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Self-Management Counseling Increases Compliance in Diabetes Mellitus Patients

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Abstract: *People with diabetes mellitus (DM) can experience various complications if they do not have a good lifestyle. People with DM must comply with medication, physical activity, diet, and education to improve a healthy lifestyle. One effort that can be made to improve compliance is to provide Self-Management Counseling (SMC) with the Transtheoretical Model (TTM) approach. This quasi-experimental study involved two groups of DM patients. 79 respondents were selected with the criteria of not having the disease and having diabetes for 2 years. Respondents were divided into an intervention group (40 people) and a control group (39). The results showed that there were differences in compliance with diet (p = 0.001), activity (p = <0.001), treatment (p = <0.001), and education (p = 0.002) between the intervention group and the control group. Therefore, it can be concluded that SMC with the TTM approach has proven effective in improving compliance with type 2 diabetes patients—both compliance with diet, activity, treatment, and education.*

Keywords: Compliance, Diabetes Mellitus, Self-Management Counseling, Transtheoretical Model

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INTRODUCTION

Various complications can occur due to type 2 diabetes mellitus, also known as type 2 DM. According to WHO data, type 2 DM causes complications such as retinopathy, leg ulcers, cardiovascular disease, and hypertension (WHO, 2024). The number of cases of type 2 diabetes that have complications has increased in recent years. It harms human life, health, and safety (Niu et al., 2024; Sanz-Cánovas et al., 2022). Therefore, the risk of dying from various causes increases by two to three times for people with type 2 diabetes (Yang et al., 2019; Peimani et al., 2024).

Regular checkups and medications can help control diabetes. However, the Ministry of Health data shows that 9% of diabetics have not adhered to examination and treatment. This is caused by various factors, such as feeling healthy (50.4%), not going to health facilities regularly (30.2%), taking traditional medicine (25.3%), often forgetting (18.8%), others (18.2%), not being able to tolerate drug side effects (12.6%), and not being able to buy drugs regularly (8.5%). Drugs are unavailable at health facilities (Kementerian Kesehatan, 2018).

As a result, preventive efforts are necessary for people with diabetes who have risk factors (van Netten et al., 2024). Adherence to diet, physical activity, blood glucose monitoring, medication adherence, and risk reduction measures are the main concepts of diabetes self-management behaviors to improve one's health (Bossman et al., 2021). Diabetics should adhere to their diabetes treatment program, which includes medication, diet, and exercise, to reduce the risk of diabetic foot ulcers. Diabetics should change their behavior, change their lifestyle, take medication regularly, and regulate their diet as recommended by their doctor.

However, adherence to treating patients with diabetes and other chronic diseases is still not good (Nkhoma et al., 2021). One way to improve compliance is to conduct self-management counseling (SMC) with the transtheoretical model (TTM) approach. SMC is counseling that is carried out to Improve self-

care. One method that can be applied in counseling is TTM. TTM is an integrative model of behavioral change that can be used to predict patient readiness to implement proposed behavioral changes (Dunkel et al., 2024). So, counseling with TTM is important for people with DM. This is because diseases that have been suffered for a long time take a long time to heal, so patients need to be educated. In addition, education is also one of the nurses' duties related to the role of nurse educators. Counseling in type 2 DM patients has been the subject of much research (Jalilian, Sarbarzeh, & Oubari, 2020) (Anoop & Kiron, 2021; Farahani, Laeer, Farahani, Schwender, & Laven, 2020; Khan, 2024).

Counseling can be done on DM patients to prevent complications of diabetic foot ulcers, improve quality of life, improve adherence to diet or nutrition, and increase knowledge (Satheesh et al., 2020; Ghasemi, Vakilian, & Khalajinia, 2021; Patnode et al, 2022; Lee, Renner, Kovacic, & Lee, 2022; Sarmadika et al., 2022). The novelty of this study is that it uses the SMC approach with the TTM approach, which combines four pillars of diabetes management: nutrition, physical activity, treatment, and erection to prevent diabetic foot ulcers. So, what differentiates this research from previous research is that applying SMC with TTM will be more effective in changing the behavior of DM sufferers. This study aims to analyze the effect of SMC on the level of compliance of type 2 DM patients.

METHODS

Study Design

This quasi-experimental study was conducted in Surakarta, Indonesia, from August to November 2024. It investigated how self-management counseling (SMC) impacts DM patient compliance. Thus, SMC effectively improves DM patient compliance.

Samples/Participants

The study was conducted on two groups of individuals suffering from type 2 DM. The intervention group consisted of 40 people and the control group of 39. Multistage random sampling is used for sampling. The regions selected for the study were taken in the first stage, which used cluster random sampling, and the predetermined population was taken in the second stage. The study sample consisted of patients with type 2 diabetes who met the inclusion and exclusion criteria. Patients with type 2 diabetes must be enrolled in the Puskesmas for a minimum of two years, have a diagnosis of type 2 DM, and be willing to be a respondent. Patients with type 2 diabetes with complications and difficulty communicating are exclusion criteria.

Intervention

SMC intervention with TTM was given to an experimental group by health workers trained as counselors. Counseling lasted for 16 weeks, and meetings were held nine times. Counseling includes nutrition and diet, physical activity, medication, and education. On the other hand, the module was given to a control group of people with type 2 diabetes as a guide to improve adherence to the four pillars of diabetes management.

Data Collection

Eight counselors were trained to counsel people with diabetes mellitus. Before and after the intervention, both groups were assessed for adherence to the four pillars of diabetes management: nutrition, physical activity, medication, and education.

Data Analysis

Data analysis was conducted to describe the characteristics of respondents and analyze differences in the level of compliance with diet, exercise, medication, and education between the intervention and control groups. Categorical variables can be described by frequency and percentage; continuous variables can be described by mean and standard deviation. An independent T-test was used to determine differences in the level of compliance between the intervention group and the control group.

Ethical Considerations

The research ethics commission of the Universitas Aisyiyah Surakarta issued a letter of ethical feasibility, number 198/VII/AUEC/2024, on 4 July 2024, which shows that this research is ethically feasible.

RESULTS

Table 1 shows the variable frequency distribution of respondents, including gender, occupation, education level, and smoking history. Table 1 shows that in the intervention group, most of them were women (60%), did not work (57.5%), had secondary education (50%), and had no history of smoking (82.5%). Meanwhile, in the control group, most of them were women (71.79%), did not work (61.54%), had basic education (69.23%), and had no smoking history (89.7%).

Table 1. Frequency Distribution of Respondent Characteristics

		Intervention groups (n = 40)	Control groups (n = 40)
Gender	Female	24 (60%)	28 (71.79%)
	Male	16 (40%)	11 (28.2%)
Work	Work	17 (42.5%)	15 (34.46%)
	Not working	23 (57.5%)	24 (61.54%)
Level of education	Higher education	5 (12.5%)	2 ((5.13%))
	Secondary education	20 (50%)	10 (25.64%)
	Basic education	15 (37.5%)	27 (69.23)
Smoking history	Do not smoke	33 (82.5%)	35 (89.7%)
	Smoke	7 (17.5%)	4 (10.3%)

Table 2 shows that at the baseline values of the two groups, there is no difference in adherence to the four pillars of diabetes management, namely nutrition/diet (p = 0.145), physical activity (p = 0.744), treatment (p = 0.366), and education (p = 0.592).

Table 2. Differences in compliance levels between the intervention and control groups before the intervention

Variable	n	Mean	SD	ρ
Diet				
Intervention groups	40	4.35	1.11	0.145
Control groups	39	4.72	1.02	
Exercise				
Intervention groups	40	4.40	1.09	0.744
Control groups	39	4.49	1.09	
Treatment				
Intervention groups	40	5.27	1.11	0.366
Control groups	39	5.05	1.07	
Education				
Intervention groups	40	5.57	0.93	0.592
Control groups	39	5.4	0.94	

Table 3 shows that after the intervention was given, there were differences in adherence to the four pillars of diabetes management in both groups: nutrition/diet (p = 0.001), physical activity (p < 0.001), treatment (p < 0.001), and education (p = 0.002). This suggests that SMC interventions effectively improve adherence in people with DM.

Table 3. Differences in compliance levels between the intervention and control groups after the intervention

Variable	n	Mean	SD	ρ
Diet				
Intervention groups	40	5.83	0.64	0.001*
Control groups	39	4.92	1.22	
Exercise				
Intervention groups	40	5.85	0.66	<0.001*
Control groups	39	4.72	1.17	
Treatment				
Intervention groups	40	5.9	0.38	<0.001*
Control groups	39	4.72	1.26	
Education				
Intervention groups	40	6	0	0.002*
Control groups	39	5.54	0.91	

*Significant at p < 0.05 when comparing intervention and control groups

DISCUSSION

If they do not change their lifestyle, DM sufferers can experience various problems. Structured lifestyle intervention programs include adherence to treatment programs, dietary changes, exercise interventions, group education, cognitive behavioral support, and exercise interventions carried out gradually and individually (Galstyan et al., 2021). Thus, people with DM must control their condition by applying a multidisciplinary approach that includes diet, physical activity, and therapy or medication (Cannata et al., 2020).

TTM can improve glycemic control by encouraging behavioral change, self-efficacy, and medication adherence in diabetic patients, especially new patients (Zhang et al., 2024). The results of this systematic review provide an overview of the benefits of TTM in predicting and improving treatment adherence of patients with chronic conditions. However, some studies have shown that TTM-based interventions have not been successful in patients with medication adherence (Imeri, Toth, Arnold, & Barnard, 2022).

TTM has been proven to increase motivation to obey physical activity. By applying TTM, patients can choose physical activities that suit their condition to improve their health status (Pennington, 2021; Jiménez-Zazo et al., 2020). In most areas, TTM-based lifestyle interventions have a long-term effect beyond the duration of the intervention, and patients can sustain behavioral changes (Dunkel et al., 2024).

People with DM, by changing their lifestyle and increasing compliance, can maintain their health status. Things that need to be changed include exercising regularly, managing weight, and adhering to a healthy diet (Bekele, Asefa, Getachew, & Belete, 2020). Although there is evidence that a healthy diet and physical activity are associated with reduced morbidity and mortality, most have not shown good behavior (Patnode, Redmond, Lacocca, & Henninger, 2022). For this reason, to change the lifestyle of diabetics, counseling is necessary (Medhat, Sabry, & Ashoush, 2020; Patnode et al., 2022; Lee, Renner, Kovacic, & Lee, 2022; Sarmadika, Mazandarani, Faramarzi, & Ehsani, 2022). Support is needed to improve people's compliance with diabetes. One of the supports that can be provided is to give diabetics

the knowledge they need. Better knowledge can help people with diabetes manage diet, medication, activity, and stress (Kusnanto, Arifin, & Widyawati, 2020).

Lifestyle and diet changes positively affect diabetic patients (Molavynejad, Miladinia, & Jahangiri, 2022) (Ji et al., 2021). Dietary adherence is the first step in diabetes control. However, dietary changes and adherence to dietary recommendations are the most challenging parts of diabetes control (Molavynejad et al., 2022; Abu-Saad et al., 2019). Therefore, people with diabetes need to get education (Lee et al., 2022; Abu-Saad et al., 2019) and instructions on diet so that they can develop an appropriate and sustainable meal plan that meets the needs of each individual (Abu-Saad et al., 2019). Information about diet is indispensable for diabetics. Diabetics should reduce sugar and fat and be fibre-rich (Hjelm, Bard, & Apelqvist, 2022).

CONCLUSION

With a TTM approach, SMC has been proven effective in improving the adherence of people with type 2 diabetes to diet, activity, medication, and education. Therefore, it is recommended that people with type 2 diabetes receive assistance so that they remain compliant with the four pillars of diabetes management. This study's limitation is that the SMC stage has only been carried out up to the action stage, while the maintenance and termination stages have not been carried out. So, the study must continue to maintain compliance with DM patients.

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AUTHOR CONTRIBUTION

M contributed to the proposal preparation, research permit, ethical testing, data collection, data presentation, and discussion. Author NAA contributed to data presentation, discussion, and writing references. Authors W and H contributed to data processing**.** All authors approved the final version of the manuscript.

ETHICAL APPROVAL AND CONSENT

This research got approval from the Ethical Clearance Universitas Aisyiyah Surakarta, number 198/VII/AUEC/2024, on 4 July 2024. Informed consent was obtained from all individual participants included in the study.

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CONFLICT OF INTEREST

The authors hereby declare that there's no conflict of interest in this study, either to any institutions or individuals

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