of this study show a p-value of 0.000 <0.05. This result indicates a relationship between resilience and quality of life in T2DM patients with chronic complications. The relationship value of the two variables is strong and has a positive direction with a value of 0.782. It means the better the resilience, the higher the quality of life in T2DM patients with chronic complications. Resilience significantly correlates with quality of life (b=1.10; p=0.003) in older adults with chronic diseases (Tecson et al., 2019). This high resilience will be able to reduce depression and support a better quality of life (Yao et al., 2021).

In general, resilience will affect the quality of life because a higher resilience value is associated with a better positive coping style (Wu et al., 2020). In addition, the correlation between resilience and quality of life is assessed by the high ability to encourage one's resilience and contribute to formulating appropriate clinical interventions and a better quality of life (Pardeller et al., 2020). Resilience also affects the ability of DM patients to survive and perform self-care appropriately (Kusnanto et al., 2020).

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Resilience is correlated with good physical function and quality of life in the elderly group (Olson et al., 2023). The large effect of resilience on quality of life was identified in the ability to self-management, a positive appraisal style that can maintain a high quality of life (Brinkhof et al., 2021). In addition, resilience allows for social skills and access to other resources at all stages of life (Klokgieters et al., 2020). Other findings state that resilience influences well-being by improving physical and psychological responses in elderly patients with chronic diseases (Tecson et al., 2019).

In conclusion, resilience can improve the quality of life by reducing depression, improving positive coping styles, improving the ability to survive and carry out appropriate self-care and self-management, and increasing good physical and psychological responses. Based on this result, it is necessary to increase resilience to maintain the quality of life of type 2 DM patients with chronic complications. Resilience can be improved such as through cognitive behavioral therapy and family empowerment.

CONCLUSION

Positive and strong relationships exist between resilience and quality of life in T2DM patients with chronic complications. Therefore, improving resilience is crucial to enhancing the quality of life in T2DM patients with chronic complications.

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