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Community-Based Client Empowerment in Therapy Management of Type 2 Diabetes Mellitus Clients in the City of Surabaya

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ABSTRACT

The Government of the Republic of Indonesia affirms its commitment to prevent and control diabetes through community empowerment. The research objective was to identify community-based client empowerment strategies in the management of client therapy with type 2 diabetes mellitus in the city of Surabaya. This type of research is a quasi-experiment using a pre-post test control group design. The research subjects were some of the diabetic patients in the Tambakrejo Health Center, Surabaya, totaling 80 people, divided into treatment and control groups. The independent variable is a community-based client empowerment strategy. The dependent variable is therapy management of DM clients. Data analysis using t-test. The results showed that there was an effect of Community-based Client Empowerment Strategies in the treatment group ($p = 0.000 \leq \alpha = 0.05$) and the control ($p = 0.078 \geq \alpha = 0.05$). At the pre-test, the mean of self-care management in the treatment group was 22.20 ± 6.65, while the control group was only 19.30 ± 5.27. There is a difference in the treatment group which has a delta mean of self-care management of 6.35 ± 7.66 and the control group of 2.28 ± 7.96. At the time of the pre-test the mean of self care management in the treatment group was 22.20 ± 6.65, while the control group was only 19.30 ± 5.27. The post-test the mean self-care management in the treatment group was 28.15±6.18, while the control group was 21.57±6.76

Keywords: community**;** empowerment**;** T2DM; management-therapy; health-promotion; nursing

INTRODUCTION

Background

Diabetes is an important public health problem that is becoming a worldwide epidemic. Indonesia also faces a diabetes threat situation similar to the world [(1)]. Indonesia has entered an epidemic of type 2 diabetes mellitus. Lifestyle changes and urbanization are important causes of this problem, and continue to increase in this millennium [(2)]

Indonesia ranks seventh of the world's population affected by diabetes with a prevalence of 11.77. Every minute there are 12 new clients and every minute six people die and 3.8 million people die of diabetes every year. Seven out of ten people with diabetes develop complications so that the quality of life decreases and accelerates the occurrence of death.

When compared to 2013, the prevalence of diabetes in Indonesia based on doctor's diagnosis in the population aged 15 years as a result of Riskesdas 2018, increased to 2%. East Java Province ranks 5th highest with the prevalence of diabetes in 2013 of 2.1% in 2018, the prevalence increased to 2.6%.

There is an iceberg phenomenon in the diabetes mellitus epidemic in Indonesia. It is estimated that there are still many (about 50%) people with diabetes who have not been diagnosed in Indonesia. In addition, only two-thirds of those diagnosed are undergoing treatment, both non-pharmacological and pharmacological. Of those who underwent the treatment, only one-third were well controlled [(2)]. Complications of diabetes have started to run since the occurrence of impaired insulin function, both already and undiagnosed.

Diabetes and its complications bring huge economic losses to diabetic clients and their families, the health system, and the national economy through direct medical costs, job losses, and income. The main cost components include hospital and outpatient care.

Complications of diabetes can be prevented with optimal glycemic control. Optimal glycemic control is very important. Research evidence shows that the target of achieving glycemic control in Indonesia itself has not been achieved.

The results of Muafiro's research (2015) at the Tambak Rejo Health Center Surabaya showed that glycemic control had not been achieved. The results of the measurement of the highest random blood sugar levels in type 2 DM clients in the control group were 312 mg% and the lowest was 152 mg%. Meanwhile, the average random blood sugar level in the treatment group was 395 mg% and the lowest was 142 mg%. The two groups showed no difference (p=0.198 and p=0.567) and the glycemic control had not yet been achieved [3]

The failure to achieve good glycemic control results from the worsening of the client's physiological condition, not carrying out preventive behavior. DM Control The four pillars of DM control are exercise and diet regulation (high in fiber and low in carbohydrates), education, and drug consumption [4]. DM clients must carry out the four pillars of DM control so that they do not experience acute or chronic complications throughout their lives.

According to Ghebreyesus, there are three strategies to accelerate diabetes prevention and control programs, namely Prevention, Prevention and Prevention. The Minister of Health also expressed the same thing that the power of Prevent, Prevent and Prevent can be started from the approach to strengthening health services at the primary level to prevent and control diabetes. This approach has proven to be effective in reducing the risk factors for Non-Communicable Diseases (NCD), namely: by increasing public awareness of the dangers of NCDs; and by providing a healthy environment for the community.

Indonesia is committed to preventing and controlling Diabetes through community empowerment. As part of efforts to prevent and control Non-Communicable Diseases (NCD), the Government of Indonesia has established an Integrated Development Post (Posbindu) for PTM, as the foremost effort to prevent and control PTM. Effective efforts to prevent and control diabetes should focus on risk factors accompanied by regular and ongoing monitoring of their development.

The results of Putri, *et al* (2018) research on the relationship between the four pillars of controlling type 2 DM with average blood sugar levels showed a relationship between all variables. Good education absorption, diet, exercise, and medication adherence have the effect of stabilizing blood glucose and improving quality of life [5].

The results of the Diabetes Mellitus cadre training activities in community service activities carried out in the city of Surabaya in 2016 and 2018 as well as in the Bojonegoro district in 2019 both showed the level of knowledge of DM cadres was mostly (75%) good and almost all (85%) DM cadres also had good skills [3] [6] [7].

The Community-Based Client Empowerment Strategy is carried out through the empowerment of Health Cadres that have been formed in the community to approach health promotion and education, especially Management of Self-care Therapy for Type 2 Diabetes Mellitus clients in the Puskesmas area in Surabaya. Empowerment of these cadres, through training approaches and practicing them in the community by referring to the copyright module and with the supervision of instructors.

Purpose

The purpose of the study was to analyze the Community-Based Client Empowerment Strategy in Therapeutic Management of self-care Type 2 Diabetes Mellitus clients in the city of Surabaya.

METHODS

The research was conducted using a research and development strategy approach [8] , was carried out in two stages, namely, the first stage was exploratory descriptive research, expert discussions, and module preparation, the second stage was researched with a quasi-experimental design to intervene.

In the first stage, the researcher used a descriptive design. The sample is 9 people using the purposive sampling method. The data collection tool uses structured interviews to get an overview of knowledge and skills in self-care management that DM cadres and / or clients want to know to prevent DM complications (9).

The steps taken are as follows: 1) conducting a literature study from books and journals related to health education needed by DM clients that support the maintenance of blood sugar levels as prevention of DM complications; 2) identify the need for knowledge and skills in self-care management desired by DM cadres and or clients and 3) conduct expert consultations with experts in the field of DM discussing the results found to develop an effective intervention module used as a Community-based Client Empowerment strategy in Therapy Management Type 2 Diabetes Mellitus client

The subjects of this study were health cadres in the Puskesmas Tambakrejo Surabaya. Sample selection was done through the purposive sampling method. The research instrument was a questionnaire about the knowledge and skills needed to support the maintenance of blood sugar levels as prevention of DM complications based on a literature study.

The second stage of the study was a quasi-experimental study using a pre-post-test control-group design. The study population was all diabetic clients in the Puskesmas Tambakrejo Surabaya. The research sample was some diabetic clients in the Puskesmas Tambakrejo Surabaya with inclusion criteria being long-suffering from type 2 DM more than 6 months, age 20 years and over, DM clients who had fasting blood sugar (GD) levels more than normal (> 100 mg/dl) in the last 3 months. The study sample size was 80 people, each control and treatment group was 40 people.

The dependent variable is self-care management in type 2 DM clients. The independent variable is the community empowerment strategy. The location of the research is in the area of the Puskesmas Tambakrejo Surabaya. The instruments used are DM client self-care management questionnaire Modified from the Diabetes Self Management Questionnaire (DSMQ) taken from Health and Quality of Life Outcomes [8] which has been tested for validity and reliability and results of peripheral blood sugar monitoring while fasting. and 2 hours after eating using GCU Test Easy Touch before and after treatment. Data analysis and processing carried out homogeneity test and normality test. To

analyze the effectiveness of the community empowerment strategy using a t-test (α=0.05). Confirmation of Ethics from the Komisi Etik Penelitian Kesehatan (KEPK) Poltekkes Kemenkes Surabaya with Number of the certificate: EA/329/KEPK-Poltekkes_Sby/V/2020.

RESULT

Research Phase I

Phase I research was carried out in three steps. The first step is conducting a literature study to formulate the required module material. The second step is conducting a field study to obtain the desired information according to the reality in the community. The third step is to conduct expert consultation on the draft module that has been prepared.

Based on the literature study, it is formulated that important educational materials or materials are provided to empower community-based communities as partners, including activity and sports management; lifestyle modification; diet management; self-care; blood sugar control; foot care to prevent diabetic feet. (10, 11, 12, 13)

The next step is a field study conducted through cadres at the Tambakrejo Health Center Surabaya. The characteristics of the Puskesmas Tambakrejo Surabaya cadres are all female as many as 9 people (100%). Most of the cadres work as entrepreneurs as many as 5 people (56.6%) and as housewives as many as 3 people (33.3%). The education of the Puskesmas Tambakrejo Surabaya cadres is mostly high school as many as 7 people (77.8%) and only 2 people (22.2%) have a bachelor's degree. The results of the desired information based on the results of a questionnaire about knowledge and skills that have not been and want to be understood by the cadres of the Puskesmas Tambakrejo Surabaya are about diet management as 9 people (100%), drug management as many as 5 people (55.6%), physical activity as many as 3 people. (33.3%).

The third step is the module preparation phase, beginning with expert consultation on the draft module. The results are as follows: empowerment module materials include: DM concept, 2) nutrition management, drug/insulin management, 3) independent monitoring of blood sugar levels, 4) foot care; 5) exercise for DM clients.

Research Phase II

At this stage, it presents the results of data analysis of Community-based Client Empowerment Strategies in Management of Therapy for Type 2 Diabetes Mellitus clients in the city of Surabaya.

The study was conducted from February to October 2020 in the Tambakrejo Health Center Surabaya area. Due to the Covid-19 pandemic, data collection begins in August 2020 - October 2020.

Table 1. Respondent characteristics Type 2 DM Clients at Puskesmas Tambakrejo Surabaya and Homogeneity Test August – October 2020

Variables	Control group (n=40)		Treatment group (n=40)		Homogeneity test
	f	%	f	%	
Gender					
Man	5	12.5	10	25.0	0.252
Woman	35	87.5	30	75.0	
Profession					
Does not work	4	10.0	12	30.0	0.026
Housewife	31	77.5	18	45.0	
Civil servant	1	6.7	-	-	
Pension	2	5.0	2	5.0	
Self-employed	2	5.0	2	5.0	
Private	1	2.5	6	15.0	
Education					
S1 (Bachelor Degree)	2	5	-	-	0.222
Senior high school	12	30.0	20	50.0	
Junior high school	14	35.0	10	25.0	
SD (Elementary School)	11	27.5	10	25.0	
No school	1	2.5	-	-	

The results of the study in table 1 show that most of the type 2 DM clients were female, both in the control group (87.5%) and the treatment group (75.0%). The results of the homogeneity of variance test showed that there was no gender difference between the two groups (p=0,2525>α=0,05).

The results showed that in the control group the majority of clients worked as housewives as many as 31 people (77.5%) and 4 people did not work (10.0%). The treatment group also mostly types 2 DM clients as well as housewives as many as 18 people (45.0%). The results of the homogeneity of variance test in table 4.5 show that the work variables between the two groups (p=0.026≤α=0.05) were not homogeneous.

The results of the homogeneity test of variance in Table 4.5 on the education variable showed that the two groups were homogeneous (p=0.222≥α=0.005). In the control group, most of the 35% had junior high school education and 2.5% were not in school. In the treatment group, most of them had high school education (50%), and a small part of them had the same education, namely 25%.

The results of the analysis in table 2 show that the average age of the control group of Type 2 DM clients is 60.78 years with a standard deviation of 9.338 years. In the treatment group, the mean age was 59.55

years with a standard deviation of 7.70 years. The results of the homogeneity of variance test showed that there was no difference in the mean age between the two groups (p=0,524>α=0,05).

Table 2. Characteristics and homogeneity test results for age, length of sickness, and re-test blood sugar levels in type 2 DM Clients at Puskesmas Tambakrejo Surabaya, August – October 2020

Variables	Control group (n=15)		Treatment group (n=15)		Homogeneity test
	Mean	SD	Mean	SD	
Age (year)	60,78	9,338	59,55	7,703	0,524
Length of Sickness (year)	4,03	4,088	5,62	4,510	0,103
Pre-Test Blood Sugar Levels	191,60	81,940	209,95	75,579	0,313
Blood sugar 2 hours after eating Pre test	253,50	104,841	316,45	99,157	0,007

The results of the analysis of the variable length of illness for type 2 DM clients in table 4.6 obtained an average of 4.03 years in the control group with a standard deviation of 4.088 years. In the treatment group, the average length of illness for type 2 DM clients was 5.62 years with a standard deviation of 4.510 years. The results of the homogeneity of variance test showed that there was no difference in the average length of illness for type 2 DM clients between the two groups (p=0,103>α=0,05).

The average fasting blood sugar level during the pre-test in the control group was 191.60 mg% (SD=81.94mg%) and the sugar level 2 hours after eating was 253.50mg% (SD=104.84mg%). Meanwhile, the highest average fasting blood sugar level in the treatment group was 209.95mg% (SD=75.579mg%) and the blood sugar level 2 hours after eating was 316.45mg% (SD=99.157mg%). Both showed that there was a difference (p=0.007≤α=0.05).

The results of the normality test of the data in table 3 show that the control and treatment groups were almost entirely normally distributed, except for the delta variable of fasting blood sugar levels in the control group (p=0.041) the data will be tested using non-parametric statistics.

Table 3. Data normality test results

Variable	Kolmogorov Smirnov Test		
	Control group (n=15)	Treatment Group	(n=15)
Pre-Test Fasting Blood Sugar Level	0.184	0.596	
Fasting Blood Sugar Levels Test Post	0.554	0.830	
Delta Fasting Blood Sugar Level	0.041	0.522	
Blood Sugar Levels 2 Hours PP Pre Test	0.620	0.414	
Blood Sugar Level 2 Hours PP Post Test	0.907	0.982	
Delta Blood Sugar Level 2 Hours after eating	0.223	0.850	

The Influence of the Community-based Client Empowerment Strategy Model in Therapy Management on Self Care

The results of the study in table 4 show that there is an influence of Community-based Client Empowerment Strategies in therapeutic management on Self Care of Type 2 Diabetes Mellitus clients in the city of Surabaya between the treatment group and the control group (p = 0.022 = 0.05). It was proven that there was a significant difference in the mean delta of Self Care Management for Type 2 DM Clients between the treatment group and the control group at the Tambakrejo Public Health Center Surabaya (p=0.02≤α=0.05). Type 2 DM clients in the treatment group had an average self-care management delta of 6.35±7.66, which was greater than the control group which was 2.28±7.96.

At the time of the pre-test, the mean of self-care management in the treatment group was 22.20 ± 6.65, while the control group was only 19.30 ± 5.27. Likewise, at the time of the post-test, the mean self-care management in the treatment group was 28.15±6.18, while the control group was 21.57±6.76.

Table 4. The influence of the community-based client empowerment strategy model in therapy management on self-care for type 2 DM clients in the treatment and control group at Puskesmas Tambakrejo Surabaya, August – October 2020

Groups	Pre-test		Post-test		Delta		p
	Mean	±SD	Mean	±SD	Mean	±SD	
Treatment (n=40)	22.20	6.65	28.15	6.18	6.35	7.66	0.022
Control (n=40)	19.30	5.27	21.57	6.76	2.28	7.96	

DISCUSSION

The Influence of Empowerment Strategy on Self Care Management

There is an effect of community-based community empowerment strategies. Type 2 DM clients in the treatment group have an increase in the mean delta of self-care management which increases greater than the control group. This is the result of community empowerment activities by DM cadres in the treatment group.

Several factors influence the increase in the average self-care management in the treatment group, among others, some have high school education. So that DM clients in this group are easier to digest and understand the knowledge and skills taught by DM cadres [14].

Theory of reasoned action, sufficient and correct knowledge about DM therapy management will affect attitudes, subjective norms, and perceived behavioral control. This condition makes the intention to carry out self-care management increase and realize the importance of preventing DM complications by carrying out proper self-care[14,15].

This statement is following the research. The results of Luthfa's research (2019) show that most of the respondents already have good self-care skills (62.5%) [16]. Self-care management of DM clients is an effort to maintain physiological stability (maintenance) and respond to the symptoms experienced. These actions aim to maintain a healthy lifestyle by complying with treatment efforts and monitoring the symptoms of the disease. Self-care management efforts for clients with Type 2 DM are very important because this disease will be experienced throughout life[14, 17, 18].

Self-care management of Type 2 DM clients must be applied and carried out daily and continuously [10,14]. This activity includes 5 pillars, namely: 1 managing diet; 2.glucose management; 3 drug/insulin therapy management; 4. control blood sugar levels, and 5. doing physical activity.

In the treatment group, Type 2 DM (DMT2) clients were given assistance and guidance by health cadres who had been trained and equipped with knowledge and skills about self-care for diabetic clients. So that the treatment group clients had a better self-care management average than DM clients who were not accompanied by health cadres in their environment (control group).

Research has shown that increasing the client's knowledge about the disease and its complications has significant benefits concerning client adherence to treatment and a reduction in disease-related complications. This is directly linked to positive and desirable health outcomes. Self-care practices have been generally accepted as the key to achieving better glycemic control in the treatment of T2DM. Optimal and good health outcomes of clients with T2DM are related to the client's level of knowledge about the disease and its management obtained through self-management education, adequate attention, and commitment to self-care practices using available health resources.

Self-care management guidance by cadres is a form of community-based empowerment. The first step is to assess fasting blood sugar levels and 2 hours after eating before mentoring and taking self-care data for DM clients (Pre-test). Furthermore, cadres as part of community leaders in the DM client environment, so that in providing guidance and counseling about self-care DM clients are very easy to accept and trust[19,20].

The guidance provided by cadres for DM clients includes: 1) right way and time to take the correct anti-diabetic medication; 2) food needs, type of schedule, amount and method of dieting; 3) exercise that can be done and for how long and things to be aware of when doing sports and also being taught foot exercises to improve peripheral circulation and prevent diabetic feet; 4) foot care; and 5) monitoring blood sugar levels (Ministry of Health, 2019) [1]. In the end, type 2 DM clients in the treatment group were able to carry out self-care activities better than the control group [17,18].

CONCLUSION

The study concludes that community-based client empowerment strategies in therapeutic management have an influence on self-care of Type 2 Diabetes Mellitus clients in the city of Surabaya.

Suggestions to health service institutions need to be intensified and fostered and developed for DM cadres that have been formed in the city of Surabaya as many as 2 generations to help prevent complications for DM clients in the community. Health cadres continue to communicate with health and education service institutions and develop their knowledge and skills to other cadres and/or DM clients in DM therapy management in their environment.

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