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ORIGINAL RESEARCH

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THE EFFECT OF HEALTH EDUCATION THROUGH SESSION-HEALTH APPLICATION MEDIA ON BEHAVIOR MANAGEMENT BEHAVIOR OF DIABETES MELITUS IN BENGKULU CITY

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic disease that requires specific self-management behavior for a lifetime, to avoid long-term diabetic complication. Education about diabetes self-management for people with diabetes mellitus and families is absolutely necessary to overcome diabetic complications. The use of smartphones as educational media provides space for people with DM without restrictions on place and time.

Objective: The aims of this study was to identify the effect of health education through the Salam-Sehat application media on diabetes self-management behavior.

Method: This research is quantitative with pre-experiment design with one group pre-test post-test. The population of this study was all people with DM in Bengkulu City. Sample was selected by using Multi Stages Cluster Sampling technique. The sample size was determined using the Slovin formula which results are 384 respondents. The sample was selected by using proportional random sampling. The Data were analyzed by using the Wilcoxon Signed Rank Test.

Result: The results showed that the average DM self-management behavior before being given education through the Salam-Sehat application was 35.42 and the average DM self-management behavior after being given education through the Salam-Sehat application was 65.18. There is significant influence of health education through Salam-Sehat application media for self-management behavior among diabetes mellitus people in Bengkulu City, with Asymp value. Sig (p) = 0.000.

Conclusion: It is expected that the research results of the Salam-Sehat application can be used as an online-based health education media that provides convenience in obtaining health information without being limited by space and time for people with DM in Bengkulu City.

Key words: Diabetes Mellitus, Self-Management, Application.

INTRODUCTION

Diabetes mellitus (DM) is still a serious problem to the world's population. World Health Organization (WHO) states that the prevalence number of the cases of diabetes continues to increase every year. WHO estimates that globally, 422 million adults over the age of 18 lived with diabetes in 2014, the number of diabetics increased

substantially between 1980 and 2014, increasing from 108 million to 422 million or about four times (Kemenkes RI, 2018). Diabetes caused 1.5 million deaths in 2012. The result of high blood sugar level was an additional on 2.2 million deaths, by raising the risk of cardiovascular and other diseases. 43% of the 3.7 million deaths occurred before 70 years of age (WHO

Global Report, 2016). Diabetes Mellitus is estimated ranks 7th for the cause of world death in 2030 (Kemenkes, 2013).

The International Diabetes Federation (IDF) Atlas 2017 reported that the diabetes epidemic in Indonesia is still showing an increasing trend (Chou, 2018). Indonesia is the sixth ranked country in the world after China, India, the United States, Brazil and Mexico with the number of diabetics aged 20-79 years around 10.3 million people (Kemenkes, RI. 2018). The increasing number of diabetic's patient DM type II is from 90% to 95% (Smeltzer & Bare, 2013).

Diabetes mellitus (DM) is a chronic progressive disease characterized by the body's inability to metabolize carbohydrates, fats and proteins leading to hyperglycemia or high blood glucose levels (Black & Hawks, 2014). Apart from death, complications of this disease can lead to disorders (nerve of the eye) retinopathy, nephropathy, and nerve disease (stroke), high blood pressure, and abnormalities of the heart, liver and kidneys (Waspadji dalam Setiati, 2015).

Diabetes mellitus is a chronic disease that requires self-management behavior specifically for a lifetime, so patients must learn about diabetes self-management. Patients must not only learn skills to care for themselves, but also must have preventive behaviors in lifestyle to avoid long-term diabetic complications. Various studies shown that patient adherence to regimens performed by doctors in diabetic clients is generally low. This non-compliance is one of the obstacles in managing diabetes (Basuki dalam Soegondo, 2015). To overcome this, education about diabetes self-management for persons and their families is absolutely necessary.

Waspadji in Soegondo (2015), defining diabetes education as training education on knowledge and skills for diabetic patients aimed at supporting behavioral changes to improve patient understanding of the disease, which is

needed to achieve optimal health and adjustments to psychological conditions and a better quality of life. The information media are developing quite rapidly nowadays and have an important role in the dissemination of information including information about diabetes mellitus. One of the most widely used information media is mobile phones.

According to data from the Central Statistics Agency (BPS) in 2016 most of people aged more than 5 years, namely 85.75% access the internet through mobile phones. The results of the BPS survey showed, that the majority (77.84%) were accessing the internet to get information, and 85.55% internet as social media (Badan Pusat Statistik, 2016). The Riskesda reported (2013) that in Bengkulu City there are still many diabetic clients who have experienced symptoms but have not been diagnosed by a doctor. The data showed that health education is still needed. The use of the android application as an alternative of health education media, is one of solution in an effort to improve diabetes self-management behavior, in order to make confidence and motivation is formed among the diabetic clients, that they are able and willing to carry out proper and sustainable diabetes self-management.

METHODS

Study Design

This type of research is quantitative using a pre-experimental design with the type of one group pre-test post-test.

Setting

Research sites are in Bengkulu City because the highest number of DM type II cases is in Bengkulu City and the Internet network access is good enough, besides that most people with DM type II use smartphones as information and communication media.

Research Subject

The population in this study were all people with type II DM in Bengkulu City.

1,962 people. The sample was chosen based on inclusion criteria, namely: people with DM who access the Salam-Sehat application, have a smartphone with an Android operating system, are able to use the Android application version 4.4.3 (Kitkat), have internet access in the form of Wi-Fi or personal internet network, willing to become a respondent. The selection of research sites is based on the method of sampling technique that has been determined by the Researcher namely Multi Stages Cluster Sampling. Researchers used the simple random sampling method to get four (4) The Public Health Center representing their respective areas, namely the North (Public Health Center of Beringin Raya), the West (Public Health Center of Pasar Ikan), the East (Public Health center of Bentiring) and the South (Public Health Center of Padang Serai). Determination of the sample size using the Slovin formula, and the number of respondents was 384 people.

Instruments

Measurement results using the instrument is Diabetes self-management behavior questionnaire The Summary of Diabetes Self Care Activities (SDSCA) (Toobert et. Al. 2000) and adopted from Kusniawati's research (2011), with the validity and reliability value of the instrument in previous studies was $r: 0.80$ and $\alpha: 0.74$. This questionnaire consists of 16 questions related to diabetes self-care activities in type 2 DM clients that include: diet, exercise, anti-hypoglycemia drugs, independent blood glucose monitoring and foot care. This instrument consists of 8 alternative answers, namely 0 days to 7 days. For positive questions, in questions 1-3, 5-16, the score is 0 days (score = 0), 1 day (score = 1), 2 days (score = 2), 3 days (score = 3), 4 days (score = 4), 5 days (score = 5), 6 days (score = 6), 7 days (score = 7). As for the negative questions, in question no.4, the score taken is 0 days (score = 7), 1 day (score = 6), 2 days (score = 5), 3 days

(score = 4), 4 days (score = 3), 5 days (score = 2), 6 days (score = 1), 7 days (score = 0). The range of diabetes self-care values is 0-112, then analyzed to find out the mean, standard deviation, min-max and 95% CI. Interventions were given to respondents for 2 weeks. Researchers conducted 2 times face to face with respondents. The first meeting the researcher made a contract, explained the purpose, objectives and research procedures and then sent the Salam-Sehat application link via whatshap, then accompanied the respondent to download/install the application onto an android mobile phone. The next stage the researcher reminded respondents every 3 days via whatshap chat to open material about DM self-management in a healthy greeting application. The researcher asks the respondent if there are things that need to be discussed. At the end of the second week the researchers conducted an evaluation by each respondent refilling the post-DM Self-Management questionnaire. It is expected that after 2 weeks the respondents have internalized (knowing, understanding and there are efforts from clients to carry out self-management type II DM) educational material provided through the Salam-Sehat application.

Data Analysis

The research data were analyzed by using the Wilcoxon Signed Rank Test.

Ethical Consideration

This study was approved by the Health Research Ethics Commission of the Ministry of Health Bengkulu with No. DM.01.04 / 101/3 / V / 2019.

RESULTS

Normality Test

Normality test is conducted to determine the distribution of data in a group of data or variables whether the distribution of data is normal or abnormal distribution using the Kolmogorov-Smirnov or Shapiro Wilk statistical tests. The normality test results can be seen in the table as follows:

Table 1. Kolmogorov-Smirnov and Shapiro Wilk Normality Test DM Self-Management Behavior Before and After Providing Health Education Through Salam-Sehat Applications in Bengkulu City in 2019 (n = 384).

		Pretest Self-Management of DM	Posttest Self-Management of DM
Kolmogorov-Smirnov	Statistics	0.110	0.057
	df	384	384
Shapiro-Wilk	Sig.	0.000	0.005
	Statistics	0.923	0.976
	df	384	384
	Sig.	0.000	0.000

Source: Primary data of questionnaire, 2019

Table 1 illustrates the results of the normality test for Diabetes Mellitus Self-Management Behavior Before and After being given Health Education through the Salam-Sehat application using the Shapiro-Wilk Test. From the table it is known that the *p*-value (Sig.) for Self-Management Behavior.

Diabetes Mellitus Before Health Education at 0,000 and Self-Management Behavior Diabetes Mellitus After Health Education at 0,000. Because all *p*-values <0.05, before and after health education is not normally distributed.

Overview of DM Self-Management Behavior Before and After Providing Health Education Through Salam-Sehat Application in Bengkulu City in 2019

Table 2. Overview of DM Self-Management Behavior Before and After Providing Health Education Through Salam-Sehat Application in Bengkulu City in 2019 (n = 384).

Variable	Mean	Standard Deviation	Min	Max
Before education through the Salam-healthy application	35.42	7.499	20	76
After education through the Salam-Sehat application	65.18	6.404	48	97

Source: Primary data of questionnaire, 2019

Based on table 2 above, it can be seen that DM self-management behavior before it is given before education through Salam-Sehat application with a mean value of 35.42 and a standard deviation of 7.499. DM self-management behavior after given Before education through the Salam-healthy application the mean value is 65.18 and the standard deviation is 6.404.

Examination the Effect of Health Education through the Salam-Sehat Application Media on Diabetes Self-Management Behavior

To determine the effect of health education through the Salam-Sehat application media on the self-management behavior of diabetes mellitus in the city of Bengkulu, the Wilcoxon Signed Rank Test was used. The Wilcoxon Signed Rank Test is used because the data on self-management behavior of diabetes mellitus before health education (Pre-Test) and self-management behavior of diabetes mellitus

after health education (Post-Test) are not normally distributed.

Table 3. Examination the Effect of Health Education through the Salam-Sehat Application Media on Diabetes Self-Management Behavior by using the Wilcoxon Signed Rank Test.

Variable	n	Z $\alpha <$ 0.05	p- value
DM Self-Management Behavior after education (posttest)	385	-16.989	0.000
DM Self-Management Behavior before education (pretest)			

Source: Primary data of questionnaire, 2019

Wilcoxon Signed Rank Test Results obtained -16.989 with Asymp values. Sig (p) = 0.000. Because the value of $p < 0.05$ then there is a significant effect of health education through the Salam-Sehat application media on the self-management behavior of diabetes mellitus in Bengkulu City.

DISCUSSION

The Average Description of DM Self-Management Behavior Before and After Being Given Education through the Salam-Sehat Application in Bengkulu City, 2019

Based on the results of the study in table 2, the average DM self-management behavior before being given education through the application of healthy greetings is 35.42 with a standard deviation of 7.499. While the average DM self-management behavior after being given education is 65.18 and the standard deviation is 6.404. These results indicate an increase in the average value of DM self-management behavior by 29.76 after being given education through the application of healthy greetings.

The same research results with research by Rohdianto, (2012) concluded that there is an influence of diabetes self

management education in discharge planning on the self care behavior of DM type II patients, explained in this study that independent treatment is highly dependent on the client in making decisions and assessments in live their daily lives so that comprehensive diabetes management can be carried out.

The results of the questionnaire on diet indicators before the education of healthy greetings showed that respondents had sufficient knowledge. This was known based on interviews with respondents, most of them already knew the procedures for dieting that must be done every day, but they said they often felt bored with the dietary arrangements that must be lived and often If you feel attracted to tasting food that should not or are limited to consumption, this happens because other family members do not take part in protecting respondents in carrying out their diets.

Indicators of physical exercise show that almost all respondents rarely do physical exercise, respondents said that doing homework is also included in physical exercise because by doing so it can sweat and quite tiring. Whereas in the medication indicator the opposite results were found, namely the average respondent compliant to consume drugs given from the Public Health Center or Hospital because they thought that if they did not consume the drugs, their body felt weak and uncomfortable, besides the respondents also knew the type of drug, dosage and time of drug administration consumed.

The indicator of independent blood glucose monitoring shows that most respondents within a week do not check their blood sugar levels, this is done because respondents do not have their own tools to check blood sugar, they say only check their blood sugar if there are complaints or if there is a free blood sugar check at the health center. The results of interviews with health center staff, said that blood sugar tests for patients cannot be

done every week because of the limited costs of buying blood sugar sticks, checks are only carried out if there are indications.

And foot care indicators show the results that respondents have less knowledge about diabetes foot care. It is known from the results of the interviews, most said that they do foot care as usual while taking a bath, almost never do special foot care, such as checking the condition of the feet and foot soaking, said he did not know if the most complications of DM were ulcers or wounds to the diabetic foot. The results of this study are reinforced by the opinion of Windani (2012), states that knowledge significantly influences the behavior of Diabetes Mellitus patients in foot care.

The Effect of DM Self-Management Before and After Education is Provided by A Healthy Greeting Application in Bengkulu City, 2019

Wilcoxon Signed Rank Test Results obtained -16.989 with Asymp values. Sig (p) = 0.000. Because the value of $p < 0.05$ then there is a significant effect of health education through the Salam-Sehat application media on the self-management behavior of diabetes mellitus in Bengkulu City.

This shows that the use of educational media application of Salam-Sehat can improve the self-management of DM patients. Based on the results of interviews with respondents mentioned that the provision of information based online through the application of healthy greetings is more interesting when compared to the method of providing health education so far that seems boring, because only in the form of lectures and discussions using leaflets or LCD media.

Through the application greetings healthy respondents can access all the information needed about disease and self-management of DM without space and time restrictions, they do not have to go to health care facilities, they can also ask questions

through chat rooms available on the application, can see videos about how the process DM can occur in his body, so that it can increase the respondent's knowledge and ultimately is expected to improve DM's self-management behavior and avoid complications of diabetes.

The results of the questionnaire on diet indicators after the provision of education through the application of greetings-healthy, showed an increase in the average value of DM self-management behavior. Respondents said that after downloading a healthy greeting application and studying DM self-management, his knowledge increased and motivated him to do DM self-management at home, when they felt bored and bored they said they would play back the video due to continued diabetes mellitus, because it would make they feel fear and the desire arises to prevent these complications from happening to them. In addition, if they want to make a variety of foods, they can see in the application of healthy greetings about the types of foods that are not restricted or safe for their consumption. Researchers also provide education to family members to jointly care for DM patients by supervising their diets independently at home. Azizah's study, et al (2019), showed the same results concluded that nutritional counseling using the application of Nutri Diabetic Care was effective in increasing the knowledge of patients with type 2 diabetes.

Based on the results of interviews on physical exercise indicators, respondents said that the knowledge of physical exercise referred to in DM self-management increased, they became aware of the importance of doing daily physical exercise for DM patients and would implement it in their daily lives, if they are bored they can open the greetings-healthy application to see what kind of physical exercise choices can be done. The results of this study are in accordance with the Study of Andrew et. al (2010), which shows that lifestyle changes (diet and physical activity) after diagnosis

can improve improvement in body weight and insulin resistance in type 2 diabetes patients, this study also explains that intensive dietary interventions immediately after diagnosis can improve glycemic control and blood pressure.

The same study was conducted by Widyanata (2018) who concluded that the use of an android-based DM calendar as a DSME media effectively reduced the HbA1c value compared to using conventional media (leaflets) in DM patients. It was explained in this study that the electronic education program was effective in increasing metabolic control in DM patients where this program provided a simple communication and consultation system for patients to directly contact with their health team and easy accents to educational material. Research Team from Taiwan (Guo, Chang & Lin, 2015), developed the Mobile Diabetes Self-Care System to facilitate DM sufferers in improving their self-care abilities and actions. This study also evaluated the effectiveness of the system in self-care knowledge and behavior in people with type 2 diabetes.

This finding is consistent with research conducted by Pantandung (2018), which concludes that structured education with telephone health coaching can improve health literacy and reduce HbA1C levels in type II DM patients.

Health education about type II DM has often been carried out by health workers both in Public Health Center or Hospitals, but the educational methods provided so far are considered to be monotonous, the provision of education is still in the form of discussions, lectures, demonstrations. This needs to be a concern of health workers, especially nurses in carrying out their duties as a diabetes educator to take advantage of technological advances, especially the use of online-based android as an educational medium without being limited by space and time so that at any time patients can access to get information about diabetes mellitus.

Application development is part of innovative media in health, especially in DM patient self-care management programs. This education is one form of independent intervention in providing nursing care to improve self-management in DM patients.

CONCLUSION

There is an influence of health education through the Salam-Sehat application media on self-management behavior of diabetes mellitus in Bengkulu City with Asymp value Sig (p) = 0.000. The results showed that there was an influence of health education through the application of healthy greetings to DM self-management behavior in the city of Bengkulu, so it is expected that the application of healthy greetings could be continued (patented) as an educational media to improve diabetes self-management based online so that it can be accessed by the wider community, not only for people with DM in the city of Bengkulu.

SUGGESTIONS

Nursing institution may develop model or learning strategy which applicable in real situation in profession. The strategies can be in workshop and seminar related to developing learning process.

ACKNOWLEDGMENT

Training activities need to be held for nurses to improve nurse competence in terms of nursing care and health education related to DM self-management so that nurses' knowledge and skills in managing diabetic clients can be improved and nursing services especially for DM clients to be better.

DECLARATION OF CONFLICTING INTEREST

There are no conflicting interests involving this study.

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AUTHOR CONTRIBUTION

Hanifah Hanifah: The author contributed to the concept of study, design, collection data, analysis data, and compile publication manuscripts.

Vike Pebri Giena: The author contributed to the concept of study, design, collection data, analysis data.

Ruri Maiseptya Sari: The author contributed to the concept of study, design, collection data, analysis data.

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