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The Effect Of Physical Activity On The Knowledge And Attitudes Of People With Diabetes Mellitus

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ABSTRACT
Diabetes mellitus (DM) remains a major global health problem due to its increasing prevalence each year. Effective DM management aims to establish a healthy and balanced lifestyle, while failure to do so can lead to serious complications. One key component of diabetes management is regular physical activity. Efforts to promote such activity include improving patients' knowledge and attitudes toward exercise. However, many DM patients still have limited understanding and maintain a focus solely on medication. This study analyzed the influence of knowledge and attitudes on physical activity among patients with DM at the Tenayan Raya Community Health Center, Pekanbaru. Using a quantitative cross-sectional design, the research involved 70 respondents who completed questionnaires assessing physical activity, knowledge, and attitudes. Data were analyzed using SPSS 25 and SmartPLS to test validity, reliability, and correlations. Reliability results were strong, with Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE) values as follows: physical activity (CA = 0.933, CR = 0.937, AVE = 0.625), knowledge (CA = 0.932, CR = 0.941, AVE = 0.624), and attitude (CA = 0.929, CR = 0.933, AVE = 0.610). Path analysis revealed significant relationships, with T-statistics > 1.96 and $p < 0.05$ for all tested variables. The effect of knowledge on physical activity showed T = 8.060, p = 0.000, and the effect of attitude on physical activity showed T = 7.825, p = 0.000. These findings demonstrate that better knowledge and positive attitudes significantly enhance the likelihood of engaging in physical activity among DM patients, emphasizing the vital role of behavioral factors in diabetes self-management.
Keywords: *Diabetes Mellitus, Knowledge and Attitudes, Physical Activity, Diabetes Mellitus Management.*

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disease characterized by high blood sugar levels due to impaired insulin production or function. In Indonesia, the prevalence of DM in adults reached 11.3% in 2023, with a total of approximately 20.4 million cases (International Diabetes Federation, 2024).

According to the World Health Organization (WHO), the incidence of DM worldwide is increasing year by year. The WHO estimates that 80% of new cases will occur in developing countries by 2025 (Mekonnen et al, 2021).

DM, which is classified as a non-communicable disease (NCD), is the leading cause of death globally according to a WHO report, accounting for 63% of all annual deaths. NCDs kill more than 36 million people every year. About 80% of all NCD deaths occur in low- and middle-income countries (Riau Province Health Profile, 2021).

The management of diabetes mellitus (DM) does not only focus on medication, but also on blood sugar control programs, diet management, and physical exercise or sports activities. This is done to reduce the risk of complications, both macrovascular and

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microvascular. Physical activity is very helpful in preventing these complications. Physical exercise or sports activities encourage people with diabetes to live a healthy, balanced life without complications (Colberg et al, 2016).

The importance of knowledge and attitude of DM patients in sports activities is very much needed. The DM management program, namely sports activities, provides benefits in addition to medication. Regular sports activities can help DM patients control blood sugar levels, increase insulin sensitivity, and prevent DM-related complications (Harvard Health Publishing, 2023).

Although the benefits of physical activity are known to many people with diabetes, the extent to which their knowledge and attitudes can change their interest in engaging in physical activity remains unclear. This may be due to a lack of knowledge about the appropriate type, duration, and intensity of physical activity, as well as negative attitudes toward the importance of physical activity for people with diabetes (Saeedi et al., 2021).

METHODS

This study used a quantitative method with a cross-sectional design. The research subjects were 70 DM patients in the working area of the Tenayan Raya Community Health Center in Pekanbaru. The sampling technique used purposive sampling. Data were collected through questionnaires about the knowledge, attitudes, and physical activity of DM patients. The questionnaire consisted of respondent data (age, gender, occupation, and duration of DM) and statements or questions about knowledge, attitudes, and physical activity using a 1–5 Likert scale. The independent variables were knowledge and attitudes, and the dependent variable was the physical activity of DM patients. Respondent frequency distribution data analysis was performed using SPSS version 25 software. Correlation tests were performed using SmartPLS, comparing the T-Statistic and p-value between variables X and Y. The research results were considered significant if the T-Statistic value was > 1.96 and the p-value was < 0.05.

RESULTS

1. Karakteristik Responden

Respondent characteristics in this study include frequency distribution information such as age, gender, education, occupation, duration of illness, information obtained, and sources of information.

Table 1. Frequency Distribution of Respondent Characteristics

Variable	Category	Frequency (n)	Persentase (%)
Age	26 - 35 years	2	2,9%
	36 - 45 years	1	1,4%
	46 – 55 years	38	54,7%
	56 – 65 years	27	38,6%
	> 65 years	2	2,9%
Gender	Male	32	45,7%
	Female	38	54.3%
Level of Education	Elementary School	4	5.7%

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	Junior High School	12	17.1%
	High School	37	52,9%
	Diploma/University	17	24,3%
Type of Job	Civil Servant	13	18,6%
	Self Employee	21	30.0%
	housewife	20	28,6%
	Employee	2	2,9%
	Unemployee	14	20,0%
Long Suffering	<1 years	27	38,6%
	1-2 years	31	44,3%
	3-6 years	11	15,7%
	>10 years	1	1,4%
Receive Information	Already	70	100,0%
	Not yet	0	0,0%
Source of Information	Online Media	16	22,9%
	Social Media	23	32,9%
	Family	11	15,7%
	Health Workers	20	28,6%

Source: Output SPSS 25 (2025)

Table 1 shows that there were 70 respondents in this study. The characteristics of the respondents include the following frequency distribution: characteristics based on age: the majority of respondents were in the early elderly group aged 46-55 years, totaling 38 respondents (54.3%), followed by the early elderly group aged 56-65 years, totaling 27 respondents (38.6%), followed by the early adult group aged 26-35 years with 2 respondents (2.9%) and the elderly group aged > 65 years with 2 respondents, and the late adult group aged 36-45 years with 1 respondent (1.4%). This shows that the majority of DM patients are in the early elderly group aged 46-55 years. The gender of the respondents was female in 38 respondents (54.3%) and male in 32 respondents (45.7%). This shows that the majority were female. The respondents' education levels were high school for 37 respondents (52.9%), diploma/university for 17 respondents (24.3%), junior high school for 12 respondents (17.1%), and elementary school for 4 respondents (5.7%). The respondents' occupations were as follows: 21 respondents (30.0%) were self-employed, 20 respondents (28.6%) were housewives/homemakers, Unemployed/retired for 14 respondents (20.0%), Civil Servant/ASN for 13 respondents (18.6%), and Private Employee for 2 respondents (2.9%). The duration of DM was 1-2 years for 31 respondents (44.3%), < 1 year for 27 respondents (38.6%), 3-6 years for 11 respondents (15.7%), and > 10 years for 1 respondent (1.4%). All 70 respondents (100.0%) had received information about DM. The sources of information were social media (23 respondents, 32.9%), health workers (20 respondents, 28.6%), online media (16 respondents, 22.9%), and family (11 respondents, 15.7%).

2. Descriptive Analysis of Validity and Reliability

Tabel 2. Analisis Validitas dan Reliabilitas

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Descriptive Reliabity and Validity				
	N	Cronbach' Alpha (CA)	Composite Reliability (CR)	Average Variance Extract (AVE)
Physical Activities	70	0.933	0.937	0.625
Knowledge	70	0.932	0.941	0.624
Attitudes	70	0.29	0.933	0.610

Source: SmartPLS 4.0 (2025)

Table 2 shows the results of the validity and reliability analysis, namely the CA sports activity value = 0.933, CR = 0.937, AVE = 0.625, knowledge value CA = 0.932, CR = 0.941, AVE = 0.624, attitude value CA = 0.929, CR = 0.933, AVE = 0.610. The study is considered valid if the AVE value is greater than 0.5 (> 0.5) and reliable if the CA value is greater than 0.6 (> 0.6). This study is proven to be valid and reliable.

3. Descriptive Analysis of Knowledge and Attitudes

Tabel 3. Descriptive Analysis of Knowledge and Attitudes

	N	R-Square	R-Square Adjusted
Knowledge	70	0.375	0.366
Attitudes	70	0.572	0.566

Source: SmartPLS 4.0 (2025)

Table 2 shows the results of the descriptive analysis of respondents' knowledge with an R-Square value of 0.375 and an R-Adjusted value of 0.366. This means that the average knowledge of respondents is at a moderate level. The results of the descriptive analysis of respondents' attitudes show an R-Square value of 0.572 and an R-Adjusted value of 0.566. This means that the average attitude of respondents is moderate to high. According to Hair et al (2021), the criteria for interpreting R-Square are grouped into three categories: high if the R-Square value is ≥ 0.75, moderate if the R-Square value is ≥ 0.50, and low if the R-Square value is ≥ 0.25.

4. Correlative Descriptive Analysis

Tabel 3. Correlative Descriptive Analysis

Descriptive Corelative				
	N	Standar Deviation (SD)	T Statistic	P Values
X. Physical Activities -> Y1. Knowledge	70	0.076	8.060	0.000
X. Physical Activities -> Y2. Attitudes	70	0.096	7.825	0.000

Source: SmartPLS 4.0 (2025)

Based on Table 3, the results of the correlation test using SmartPLS 4.0 2025 show that there is a significant effect of exercise activity on the knowledge and attitudes of DM

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patients. The test results are said to be significantly influential, namely T-Statistic >1.96 and P-value < 0.05). The results of the effect of physical activity on knowledge are T-Statistic = 8.060 (>1.96) and P-value=0.000 (< 0.05), while the effect of physical activity on attitude is T-Statistic = 7.825 (>1.96) and P-value=0.000 (< 0.05). The results of the study show that there is a significant effect of exercise performed by DM patients on knowledge and attitude. These findings reinforce that the knowledge and attitude of DM patients play a very important role in increasing exercise for DM patients.

DISCUSSION

The results of the study show a significant influence between physical activity and the knowledge and attitudes of DM patients. The correlation results are proven by looking at the T-Statistic and P-value values. The T-Statistic value is greater than 1.96 (> 1.96) and the P-value is less than 0.05 (< 0.05). The results of the effect of physical activity on knowledge are T-Statistic = 8.060 (>1.96) and P-value=0.000 (< 0.05), while the effect of physical activity on attitude is T-Statistic = 7.825 (>1.96) and P-value=0.000 (< 0.05). The results of this study indicate that there is a significant effect of exercise activity performed by DM patients on knowledge and attitude. These findings reinforce that the knowledge and attitude of DM patients play a very important role in increasing exercise activity for DM patients.

This study is in line with the research by Zhu et al (2023), which found that knowledge and attitude influence an increase in physical activity. Knowledge about DM management will change the attitude of DM patients. A positive attitude will encourage interest in physical exercise or sports. The better the knowledge and attitude of DM patients, the better they will be at implementing the DM management program itself.

Knowledge and attitudes greatly influence the interest of people with diabetes in physical activity. Another study conducted by Mtshali (2024) assessed the extent of knowledge and attitudes toward physical activity among people with diabetes. Knowledge is not merely about knowing the general benefits, but rather, people with DM must have a deeper understanding of the importance of physical activity, its benefits in managing DM, how to regulate physical activity, and practical, safe, and comfortable media or tools for physical activity. This study found that general knowledge alone does not increase the interest of people with DM in physical activity.

In line with research conducted by Sibazo et al (2024) comparing physical activity between people with DM and those without DM, the results show that the group with DM has lower knowledge. This makes the group with DM more passive towards physical activity compared to those without DM.

Research conducted by Mwimo et al (2021) using a cross-sectional approach evaluated the level of knowledge, attitudes, and physical activity among people with DM. The results showed that most respondents had moderate knowledge about physical activity, but their attitudes and physical activity levels were still low. Improving knowledge about DM and DM management can be achieved through good education.

In line with research conducted by Peter et al (2022), good education is significantly associated with positive attitudes and increased adherence to physical

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activity among people with diabetes. The knowledge and attitudes of people with diabetes are a very strong foundation for increasing interest in physical activity. The higher the knowledge and positive attitudes of people with diabetes, the more regularly they engage in physical activity.

This study shows that knowledge and attitude play a very important role in the management of DM. The risk of macrovascular and microvascular complications can occur in DM patients if DM management and treatment are not adequate. One aspect of DM management and treatment is how to increase appropriate, safe, and comfortable physical activity for DM patients. Physical activity has been proven to control blood sugar levels in DM patients. In addition, physical activity also improves the quality of life of DM patients by maintaining a healthy and balanced lifestyle. Therefore, to increase the interest of DM patients in physical activity, good knowledge and an active attitude are essential. The knowledge and attitude of DM patients need to be improved through good health education, especially regarding the importance of physical activity.

CONCLUSION

This study shows that knowledge and attitude play a very important role in DM management. The risk of macrovascular and microvascular complications can occur in DM patients if DM management and treatment are not adequate. One aspect of DM management and treatment is how to increase appropriate, safe, and comfortable physical activity for DM patients. Physical activity has been proven to control blood sugar levels in DM patients. In addition, physical activity also improves the quality of life of DM patients by maintaining a healthy and balanced lifestyle. Therefore, to increase the interest of DM patients in physical activity, good knowledge and an active attitude are essential. The knowledge and attitude of DM patients need to be improved through good health education, especially regarding the importance of physical activity.

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