Effectiveness of Behavior Modification Program for Diabetic Patients in Suan Kluai Health Promoting Hospital, Ban Pong District in Ratchaburi Province, Thailand

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Abstract

Background- This study was an experiment for changing behavior in patients with diabetes mellitus. Because behavior modification and promoting knowledge of patients will make the quality of life of patients with diabetes with good quality and reduce the cost of treatment, reduce the complication of patients.

Objective - To measure blood sugar level with pre-post joining to change the behavior and comparison of knowledge before and after participation in health behavior modification program of patients with diabetes.

Material & Methods – Our study was a quasi-experimental design. The samples were diabetic patients with similar qualifications. Simple random sampling consisted of 60 participants, divided into 30 experimental and 30 control groups. The experimental group was modified by the researcher-developed self-care behavior. The data was collected by using questionnaires. Spending time to 12 weeks for behavior modification. Analyze data from experimental and control groups. Compare the mean of self-care behavior scores before and after joining the program by using the pair *t*-test statistics. We also compare the mean of the self-care behavior score of the control group and the experimental group using independent *t*-test statistics.

Results - The results of this study showed that the blood sugar levels of patients with diabetes after participation in activities the experimental group lower sugar levels 24 people, 80.00 %. By comparing the knowledge scores before and after the participation in the health behavior modification model of diabetics, it was found that the experimental group had a mean of 2.78 and the control group had a mean value of 2.50. The experimental group's mean knowledge score was higher than the control group. This activity pattern is appropriate for the patient.

Conclusion – The successful behavior changes in patients with diabetes. The patient's needs must be taken into account by a patient-centered patient to decide and choose a course of treatment to raise awareness of the patient. However, medical personnel should educate and as a consultant to give patients confidence in taking care of themselves to have a good quality of life forever.

Keywords: *Diabetics Mellitus, Behavior Modification Model, DM patients, Health Promoting Hospitals*

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Introduction

Diabetes mellitus (DM) is caused by a disorder in the pancreas' functioning that is used to make the hormone insulin.[1] DM is a general term for heterogeneous disturbances of metabolism, for which the main finding is chronic hyperglycemia.[2] The cause is either

impaired insulin secretion or impaired insulin action, or both. Usually, the hormone insulin is responsible for the metabolism of sugar used for energy in the body.[3] However, when the body has insufficient insulin hormones to use sugar, it cannot be used as energy. Causing the accumulation of blood sugar levels.[4] DM is a chronic metabolic noncommunicable diseases (NCDs), has attained epidemic proportions worldwide. [5,6] As of 2015, > 415 million adults have diabetes mellitus, and this number is estimated to increase to 642 million by 2040.[7] Lin et al[8] reported that DM is mostly women and is in the reproductive. In Thailand, the number of DM patients increased to 9.80%, and each day, 200 patients died from DM or about eight people/ hour.[5] The cost of treating DM is level 2 for the chronic disease group. The cost of measuring blood sugar levels will be 30.10 - 133.78 USD per person, and the cost of drugs used for treatment will start at 13.38 USD, and if complications arise, the cost will increase according to the complications. The government sector has lost about 602.68 USD per person for DM treatment.[9] In 2015, Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong district Ratchaburi Province, there were 685 patients with DM, 710 patients in 2016, and 737 patients 2017. Furthermore, in 2018 there are 738 patients with DM. Which tends to have more cases every year; 251 patients had complications from DM, most of them had an eye and kidney complications representing 4.87 % of all people with DM. Suttithum et al[10] found that providing information and knowledge, teaching the necessary skills, creating an environment that is conducive to learning by providing brochure-type, media exercise video, creating a collaborative learning environment among patients build confidence and encourage. Setting common goals for self-care behavior change will enable patients to take better care of themselves and adjust behaviors that are appropriate to their lifestyle, resulting in lower blood sugar levels.

Therefore, the researcher sees that the behavioral modification of patients with DM is diabetics should be aware and accept their health first to set common goals for behavior change in various fields, including diet, exercise, drug use and doctor visits, foot care, and complication prevention behaviors.[11] DM patients can control the blood sugar level to be in a normal range and reduce the occurrence of complications. The results of this research, the researcher hopes that the hospital director of Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province, and relevant personnel will be able to use the findings of this research to promote correct health behaviors. Furthermore, it is suitable for DM patients to reduce the incidence of complications, mortality, lower government costs, and give DM patients a better quality of life.

Objective

1. To measure the blood sugar level of patients with diabetes before and after participating in the program of changing health behavior of patients with diabetes.

2. To compare knowledge before and after participating in the diabetes health behavior modification program.

3. To analyze the effectiveness of the health behavior modification program of patients with diabetes.

Methods

Research model

This research was a quasi-experimental research design in patients with diabetes of Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province. Use the self-care ability development model, namely group relations activities, problem analysis review, joint decisions to solve problems, and providing self-care knowledge for five subjects is to control food, exercise, drug use, and doctor visits, foot care, and complication prevention behaviors. After educating, the researcher distributed the diabetic self-care manual to the experimental group to review their self-care at home and explore the results of the next trial.

Population and Sample

2.1 The population used in this study was diabetic patients admitted to a chronic disease clinic of Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province, 738 patients.

2.2 The sample consisted of diabetic patients admitted to chronic disease clinics of Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province. All 60 patients were divided into two groups by selecting patients with

similar qualifications in terms of age, blood sugar level. Simple random sampling by drawing lots choose to be a control group of 30 patients and an experimental group of 30 patients.

Instruments

We created the questionnaire were divided into two categories.

1. Questionnaires were developed from the literature review is divided into two parts:

Part 1 is a questionnaire for personal information consisting of age, gender, nationality, occupation, income per month, marital status, weight, height, waist circumference, education level, number of family members, the duration of diabetes, before-after blood sugar level, family history of diabetes, and about self-care while having diabetes 16 questions.

Part 2 was a questionnaire about self-care for five subjects to control food, exercise, drug use, doctor visits, foot care, and complication prevention behaviors. The question is a numerical rating scale of three levels 29 questions.

2. Experiment equipment there is a comprehensive content of awareness and acceptance of their health behavior modification in various fields such as control food, exercise, drug use and doctor visits, foot care, and complication prevention behaviors. It consists of 3 sets of tools:

2.1 Set 1: Model for developing self-care to the researchers, there are also public health experts at Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province become a research assistant in organizing activities according to the experimental plan. Including preparing the patient review, analyze problems assessment, decision setting realistic goals, educating, and practicing self-management and monitoring and evaluation.

2.2 Set 2: Presentation slides presenting five topics of self-care knowledge of patients such as control food, exercise, drug use and doctor visits, foot care, and complication prevention behaviors.

2.3 Set 3: Diabetes Home self-care guide with content about diabetes, causes, symptoms, interpretation of hypoglycemia, unconsciousness from hyperglycemia, complications, and exercise characteristics of the researcher applied an exercise model from the Parhira [12] research to enable the experimental group to review home care.

Content validity

Conducted content correlation from 3 experts to check for content validity. The questionnaires were used with 30 people, which looked like a sample group (Try out), and analyzed the questionnaire's confidence. By using the Cronbach alpha coefficient, receive the confidence value of the questionnaire total equal to 0.79.

Data collection

We collected the data at the Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province. Throughout the research period, the experimental group was collected on Tuesday, and data collection is divided into two groups as follows:

1. The control group collects the following information:

1.1 First time collecting general information on October 1, 2019, to collect data on self-care behavior and the blood sugar level and hand out self-care manuals to control groups for use in home self-care. Then, set up a control group at the second meeting for the next four weeks.

1.2 Second time on November 1, 2019, the control group received regular care following a general treatment procedure, namely blood glucose measurement. Weighing Measure blood pressure, measure waist circumference, take a history, see a doctor and take-home medication, and the third meeting in 4 weeks.

1.3 Third time on December 1, 2019, the researcher collected the self-care behavior data. Take blood to measure blood sugar levels and give information to the control group like the experimental group.

2. The experimental group participated in the behavior change program as follows:

2.1 First time: General data was collected on October 1, 2019, to collect self-care behavior data. Blood sugar level, then make an appointment to attend the workshop

for the 2nd time for another four weeks.

2.2 The second time, on November 1, 2019, the experimental group participated. Behavior modification programs that applied the operating procedures followed the Orem theory and the literature review.

2.2.1) Step 1: Build relationships, prepare patients with analytical activities, problem situations, and set goals for action according to their circumstances by organizing group relations activities to dissolve behaviors and promote good relationships. Facilitate better learning in this activity. The experimental group was paired to discuss and exchange blood sugar levels behavioral health problems that result in an inability to control blood sugar levels, health problems, or complications that follow and guidelines for managing self-care problems.

2.2.2 Step 2: It is a period of evaluation and decision. Five topics of self-care knowledge of patients include controlling food, exercise, drug use and doctor visits, foot care, and complication prevention behaviors. It creates a collaborative learning atmosphere among the patients with media for lectures and group activities.

2.2.3 Step 3: The phase of the action and the evaluation of the action in this phase uses a participatory learning process. To consider past self-care behaviors setting goals practical. Building confidence in self-care and complimenting a decision encourage and motivate participants to take care of themself when they return home.

2.2.4 Describe the self-care manual for DM patients, give them back to review, and then make an appointment for the third trial group for another four weeks.

2.3 The third time, on December 1, 2019, after participating in the 12-week program, the researcher collected the self-care behavior data. Furthermore, sent to the public health officials Suan Kluai Subdistrict Health Promoting Hospital, Ban Pong District Ratchaburi Province, performed a blood test to check blood sugar levels, and we analyzed the findings.

Data Analysis

Socio-demographics data were analyzed for the samples by distributing frequency, percentage, mean, standard deviation. Compare the mean of self-care behavior scores before and after joining the program by using the pair *t*-test statistics. Furthermore, compare the mean of the self-care behavior score of the control group and the experimental group using independent *t*-test statistics.

Ethical Consideration

The present study was approved by the Ethical Committee from Suan Sunandha Rajabhat University Ethics Committee certificate number: COA. 1-013/2019 and the directors of five faculties. Each participant received explanations about the study and had their rights protected throughout, including confidentiality and the right to refuse or withdraw from the study. The participants also received information 60 sheets and signed a consent form.

Results

In total, 60 patients with DM, divided into experimental groups of 30 patients, a control group of 30 patients. From the data analysis, it was found that most diabetics have an average age of 51-60 years, the average income is approximately 334.11 - 501.17 USD/ per month, most of them are single, qualifications are in the first to 6 years of education. There are 4-6 family members. The duration of diabetes is 5-10 years, and most have no family history of diabetes. The average patient's weight was 49 kilograms, height 165 and 160 centimeters, waist circumference 30 inches, and most of the patients received knowledge from doctors, nurses, and patients, by obtaining knowledge of drug use, meeting a doctor, eating and exercise.

From Table 1, the blood sugar of a total of 30participants had a decreased post-program participation level of 24 participants (80.00%), The same sugar level of 5 participants (16.67%) and the sugar level increased by one participant (3.33%), with the mean sugar level of about 110.16 mg /dL.

Table 1 Mean and standard deviation blood sugar levels in the experimental group diabetics patients (*N*=30)

Blood sugar level	Number	Percent (%)	M	S.D.
			110.16	33.35
Same	5	16.67		
Decrease	24	80.00		
Increase	1	3.33		

From Table 2, it was found that knowledge of self-care of the experimental group before joining a model of behavior modification of patients the average was 2.40 and after joining with an average of 2.78. Prior to joining the behavior modification model of the patients, the control group had a mean of 2.41, after the participants had a mean of 2.50. Comparing the pre-post cohort to the patient behavior modification model, it was found that this model of behavior modification was significantly suitable for the patients at a significance level of 0.05.

Table 2 Mean and standard deviation knowledge score self-care experimental and control groups diabetics patients (*N*=60)

Sample group	Before experiment		After experimental		t	p-value
	M	SD	M	SD		
Experimental group	2.40	.03	2.78	0.02	2.96	0.00*
Control group	2.41	.02	2.50	0.01	1.20	0.11

Note: Significance Level $p < .05$

From Table 3, it was found that knowledge of self-care the mean of the experimental group was 2.78, and the control group had a mean of 2.50. Statistical t-test equal to 3.27, showed that the behavior modification model of patients with DM was suitable for people with diabetes this time.

Table 3 Compare scores of knowledge self-care of experimental and control groups diabetics patients (*N*=60)

Sample group	M	SD	t	p-value
			3.27	0.00*
Experimental group	2.78	0.02		
Control group	2.50	0.01		

Note, Significance Level 0.05

Discussion

Our results on the effectiveness of the behavior modification model in patients with DM. From analysis and the summary of the research results can be discussed as follows: The blood sugar level of patients with diabetes before and after participating in a model of behavior modification of patients in the experimental group have a lower sugar level this is consisted with the study of Parhira [12] found that the effect of exercise by Muay Si Kong on physical fitness, glucose and blood fat levels of type 2 diabetics, Maharat Nakhon Ratchasima hospital, It was found that the patients with type 2 diabetes who exercised by Muay Si Kong fitness for 12 weeks had a statistically significant lower blood sugar level than before, at 0.05. Boehme et al[13] found that the trend of people with diabetes tended to increase particularly the elderly population aged between 51-60 years, which in this research found that the sample was between 51-60 years old the most and in line with research by Lipska et al[14] found that the occurrence of diabetes in the elderly is caused by an inability to control blood sugar levels.

Behavior modification patterns in patients with DM consist of relationship group activities education. This was because the knowledge score of self-care of diabetics in the whole experimental group increased the score level. The study of Ulittaphon [15] studied the use of a program to modify the health behavior of DM patients. Using the conceptual framework of beliefs in health and self-efficacy theory of type 2 diabetes patients, Khao Phanom hospital, Khao Phanom District, Krabi province was found that the self-care behavior of diabetic patients receiving the health behavior modification program was significantly higher than that of the previous trial at 0.05.[15] Average of the score cognitive behavior of diabetes according to the conceptual framework of the beliefs in the health of the patient; Diabetes after the program this was significantly higher than the control group at .05 level, indicating that the health behavior modification program was by using the conceptual framework, beliefs in health and self-efficacy theory positively affects the health behaviors of type 2 diabetes patients.[15] Phongprapapan et al[16], who found that empowering behavioral modification of diabetic patients in the community of Purnawat temple found that the total score of health behavior of the sample after the empowerment process activity for health behavior modification. Have more points before doing the strengthening process activities. Statistically significant at the level of 0.01.[16] In line with the study of Pennim [17] found that the behavior modification program of type 2 diabetic patients with HbA1C value were greater than 7%, was found that before joining the health behavior change program, patients had little awareness about diabetes. Most members are unaware of the importance of blood sugar levels after joining the program. It was found that the patients understood more about diabetes in terms of complications. Understanding their own blood sugar values self-care behaviors in promoting blood sugar control of diabetic patients [17]. Inconsistent with the research of Suttithum et al[10] who conducted the effects of self-care ability program on self-care behavior and HbA1C levels of type 2 diabetes patients at Lan Saka hospital results of comparison of self-care behavior was found that the control group and the experimental group had no different mean scores for self-care behavior.

Conclusion

This model of behavior changes in diabetes it consists of a planning process about relationship building, establishing common health care goals, doing group relations activities, important education in patient self-care was appropriate for the patient. Because of the opportunity for patients to set goals in their own health care. Make patients aware of their health care and to cooperate in doing this activity, the blood sugar level of the experimental group decreased. This has a positive effect on the control of blood sugar levels of patients improving patient quality of life.

Limitations

Our study has some limitations. Some patients do not have time to participate in a diabetes behavior modification program because most of them are employed. The questionnaire for the Suan Kluai Subdistrict Health Promoting Hospital workers, Ban Pong District in Ratchaburi Province, commented that most patients were trained several times. However, the patients were unable to implement recommendations. Thus, making the patient unable to control the blood sugar level. This may be due to the inadequate awareness of the severity of the disease, and some patients think that taking medication or injections regularly can lower blood sugar levels as well. Therefore, not paying attention to

taking care of themselves. Therefore, raising awareness of self-care is important, and allowing patients to set goals for their health care is an important consideration for healthcare professionals. So that patients have the best quality of life with their diseases.

Implications for future research

Our study indicated knowledge for patients with care. The education about self-care for five subjects is to control food, exercise, drug use and doctor visits, foot care, and complication prevention behaviors as a preliminary knowledge for the patient to modify the behavior to be correct. Focus on involving patients in planning and setting goals for self-care to make patients aware and take responsibility for health care. This study provides guidelines for promoting appropriate patient care for patients in each area due to differences in personality factors and cultures; those designing behavioral modification should take this into account.

Declaration of Conflicting Interest

The authors declare no conflict of interest.

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