

The Effect of Motivational Interviewing and Family Support on Self-Management in Type 2 Diabetes Mellitus Patients

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Abstract

Background: Diabetes is a disease that the main factors are lifestyle-related, such as diet and activity habits. The risk of the disease will increase in individuals with uncontrolled hypertension, lack of exercise/physical activity, and an unhealthy lifestyle. Most type 2 diabetes mellitus (DM) patients still have difficulty in self-management. Motivational interviewing and family support help improve self-management for sufferers.

Aim: The present study was performed with aim to determine the effectiveness of motivational interviewing and support for self-management in patients with type 2 DM.

Method: This quasi-experimental study with a pre-post-test design was conducted on 60 participants in Bulango Health Center, Gorontalo Province, Indonesia from April to August 2023. The research tool was the DSMQ (Diabetes Self-Management Questionnaire). The subjects were divided into two intervention groups: motivational interviewing (n=30) and family support (n=30). The difference in self-management scores in each group was evaluated using the bivariate analysis.

Results: There was a significant difference in self-management scores between the motivational interviewing group, an average increase of 9.8 points ($p < 0.001$), and the family support group, an average increase of 6.8 points ($p < 0.001$). Motivational interviewing is significantly more effective than family support in improving self-management in type 2 diabetes mellitus patients.

Implications for Practice: Motivational interviewing and family support can be recommended as an independent action in nursing care services for type 2 DM patients.

Keywords: Family support, Motivational interviewing, Type 2 diabetes mellitus

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Introduction

Over the last decades, the prevalence of diabetes has increased more rapidly in low- and middle-income countries (1). Around 425 million people (8.8%) worldwide are estimated to suffer from diabetes. About 79% live in low- and middle-income countries. It is estimated that in 2045, 629 million people aged 20-79 years will have diabetes. Deaths due to diabetes in people aged 20-79 years were 4 million in 2017 (2). Among the top ten countries with Diabetes Mellitus, Indonesia is in fourth place, with a prevalence of 8.6% of the total population of type 2 Diabetes Mellitus cases. From 2000 to 2030, it is estimated that there will be an increase of 8.4 to 21.3 million people with Diabetes Mellitus (3). It is often difficult for many people with diabetes to accept that they have to use medication throughout their lives, resulting in poor medication adherence and self-care management (4). These psychosocial problems may ultimately develop depression or other psychological disorders associated with poor self-care behaviors, poor metabolic outcomes, increased mortality, functional limitations, increased healthcare costs, lost productivity, and reduced quality of life (5).

Health services focus on assessing blood sugar levels because the needs of diabetes patients are not only limited to adequate glycemic control but also need to prevent diabetes complications. Seven important self-care behaviors in diabetes patients can provide good results, namely healthy eating, being physically active, monitoring blood sugar levels, complying with medication, good problem-solving skills, healthy coping skills, and risk reduction behaviors (6). The main obstacle in treating DM is patient boredom in undergoing an ongoing DM treatment program. This can influence a person to control their emotions and risks, causing depression. In this condition, treatment is essential, but family support is important. Continuous treatment carried out by the patient can cause psychological impacts and a feeling of hopelessness because the treatment has not been completed.

Self-care management is the basis of control, but findings from several research show that patient self-care management behavior is low (7,8). Psychological factors have a significant impact on the occurrence of diabetes and can cause low levels of self-management in type 2 DM patients (9). Patients' poor understanding of diabetes and low levels of self-care are believed to delay appropriate self-care management, thereby accelerating cardiovascular complications, stroke, and kidney failure (10). The self-management of type 2 diabetes patients can be improved through motivating patients starting from primary care. Changes in patient behavior can be influenced by their psychological condition (11).

Motivational interviewing (MI) is a collaborative patient-centered counseling approach with the aim of the patient changing their behavior while undergoing treatment (12). Counselors use the techniques to create an atmosphere that helps patients explore the differences between their goals and current behavior. The focus of MI is discovering and resolving ambivalence, increasing patients' perceptions of the importance of behavior change, and supporting them to make changes. MI provides a structural framework with guiding principles that can be quickly followed by health workers, especially in primary care (13). In a recent systematic review, it was found that motivational interviewing significantly improved the patients' outcomes, such as total cholesterol, fasting blood glucose, body mass index, blood pressure, waist circumference, and physical activity (14). In another study, intervention accompanied by education reduced HbA1c by 1% (15). Other studies also showed that MI can contribute to improving healthy eating patterns, weight control, and increasing physical activity (16,17).

One form of support is through collaboration between families and professional health workers in diabetes mellitus treatment programs. Family support and support from health professionals significantly contribute to the increase in the incidence of diabetes mellitus, including psychological problems in the form of diabetes distress (18). Family support can be provided through the participation and active role of the family in facilitating the patient in overcoming the concerns and emotional burdens. This active role of family follows the concept of the healthy paradigm, namely that care and healing do not only focus on the patient's recovery but also on seeking healthy family members, which is also essential to maintain and improve the health of both sick and healthy families. Therefore, in the care and management of Diabetes Mellitus, not only an organological approach is needed but also family support through a family approach is required (19).

Nowadays, the intervention to improve self-management of DM type 2 patients in Indonesia is to focus on family support. Also, a motivational interviewing program is needed to enhance the self-management of the patients. Also, no previous research compared motivational interviewing programs

and family support for self-management in DM. Therefore, the present study was performed with aim to determine the effectiveness of motivational interviewing programs and family support for self-management in type 2 diabetes mellitus patients.

Methods

This comparative analytical research was conducted using a quasi-experimental approach (20) with a pretest-posttest design. In this design, there are two groups, namely, the motivational interviewing group and the family support group. The first intervention group received treatment through motivational interviewing, while the second group received family support. This research was conducted to determine whether there was a causal relationship after treatment in the intervention group. Then, after the treatment, a self-management assessment was carried out and compared in both groups (21). The research was carried out from April to August 2023 at the South Bulango Health Center (Intervention Group 1) and in the working area of the East Bulango Health Center (Intervention Group 2) Bone Bolango Regency, Gorontalo Province.

The population studied in this study had type 2 diabetes mellitus, long-suffering for <5 years, able to work together and communicate well. The family that cared for them was the nuclear family (husband, wife, and child), who lived in the same house as the respondent. The exclusion criteria were known comorbidities or severe complications, such as cancer, unstable angina, chronic obstructive pulmonary disease with frequent exacerbations, or diabetic retinopathy, and respondents withdrew during the research process. The Cohen formula was used to estimate the sample size by considering $\alpha=0.05$, power=0.80, and the effect size was (d)=0.20, indicating the minimum required sample size of 30 participants per group (22). The non-probability sampling technique was used in this research, which is a type of purposive sampling, a sample determination technique by selecting a sample from the population according to what the researcher desires (objectives/problems in the research), so that the participants can represent the characteristics of the population (20,21).

In this study, 95 subjects were assessed for eligibility and 60 respondents were studied (Figure 1). The participants who agreed to participate in the study signed an informed consent. Measurement of self-management was done using a questionnaire twice, namely in the first week before the intervention as pretest, and after four weeks of therapy as post-test. During the research, the researchers visited the respondents' homes to provide therapy.

The research tools were the DSMQ (Diabetes Self-Management Questionnaire). The questionnaire consists of 19 items including management of blood sugar levels (5 items), diet control (7 items), physical activity (3 items), and diabetic foot care (4 items). The scale is scored on a Likert scale with 0 (does not apply to me), 1 (applies to me to some degree), 2 (applies to me to a considerable degree), and 3 (applies to me very much). The minimum score was 0 and the maximum score was 57. The validity and reliability tests were conducted on 30 patients with DM before the study. The items of validity test was analyzed using IBM-SPSS version 26.0. The corrected item-total correlation of the instruments ranged from 0.79 to 0.94. Cronbach's alpha values were 0.89 to 0.01.

Motivational interviewing is an effective counseling method for increasing motivation through resolving ambivalence. The participants in the motivational interviewing group received 4 sessions including open questions, affirmations, reflections, and summaries, for four weeks, two times each week, with duration of 40 minutes. At the first meeting, before receiving motivational interviewing, self-management was measured. This data was used as pre-test data. After four weeks, self-management was measured again, this data was used as post-test data (Table 1).

In the family support group, structured education was provided to families in 4 sessions over four weeks, one session/week with duration of 40 minutes per session. The material provided includes four dimensions of family support, namely emotional, appreciation, information, and instrumental dimensions. Before receiving family support, self-management was measured. This data was used as pre-test data. After four weeks, self-management was measured again, this data was used as post-test data.

Descriptive statistics were carried out to determine the characteristics of the samples. The paired t-test was used to see the differences in self-management before and after motivational interviewing and family support and to prove the research hypothesis. The collected data was analyzed using the SPSS software (version 26). Before the bivariate test, a data normality test was carried out using the Shapiro-Wilk test. Normality tests were carried out on the self-management of each group at both

measurement times. The homogeneity test with Levene's test was carried out. $p < 0.05$ was considered statistically significant.

Table 1. The basic skills of motivational interviewing

Ask open-ended questions* -The patient do most of the talking -Gives the practitioner the opportunity to learn more about what the patient cares about (eg. their values and goals)	<i>I understand that you have concerns about the habit of neglecting diabetes management that you experience. Can you tell me why this happened?</i>
Make Affirmations -Can take the form of compliments or statements of appreciation and understanding -Helps build rapport and validate and support the patient during the process of change -Most effective when the patient's strengths and efforts for change are noticed and affirmed	<i>I appreciate your extraordinary courage to discuss your diabetes management habits with me today. You seem to have had a lot of sense to overcome these difficulties over the past few years. Thank you for willing to accompany me. I appreciate this is not easy for you to hear.</i>
Use Reflections* -Involves rephrasing a statement to capture the implicit meaning and feeling of a patient's statement -Encourages continual personal exploration and helps people understand their motivations more fully -Can be used to amplify or reinforce desire for change	<i>You enjoy busy activities like normal people usually do, making food according to your taste without thinking about managing DM, including when to take medication, which is a limitation in living a normal life. However, it would help if you started to worry about the impact of side-by-side DM management on your health. In fact, until now, you are not too worried about how big the risk of DM complications is because you think that you can control it. Then you discovered that your health was not in good condition, and your family said several things which made you doubt that indiscipline in DM management would help you in the long run.</i>
Use Summarising -Links discussions and 'checks in' with the patient -Ensure mutual understanding of the discussion so far -Point out discrepancies between the person's current situation and future goals -Demonstrates listening and understand the patient's perspective	<i>Let me conclude whether I have understood everything we have discussed so far. Sir/madam, we are worried about how often you have violated DM management in the last few months because you know you have experienced several health problems related to your indiscipline. You have received warnings from your family that they are not happy with how often you need to remember to manage the DM. However, several times, you have tried to be disciplined in managing DM, which is difficult and requires strong determination.</i>

* A general rule-of-thumb in MI practice is to ask an open-ended question, followed by 2–3 reflections

Ethical Consideration

This research was carried out after obtaining approval from the ethics review board or passing the ethical review at the Gorontalo Ministry of Health Polytechnic (DP.01.01/KEPK/200/2023). The researchers explained about the potential participants, also the objectives, methods, benefits, and risks of the study. The researcher guarantees the confidentiality of the participants' information and gives respondents the right to withdraw from the research at any time without implications for further treatment.

Results

According to the results of homogeneity test, there is homogeneity between the motivational interviewing group and the family support group regarding age, gender, and occupation. The mean age of participants was 55 ± 7.77 years, with the youngest age being 53 years and the highest age being 59 years (Table 2). Most participants (70%) were female with the job category of housewife (68.3%) (Table 3). The self-management score before the intervention was 19.67 ± 5.28 in the motivational interviewing group and 20.37 ± 5.04 in the family support group ($p = 0.53$).

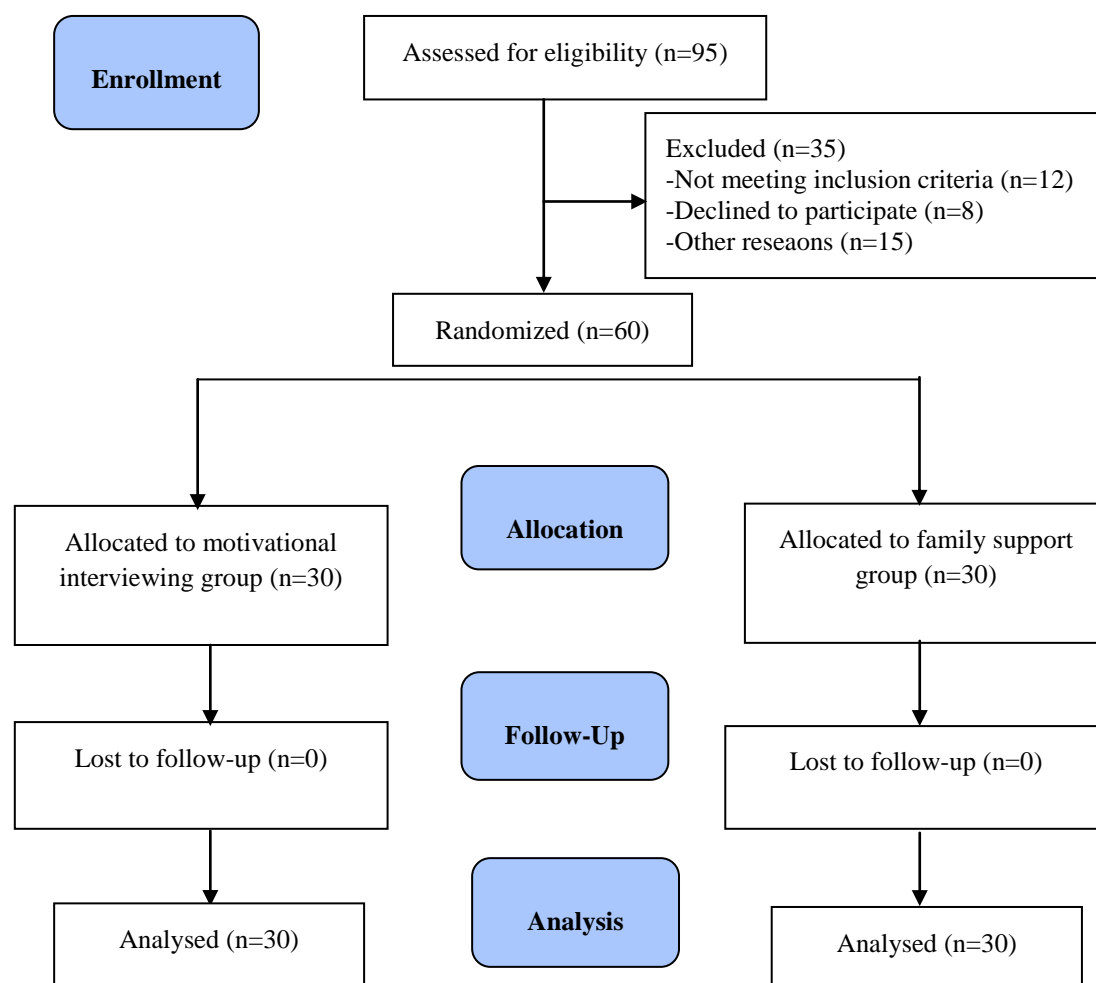


Figure 1. CONSORT diagram to clarification of research phases

Table 2. Characteristics of participants based on age

Variable	Group	Mean±SD	Min-Max	95% CI	P-value*
Age	Motivational Interviewing	56.30±8.85	38-74	53.27- 59.40	0.442
	Family support	55.67±6.99	45-74	53.43- 58.30	
	Total	55.98±7.77	38-74	54.00- 57.98	

*t-test

Table 3. Characteristics of participants based on gender and occupation

Variable	Motivational Interviewing N (%)	Family support N (%)	Total N (%)	P-value*
Gender				
Male	10 (33.3)	8 (26.7)	18 (30)	0.266
Female	20 (66.7)	22 (73.3)	42 (70)	
Occupation				
Housewife	20 (66.7)	21 (70)	41 (68.3)	0.551
Self-employed	8 (26.7)	7 (23.3)	15 (25)	
Private	1 (3.3)	2 (6.7)	3 (5)	
Government employees	1 (3.3)	0 (0)	1 (1.7)	

*Chi-square test

The mean self-management score of participants after motivational interviewing was 29.47 ± 4.93 and in the family support was 27.17 ± 4.03 . Further analysis showed that both groups had significant values for the self-management of type 2 DM patients before and after the motivational interviewing and family support. MI had a score of 9.8 points, higher than family support, which had an increase in score of 6.8 points. In other words, motivational interviewing was significantly more effective than family support in improving self-management score in type 2 DM patients ($p < 0.05$) (Table 4).

Table 4. Mean score of self-management according to measurement stage in the two groups

Variable	Group	Time	Mean \pm SD	Mean Difference	P-value*
Self-management	Motivational Interviewing	Before	19.67 \pm 5.28	9.8	<0.001*
		After	29.47 \pm 4.93		
	Family support	Before	20.37 \pm 5.04	6.8	<0.001*
		After	27.17 \pm 4.03		

*Dependent t-test

Discussion

The purpose of the current research was to evaluate the effectiveness of motivational interviewing and family support for self-management in type 2 diabetes mellitus patients in Indonesia. The results of this study showed that the mean age of respondents was 55 years, with an age range of 53-59 years, where this age is classified as advanced adulthood (1). Based on the results of the study by Erida Silalahi et al. (2021) (24), there was relationship between age and self-management behavior. According to the research conducted by Zare et al. (2020) (25), age has a positive relationship with self-management behavior, meaning that as age increases, there will be an increase in self-management behavior. Increasing age causes an increase in a person's maturity so that sufferers can reason about the benefits that will be achieved if sufferers carry out adequate DM self-management behavior in everyday life. The analysis results showed that as age increases, especially over 45 years, glucose intolerance begins to increase, and the function of the body system decreases. At this age, support is needed to encourage clients to focus on self-management behavior to prevent the complications caused by DM. It can be concluded that old age can influence self-management.

The majority of respondents (70%) in this study were female. Women have the estrogen hormone, which is influenced by increasing age, whereas in older women, there is a decrease in estrogen. According to the researchers' view, this occurs because in older women, there can be changes in the estrogen hormone affecting blood glucose balance, especially in women experiencing menopause (26). During menopause, the balance of blood glucose levels will decrease, which can cause women to be more at risk of developing diabetes mellitus because, physically, women have a greater chance of increasing body mass index, making the distribution of body fat more accessible to accumulate due to this hormonal process (27). This research is also in line with the research by Shabana & Sasisekhar (2013) (28) regarding that there are more women than men with diabetes mellitus in Indian hospitals. Women tend to be obese due to an increase in the estrogen hormone, which causes an increase in fat and subcutaneous tissue, so women have a greater risk of developing diabetes if they have an unhealthy lifestyle (29).

In the present study, the majority of participants were housewives. According to the study of Reyes et al. (2017) (18), respondents who act as housewives and work as entrepreneurs have an irregular daily eating schedule. It is known that a person's level of education is related to their ability to understand information, which influences patient compliance in self-management, including diet. Knowledge about self-management has been given to patients. However, many do not comply because they consider the diet unpleasant and do not control their eating patterns as long as they do not have serious symptoms. The results by Khunti et al.'s research (2021) (30) showed a relationship between work and the eating habits of respondents in diabetes mellitus sufferers.

In the present study, the mean score of self-management after the intervention had a higher increase in the motivational interviewing group compared to the family support group. In comparison, in the family support group, the self-management score increased with score of 6.8 points. The results of this study support the research hypothesis that the mean score of self-management after motivational

interviewing was higher than in the family support group. Thus, motivational interviewing and family support effectively increased self-management scores in respondents with type 2 diabetes mellitus.

Diabetes self-care management aims to control blood glucose levels so that blood glucose remain within normal levels for diabetes mellitus patients. Self-care management also aims to improve the patient's ability to fulfill their daily needs independently so that patients can prevent and manage diabetes by complying with the treatment and advice given by health workers. Diabetes self-care management, if done correctly, can prevent diabetes complications.

The study by Song et al. (2014) (31) assessed six self-management abilities in type 2 diabetes patients: diet control, regular exercise, adherence to medication, glucose monitoring, foot care, and prevention and treatment of hyperglycemia and hypoglycemia. Compared with the control group, MI resulted in a significantly more significant improvement in patients' self-management abilities in all aspects except treatment adherence. This results also aligns with the findings of the research of Rosenbek Minet et al. (19) showing that the average self-efficacy score increased significantly in the intervention group after MI. Therefore, this approach is recommended for people with type 2 diabetes to increase self-efficacy and improve health and quality of life (32).

Since people with type 2 DM are in a family and broader social environment, these factors can also influence the care of diabetes patients. Family members are the primary source of instrumental and emotional support (33). Instrumental support includes helping patients complete specific tasks, such as making appointments with healthcare providers or assisting with insulin injections. In contrast, emotional support can include providing comfort and encouragement when patients encounter distress or frustration during their lengthy diabetes treatment (34). Recognizing the effect of family support on diabetes, diabetes care guidelines include providing diabetes education to family members or including family support as part of the diabetes patient's care plan. In this way, educational programs that focus solely on the individual can be limited.

The development of family-supported diabetes interventions is integral to maintaining self-management behaviors and improving health outcomes for patients with type 2 diabetes. This system demonstrated that DSME with family support improves health outcomes for patients with uncontrolled blood sugar (35). This is in line with the research by Peñarrieta et al. (2015) (36), showing that the inclusion of family members in family support and intervention programs provide physical and psychological comfort. Nurses, as one of the health workers closest to patients have a significant role, especially in motivating and empowering patients to improve self-management in diabetes care. Nurses can act as educators and motivators for patients and families (37,38).

The limitation of this study is that it did not include many variables, such as foot sensitivity, blood sugar levels, and capillary refill time. However, this research is sufficient to explain the manual self-management score, where this self-management score is at least an indicator so that DM patients can adopt a healthy lifestyle by paying attention to appropriate rules to prevent long-term complications.

Implications for practice

The mean score of self-management before and after the intervention increased by 9.8 points in the motivational interviewing group, which was higher than family support that had an increased score of 6.8 points. In other words, motivational interviewing was significantly more effective than family support in improving self-management. Motivational interviewing programs and family support are also needed so that nurses can apply them in providing nursing care to type 2 DM patients and improving patient self-management. Future research are needed to develop a transitional care program between hospital and home, including motivational interviewing and family support, to enhance self-management of patients with DM type 2 in Indonesia.

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Conflicts of interest

The authors declared no conflict of interest.

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Authors' Contributions

Ratnawati Ratnawati, Jumari Jumari, Eka Firmansyah Pratama, Akifa Syahrir, and Reni Devianty Usman, Indriono Hadi designed the study, collected data, performed data analysis, and wrote the article. All the authors read and approved the final manuscript.

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