

**EFFECTIVENESS OF IMPLEMENTING MOBILE MONITORING APPLICATIONS ON
COMPLIANCE OF DIABETES MELLITUS PATIENTS IN THE INFECTIOUS
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Disubmit: 21 April 2026 Diterima: 28 Juli 2026 Diterbitkan: 01 Agustus 2026
Doi: <https://doi.org/10.33024/mnj.v8i8.25688>**ABSTRACT**

Diabetes Mellitus (DM) is a chronic metabolic disease with many causes which is generally characterized by increased blood glucose levels accompanied by impaired carbohydrate, lipid, and protein metabolism as a result of impaired insulin function. In the current era, technology can facilitate health care with simple messages and warnings that help achieve adherence to treatment for patients with the disease. Lack of knowledge, lack of family support, poor communication with health workers, and limited health literacy are factors that hinder the compliance of diabetes mellitus sufferers in taking medication, thus causing blood sugar to tend to be uncontrolled. To determine the effectiveness of the application of mobile monitoring applications on dietary compliance of Diabetes Mellitus patients in the Inpatient Room of Mekar Sari Hospital, Bekasi. This research uses a quantitative design with a quasi-inquiry method. experiment one group pre-test and post-test. The research sample consisted of 24 patients in the inpatient ward of Mekarsari Hospital, Bekasi. Data analysis was performed using the Dependent T- test or Wilcoxon test, according to the data distribution. The results of the study showed that the use of mobile monitoring accompanied by filling out a diet questionnaire had a significant impact on the management of Diabetes Mellitus patients. This was demonstrated by the results of the statistical analysis with a p-value of 0.000 (<0.05), which indicates a significant relationship between the use of mobile monitoring and patient compliance in filling out the diet questionnaire. The use of mobile monitoring is accompanied with filling proven diet questionnaire give significant influence in management Diabetes Mellitus patients. This shown by the results analysis statistics showing existence meaningful relationships between mobile monitoring usage and level compliance patient in fill in diet questionnaire. With Thus, the application of mobile monitoring can become one of the effective strategies For increase compliance patient as well as support more optimal management of Diabetes Mellitus.

Keywords: Diabetes Mellitus, Effectiveness, Mobile Monitoring.**INTRODUCTION**

Diabetes Mellitus (DM) is a chronic metabolic disease with many causes which is generally

characterized by increased blood glucose levels accompanied by impaired carbohydrate, lipid, and

protein metabolism as a result of impaired insulin function (Nurhidayah et al., 2020). Diabetes Mellitus is classified into many types, but the most common types are type 1 and type 2 DM. Type 2 DM is characterized by insulin resistance and decreased insulin production (Ministry of Health of the Republic of Indonesia, 2019). In 2021, an estimated 536.6 million people worldwide suffer from diabetes mellitus and will increase to 783.2 million by 2045. The age group 75-79 years is the age group that suffers most from diabetes mellitus. The prevalence of diabetes mellitus is higher in urban areas (12.1%) compared to rural areas (8.3%) and in high-income countries (11.1%) compared to low-income countries (5.5%) (Sun et al., 2022; Setyawati et al., 2020). Diabetes mellitus management essentially aims to achieve controlled glucose levels, prevent complications, improve quality of life, and maintain optimal body function. All three major reference sources—PERKENI 2021, American Diabetes Association (ADA) 2022, and Brunner & Suddarth—emphasize a similar approach, namely a combination of non-pharmacological and pharmacological management, and ongoing monitoring (Lee & Kim, 2024).

Type 2 DM patient compliance is the extent to which patients follow therapeutic recommendations given by healthcare professionals, including the consumption of antidiabetic drugs, a diabetic diet, physical activity, blood sugar monitoring, and routine check-ups. According to the WHO (2003), compliance is patient behavior that is in accordance with healthcare professional recommendations. Perkeni (2021) emphasized that compliance in DM

patients includes comprehensive therapy management to achieve glycemic targets. Meanwhile emphasized medication compliance as a key component in preventing long-term complications in type 2 DM patients. Factors that influence blood sugar control in diabetes mellitus sufferers include good knowledge about DM, regular consumption of blood sugar medication, exercise, diet and regular blood sugar checks (Jerita et al., 2023).

In today's era, technology can facilitate healthcare with simple messages and alerts that help achieve patient adherence to treatment (Permatasari, 2022). One technology that can be applied to improve adherence and glycemic control in patients with type 2 diabetes mellitus is mobile health (mHealth). mHealth is considered a fast, accurate, simple, affordable, convenient, and safe technology (Retnoningrum & Herawati, 2023). Research related to the benefits of mHealth for diabetes management. The effectiveness of mobile applications is demonstrated by the application's ability to change health behaviors, including improving patient adherence, through consistent reminder, feedback, and self-monitoring features. Research on the use of mobile monitoring applications to improve adherence in patients with diabetes mellitus has been widely conducted and has shown consistent results (Wang et al., 2017).

Diabetes monitoring applications can improve self-care behaviors such as blood sugar monitoring, dietary adherence, and physical activity, and contribute to lowering HbA1c in patients with type 2 diabetes. Furthermore, a study by Free et al. (2013) reported that mobile health-based interventions

effectively increased health behavior change and medication adherence through digital reminder and education features (Eberle et al., 2021). Also showed that mobile-based monitoring systems provide structured feedback, thereby increasing patient engagement and adherence to therapy. Another study by that monitoring applications that provide real-time data, personalization, and two-way communication have been shown to improve self-management in diabetes patients and strengthen adherence to treatment (Aulia et al., 2024). These findings are supported by a study by which stated that the quality of application features, ease of use, and user retention are important factors determining the effectiveness of mobile applications in supporting adherence in chronic patients, including those with diabetes (Stephanie E et al., 2020).

Overall, these research results indicate that mobile monitoring applications have a positive impact on diabetes patient adherence through reminder mechanisms, self-monitoring, education, and integration with healthcare services. However, several studies have also highlighted that effectiveness is influenced by duration of use, patient digital literacy, app design, and user preferences (Fithriana et al., 2025). Therefore, research on the effectiveness of mobile apps remains relevant, particularly in the context of local populations with varying characteristics in terms of technology access and health education needs.

LITERATURE REVIEW

The concept of DM patient compliance refers to the extent to which patients follow medical recommendations including diet, medication, physical activity, and blood sugar checks. According to chronic health literature, the concept of DM patient compliance, (Lukito, 2021); (Winaningsih et al., 2020). Lack of knowledge, lack of family support, poor communication with healthcare professionals, and limited health literacy are factors that hinder compliance in diabetes mellitus patients in taking medication, resulting in a tendency for blood sugar to be uncontrolled (Andriyana et al., 2023). Controlling blood sugar in patients with diabetes mellitus is very important to prevent various complications that arise (Mirahmadizadeh et al., 2020).

RESEARCH METHOD

This research uses a quantitative design with a quasi-inquiry method. experiment one group pre-test and post-test . The research sample consisted of 24 patients in the inpatient ward of Mekarsari Hospital, Bekasi . Data analysis was performed using the Dependent T- test or Wilcoxon test , according to the data distribution. Study This conducted at Mekar Sari Hospital which has apply or allow use mobile monitoring application by patients . Period implementation study started from stage preparation until writing report in a way the whole thing that will held on 01-10 December 2025

RESEARCH RESULTS

Table 1. Distribution Frequency Type Gender And Age

Frequency Characteristics		Percentage
Gender		
Man	10	41.7
Woman	14	58.3
Total	24	100.0
Age		
Age 46-50 Years	7	29.2
Age 53-58 Years	4	16.7
Age 61-69 Years	9	37.5
Age 70-77 Years	4	16.7
Total	24	100.0

Based on the table above Distribution Frequency type gender , known type female genitalia more dominant with total 14 people (58.3%) and male as many as 10 people (41.7%). Meanwhile For Age , unknown that part big respondents is at the age of 16 years , namely as many as 18 respondents (52.9%).

Furthermore , respondents with aged 61-69 years totaling 9 respondents (37.5 %), while respondents with age 46-50 years as many as 7 people (29.2%). Followed ages 53-58 and 70-77 years own the same amount is also group minimum age , namely as many as 4 respondents (16.7%).

Table 2. Distribution Frequency Knowledge and Behavior

Test Statistics	
	Previous Score Score After
Z	-3.875 ^b
Asymp . Sig . (2-tailed)	<,001

Wilcoxon test results shows a Z value of -3.875 with a significance value Asymp.Sig . (2 tailed) is $p < 0.001$. The significance value is smaller than 0.05 ($p < 0.05$) so H_0 is rejected and H_a is accepted. This

shows that there is a significant difference between the diet compliance scores before and after using the mobile application . monitoring in Diabetes Mellitus patients.

DISCUSSION

The research results show that the majority of respondents in this study were in the elderly group. This condition indicates that diabetes mellitus sufferers are more common

in older age groups. This may occur because with age, various physiological changes occur in the body that can affect glucose metabolism. Increasing age is

associated with a decline in organ function, including the pancreas's function in producing insulin. Furthermore, with aging, insulin resistance can also increase, causing the body to become less effective in controlling blood glucose levels. This condition puts elderly individuals at a higher risk of developing diabetes mellitus. According to Smeltzer and Bare, increasing age is a major risk factor for diabetes mellitus. This is due to changes in the body's metabolism that can affect the body's ability to regulate blood glucose levels. Furthermore, lifestyle factors such as lack of physical activity and irregular eating patterns can also exacerbate the condition. The results of this study align with several previous studies that found that diabetes mellitus is more common in the elderly. This suggests that age plays a significant role in the development of diabetes mellitus.

The study results showed that there were more female respondents than male respondents. This indicates that women are more likely to develop diabetes mellitus than men. Physiologically, women have several factors that can affect glucose metabolism in the body, particularly those related to hormonal changes. In women entering menopause, there is a decrease in the hormone estrogen, which can affect insulin sensitivity and glucose metabolism in the body.

Furthermore, women also tend to experience weight gain, which can affect the risk of insulin resistance. This condition can increase the likelihood of developing type 2 diabetes mellitus. According to the International Diabetes Federation, hormonal changes that occur in women can increase the risk of glucose metabolism disorders.

This makes women one of the groups at high risk for diabetes mellitus.

Mobile application In this study, monitoring serves as a tool to assist patients in managing their daily diet. Through this application, patients can obtain information on recommended foods for people with diabetes mellitus and dietary adjustments appropriate to their health condition. Apart from being an information medium, mobile applications Monitoring can also serve as a reminder for patients to maintain a regular diet. With reminders and monitoring via the app, patients become more aware and motivated to follow the dietary recommendations provided by healthcare professionals.

According to the theory proposed by (Notoatmodjo), changes in a person's health behavior are influenced by several factors, including knowledge, attitudes, and the availability of supporting facilities that make it easier for individuals to implement healthy behavior. In this study, a mobile application was used. Monitoring serves as a supportive tool to help patients improve adherence to recommended diets. Furthermore, the use of mobile monitoring applications aligns with the concept of self-management in chronic disease management. Diabetes mellitus management relies not only on healthcare professionals but also requires the patient's active involvement in monitoring diet, physical activity, and other health behaviors.

The results of this study also align with several previous studies showing that the use of mobile app-based health technology can help improve patient adherence to chronic disease management. Health technology makes it easier for patients to access health

information and monitor their health independently.

Based on the study results, all 24 respondents demonstrated compliance in completing the Diabetes Mellitus diet questionnaire via mobile monitoring. This indicates that patients have a good level of acceptance of the use of technology in monitoring their health. This finding aligns with research (Gusdiani et al., 2021), which states that the use of simple and easily accessible monitoring instruments can improve patient compliance in following treatment programs. Furthermore, research (Angraeni, 2023) also shows that patient compliance in completing monitoring instruments contributes to improved patient safety and the quality of healthcare services.

Patient compliance in completing the diet questionnaire is crucial to prevent errors in the management of diabetes mellitus, particularly related to dietary intake. Complete and accurate questionnaire completion can assist healthcare professionals in evaluating and adjusting patient care plans. The study's findings indicate that the use of mobile monitoring coupled with a diet questionnaire plays a positive role in the management of diabetes mellitus patients. All respondents who used the system reported no problems monitoring their diet during treatment. Statistical tests showed a significant relationship between mobile monitoring use and patient compliance. These findings align with research (Latief et al., 2025) that found that implementing a technology-based monitoring system significantly improves patient safety and quality of care. Research (Andriyana et al., 2023) also demonstrated that the use of structured monitoring instruments

can reduce the risk of complications and improve patient clinical outcomes. However, these findings differ slightly from research (Lukito, 2021), which reported that despite the implementation of the monitoring system, obstacles were encountered in its implementation due to resource constraints and user compliance. These differences indicate that the effectiveness of mobile monitoring is strongly influenced by system readiness and the commitment of all parties involved.

CONCLUSION

Based on results study The effectiveness of implementing the Mobile Monitoring Application on Diet Compliance in Diabetes Mellitus Patients in the Sleeping Room at Mekar Sari Hospital , can be concluded that Use of accompanying mobile monitoring with filling proven diet questionnaire give significant influence in management Diabetes Mellitus patients . This shown by the results analysis statistics showing existence meaningful relationships between mobile monitoring usage and level compliance patient in fill in diet questionnaire . With Thus , the application of mobile monitoring can become one of the effective strategies For increase compliance patient as well as support more optimal management of Diabetes Mellitus .

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