



Influence of health reminders on the self-management of patients with diabetes mellitus at Patas Health Center, Central Kalimantan

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Pengaruh pengingat kesehatan terhadap manajemen diri pasien diabetes mellitus di Puskesmas Patas, Kalimantan Tengah

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ABSTRACT

Background: Telemedicine has an important role in diabetes mellitus management, including health reminders. Diabetes mellitus sufferers need to have good self-care management skills to prevent complications. One way to establish a good level of self-management is by providing reminders containing self-management components through communication media.

Purpose: To analyze the influence of health reminders on the self-management of patients with diabetes mellitus at Patas Health Center, Central Kalimantan.

Methods: This study type was quantitative, and the design used the quasi-experimental method with a pre-post test design with a control group. The sample in this study was 74 respondents via purposive sampling, with 37 respondents in each group, with an intervention group and a control group. The data collection in this study used questionnaire measurement tools and data analysis using the Mann-Whitney and Wilcoxon tests.

Results: The research results showed that the results of the analysis using the Wilcoxon test in the control group showed $p > 0.05$, namely 0.82, which means there was no significant increase in the control group. In the intervention group, $p < 0.05$ is the same as 0.00, which means there is a significant increase in self-management abilities in the intervention group. Meanwhile, the Mann-Whitey result was $p = 0.00$, meaning there was a difference between the intervention and control groups.

Conclusion: Health reminders have a positive influence on the self-management of diabetes mellitus patients. Health reminders need to be implemented by service facilities, especially in caring for diabetes mellitus patients. The government also needs to pay attention to implementing telenursing in service facilities.

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1. Background

Diabetes mellitus is a long-term disease that cannot be cured. In diabetes, high blood sugar acts like poison. Diabetes is often called the 'silent killer' if the symptoms are ignored and complications are discovered[1]. At the end of 2021, the International Diabetes Federation (IDF), in its 10th edition of the atlas, confirmed that diabetes is one of the fastest-growing global health emergencies in the 21st century. In 2021, 537 million people from all over the world will live with diabetes, and this number is projected to continue to increase every year[2].

It should be noted that Indonesia is ranked 6th in the country with the highest number of diabetes sufferers, namely 10.7 million[2]. The prevalence of diabetes mellitus in Indonesia, according to the Basic Health Research report (RISKESDAS), has increased from 6.9% in 2013 to 8.5% in 2018 (RISKESDAS, 2018). The Health Research and Development Agency (LITBANGKES) of the Ministry of Health of the Republic of Indonesia (2019) stated that Province Central Kalimantan contributes as much as 0.7% of the population of people with diabetes in Indonesia.

In Patas Regency, in 2020, there were 2,830 diabetes mellitus sufferers spread across 8 villages[3]–[5].

The importance of diabetes mellitus care management will affect the patient's quality of life. Patients with diabetes mellitus who are not able to do management maintenance themselves will have a negative impact on the patient and even trigger the emergence of a new disease. Uncontrolled blood sugar levels result in various complications, such as neuropathy, retinopathy, nephropathy, diabetic ulcers, and many more[6]. However, along with the times and advances in technology, treatment of patients with chronic diseases can no longer only be done in hospitals or other health facilities but can now be done at home through media health reminders [7], [8]. The Health Reminder is a model of care for people with chronic diseases through the use of communication technology and remote information[9].

The technology that can be used in health reminders varies greatly, including: telephone, computer, smartphones, audio conferencing, etc. Forms of use of health reminders include websites, social media, WhatsApp, and software in the form of health reminder applications [1], [10].

Based on the results of a preliminary study conducted at the Patas Community Health Center on Tuesday, March 7, 2023, it shows that 7 out of 10 patients have poor diabetes management skills, still often consume food outside the diet program, and rarely do physical activity such as exercise. Some of them said that they already understand diabetes treatment but still often skip it because they forget. Patients' willingness to embrace technological advances, especially the use of smartphones, is quite high, as evidenced by the fact that 6 out of 10 patients surveyed have used smartphones and WhatsApp to communicate over long distances. The aim of this study was to analyze the influence of health reminders on the self-management of patients with diabetes mellitus at Patas Health Center, Central Kalimantan.

2. Methods

The methods follow the following structure:

2.1 Research design

This study type was quantitative, and the design used the quasi-experimental method with a pre-post test design with a control group.

2.2 Setting and sample

The sample in this study was 74 respondents via purposive sampling, with 37 respondents in each group, with an intervention group and a

control group. The data collection in this study used questionnaire measurement tools. The criteria determined by researchers are as follows:

Criteria inclusion

- a. Patients with diabetes who own smartphones and use WhatsApp
- b. Patient with diabetes, which has data and good internet access during the research
- c. Willing to become respondents

Criteria exclusion

- a. Diabetes patients who have complications

2.3 Instruments and data collection

The instrument or measuring tool used in this research is the health reminder variable using SPO regarding diabetes mellitus care, which has 5 indicators: diet, activity, pharmacology, monitoring blood sugar levels, and foot care. The information provided via the WhatsApp application is in the form of reminders in the form of text messages regarding diabetes mellitus treatment. Meanwhile, the self-management variable uses a questionnaire for self management of diabetes mellitus, which is used as a pre-post test. The questionnaire was adopted from I Gusti Ayu (2022), which contains questions about self-management variables that focus on diet patterns, physical exercise, pharmacological interventions, and blood sugar monitoring. This questionnaire consists of 20 types of questions with pattern setting indicators: diet (numbers 1, 2, 3, 4, 5, 6, 7, 8), exercise physique (numbers 9, 10, 11), blood sugar monitoring (12, 13, 14), pharmacological interventions (numbers 15, 16), and foot care (numbers 17, 18, 19, and 20). By using an assessment score of 1: never, 2: rarely, 3: sometimes, and 4: always. Which were then calculated and categorized into good, sufficient, and poor.

2.4 Data analysis

Data analysis in this study used univariate and bivariate analyses. The variables analyzed univariately in this study were age, education, and employment. The form of univariate analysis is presented in the form of distribution frequency. while for bivariate analysis to analyze the effect of health reminders on glucose levels and self-management in diabetes patients at the Patas Health Center. Analysis of the effect of health reminders on self-management uses the Wilcoxon test and the Mann-Whitney test. If $p < \alpha$ (0.05), then the hypothesis is accepted, which means health reminders have an influence on self-management in diabetes mellitus patients.

2.5 Research ethics

The ethical principles of this research are providing informed consent, the right to autonomy, confidentiality, justice, and anonymity.

3. Results

In this study, the respondents were of average age (41.54 in the group intervention and

45.76 in the control group), with the majority having elementary school or equivalent education, namely 40.5% in the intervention group and 45.9% in the control group. The majority of respondents work in the private sector, with 43.3% in group intervention and 40.6% in the control group. Detailed information about characteristics, demographics, and respondents is explained in Table 1.

Table 1. Respondent characteristics

Characteristics	Intervention group		Control group	
	Frequency	Percentage	Frequency	Percentage
Age (years)		years		years
Mean:		41.54		45.76
Maximum:		59		53
Minimum:		35		34
Education				
Elementary school	15	40.5%	17	45.9%
Junior high school	14	37.8%	8	21.6%
Senior high school	6	16.2%	12	32.4%
Bachelor/master	2	5.4%	0	0
Work				
No work	11	29.7%	14	37.8%
Entrepreneur	9	24.3%	8	21.6%
Government employees	16	43.3%	15	40.6%
Private employees	1	2.7%	0	0%

Data on self-management abilities in the intervention group showed that most of them had moderate ability to carry out self-management before being given the health reminder intervention, namely 26 respondents with a percentage of 70.3%, and the control group was mostly at a sufficient level of ability, namely 29

people (78.4%). Meanwhile, after being given the health reminder intervention, namely in the intervention group, most were at a good level of ability, namely 28 people with a percentage of 75.7%, and in the control group, most were still at a moderate level of ability, namely 27 people (73.0%). Detailed information is explained in Table 2.

Table 2. Self management pre-test and post-test

Characteristics	Intervention group		Control group	
	Frequency	Percentage	Frequency	Percentage
Self-management pre-test				
Good	11	29.7%	8	21.6%
Moderate	26	70.3%	29	78.4%
Poor	0	0%	0	0%
Self-management post-test				
Good	28	75.7%	10	27.0%
Moderate	9	24.4%	27	73.0%
Poor	0	0%	0	0%
Wilcoxon test		p= 0.00		p= 0.82
Mann-Whitney test		p= 0.00		

4. Discussion

Self-management of diabetes mellitus is action-independent, which must be done by diabetes patients in everyday life[1], [11]. There are five pillars of implementing self-management that must be carried out by diabetes patients with mellitus: diet, activity/exercise physical therapy, pharmacological therapy, monitoring blood sugar levels, and foot care[7], [12]. The results showed that the characteristics of respondents based on age were 41.54 years old in the intervention group and 45.76 years old in the control group. Diabetes screening must start at the earliest age, 45 years. This is because the older a person gets, the more bodily functions decline[2]. Ages over 30 years are at risk of suffering from diabetes due to anatomical, physiological, and biochemical decline[1], [6]. Another factor that influences diabetes is education. In this study, it was found that the majority of respondents had elementary school education, namely 15 respondents (40.5%) in the intervention group and 17 respondents (45.9%) in the control group. A person's education is related to their knowledge about health and understanding of how to manage self-care[1], [13].

The educational factor is one variable that has a significant correlation with diabetes patient compliance in self-care management. A high level of education can influence the level of knowledge about health. The characteristics of respondents based on work showed that most respondents had jobs. In the intervention group, the results showed that 26 respondents were working, divided into self-employed, private sector, and civil servants. In the control group, there were as many as 23 respondents. Work as self-employed or private; 14 others do not work. Occupational factors influence the risk of diabetes; working with light physical activity will cause the body to burn energy, thereby triggering the risk of diabetes mellitus. It can be concluded that type of work affects the risk of developing diabetes mellitus; work with less activity can cause a lack of energy burning in the body, resulting in a greater risk of developing diabetes mellitus[6], [12], [14].

Based on the results of research on ability levels, self-management after the health reminder intervention in the intervention group was mostly at a good level of 86.5%, and in the control group it was at level A, which is enough, namely 75.7%. Orem's theory states that self-care is an activity carried out by individuals themselves to fulfill the need to maintain health. Orem said there are three

levels at which the nursing system is designed to meet the needs of maintenance patients, one of which is a supportive educational system. This person can form or learn from internal and external self-care but can't do it without help. This system is implemented so that patients can carry out nursing tasks after being given education and a reminder of their health. The support system using the reminder method is a development of this system[7], [8], [15].

One of the information technologies that is currently developing and in demand is WhatsApp. WhatsApp features include chatting, sending files in any format, sending photos and videos, and even the ability to host conferences using WhatsApp's web, LCD, and speaker[11], [16]. This is supported by research by Pereira et al. (2020), which revealed that WhatsApp made education and health more effective online during the COVID-19 pandemic with many supporting features. Providing intervention form Reminders self-management by using media WhatsApp This aim is to facilitate diabetes mellitus patients regarding self-care management at home. Giving interventions with reminders has been proven effective in improving the self-management of diabetes mellitus patients[9], [10], [17].

Health reminder intervention found that there was an increase in ability in the intervention group patients; on average, they were at a good ability level of 86.5% (32 people), but there were still those who had enough ability, which is 13.5% (5 people). Results test statistics: Mann-Whitney obtained a p-value of 0.00 or < 0.05 between the intervention and control groups, so the hypothesis is accepted, which means there is an influence of health reminders on self-management in diabetes mellitus patients. The results of this study indicate that health reminders are effective in improving self-management abilities in patients with diabetes mellitus, namely the reminder concept, which is given using simple communication and carried out regularly. Mobile and internet technologies are widely present, which can then be utilized to promote disease management and facilitate behavior modification[9], [17], [18].

The use of mobile phones or smartphones as a medium for health intervention has advantages, including the tendency of users to carry mobile phones everywhere, making it easier for health workers to send information and support to patients [1], [9], [17]. The results of this study are in line with those of Haddad et al. (2014). The results show that, apart from being acceptable, the

telenursing method is also more cost-effective and can be used to support diabetes care. increasing foot care knowledge, foot care practices, and metabolic control in patients with diabetes mellitus through text message-based interventions[19].

Indonesia is an archipelagic country that is very suitable for the application of telenursing as an answer to the problem of unequal health services in Indonesia, but of course the government and professional organizations must create regulations that will regulate telenursing practices, namely standards of practice, codes of ethics, protocols, and telenursing guidelines in Indonesia[1], [8], [10], [16], [20].

5. Conclusion

It can be concluded that Health reminders have a positive influence on the self-management of diabetes mellitus patients. Health reminders need to be implemented by service facilities, especially in caring for diabetes mellitus patients. The government also needs to pay attention to implementing telenursing in service facilities.

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