

The Correlation of Physical Activity and Medication Adherence with The Quality of Life in Type 2 Diabetes Mellitus Patients at Randuagung Health Center, Lumajang

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Abstract:

Diabetes mellitus is a chronic disease that cannot be cured. Patients with diabetes mellitus will experience various problems in their life processes, which can affect their quality of life. To improve the quality of life of patients, physical activity and medication adherence are necessary. This study aims to determine the correlation between physical activity and medication adherence with the quality of life in diabetes mellitus patients. The research design used a correlational design with a cross-sectional approach. The sample consisted of 44 respondents. The study employed the GPAQ, MMAS, and DQOL questionnaires. Data analysis was performed using chi-square. The results showed that most of the physical activity among patients with type 2 diabetes mellitus was categorized as moderate, with 26 (59.1%). Most patients had low medication adherence, with 17 (38.6%) falling into this category, and the majority had poor quality of life, with 20 (45.5%) in this category. The study found a significant correlation between physical activity and quality of life with $p = 0.004$ ($p < \alpha = 0.05$) and a significant correlation between medication adherence and quality of life with $p = 0.000$ ($p < \alpha = 0.05$). Quality of life is an important factor that can influence an individual's health condition. Physical activity and medication adherence have an impact on the quality of life for patients with type 2 diabetes mellitus. Based on the research findings, develop educational materials that promote the benefits of physical activity and the importance of medication adherence to improve the quality of life for patients.

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INTRODUCTION

Diabetes mellitus is a chronic non-communicable disease characterized by persistent hyperglycemia due to insulin secretion abnormalities, insulin action issues, or both. Its prevalence has been steadily increasing globally, affecting both developed and developing countries (T.Eltrikanawati et al., 2020). As an incurable condition, diabetes significantly impacts patients' quality of life, which correlates with morbidity and mortality rates, ultimately influencing life expectancy (Ipa et al., 2022; Umam et al., 2020).

According to the International Diabetes Federation (2019), the number of diabetes patients worldwide reached 415 million in 2019, projected to rise to 629 million by 2045—a 51% increase. In Indonesia, the country ranked seventh in the world for adult diabetes prevalence, with 10.7 million cases in 2019, expected to rise to 13.7 million by 2030 and 16.6 million by 2045 (Istiqomah & Yuliyani, 2022). In East Java, there were 867,257 reported diabetes cases, with Lumajang County

having 21,846 cases in 2022. Data from Randuagung Health Center shows 892 cases in 2022, increasing to 958 in 2023.

Observations at Randuagung Health Center on January 29, 2024, revealed that among ten type 2 diabetes patients, 50% engaged in light physical activity, mainly walking once or twice a week. Thirty percent performed moderate activity, walking almost daily for about an hour, while 20% undertook heavy labor, like construction work. Medication adherence was low in 60% of patients, who only visited health facilities when ill, while 20% had moderate adherence, and 20% maintained high adherence, regularly taking their medications and attending follow-ups.

The quality of life among these patients was notably poor, with 80% reporting uncontrolled blood sugar levels and frequent worries about their health, while only 20% felt their condition was well-managed. Type 2 diabetes leads to serious health impacts due to insulin secretion and function impairments, often affecting individuals over 45 years old due to aging and bodily decline (Hairunnisa et al., 2024). Effective management and care are crucial for maintaining quality of life since diabetes is a lifelong condition.

Uncontrolled blood sugar levels can result in severe complications, including diabetic retinopathy, cardiovascular diseases, and neuropathy, significantly affecting patients' quality of life (Hazni et al., 2021; Suwanti et al., 2021). Quality of life is a vital factor that can influence overall health, particularly in chronic diseases like diabetes, where poor quality of life can exacerbate health conditions (Umam et al., 2020). To enhance quality of life for diabetes patients, regular physical activity and medication adherence are essential (Noorratri et al., 2019; Katadi et al., 2019). Physical activity plays a crucial role in managing diabetes, aiding in blood glucose reduction, weight maintenance, and improving insulin sensitivity (Ramadhani et al., 2022).

Medication adherence also significantly impacts patients' quality of life, as it helps control chronic conditions effectively (Panduwiguna et al., 2022). Patients who are compliant with their treatment regimens generally experience better quality of life compared to those who are not, with a direct correlation between medication adherence and quality of life improvements (Umam et al., 2020).

METHOD

This correlational study uses a cross-sectional design to examine relationships between physical activity, medication adherence, and quality of life among patients with type 2 diabetes. The study population includes all diabetes mellitus patients treated at the Randuagung Health Center, Lumajang Regency, with a sample size of 44 participants selected via purposive sampling. The study was conducted at Randuagung Health Center in July 2024. Data collection instruments include a demographic questionnaire, the Global Physical Activity Questionnaire (GPAQ) for physical activity levels, the Morisky Medication Adherence Scale (MMAS-8) for adherence, and the Diabetes Quality of Life (DQOL) questionnaire for quality of life, each validated and tested for reliability.

Data collection involved administering questionnaires directly to respondents, with GPAQ items categorized into high, moderate, and low activity levels based on MET scores, while MMAS-8 assesses adherence across three levels. DQOL uses a Likert scale to capture patients' satisfaction and perceived impacts of diabetes. Data were analyzed using Chi-Square tests, with a significance level of 0.05 to determine associations. Results are interpreted based on p-values, where H1 is accepted if $p \leq 0.05$, indicating a significant relationship. Ethical clearance was obtained to ensure confidentiality, voluntary participation, and proper handling of sensitive data.

RESULT

Table 1. Characteristics of Respondents (n=44)

Characteristics	Frequency	Percentage (%)
Age		
26 - 35 years	4	9.1
36 - 45 years	4	9.1
46 - 55 years	14	31.8
56 – 65 years	15	34.1
>65 years	7	15.9
Gender		
Male	7	15.9
Female	37	84.1
Occupation		
Not Working/Housewife	36	81.8
Laborer	1	2.3
Civil Servant	2	4.5
Entrepreneur	4	9.1
Private Sector Employee	1	2.3
Education		
No formal education	4	9.1
Elementary School	29	65.9
Junior High School	7	15.9
Senior High School	2	4.5
Higher Education	2	4.5
Duration of Suffering		
≤ 5 years	5	11.4
> 5 years	39	88.6

Based on the characteristics of the respondents, most are between 46 and 65 years old (65.9%), with 31.8% aged 46-55 years and 34.1% aged 56-65 years. Most are female (84.1%), while males comprise 15.9%. In terms of occupation, most respondents are not working or are housewives (81.8%), followed by entrepreneurs (9.1%), private sector employees (2.3%), laborers (2.3%), and civil servants (4.5%). Regarding education level, 65.9% have only completed elementary school, with only a few reaching senior high school (4.5%) or higher education (4.5%). For the duration of suffering, most have been experiencing the condition for more than 5 years (88.6%), while only 11.4% have been affected for 5 years or less.

Table 2. Physical Activity, Medication Adherence, and Quality of Life Categories for Diabetes Mellitus Patients in the Randuagung Health Center (n=44)

Category	Frequency	Percentage (%)
Physical Activity		
High	1	2.3
Moderate	26	59.1
Low	17	38.6
Medication Adherence		
High	15	34.1
Moderate	12	27.3
Low	17	38.6
Quality of Life		
Good	13	29.5
Moderate	11	25
Poor	20	45.5

Based on the data, physical activity levels among diabetic patients in the Randuagung Health Center area show that the majority have a moderate activity level (59.1%), while 38.6% have low activity, and only 2.3% have high activity. In terms of medication adherence, 34.1% demonstrate high adherence, 27.3% have moderate adherence, and 38.6% have low adherence. Regarding quality of life, 29.5% of patients report a good quality of life, 25% report a moderate quality of life, and 45.5% report a poor quality of life. This data highlights areas where improvement in activity, adherence, and quality of life may be beneficial.

Table 3. Correlation of Physical Activity And Medication Adherence With The Quality Of Life In Patients with Type 2 Diabetes Mellitus At Randuagung Health Center

Category	Quality of Life			Total	Chi-Square Test
	Good	Moderate	Poor		
Physical Activity					
High	1 (100%)	0	0	1 (100%)	P value = 0.004 α = 0.05
Moderate	12 (46.2%)	7 (26.9%)	7 (26.9%)	26 (100%)	
Low	0	4 (23.5%)	13 (76.5%)	17 (100%)	
Total	13 (29.5%)	11 (25%)	20 (45.5%)	44 (100%)	
Medication Adherence					
High	10 (66.7%)	5 (33.3%)	0	15 (100%)	P value = 0.000 α = 0.05
Moderate	2 (16.7%)	2 (16.7%)	8 (66.7%)	12 (100%)	
Low	1 (5.9%)	4 (23.5%)	12 (70.6%)	17 (100%)	
Total	13 (29.5%)	11 (25%)	20 (45.5%)	44 (100%)	

Based on the table, physical activity and medication adherence are significantly associated with the quality of life of diabetes mellitus patients. For physical activity, patients with moderate activity levels have better quality of life outcomes, with 46.2% reporting a good quality of life. Patients with low activity levels, however, largely report a poor quality of life (76.5%), with a significant association (P value = 0.004, α = 0.05). In terms of medication adherence, patients with high adherence report the best quality of life outcomes, with 66.7% indicating good quality of life. In contrast, most patients with low adherence report poor quality of life (70.6%), showing a strong association (P value = 0.000, α = 0.05). This suggests that higher physical activity and medication adherence are linked to improved quality of life among these patients.

DISCUSSION

Physical Activity of Diabetes Mellitus Patients

The study results indicate that, in 2024, the majority of diabetes mellitus patients at Randuagung Health Center, Lumajang Regency, fall within the moderate physical activity category, with 26 patients (59.1%) exhibiting this level. Of the 44 respondents studied, physical work activity levels ranged from a minimum of 0 MET to a maximum of 3120 MET. Commuting activities ranged from 0 MET to 1680 MET, recreational activities ranged from 0 MET to 2160 MET, and sedentary activities ranged from 140 MET to 720 MET. Physical activity is essential in managing diabetes mellitus and is one of the four pillars of diabetes management (Alza et al., 2020). Physical activity levels directly influence blood glucose in type 2 diabetes patients. Lower activity levels are associated with a 3.217 times greater risk of elevated blood glucose than those who engage in regular physical activity. Physical activity is, therefore, a critical factor for blood glucose control in type 2 diabetes patients, with increased regularity in physical activity correlating to better blood glucose management (Istiqomah & Yuliyani, 2022; Lisnawati et al., 2023). Researchers conclude that physical activity plays a crucial role in type 2 diabetes management, with consistent activity

associated with better blood glucose control, whereas low activity increases the risk of elevated blood glucose and health complications.

Medication Adherence Among Diabetes Mellitus Patients

The study reveals that the most common category of medication adherence among diabetes mellitus patients at Randuagung Health Center, Lumajang Regency, in 2024 is low adherence, with 17 patients (38.6%) falling into this group. Medication adherence refers to a patient's commitment to accurately following prescribed treatment and restrictions. Adherence to health center programs involves patients' commitment to the recommended advice, directions, and restrictions from healthcare providers to expedite recovery. The level of adherence to medication is a significant determinant of diabetes mellitus therapy success (Yulianti & Anggraini, 2020). Compliant patients tend to have normal blood glucose levels, while those who are non-adherent often have higher glucose levels (Rismawan et al., 2023). Non-adherence among type 2 diabetes patients can elevate the risk of complications and worsen the disease, affecting therapeutic outcomes (Chendra et al., 2024). Chronic complications like stroke, coronary heart disease, blurred vision, kidney issues, and diabetic neuropathy can result from uncontrolled blood glucose. Effective diabetes therapy and complication prevention are thus strongly influenced by adherence to prescribed treatments (Yusnita et al., 2021). Researchers suggest that medication adherence is crucial in type 2 diabetes therapy, where compliant patients typically achieve better blood glucose control and reduced complication risks compared to those who are non-adherent.

Quality of Life Among Diabetes Mellitus Patients

The study indicates that the most common quality of life category among diabetes mellitus patients at Randuagung Health Center, Lumajang Regency, in 2024 is poor, with 20 patients (45.5%) falling into this category. Quality of life is the level of personal satisfaction experienced by an individual, shaped by cultural and regional values, as well as factors like happiness, living standards, aspirations, and personal interests. It encompasses various aspects, including physical health, psychological state, comfort, social relationships, and future aspirations. Health-related quality of life reflects the well-being of individuals living with or recovering from a disease (Jais et al., 2021; Runtuwarow et al., 2020). Complications worsen patients' physical, psychological, and emotional symptoms, influencing physical activity, social engagement, and other aspects of life, which in turn reduces their overall quality of life as the disease progresses (Sani et al., 2023).

The researchers conclude that an individual's quality of life is significantly impacted by both their physical and psychological health, as well as their ability to manage their condition effectively. Research highlights that quality of life spans multiple dimensions, including physical health, psychological well-being, comfort, social connections, and future goals. Disease complications can aggravate physical and emotional complaints, affecting social and physical activities and ultimately diminishing quality of life. This underscores the importance of effective management and care, as the more severe the disease, the greater its negative impact on an individual's quality of life.

Relationship Between Physical Activity and Quality of Life in Diabetes Mellitus Patients

The study's chi-square test results indicate a significant relationship between physical activity and quality of life in diabetes mellitus patients in the working area of Puskesmas Randuagung, Lumajang Regency, with a p-value of 0.004 ($p < 0.05$). Quality of life in healthcare assesses emotional, social, and physical capacities to engage in daily activities, where illness can detract from quality of life (Antoniadou & Mangoulia, 2023). Improving quality of life for diabetes patients can be aided by physical therapy. Physical activity is essential in managing diabetes, one of the four key

management pillars (Alza et al., 2020). Regular physical activity benefits the body, especially for diabetes patients, by lowering blood glucose, maintaining weight, enhancing body strength, and improving insulin sensitivity (Ramadhani et al., 2022). The researchers believe effective health management significantly affects quality of life. In diabetes, physical activity is crucial for blood glucose control, weight maintenance, physical strength, and insulin sensitivity, thus promoting overall well-being.

Relationship Between Medication Adherence and Quality of Life in Diabetes Mellitus Patients

The study's chi-square results also show a significant relationship between medication adherence and quality of life in diabetes mellitus patients at Puskesmas Randuagung, Lumajang Regency, with a p-value of 0.000 ($p < 0.05$). A key goal in diabetes therapy is enhancing quality of life, which involves psychological, biological, spiritual, environmental aspects, and functional capacity. Behavioral changes are necessary for controlled blood glucose, requiring patient awareness of the importance of adherence (Mutmainah et al., 2020). Adherence to antidiabetic medications is crucial for effective therapy and a good quality of life (Naufanesa et al., 2021). Patients who adhere to therapy typically experience better quality of life compared to those who do not. The researchers argue that improving diabetes patients' quality of life depends heavily on adherence to recommended therapy, as it aids in blood glucose control and contributes to achieving a better quality of life.

CONCLUSION

The studies conducted at Randuagung Health Center in Lumajang Regency reveal critical insights into the management of diabetes mellitus. A significant proportion of patients exhibit moderate physical activity, yet many struggle with low medication adherence, both of which negatively impact their quality of life, as evidenced by the high rates of poor quality of life among respondents. Notably, there are significant relationships between physical activity and quality of life, as well as between medication adherence and quality of life, highlighting the importance of both factors in effective diabetes management. Overall, enhancing physical activity and medication adherence is essential for improving blood glucose control and, consequently, the overall quality of life for diabetes patients.

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CONFLICT OF INTEREST

The authors declared no competing interests in the production of this manuscript.

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