

The Relationship Between External Factors and Self-Management in Type 2 Diabetes Mellitus Patients in the Working Area of Kedungwuni 1 Community Health Center, Pekalongan Regency

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ARTICLE INFO

Kata Kunci:

Diabetes Mellitus, Self-Management, External Factors

Received : 20, June

Revised : 25, July

Accepted: 03, August

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ABSTRACT

External factors such as family support, the role of healthcare workers, healthcare facilities, and accessibility of information significantly influence the success of self-management in diabetes mellitus patients. Data from the Kedungwuni 1 Community Health Center (Puskesmas Kedungwuni 1) showed 1,007 cases of diabetes mellitus in 2024. The purpose of this study was to determine the relationship between external factors and self-management in diabetes mellitus patients in the Kedungwuni 1 Community Health Center area, Pekalongan Regency. A quantitative approach with a cross-sectional design and purposive sampling technique was used, with 91 respondents. The results showed a significant relationship between family support ($p=0.045$), the role of healthcare workers ($p=0.004$), and accessibility of information ($p=0.041$) and self-management. However, there was no significant relationship between healthcare facilities and self-management ($p=0.126$). Logistic regression results indicated that the role of healthcare workers was the most influential factor, with an OR of 4.347. Conclusion External factors, especially family support and the role of health workers, play an important role in supporting self-management of diabetes mellitus sufferers.

INTRODUCTION

Diabetes mellitus is a chronic disease caused by the pancreas' inability to produce sufficient insulin or the body's inability to use the insulin produced effectively. As a result, glucose concentration in the blood increases (hyperglycemia). Elevated glucose levels that exceed the normal range can cause nerve damage and impair the function of blood vessels leading to the heart (Amanah et al., 2024). Diabetes mellitus is often referred to as a silent killer because sufferers are frequently unaware of the condition until complications occur. It typically develops gradually, with symptoms ranging from mild to severe, and may eventually lead to chronic complications and even death (Desnita et al., 2023).

According to the International Diabetes Federation (IDF, 2021), Indonesia ranks fifth in the world after China, India, Pakistan, and the United States. Approximately 19.47 million people aged 20–79 years in Indonesia have diabetes mellitus, and around 1.5 million deaths are attributed to it. The IDF reported a rapid increase in the number of diabetes cases in Indonesia over the past ten years. This number is projected to rise to 28.57 million by 2045—an increase of 47% compared to the 19.47 million recorded in 2021.

According to data from the World Health Organization (WHO, 2022), around 422 million people worldwide suffer from diabetes mellitus. In 2022, this disease was among the top 10 leading causes of death globally. In Central Java, the prevalence of diabetes mellitus in 2022 was 163,751 cases, increasing significantly to 624,365 cases in 2023 (Dinkes Jateng, 2023). In Pekalongan Regency, the prevalence of diabetes mellitus in 2024 also remains high, with a total of 16,463 cases, particularly in the Kedungwuni 1 Public Health Center (Puskesmas) working area (Dinkes Kab. Pekalongan, 2024).

In 2024, there were 1,007 recorded cases of diabetes mellitus in the working area of Kedungwuni 1 Health Center. The majority of sufferers were aged between 35 and 65 years. This age range generally includes individuals at the peak of their careers, actively working, and significantly contributing to family finances—often referred to as the breadwinners. Pekalongan Regency, especially the Kedungwuni District, is a densely populated area with rapidly growing economic activity, as evidenced by the high number of home-based garment industries and trade. Lifestyle changes among Kedungwuni residents—caused by urbanization, increased consumption of fast food, easy access to food delivery apps, and a lack of physical activity—have contributed to the rise in diabetes cases.

Therefore, it is important to examine the relationship between external factors and self-management among sufferers in the Kedungwuni 1 Health Center working area, Pekalongan Regency. This research is expected to provide concrete input for improving health interventions based on family, community, and healthcare professional education.

LITERATURE REVIEW

Family Support

Family support is a concept that describes the vital role of the family in providing physical, emotional, social, and informational assistance to one of its members. This support is especially crucial for individuals suffering from diabetes mellitus. According to research by Dinavari et al. (2023), family support contributes to improved adherence among patients in self-management activities, such as regularly monitoring blood glucose levels and maintaining dietary discipline. It is also noted that patients who receive family support show better reductions in HbA1c levels, indicating stable blood glucose control.

Role of Healthcare Workers

Healthcare professionals play a vital role in supporting successful self-management in individuals with diabetes mellitus (Sidiq et al., 2024). Self-management is not solely dependent on the individual but is also significantly influenced by professional healthcare support and guidance.

Healthcare workers act as motivators, providing encouragement and moral support to diabetes patients to help them maintain a healthy lifestyle. Nurses, for instance, accompany patients throughout their treatment process. According to a journal by Seviah et al. (2025), the presence of healthcare workers during patient accompaniment increases self-efficacy and reduces stress levels caused by the disease.

Health Facilities

According to Government Regulation No. 47 of 2016, Article 1 Paragraph 1, health facilities refer to health services used to deliver personal health care efforts – whether promotive, preventive, curative, or rehabilitative – provided by the government, local governments, or the community (Di, Haji, and Yogyakarta, 2025). Primary healthcare facilities (PKD) and Community Health Posts (Posbindu) are essential components of the public health system, especially in controlling non-communicable diseases like diabetes mellitus.

Health Accessibility

Information accessibility refers to an individual's or group's ability to easily, accurately, and quickly access, understand, and use the information they need without barriers. In this study, information accessibility refers to how easily people – especially those with diabetes mellitus – can obtain accurate and relevant health information, so they can make informed decisions regarding their health, including in managing their diabetes mellitus condition.

METHODOLOGY

This study employed a quantitative cross-sectional design. The research population consisted of type 2 diabetes mellitus (DM) patients in the working area of the Kedungwuni 1 Public Health Center (Puskesmas). The sample size of 91 respondents was determined using the Slovin formula with a 10% margin of error. Sampling was conducted purposively based on the following inclusion criteria: aged 35–65 years, diagnosed with type 2 DM, living with family, and willing to participate as respondents.

Data were collected using structured questionnaires, filled out through direct interviews (door-to-door). The data were analyzed using Chi-square tests and logistic regression analysis.

RESEARCH RESULTS

Table 1. Respondent Characteristics

Characteristic	Frequency	Percentage (%)
Age		
35–45 years	27	29.7%
46–55 years	56	61.5%
56–65 years	8	8.8%
Total	91	100%
Gender		
Male	23	25.3%
Female	68	74.7%
Total	91	100%
Last Education		
No schooling	1	1.1%
Elementary school	55	60.4%
Junior high school	13	14.3%
Senior high school	18	19.8%
Higher education	4	4.4%
Total	91	100%
Occupation		
Civil servant (ASN)	2	2.2%
Entrepreneur	12	13.2%
Laborer	26	28.6%
Housewife	37	40.7%
Private employee	14	15.4%
Total	91	100%
Duration of illness		
Less than 3 years	36	39.6%
More than 3 years	55	60.4%
Total	91	100%

Based on Table 1, the analysis of 91 respondents shows that the characteristics of type 2 diabetes mellitus patients in the Kedungwuni 1 Puskesmas working area, Pekalongan Regency, are as follows:

The most affected age group is 46–55 years (61.5%), predominantly female (74.7%), most have elementary school education (60.4%), work as housewives (40.7%), and have been living with the disease for more than 3 years (60.4%).

Table 2. Bivariate Analysis

Variable	Self-Management	P Value
	Good	Poor
Family Support		
High	22 (45.8%)	26 (54.2%)
Low	11 (24.6%)	32 (74.4%)
Role of Health Workers		
Good	25 (49%)	26 (51%)
Poor	8 (20%)	32 (80%)
Healthcare Facilities		
Utilized	20 (31.3%)	44 (63.7%)
Not utilized	13 (48.1%)	14 (51.9%)
Information Accessibility		
Good	12 (54.5%)	10 (45.5%)
Poor	21 (30.4%)	48 (69.6%)

Table 2 shows the results of the Chi-square statistical analysis. The p-value for family support is 0.045, for the role of health workers is 0.004, and for information accessibility is 0.041. Since these p-values are all less than 0.05, the hypothesis is accepted, indicating a significant relationship between these three variables and self-management.

In contrast, the p-value for healthcare facilities is 0.126 ($p > 0.05$), indicating no significant relationship between the use of healthcare facilities and self-management.

Table 3. Multivariate Analysis (Logistic Regression)

Variable	Sig.	OR (Exp(B))	95% CI (Lower - Upper)
Family Support	0.029	2.890	1.117 - 7.480
Role of Health Workers	0.004	4.347	1.616 - 11.693

Table 3 shows that two variables passed the logistic regression test with p-values < 0.05 :

- Family support ($p = 0.029$), with an Odds Ratio (OR) of 2.890, meaning that diabetes mellitus patients with good family support are 2.890 times more likely to have good self-management compared to those with low family support.
- Role of health workers ($p = 0.004$), with an OR of 4.347, meaning that patients who perceive good support from health workers are 4.347 times more likely to have good self-management compared to those who perceive low support – *after accounting for family support*.

DISCUSSION

Age

Based on Table 4.1, out of 91 respondents, 27 people (29.7%) were aged 35–45 years, 56 people (61.5%) were aged 46–55 years, and 8 people (8.8%) were aged 56–65 years. These results indicate that the majority of respondents in this study were in the 46–55 age group. This corresponds to the typical age range of late productive age in the Kedungwuni region, during which physiological changes, metabolic decline, and decreased insulin sensitivity commonly occur. According to Notoatmodjo (2012), age affects a person's vulnerability to disease, especially degenerative diseases such as diabetes mellitus. As age increases, organ function and metabolic processes decline, which may lead to insulin resistance.

Gender

Based on Table 1, 23 respondents (25.3%) were male, while 68 respondents (74.7%) were female. These findings show that the majority of respondents were women. According to WHO (2023), women are at greater risk of developing diabetes mellitus, particularly after menopause. This is due to hormonal and metabolic changes that affect insulin sensitivity and fat distribution.

Last Education Level

As shown in Table 4.3, of the 91 respondents, 1 respondent (1.1%) had no formal education, 55 (60.4%) had completed elementary school, 13 (14.3%) junior high school, 18 (19.8%) senior high school, and 4 (4.4%) had attended higher education. The majority of respondents had only completed elementary school. According to Notoatmodjo (2012), education is a key factor influencing a person's health knowledge, attitude, and behavior. Individuals with lower educational backgrounds tend to have limited understanding of important aspects such as blood sugar control, proper diet, and consistent medication adherence.

Respondent Occupation

Based on Table 4.4, among the 91 respondents, 2 people (2.2%) were civil servants, 12 (13.2%) entrepreneurs, 26 (28.6%) laborers, 37 (40.7%) housewives (IRT), and 14 (15.4%) private employees. The results show that the majority of respondents were housewives. Occupation influences self-management behavior in diabetes mellitus patients. Individuals who are housewives or engaged in light work may be at higher risk for diabetes mellitus due to higher chances of experiencing stress. Housewives often juggle multiple roles at home such as caring for children, managing finances, and doing household chores. Unmanaged psychological stress can lead to chronic stress and increased cortisol levels, which in turn elevate blood sugar and affect insulin response.

Duration of Living with Diabetes Mellitus

Based on Table 4.5, 36 respondents (39.6%) had been living with diabetes for less than 3 years, while 55 respondents (60.4%) had lived with the condition for more than 3 years. These results indicate that most respondents had been living with diabetes for over 3 years. Duration of illness plays a role in shaping patients' knowledge, attitudes, and skills in managing their disease effectively.

Relationship Between Family Support and Self-Management Among Diabetes Mellitus Patients in the Working Area of Kedungwuni 1 Health Center, Pekalongan Regency

Based on the analysis results shown in Table 2, the p-value obtained from the Chi-square test using Pearson Correlation is 0.045. Since the p-value is less than α (0.05), the hypothesis is accepted, indicating a statistically significant relationship between family support and self-management among diabetes mellitus patients in this area.

This finding aligns with a study by Made Rai Mahardika & Bagus Suryantara (2024), which also found a significant relationship between family support and self-management in diabetes patients, with a p-value of 0.02. Similarly, research by Azhari (2018) at Simpang IV Sipin Health Center in Jambi reported a p-value of 0.019, indicating a similar relationship.

These results suggest that diabetes mellitus patients with strong family support tend to have better self-management, while those with weak support show poorer self-management. In the Kedungwuni 1 area, most patients are aged 45–55 and have low educational levels, limiting their access to information and ability to manage the disease independently. Therefore, family support becomes a crucial external aid. According to Lawrence Green's theory, family support acts as an external reinforcement that helps maintain and strengthen self-management behaviors in type 2 diabetes patients. Without family support, patients are at greater risk of losing motivation in managing their condition.

Relationship Between the Role of Health Workers and Self-Management in Diabetes Mellitus Patients in the Kedungwuni 1 Health Center Working Area, Pekalongan Regency

Based on the analysis in Table 4.4, the p-value from the Chi-square test using Pearson Correlation is 0.004. Since $p < 0.05$, the hypothesis is accepted, indicating a significant relationship between the role of health workers and self-management among diabetes mellitus patients.

This result is consistent with research by Wulandari et al. (2024), which examined the role of nurses as educators in diabetes care at Bhayangkara Brimob Hospital in 2024. The study found a p-value of 0.002, indicating a statistically significant relationship between health worker roles and patient self-management. Similarly, Inda Mutiara et al. (2023) found a significant relationship at Vita Insani Hospital in Pematang Siantar, with a p-value of 0.002.

These findings highlight that the more effective and involved the role of health workers – through monitoring, education, and counseling – the better the patient's self-management becomes. This is in line with Lawrence Green's theory, which states that health workers function as reinforcers. Their presence and involvement help reinforce patients' confidence in maintaining and improving their self-care practices.

Relationship Between Health Facilities and Self-Management in Diabetes Mellitus Patients in the Kedungwuni 1 Health Center Working Area, Pekalongan Regency

Based on the analysis shown in Table 2, the p-value from the Chi-square test using Pearson Correlation is 0.126. Since $p > 0.05$, the hypothesis is rejected, indicating no statistically significant relationship between health facilities and self-management in diabetes patients.

This result is not in line with research conducted by Sinurat et al. (2023), which stated that there was a relationship between health facilities and self-management among type 2 diabetes mellitus patients in the same area. According to Lawrence Green's theory, health facilities are enabling factors that support individuals in carrying out effective self-care.

Field observations found that while many diabetes patients use healthcare facilities such as PKD (Primary Health Services), many do not take the medication provided. Additionally, patients often prefer to check their blood sugar at pharmacies rather than health centers due to perceived long waiting times at the latter. Most patients only return for a blood sugar check when symptoms like dizziness or fatigue arise.

The Relationship Between Information Accessibility and Self-Management in Diabetes Mellitus Patients in the Working Area of Kedungwuni 1 Community Health Center, Pekalongan Regency

DISCUSSION

The Relationship Between Information Accessibility and Self-Management Among Diabetes Mellitus Patients in the Working Area of Puskesmas Kedungwuni 1

Based on the analysis presented in Table 4.4, the p-value obtained from the Chi-square test using Pearson Correlation was 0.041. Since the p-value is less than α (0.05), the hypothesis is accepted, indicating a statistically significant relationship between information accessibility and self-management among type 2 diabetes mellitus patients in the working area of Puskesmas Kedungwuni 1.

This result is consistent with the study conducted by Aini, Hafifah, and Khotimah (2025), which reported a p-value of 0.000 ($p < 0.05$), confirming the significant relationship between access to health information and self-management in patients with diabetes mellitus.

According to the World Health Organization (WHO, 2010), health information accessibility is the right of every individual to seek, receive, and share information and ideas on health issues through any media, regardless of borders. Accessibility to health information is a reinforcing factor that supports individuals in managing their health. Easy access to information – whether from health education, media, or health services – can help patients understand diabetes mellitus better. With sufficient knowledge, patients are more capable of making the right decisions and taking responsibility for managing their illness.

Multivariate Analysis

Based on the results of logistic regression multivariate analysis, two variables were found to have a significant influence on self-management among diabetes mellitus patients in the working area of Puskesmas Kedungwuni 1, namely: family support and the role of healthcare workers.

- The family support variable showed a significance level of $p < 0.05$ with an Odds Ratio (OR) of 2.890. This implies that patients who receive high family support are 2.89 times more likely to demonstrate good self-management compared to those who receive low support. Family support plays a crucial role in encouraging patients to manage their illness, particularly in terms of medication adherence, physical activity, and dietary regulation. The family serves as a source of social control and companionship, which is essential for patients in managing their daily routines and health behaviors.
- Meanwhile, the role of healthcare workers had an even stronger influence on self-management, with a significance value of $p < 0.05$ and an Odds Ratio (OR) of 4.347. This indicates that patients who perceive a strong involvement of healthcare professionals are 4.35 times more likely to practice effective self-management than those who do not. The role of healthcare professionals includes being educators, facilitators, and motivators—providing health information, supporting treatment processes, and offering both moral and technical support to patients.

These findings highlight that active engagement and continuous education from healthcare providers strongly influence patients' capacity for independent disease management. In conclusion, both family support and the role of healthcare professionals have significant effects on diabetes self-management, with the role of healthcare providers having a stronger influence.

CONCLUSIONS

Based on the findings regarding the relationship between external factors and self-management among type 2 diabetes mellitus patients in the working area of Puskesmas Kedungwuni 1, the following conclusions are drawn:

1. The majority of the 91 respondents:
 - Were aged 46–55 years (61.5%)
 - Were female (74.7%)
 - Had elementary school education (60.4%)
 - Worked as housewives (IRT) (40.7%)
 - Had been diagnosed with diabetes for more than 3 years (60.4%)
2. Family support is significantly associated with self-management ($p = 0.045$).
3. The role of healthcare professionals is significantly associated with self-management ($p = 0.004$).
4. Information accessibility is significantly associated with self-management ($p = 0.041$).
5. Health facility utilization is not significantly associated with self-management ($p = 0.126$).

RECOMMENDATIONS

1. Implement continuous educational programs involving both patients and their families to increase awareness and knowledge about diabetes mellitus.
2. Optimize the “Prolanis” program (Chronic Disease Management Program) at the community health center (Puskesmas) level.
3. Distribute posters or pamphlets about diabetes mellitus in all health facilities to promote public awareness.
4. Provide incentives or rewards to patients who regularly attend check-ups and actively participate in health education sessions.

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