Original Research

IJNHS

Diabetes Self-Management Education (DSME) Based-Website on Dietary Behavior among Type 2 Diabetes Mellitus During Covid-19 Pandemic

Wirda[1], Dina Oktaviana[2], Suardi[3*], Ernawati[3], Zainuddin[5], Dewiyanti[6]

[1,2,3,4,5,6]Nursing Department of STIKes Tanawali, Takalar, Indonesia

Article info

Article history:
Received: September 25th, 2022
Revised: November 14th, 2022
Accepted: December 9th, 2022

Correspondent author:
Name: Suardi
Address: STIKes Tanawali, Bajeng Pattallassang 90615 Takalar Sulawesi Selatan
E-Mail: suardi@stikestanawali.ac.id

International Journal of Nursing and Health Services (IJNHS)
Volume 5, Issue 6, December 20th, 2022
DOI: 10.35654/ijnhs.v5i6.647
E-ISSN: 2654-6310

Abstract

Background: Diabetes mellitus (DM) is an established risk factor for several causes of death, including ischemic heart disease, stroke, kidney disease, infectious diseases, and some cancers. WHO predicts the number of people with diabetes in Indonesia will increase from 8.4 million in 2000 to around 21.3 million in 2030. This report shows an increase in the number of people with diabetes by 2-3 times in 2035. The strategy that can be used is education website-based diabetes self-management. **Objective:** to determine the effectiveness of website-based Diabetes Self-Management Education (DSME) on Diet Behavior in Type 2 DM Patients during the covid-19 pandemic in Takalar Regency. **Methods:** This study used an experimental design with a one-group pre and post-test design approach. The sampling technique is non-probability sampling with a purposive sampling approach. The research instruments were questionnaires and observation sheets. Data analysis with statistical Paired t-test with a value of significance degree p 0.05. **Results:** This study obtained the results of pre-intervention with post-intervention is 17.10, meaning that there is an increase in dietary behavior after the intervention where p-value = 0.000 < = 0.05. **Conclusion:** There is an influence of website-based Diabetes Self-Management Education (DSME) on Diet Behavior in Type 2 DM Patients during the covid-19 pandemic in Takalar Regency. **Recommendation:** further research needs to conduct on the study with a more significant number of samples and sharpness of intervention

Keywords: Diabetes mellitus; Diet

INTRODUCTION

World Health Organization (WHO) predicted the number of people with diabetes in Indonesia would increase from 8.4 million in 2000 to around 21.3 million in 2030. This report showed an increase in the number of people with diabetes by 2-3 times in 2035. Meanwhile, the International Diabetes Federation (IDF) predicts an increase in the number of people with DM in Indonesia from 9.1 million in 2014 to 14.1 million in 2035 (1). The incidence and prevalence of diabetes worldwide have increased exponentially (2-3). In 2014, about 387 million people worldwide, or 8.3% of the adult population aged 20-79, were estimated to have diabetes, with an increasing incidence (4-5).

Complications of DM disease can be acute or chronic, macrovascular, or microvascular. A total of 1785 DM patients in Indonesia experienced complications: 16% of DM patients had macrovascular complications, 27.6% had microvascular complications, 63.5% had neuropathy, 42% had diabetic retinopathy, and 7.3% had nephropathy (6-8).

A study showed that the five-week Support Management Program was effective, and nurses were encouraged to implement this program to prevent diabetic foot ulcers or other foot complications (9). Another study showed less than half of the subjects (42.9%) achieved all four weekly goals. However, only one issue (2.9%) could not accomplish any plans on the Self-Management Support Program (10).

Strategies that can be used to prevent ulcers and further complications among DM patients include educational support for patients, multidisciplinary management, close monitoring, and prevention in the form of foot care. Education for type 2 DM patients is essential as the first step in controlling type 2 DM (11).

Debussche et al. (2018)'s study of another DSME intervention performed by health promoters in people trained to provide patient education and counseling for 12 months did not show a significant change in the overall diabetes knowledge score over 12 months (12-13).

Diabetes self-management education (DSME) is another approach to improving dietary behavior. Previous studies reported that the five-week Support Management Program effectively improved health behaviors(9). However, information on the effectiveness of education programs in Indonesian society is limited especially using the website method. Thus, the researchers would like to apply educational media using a website strategy to improve the outcomes during the COVID-19 pandemic, which had never been done before.

A website or site can be defined as a collection of pages that display text data information, still or motion image data. The animation data, sound, video, and a combination of all, static and dynamic, which form a series of interrelated buildings, were each linked by page networks (hyperlinks) (14).

Judging from the Covid-19 Pandemic, it requires staying at home. Therefore, DM sufferers can worsen their disease condition, considering physical activity is limited or not doing it at all and excessive food intake considering staying at home without any other activities, can trigger complications from DM itself.

One form of education that can be applied in the community during the spread of covid-19 is the media website. With this media, the researchers and prospective respondents have no direct contact that can cause the spread of the covid-19 virus. Thus this study will examine the effectiveness of the Diabetes Self-Management Education (DSME) website based on Diet Behavior in Type 2 DM Patients during the covid-19 pandemic in Takalar Regency.

OBJECTIVE

This study aimed to determine the effectiveness of the website-based Diabetes Self-Management Education (DSME) based-website method on dietary behavior among Type 2 DM during the covid-19 pandemic in Takalar Regency.

METHODS

Design

In this quasi-experimental study, one group, pre-test, and post-test design were approached in this study. This study examines the effectiveness of website-based DMSE without a control group as a comparison. Researchers would determine whether there is an influence between the independent and dependent variables by measuring two times, namely before and after the intervention ends.

Sample size and sampling technique

In this study, the respondents were people with type 2 DM, willing to be respondents, had been treated at *puskesmas*, and had internet access and a handphone that could browse.

The sample size ordered in this study was based on the calculation of the formula:

$$n = \frac{(Z\alpha \sqrt{P_0 Q_0} + Z\beta \sqrt{P_1 Q_1})^2}{(P_1 - P_0)^2}$$

Information:
n = minimum number or sample size
Zα = standard value of normal distribution at certain (α = 5%; Zα = 1.96)
Zβ = standard value of normal distribution at (β = 20%; Zβ = 0.842)
P0 = proportion of dependent variable without treatment
Q0 = 1 – P0
P1 = proportion of dependent variable during treatment

Q1 = 1 – P1

$$\frac{(1{,}96\sqrt{0{,}75\ x\ 0{,}25} + 0{,}842\sqrt{0{,}5\ x\ 0{,}5}\ )^2}{(0{,}5 - 0{,}75)^2}$$

n = 28,99
n = 30

The number of respondents is 30, selected using a purposive sampling approach. It was a technique of determining the sample with specific considerations by determining subjects who meet the inclusion and exclusion criteria until they meet the required number.

The instrument for data collection

The research instrument is a questionnaire, data collection tool, and observation sheet. The questionnaire used in the study uses demographic data and Diet Behavior data a standardized questionnaire. The validity and reliability testing had been done with Cronbach alpha .80, indicated by the reliable instrument.

Intervention

Before the intervention was carried out, after measuring the pre-intervention data, the data obtained before the implementation of self-management diabetes education for DM 2 patients during the COVID-19 pandemic in the form of a website for three months by conducting monitoring once a week and retaking measurements after the intervention was carried out intervention.

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Data analysis

Data analysis was carried out using paired t-test. The data should be a normality distribution with a significance value of p 0.05 if the probability is less than p 0.05, meaning there is a significant effect between the dependent and independent variables before and after the intervention.

RESULTS

Univariate Analysis

Table 1: Description and Frequency Distribution of Respondents based on Characteristics of Respondents in Type 2 DM patients during the COVID-19 pandemic in Takalar Regency

Characteristic of Respondents	n	Mean	SD	Min-Max
Age (Year)	30	55.27	10.786	35-76
Length of suffering Diabetes Mellitus (Year)	30	6.40	4.312	1-15
IMT (Kg/M²)	30	21.80	4.199	15-32
Characteristics of respondents	n		%	

Gender		
Male	9	30
Female	1	70
Education		
Not completed in primary school	6	20
Primary school	8	26.7
Junior high school	6	20
Senior High School	8	26.7
College	2	6.7
Occupation		
House Wife	4	45.5
Farmer	1	39.4
Entrepreneur	2	6.1
Private employee	1	3.0
civil servant	2	6.7
Total	30	100

Table 1 shows that 30 respondents were 55.27 years old. The duration of suffering from Diabetes Mellitus the average was 6.40 years, the lowest duration was 1 year, and the most extended 15 Years. The average BMI is 21.80 Kg/M2, with the lowest BMI of 15 Kg/M2 and the highest at 32 Kg/M2, while the average GDS is 274.33 mg/dL. Based on table 1, it is known that of the 30 respondents for gender, the number of respondents is female, as many as 9 (30%), the education of the highest respondents are Primary school and Senior High School 8 (26.7%). When viewed from work, the majority of respondents who work as housewives are 14 (45.5%).

Bivariate Analysis

Table 2: Distribution of Respondents based on DietBehavior in Type 2 DM patients during the COVID-19 pandemic in Takalar Regency

Group	Diet Behavior					
	Good		Not Enough		Total	
	n	%	n	%	n	%
Pre Intervention	13	43.3	17	56.7	30	100
Post Intervention	28	93.3	2	6.7	30	100

Table 2 describes the 30 respondents who had good dietary behavior before the intervention, 13 (43.3%). After the intervention, the behavior score increased to 28 (93.3%). At the same time, dietary behavior was lacking before the intervention, as many as 17 (56). ,7%), and after the intervention of dietary behavior, it decreased to 2 (6.7%).

Table 3: Analysis of Differences and Effect Test in the Provision of Diabetes Self-Management Education (DSME) Website-based on Diet Behavior in Type 2 DM Patients during the Covid-19 pandemic in Takalar Regency

Diet Behavior	n	Mean	Differences Mean	Deviation	Std. Error Mean	ρ. Value
Pre-Intervention	30	76.77	17.10	7.91	1.44	0.000*
Post Intervention	30	93.87		5.23	0.95	

**Paired t-test*

Based on table 3 of the 30 respondents who were observed in the pre-intervention, the average (mean) Diet Behavior before the intervention was 76.77, and the average Diet Behavior after the intervention was 93.87, indicating there was an increase in pre-intervention and post-intervention. The results of the research on dietary behavior based on the paired t-test showed that the average difference between pre-intervention and post-intervention was 17.10, meaning that there was an increase in diet behavior after the intervention where p-value = 0.000 < = 0.05. It was indicated that there was a significant effect on Diabetes Self-Management Education (DSME) website based on Diet Behavior in Type 2 DM patients during the covid-19 pandemic in Takalar Regency.

DISCUSSION

The research on dietary behavior results shows that the mean difference between pre-intervention and post-intervention was 17.10. It offers an increase in dietary behavior after the intervention with a p-value = 0.000.

The educational model used in the study has passed trials and is suitable for

research. The importance of diabetes management education (DSME) as a strategy to educate and involve people with diabetes in the management necessary for optimal health outcomes is understood by diabetes educators, primary health care providers, and others. Some interventions have been designed to improve self-management. However, results have yet to be explored from a qualitative point of view and even less through process evaluation (15) (16).

It was consistent with the previous study that applied the DSME intervention with family involvement which education was carried out by health workers in the community carried out directly at the family home of people with diabetes. The education provided included healthy eating, understanding, monitoring glucose blood pressure, medication adherence, problem-solving, risk avoidance, and minimizing diabetes-related complications (17-18).

Another study also showed Diabetes Self-Management Education (DSME) using the media website was influential on health outcomes. Respondents can access anytime and anywhere, as long as they have internet access (19-21).

At this time, technology is developing very rapidly. It is caused by many factors, including the rapid development of people's mindsets. Needs of society in terms of information, science, and the mechanics of the world of work, web application developers are needed so that they can continue to do activities and innovate (14).

In this fast-paced world of technology, a network is needed that can simplify and accelerate the delivery of information widely and can be easily and quickly by anyone who has access to the internet (22).

This study has a positive impact on changes in dietary behavior. With this education, DM sufferers can access it anytime and anywhere to prevent further complications by increasing their knowledge and skills. Other studies also showed self-management has a positive impact on dietary behavior, exercise behavior, and clinical outcomes, including HbA1c, BMI, and cholesterol profile (23-24)

CONCLUSIONS

Implementing Diabetes Self-Management Education (DSME) website-based can improve diet behavior in Type 2 DM patients during the covid-19 pandemic. With an increase in diet behavior, people with type 2 diabetes will have the understanding and skills to improve their quality of life.

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