THE EFFECTIVENESS OF SIPANDEM APLICATION IN MONITORING ADHERENCE OF DIABETES MELLITUS IN KRAMATWATU PUBLIC HEALTH CENTRE

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ABSTRACT

Diabetes mellitus is a degenerative disease that occurs due to metabolic disorders caused by problems in insulin production. Adherence is defined as an attitude and behavior aimed at fulfilling instructions or requests from others. The "SIPANDEM" application was developed to support diabetes self-management. The determine the effectiveness of SIPANDEM Aplication in monitoring adherence of Diabetes Mellitus patients. This study employed a quantitative research design with a descriptive correlational approach to examine the relationship between two or more variables using a cross-sectional method, with pairet t-test analysis. The paired t-test analysis demonstrated a statistically significant effect of the SIPANDEM application on patient adherence (p-value = 0.000). The SIPANDEM Aplication is effective in monitoring the adherence of diabetes mellitus patients

Keywords: SIPANDEM, Aplication, Diabetes Mellitus, Adherence, Self-Management.

INTRODUCTION

Diabetes mellitus is a degenerative disease that occurs due to metabolic disorders caused by problems in insulin production (Paseki, Kaunang, & Kandau, 2021). The global prevalence of diabetes mellitus is considerably high. In 2015, an estimated 415 million people worldwide were living with diabetes, and this number is projected to increase to approximately 642 million by 2040 (Khan, et al., 2020). Based on the 2018 Basic Health Research (RISKESDAS) report, the prevalence of diabetes in Indonesia showed a significant rise; in 2013, it was recorded at 6.9%, and by 2018 it had increased to 8.5%. According to the Health Research and Development Agency (Litbangkes), Indonesia currently ranks seventh among the ten countries with the highest number of diabetes cases, with an estimated 10.7 million people affected (Yulia, Rizyana, & Rahma, 2020). Efforts to prevent and control diabetes have been carried out by community health centers (Puskesmas) through initiatives such as increasing knowledge about diet, medication, physical activity, stress management, and the involvement of support systems. However, these efforts are difficult to evaluate due to challenges in monitoring. Monitoring can be conducted monthly, but it requires substantial human resources as well as significant funding for the provision

of disposable medical supplies. The ASIK application (*Aplikasi Sehat Indonesiaku*) is a platform designed to record immunizations and facilitate early detection of non-communicable diseases. Nevertheless, its limitation lies in its inability to monitor patient adherence, particularly among individuals with diabetes. Therefore, it is necessary to develop an application that provides solutions for diabetes management, including health guidelines for patients, dietary management, physical activity, medication adherence, and spiritual components, while also optimizing the role of family as a key support factor in the management of diabetes mellitus. To address this need, we present *SIPANDEM* (Diabetes Mellitus Monitoring Application). The advantage of this application lies in its ability to monitor dietary management, physical activity, blood glucose checks, spiritual activities, and medication adherence in diabetes patients, while simultaneously involving family members in the monitoring process. Based on a preliminary survey conducted among 10 diabetes patients in the Kramatwatu Community Health Center area, respondents reported that the SIPANDEM application was helpful in supporting their self-management.

LITERATURE REVIEW

Diabetes Mellitus is a disease that causes abnormal blood glucose distribution (Rahmawati, 2022). Diabetes Mellitus (DM) is a cluster of symptoms that occur in patients due to elevated blood glucose levels, which result from decreased insulin production leading to insulin resistance (Khadori, 2024)

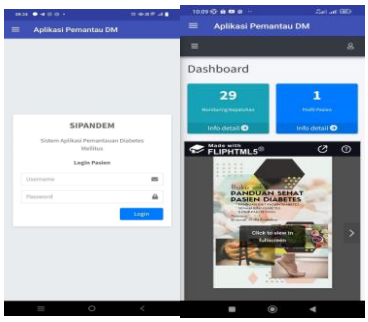
Diabetes mellitus can lead to both short- and long-term complications. Acute conditions such as hypoglycemia and hyperglycemia may result from imbalanced treatment, with the latter potentially progressing to diabetic ketoacidosis. Over time, chronic hyperglycemia contributes to serious complications including neuropathy, cardiovascular disease, retinopathy, and nephropathy, which significantly increase morbidity and mortality among patients (Iwasaki, Yagyu, & Shimano, 2025)

The management of diabetes mellitus is based on five key pillars, namely medication, lifestyle modification, education, and regular blood glucose monitoring. Pharmacological therapy such as metformin is recommended when lifestyle changes are insufficient, while insulin is indicated in cases of severe hyperglycemia. Lifestyle management focuses on proper diet planning and physical activity, supported by patient education to enhance understanding and stress control. Regular monitoring of blood glucose is also essential to prevent complications such as hypoglycemia and hyperglycemia (Wainstock, et al., 2020)

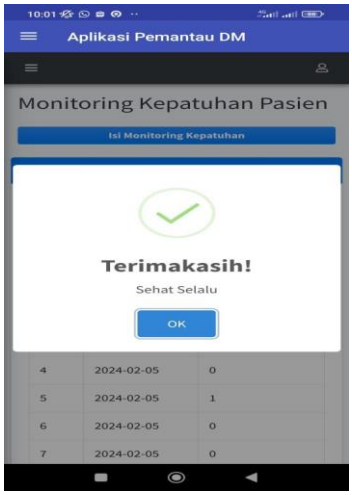
Adherence is defined as an attitude and behavior aimed at fulfilling instructions or requests from others (Fatimah & Mutmainah, 2022). According to (Khunti, Seidu, & Davies, 2017), adherence plays a critical role in reducing mortality rates and minimizing the excessive burden on healthcare systems, a finding that aligns with the study conducted by (Khunti, Seidu, & Davies, 2017) . In the context of diabetes mellitus, adherence to dietary management, medication, physical activity, and regular blood glucose monitoring is essential to prevent complications and improve patients' quality of life

The "SIPANDEM" application was developed to support diabetes

self-management through monitoring of diet, physical activity, medication, spiritual practices, and blood glucose checks. It also engages family members in adherence monitoring, aiming to improve patient discipline, reduce complications, and enhance both life expectancy and productivity.



Gambar 1. Tampilan Login dan Halaman Muka Aplikasi SIPANDEM



Gambar 2. Hasil Pengisian Aplikasi SIPANDEM (Pada Pasien Kategori Patuh), dan tampilan yang dapat diakses oleh operator PKM

The SIPANDEM application is expected to contribute to monitoring treatment adherence among diabetes mellitus patients. The research problem in this study is: How effective is the use of the SIPANDEM application in monitoring treatment adherence among diabetes mellitus patients in the working area of Kramatwatu Community Health Center?

RESEARCH METHODS

This study employed a quantitative research design with a descriptive correlational approach to examine the relationship between two or more variables using a cross-sectional method. The study assessed the relationship between respondent characteristics (age, gender, duration of illness, and knowledge) and treatment adherence among diabetes patients. To determine the effectiveness of the SIPANDEM application in

monitoring adherence, statistical analysis was performed using the Paired t-test..

To recruit research participants, the researcher employed a random sampling technique. In practice, a total of 40 respondents who were willing to participate and consistently used the application were included in the study..

RESEARCH RESULT

Tabel 1. Age Responden Distribution, n: 40

Umur	Frekuensi	Persentase (%)
50-54	9	22.5
55-60	11	27.5
61-64	6	15.0
65-70	12	30
>70	2	5
	40	100%

Table 1 shows that the majority of respondents were in the age range of 65–70 years (30%).

Tabel 2. Gender of Respondents, n : 40

Jenis Kelamin	Frekuensi	Persentase (%)
Laki-laki	17	42.5
Perempuan	23	57.5
	40	100%

Table 2 shows that the majority of respondents were female (57.5%).

Tabel 3. Duration of Illness, n ; 40

Lama Sakit	Frekuensi	Presentase (%)
1-2 tahun	8	20
3-4 tahun	17	42.5
5-6	13	32.5
>7	2	5
	40	100

Table 3 shows that the majority of respondents had an illness duration of 3–4 years.

Table 4. Table of the Relationship Between Age and Treatment Adherence in Diabetes Mellitus Patients

	p value	*Correlation Coefficient*
Umur Kepatuhan	**0.107**	**0.259**

Table 4 indicates that there was no significant relationship between age and treatment adherence among diabetes mellitus patients (p-value = 0.280).

Table 5. Table of the Relationship Between Gender and Treatment Adherence in Diabetes Mellitus Patients

	p value	*Correlation Coefisient*
Gender	**0.951**	**-0,10**

Tabel 5 indicates there was no significan relationship gender and treatment adherence among diabetes mellitus (p-value=0.951)

Table 6. of the Relationship Between Duration of Illness and Treatment Adherence

	p value	*Correlation Coefficient*
Lama Sakit	**0.004**	**0.445**

Table 6 incicates there was significant relationship between duration of illness and treatment adherence among diabetes mellitus (p-value=0.004).

Table 7. *Effectiveness of the SIPANDEM Application on the Adherence of Diabetes Mellitus Patients*

	Kepatuhan	**St Deviasi**	***P value***
Pre Test	**10.425**	**8.806**	**0.000**
Post Test	**26.350**		

Table 7 shows that the average adherence of diabetes patients in self-management before using the application was 10.43 days, while after using the application it increased to 26.35 days. The paired t-test analysis demonstrated a statistically significant effect of the SIPANDEM application on patient adherence (p-value = 0.000).

DISCUSSION

Relationship Between Age and Adherence of Diabetes Mellitus Patients

Age refers to the difference between the date of the survey and the respondent's date of birth, and it is a common demographic variable in most studies. The results of this study indicate no significant relationship between age and

adherence (p-value = 0.107). This finding is consistent with the study by (Nascimento T. , et al., 2025), which reported no significant correlation between age and treatment adherence among elderly diabetes patients. Similarly, (Widyangka, Pramudyatama, & Noviyanti, 2025) also found no association between age and medication adherence. However, this result contrasts with Pangesti & Purnamaningsih (Pangesti & Purnamaningsih, 2021), who argued that older patients tend to be more compliant with protocols. Factors such as cognitive decline, memory loss, negative beliefs about medication, limited health literacy, mental health issues, lack of family support, and socioeconomic challenges may explain why age alone does not significantly influence adherence (Ibrahim, Edis, & Owais, 2020).

Relationship Between Gender and Adherence

The results showed no significant association between gender and adherence (p-value = 0.905). This is in line with (Rosalinda & Nugraheni, 2025), who found no gender differences in medication adherence among diabetes patients in Yogyakarta. Similarly with (Baedlawi, Hardika, & T.D, 2023) reported no correlation between gender and adherence. In contrast, Bhuyan (2018) suggested that gender could influence adherence. Nevertheless, many scholars argue that adherence is more influenced by knowledge, motivation, and personal beliefs rather than gender. Additionally, factors such as education and family support are more dominant predictors of adherence (Al-Khawaladeh, 2022).

Relationship Between Duration of Illness and Adherence

Duration of illness refers to the time from the initial onset of symptoms until recovery or death (Mahendra, 2022) further described it as the effect of illness duration from the first medical visit until the disease becomes chronic. The findings indicate that illness duration significantly influences adherence as recorded in the SIPANDEM application. This aligns with (Rosyidah, 2022), who reported that longer illness duration was associated with better adherence. However, (Sharma D. e., 2023) found the opposite in India, where patients with diabetes for more than 10 years showed lower adherence. Longer illness may provide patients with greater educational experiences, awareness of complications, and stronger motivation to follow medical prescriptions due to close interaction with healthcare providers.

Effectiveness SIPANDEM for Adherence in Diabetes Mellitus Patients.

Adherence to the four pillars of diabetes management is key to reducing morbidity and mortality and improving quality of life. Government efforts through chronic disease programs in primary health care require technological support to facilitate monitoring, involve families, and motivate patients. Consistent monitoring increases patient discipline in implementing diabetes management. This is supported by (Efensi, Buston, & Septiyanti, 2021), who found that good management of the four pillars improved adherence. Following the implementation of SIPANDEM among 40 respondents for one month, correlation analysis confirmed its effectiveness in monitoring

adherence. This aligns with the findings of (Andriyana, Erawati, & Sujianto, 2023), who reported that mHealth applications can improve glycemic control and adherence among adults with type 2 diabetes mellitus.

CONCLUSION

The SIPANDEM Aplication is effective in monitoring the adherence of diabetes mellitus patients.

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