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RESEARCH ARTICLE

THE EFFECT OF THE MOTIVATIONAL INTERVIEW PROGRAM ON COPING AND ADAPTATION OF PATIENTS WITH TYPE 2 DIABETES: AN ACTION RESEARCH STUDY

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ABSTRACT

Purpose: Diabetes is a main issue for the health of public in the World and Turkey, and its incidence has been increasing. However, most patients with type 2 diabetes mellitus experience adaptation problems to their diseases. The aim of this study was to understand the consequences of motivational interviews on the levels of coping and adaptation, self-efficacy and diabetes self-care of patients diagnosed with type 2 diabetes mellitus.

Methods: This study is an emancipatory typed action study in which qualitative strand has priority. The sample consisted of volunteer adult participants who had diagnosis of type 2 diabetes mellitus. 7-9 MI interviews were conducted with each ten participants and a total of 89 interviews were conducted. Qualitative data were obtained from the motivational interviews with the participants and analyzed via descriptive phenomenological data analysis strategy of Colaizzi's (1978). In addition, quantitative data were obtained from the scales and analyzed by Friedman test and Bonferroni advanced analysis.

Results: It was found that motivational interviews significantly increased levels of coping and adaptation, self-efficacy, and diabetes self-care activities of patients with diagnosed type 2 diabetes mellitus. Significant difference was found statistically between the pretest, posttest, results of the hemoglobin A1c, fasting plasma glucose and body mass index of the participant.

Conclusion: The study suggested that motivational interviews can be used to increase the levels of coping and adaptation, diabetes mellitus self-efficacy and diabetes self-care activities of individuals diagnosed with type 2 diabetes mellitus.

Keywords: Type 2 Diabetes Mellitus, Adaptation, Coping, Motivational interview

INTRODUCTION

In the world and Turkey, diabetes is a main issue for the health of public, the prevalence of which has been going up day by day. The complications of diabetes, which is a big problem in terms of public health and health expenditures, are increasing in terms of the physiological, psychosocial, and financial load in all income groups (1). The prevalence of diabetes has gone up worldwide from 4.6% in 2000 to 9.3% in 2019 for adults over the age of 18. 4.2 million people died in the world in 2019 due to diabetes (2). Worldwide, diabetes-related health spending covers $ 760 billion, or 10% of total health spending for adults (2). The

frequency of diabetes mellitus in Turkey was 13.7% in 2008, rose to 21% in 2015 (3).

Individuals with type 2 diabetes mellitus (T2DM) often have difficulties in effectively managing diet, physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood glucose (SMBG), medication adherence, screenings activities to control their illness. It is stated that the biggest challenge of improving the health of individuals diagnosed with T2DM is behavioral change. Regarding behavior change, it is stated that traditional attitudes such as frightening the patient and giving advice make the treatment more difficult, but that counseling techniques, which include empowering the patient, educating, understanding psychosocially, and changing behavior in a short time, are more useful and facilitating (4). It is stated that the effects of traditional diabetes education on lifestyle changes are less than optimal. It is also stated that individuals diagnosed with diabetes are discouraged from participating in training sessions (5,6). It is important to take necessary interventions for individuals diagnosed with diabetes to adapt to the disease, to increase their level of self-care and to achieve self-care behaviors, rather than using a simple drug treatment. Recently education programs related to diabetes have evolved from teacher-centered approaches based on lectures and providing data to practices in which patients implement self-care performances (5,6). These practices help patients carry out self-care behaviors of their choice and actively collaborate with healthcare professionals. The changes in patients' behaviors constitute the most important aspect of diabetes treatment. It is important to improve and present adapted effective diabetes self-care method by keeping in mind the situation of each individual. These individuals will increase their diabetes mellitus and support the maintenance of self-care behaviors. Thus, complications of diabetes and early deaths can be prevented (5).

The "Motivational Interview" (MI), which is based on the Radical Humanist paradigm, focuses on self-awareness and on the individual in the change of human behavior, and is an approach that encourages motivation and actively focuses on people for change. Motivational interviewing is a method in which therapeutic communication and adaptation skills are used to encourage active listening, behavior change and strengthening, especially emphasizing the importance of each individual's unique perspectives and priorities while creating the treatment plan. Motivational interviewing is human accompaniment, that is, acceptance without judgment (7). Thus, in this study it was aimed to understand and determine the effect of the MI Program on the levels of coping, and adaptation, diabetes self-efficacy, and diabetes self-care, of individuals with T2DM.

Research Question

What is the effect of the MI Program on the levels of coping, and adaptation, diabetes self-efficacy, and diabetes self-care, of patients diagnosed with T2DM?

Quantitative phase

1. To what extend does MI Program increase the coping and adaptation levels of patients with T2DM?
2. To what extend does MI Program increase the diabetes self-efficacy levels of patients diagnosed with T2DM?
3. To what extend does MI Program increase the diabetes self-care levels of patients diagnosed with T2DM?

Qualitative phase

1. What is the meaning of healthy diet, with physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood sugar, medication adherence and screening to participants with T2DM think about?
2. What kind of barriers do participants with T2DM experience related to healthy diet, physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood sugar, medication adherence and screening?
3. How do participants with T2DM cope with the barriers related to healthy diet, with physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood sugar, medication adherence and screening?

MATERIALS AND METHODS

Study design

The design of this study is a critical action research based on an expansion of the participants' self-awareness as individuals with the qualitative method as the priority. In the study, data were also obtained qualitatively in motivational interviews based on an expansion of the participants' self-awareness as individuals with patients diagnosed with T2DM. In the study, which is critical action research based on Roy

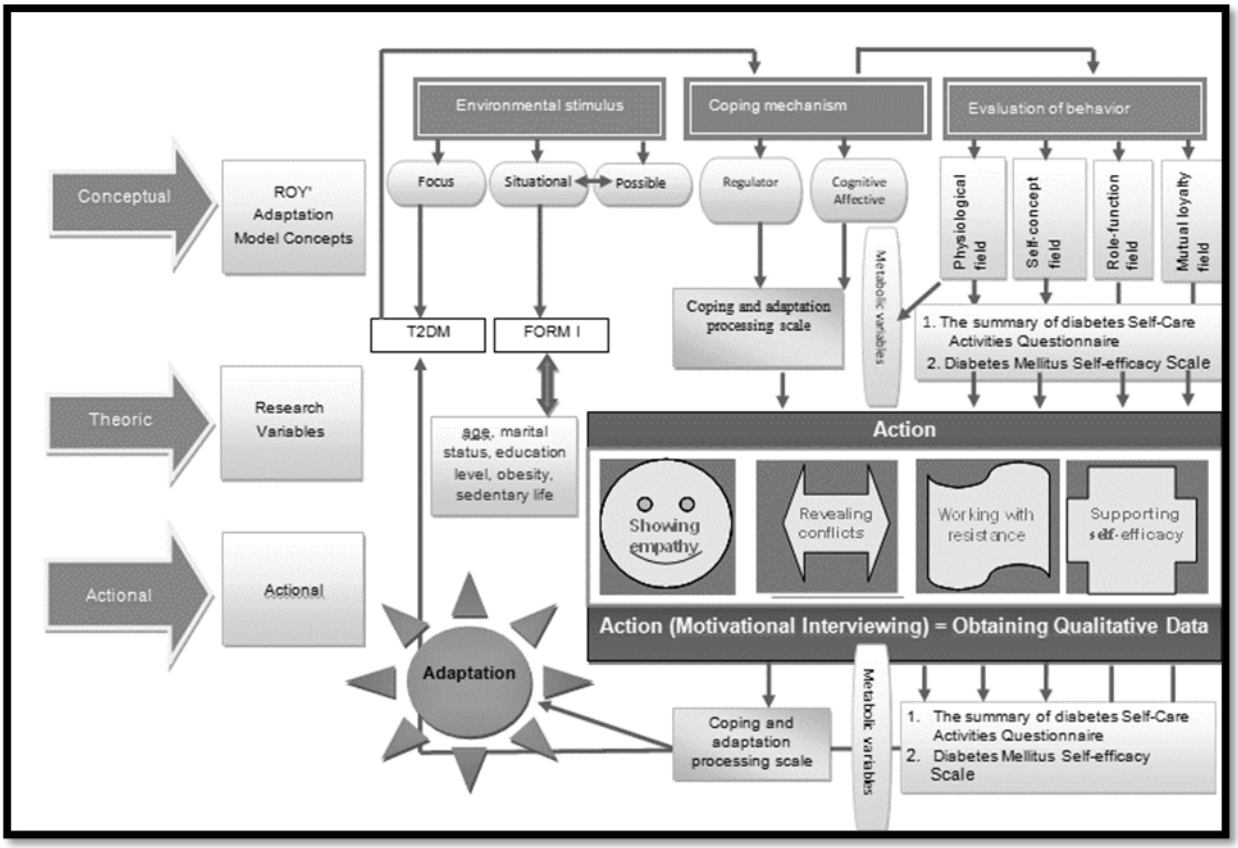

Figure 1. Conceptual, theoretical and operational (C-T-E) framework of the research constructed by structuring the Roy Adaptation Model

Adaptation Model (RAM), the conceptual, theoretical and operational (C-T-E) framework of the research was formed (Figure 1). It is stated that RAM is a guide which is coping-compatible and acts through the physiological field, self-field, role-function field, and interdependence areas in determining the factors (focus, situational, possible stimuli) that affect lifestyle transformation in patients (8).

Sample

The study population consisted of ten volunteer adult participants with a diagnosis of T2DM who applied to the endocrinology and metabolism outpatient clinic of the tertiary care hospital as the sample of participants are much smaller in number (9) in action research studies and so researcher uses equal either small or medium size of sample for both the quantitative and qualitative methods (10). Thus in this study based on purposive sampling method (11), adult individuals diagnosed with T2DM were included as participants who had the inclusion criteria; T2DM (having American Diabetes Association [ADA] criteria for T2DM (e.g., hemoglobin A1c [A1C]≥ 6.5%), calculated via record review. Participants were selected according to the criteria of having T2DM for ≥ 6 months with active illness (A1C of ≥ 6.5% within the past 6 months). Patients who were prescribed an insulin and glucose-lowering medication or lifestyle interventions (e.g. diet / exercise) to manage T2DM were included. Patients having two and more chronic diseases were excluded. Finally, sampling consisted of 10 volunteer participants who were diagnosed with T2DM who came to the control. The interviews were ended when the data started to repeat and new data could not be obtained.

Data collection

Quantitative data collection: Before the action (MI), in the first meeting, the participants' diabetes mellitus self-efficacy, diabetes self-care activities, coping and adaptation situations were measured using scales. In addition, metabolic values (A1c, FBG, LDL-c, HDL-c, triglyceride, body mass index, weight, diastolic blood pressure, systolic blood pressure) were analyzed via review of records. The participants' level of coping and adaptation, diabetes mellitus self-efficacy, diabetes self-care activities were measured using scales 15 days after the interviews and three months

later, and their metabolic values were assessed via record review again.

Qualitative data collection: After the first interview, MI with participants was done once every 15 days, starting with the subject they wanted (which she/he considers priority for herself) to talk about seven to nine times. In other words 7-9 MI interviews were done with each ten participants and a total of 89 interviews were conducted. All the interviews were conducted and recorded in a quiet location and each lasted for 45-60 minutes. MI were carried out based on the questions on the issues related to diet, physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood glucose, medication adherence, screenings what those issues meant to participants, what problems participants experienced on those issues and how they coped with them. Additionally, probe questions were asked to participants parallel with the answers to those questions. Most of the interviews started with an easy, contextual question before moving on to more difficult or in-depth questions. For example, to start a conversation about his thoughts and feelings about diet, he started with the question "Tell me how your diet has been so far". Subsequent questions will elicit answers that will help answer research questions about participants' nutritional perspectives.

MI sessions was applied in four main steps; showing empathy, revealing conflicts, working with resistance,

Table 1 Motivational Interviewing Sessions (in order of completion)

Session	Title	Session-specific Topics
1	First meeting	• Meeting with the participants who meet the criteria • Explanation of the purpose of the research • The clarified consent and consent form is read and signed by the participants • Application of pre-tests, • Planning the meeting date for the next 15 days with the participant
2	Healthy diet	• Determining the agenda specific to the individual • Continuing *MI techniques sequentially with semi-structured interview questions about the agenda (MI topic) determined together with the individual; ○ Creating an empathic atmosphere ↓ ○ Reflective listening ↓ ○ Asking open-ended questions ↓ ○ Uncovering Contradictions ↓ ○ Double-sided reflection ↓ ○ Revealing / providing ↓ ○ Requesting permission / permission to provide an expert opinion / information ↓ ○ Significance Test ↓ ○ Confirmation ↓ ○ Confidence Test ↓ ○ Rolling / dancing with resistance (talking about the ambivalence) ○ Talk over change ↓ ○ Taking Responsibility (Decision on change) ↓ ○ Agree with the plan ↓ ○ Supporting self-efficacy ↓ ○ Ending MI
3	Physical activity	
4	Psycho-social adaptation	
5	Daily foot care	
6	**SMBG	
7	Medication adherence	
8	Screenings	
9	Other MI session planning	• Determining the date of the next meeting with the individual

*MI: (Motivational Interviewing)

**SMBG (Self-Monitoring Blood glucose)

and supporting self-efficacy. MI sessions were continued considering 7 dimensions of diabetes (Table 1).

Data collection tools

Coping and Adaptation Processing Scale (CAPS): It developed by Roy (12) is a scale that enables individuals to define their coping and adaptation strategies in critical and difficult situations. Its validity and reliability study in Turkish was done by Catal and Dicle in 2012. The scale consists of 47 items. The Cronbach alpha value of the original scale was found to be 0.94 for the internal consistency reliability coefficient from the reliability analysis of the CAPS (13).

Diabetes Mellitus Self-Efficacy Scale DMSES: Self-efficacy levels of individuals with T2DM were evaluated with the scale by Van Der Bijl et al. in 1999, and validity and reliability study of the scale in Turkish was done by Usta in 2004 (14,15). The alpha value was 0.89.

Summary of Diabetes Self-Care Activities Questionnaire (SDSCA): It was validated in Turkish by Cosansu Kuzu and was developed by Toobert and Glasgow to determine individuals' the self-care activities with diabetes. Each factors of the scale is kept score unconnectedly and can be used autonomously. Cronbach alpha coefficients were found for Diet .59, Exercise .70, Blood Glucose Test .94 and Foot Care .77 (16,17).

Semi-structured interview forms: The interview form, semi-structured, consisted of a short "start" question list supported by follow-up and research questions based on the answers of the participants. All questions were prepared in an open-ended, impartial and understandable manner. Also, questions using familiar language and jargon were avoided.

Validity and reliability

In order to guarantee reliability and validity of the study, five phases were followed; (i) data were collected from semi-structured interviews based on the related literature and the data were ordered according to categories and chronical aspects, read , re-read and recurrently coded, (ii) data were used as straight quotations from the interviews free from any comments about them, (iii) a purposeful sampling method to obtain the opinions of volunteer T2DM-diagnosed participants was employed, (iv) in order to determine inter-rater reliability of the themes coded, data were first coded by two researchers independently and then Cohen's Kappa coefficient was calculated as 0.860, which showed perfect agreement for inner reliability, and (v) interview records were kept for external reliability.

Data analysis and interpretation

Analysis of quantitative data: SPSS version 23.0 was used to analyze the demographics of the questionnaire responses, analyze via descriptive statistics, and discovery significant results based on an alpha level of 0.05 for all statistical tests. Data from interviews were used to support and extend the findings from the quantitative results.

Cronbach alpha coefficients of scales were examined for the reliability of quantitative data (CAPS: 0.88, DMSES: 0.83, SDSCA: 0.71). In addition, SDSCA, DMSES, CAPS and participants' metabolic value (A1c, Fasting blood glucose (FBG), Low density lipoprotein-cholesterol (LDL-c), Hight density lipoprotein-cholesterol (HDL-c), Triglyceride, Body Mass Index (BMI), systolic blood pressure (SDP), diastolic blood pressure (DBP), waist circumference (WC) pretest, post-test and follow-up test mean scores were analyzed with the Friedman test. Bonferroni test was carried out for further analysis.

Analysis of qualitative data: The transcripts from motivational interviews recorded on the tape recorder were double-checked by the independent researcher who had experience in qualitative research prior to data analysis based on Colaizzi process for phenomenological data with seven steps (18,19): (1) Familiarization: Each transcript was read and re-read to get a general understanding of the whole content; (2) Identifying significant statements: For each transcript, significant statements referring the phenomenon of the study was extracted. and recorded; (3) Formulating meanings: Meanings of the significant statements were formulated; (4) Clustering themes: The meanings formulated were organized into categories, clusters of themes, and themes by bracketing of pre-suppositions in order to avoid any probable effect of prevailing theory; (5) Developing an comprehensive description: The findings of the study were integrated into an comprehensive description of the phenomenon of the study; (6) Producing the

Table 2 Participants' Values in Before and After Motivational Interview and Follow-up Diabetes Self-care, Diabetes Self-efficacy, Coping and Adaptation Process Scales

Scales values	Pretest			Post test (after 15 days)			Follow up test (after 3 months)			*p*
	$\bar{x}$	Min-Max:	SS	$\bar{x}$	Min-Max:	SS	$\bar{x}$	Min-Max:	SS	
****CAPS**	127,3	104 161	16.79	159.3	129 180	13.9	155.9	141 179	15.88	**0.002***
*****DMSES**	78.5	71 94	7.01	90.2	78 100	8.5	87.6	77 100	8.37	**0.001***
******SDSCA**	27,5	10 51	11.98	53.4	36 65	10.5	49.1	37 67	9.91	**0.000***
Diet	15.5	3 27	5.91	24.8	18 28	3.6	23	14 28	3.74	**0.000***
Exercise	5	0 14	4.39	11.0	0 14	4.7	9.3	0 14	4.56	**0.008***
*******SMBG**	1.8	0 10	3.61	5.8	4 11	2.6	7.1	3 10	2.33	**0.002***
Foot care	5.2	0 14	5.51	11.3	4 14	4	10.20	3 14	2.33	**0.018***

*Analyzed with Friedman and Bonferroni test. ****CAPS** (Coping and Adaptation Processing Scale). *****DMSES** (Diabetes Mellitus Self-Efficacy Scale). ******SDSCA** (Summary of Diabetes Self-Care Activities Questionnaire). *******SMBG** (Self-Monitoring Blood glucose)

fundamental structure: The fundamental structure of the phenomenon was defined and (7) looking for verification of the fundamental structure: Validation of the findings was confirmed by the participants so as to compare the researcher's descriptive results based on their experiences diagnosed with T2DM. The NVIVO 11 software program was used in the coding and categorization of the data.

Ethics

The study was carried out according to the Declaration of Helsinki, and the protocol was accepted by the Ethics Committee. At research level in the setting, the process of data collection and the objectives of the study were explicated to be kept informed at all stages and offered anonymity the participants before the action. Verbal and written consent of the participants was obtained before the data collection process (before semi-structured interviews and questionnaires) and the action. For informed consent, the participants' right to refuse to answer questions they considered to be sensitive was explicitly stated, and it was stated that they had the right of withdrawal from the study at any period. In order to ensure the privacy of the participants, the MI was conducted in the meeting room individually, face to face.

RESULTS

Findings of quantitative data of participants with type 2 diabetes mellitus

The average age of the patients was 48.2, 5/10 of the participants were high school graduates, 8/10 of the patients had another chronic disease. 6/10 of the participants used only one oral antidiabetic drug (OAD). Diabetes diagnosis duration of 6/10 of the patients was determined as one month. 5/10 of the patients stated that they had diabetes in their first-degree relatives and 3/10 of them in their second-degree relatives.

In quantitative phase of the action research, it was aimed to find out whether motivation interview program increased the coping and adaptation, the self-efficacy the self-care levels of patients with T2DM. Thus it was found that there was a difference statistically significant between pre-test, post-test and follow-up test measurements of patient' with CAPS, DMSES, and SDSCA (X^2=12.200 p <0.002, X^2=15.722, p <0.001, X^2=16.667, p <0.000) (Table 2). Additionally, it was found out that there was no difference statistically significant between CAPS, DMSES, SDSCA posttest and follow-up test scores (p> 0.05)

Table 3 Participants' Motivational Interview Pretest, Posttest and Follow-Up Test Metabolic Values

Scales values	Pretest			Post test (after 15 days)			Follow up test (after 3 months)			*P value*
	x̄	Min-Max:	SS	x̄	Min-Max:	SS	x̄	Min-Max:	SS	
A_{1c}	52.5 mmol/mol (7.5%)	45.5 mmol/mol (6.5%) 71.68 mmol 10.24	1.4	40.6 mmol/mol (5.8%)	40.6 mmol/mol (5.3%) 45.5 mmol/mol (6.5%)	0.36	41.3 mmol (5.9%)	34.3 mmol/mol (4.9%) 46.2 mmol/mol (6.60%)	0.49	0.000*
****FPG**	123	89 196	38.51	95.3	73 130	15.88	104.0	87 132	14.5	0.006*
*****LDL-c**	118.5	38 188	44.3	106.9	61 156	32.19	142.9	27 601	164.9	0.199
******HDL-c**	51.3	28.9 76	17.7	50.6	31.6 91.3	19.22	52	30.30 87.70	16.3	0.761
Trigliserid	156	44 326	96	105.1	58 193	48.6	125.61	56 217	58.4	0.303
*******SDP**	136	125 140	4.95	130.6	120 145	9.2	131.8	116 150	9.4	0.832
********DBP**	83.3	70 100	8.8	82.8	74 90	4.1	83.2	74 90	5.5	0.066
Weigh (kg)	82	60 110	16.6	77	57 98	15.3	77.2	57 98	15.7	0.001*
*********BMI**	31.7	24 47	8.30	29.16	21 42	8.1	29.4	21.9 42.4	7.9	0.001*
**********WC**	96.2	80 111	11.4	94.2	76 110	10.9	94.7	80 110	11.36	0.066

* Analyzed with Friedman and Bonferroni test. ****FPG** (Fasting blood glucose). *****LDL-c** (Low density lipoprotein-cholesterol). ******HDL-c** (Hight density lipoprotein-cholesterol). *******SDP** (Systolic blood pressure). ********DBP** (Diastolic blood pressure). *********BMI** (Body Mass Index). **********WC** (waist circumference)

While there were differences statistically significant between the pretest, posttest results of patient' A1c, FBG, weight, BMI metabolic values (X^2 =16.667, p <0.000, X^2=10.400, p <0.006, X^2=12.400, p <0.001, X^2=15.167 p <0.001), no differences statistically significant were found between HDL-c, LDL-c, Triglyceride, systolic and diastolic blood pressure, WC pre-test, post-test and follow-up test results (X^2=0.545, p> 0.761, X^2=3.921, p>0.199, X^2=2.600, p> 0.273, X^2=2.389, p> 0.303, X^2=0.368, p> 0.832, X^2=5.448, p> 0.066) (Table 3). There was no difference statistically significant between the posttest and follow-up test values of metabolic variables (p> 0.05).

Findings of qualitative data obtained in motivational interview of patients with type 2 diabetes mellitus

In the qualitative phase of the study, it was understood descriptively based on thematic analysis and interpreted for the participants diagnosed with T2DM the meaning, the barriers and the way to cope with those barriers related to healthy diet, physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood sugar, medication compliance, the screening.

The meaning, the barriers and the way to cope with the barriers related to healthy diet

As seen in Figure 2, participants stated their views regarding cope with healthy diet. For instance, one participant stated his or her views in the sub-theme of **importance of healthy diet**:

"Isn't nutrition important for protecting against diseases? I think so, I think so. In order not to get some diseases ... Well, according to the people I see around me, that is, when their feet are wound, it does not heal ... I do not want to experience such kind of things" [Participant 7].

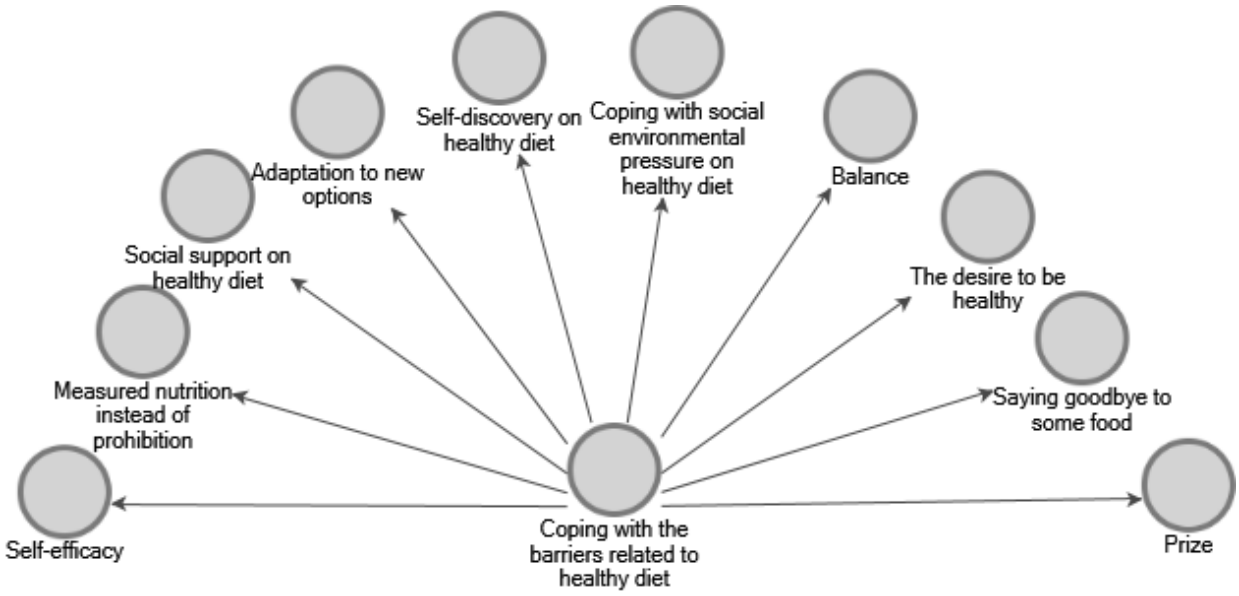

Figure 2. Coping with the barriers related to healthy diet

Participants stated their views regarding barriers to healthy diet. For instance, two participants stated their views in the sub-theme of **social environment pressure on healthy diet**:

> "The sensitivity of the people around this environment is very poor. It seems like psychological pressure and harassment in a way that will wear you out without thinking that it will harm you. For example, 'eat, eat, nothing, nothing, come on, eat this, eat it'. No respect?" [Participant 3].
>
> "If a portion of baklava is served, 'Do you eat for God's sake?' I felt that pressure, I was having them at a few friends' meetings. 'For God's sake, look, didn't you like it?' [Participant 7].

They also stated their views in the sub-theme of **social support on healthy diet.** For example, one participant said:

> *"She is very supportive (he means his wife). She started to make whole wheat bread at home. Thanks, she tries to support me. My friends support me, friends who know my illness will eat their dessert away from me anyway" [Participant 6].*

The meaning, the barriers and the way to cope with the barriers related to physical activity

Participants stated their views regarding barriers to physical activity. For instance, one participant stated his or her views in the sub-theme of inability to **importance of physical activity:**

> *"Exercising is a very good thing now. Great for everyone. If everyone who is sick or healthy does exercise, we get no diseases anyway. We stay healthy." [Participant 9].*

As seen in Figure 3, participants stated their views to cope with the barriers related physical activity. One participant diagnosed with T2DM stated his or her views in the sub-theme of **social support on physical activity:**

> *"I don't know. There has to be something triggering. Maybe my wife can help me with this.." [Participant 6].*

Participants stated their views to cope with the barriers related physical activity. One participant diagnosed stated his or her views in the sub-theme of **self-discovery on physical activity:**

> *"Physical exercise was difficult for me in the evening. I started walking in the morning." [Participant 10].*

The meaning, the barriers and the way to cope with related to psychosocial adaptation

Participants stated their views regarding psychosocial adaptation barriers. For instance, one participant stated his or her views in the sub-theme of **importance of psychosocial adaptation**:

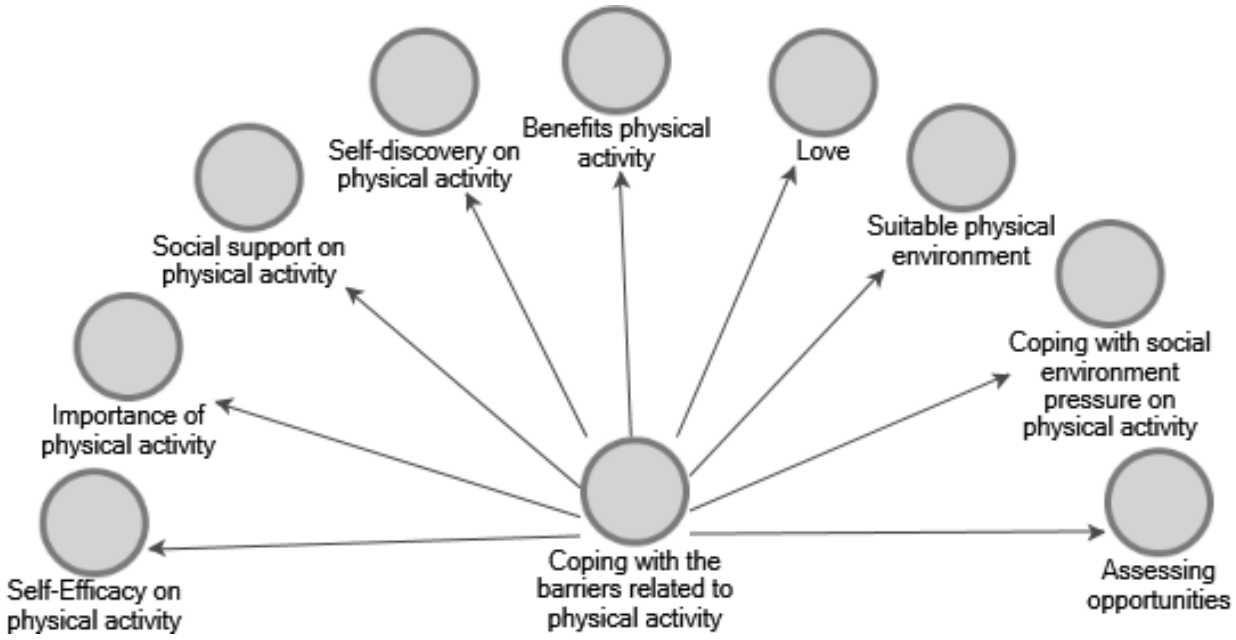

Figure 3. Coping with the barriers related to physical activity

"I used to be in a simple life. I care myself now and I really live in good quality. I can handle it, do whatever it takes, and I started with three pills. Now I take only a pill." [Participant 9].

As seen in Figure 4, participants stated their views regarding cope with the barriers related to psychosocial adaptation. They also stated their views in the sub-theme of **social support on psychosocial adaptation**. For example, one said:

"Sometimes it is comforting to have someone who will warn you, "Okay, your blood glucose level will go up" when you get angry. It's good to have someone's support… For example, our relatives, they (referring to his family) decreased consuming the level of sugar. "[Participant 6].

Moreover, they stated their views in the sub-theme of the **self-discovery on psychosocial adaptation.** For example, one said:

"I have to be calm. I pray. If I don't, my life will pass away anyway. I will also do my walk." [Participant 8].

"I listen to the radio now. Since I was a kid, I have loved the radio. There is also music. I listen to music from the radio. I listen to those oldies and so." [Participant 3]

The meaning, the barriers and the way to cope with the barriers related to d**aily foot care**

As seen in Figure 5, participants stated their views in the sub-theme of **importance of daily foot care.** For example, one said:

"I mean, as far as I have read, it does not heal when there is a wound on the foot, you know in the future, it can go as far as the foot is cut out, now if I want to live like a normal person, and I need my feet and they must also be strong." [Participant 10]

The meaning, the barriers and the way to cope with the barriers related to SMBG

As seen in Figure 6, participants stated their views in the sub-theme of **support to SMBG.** For example, one said:

"For example, my daughter can't pierce my finger and gets a little bit upset. I pierce it, she sets that machine right away, measures my blood glucose level, then writes it in the notebook. I say" my little nurse "to her anyway. She takes care of me." [Participant 5].

adherence Participants stated their views in the sub-theme of **importance on medication adherence.** For example, one said:

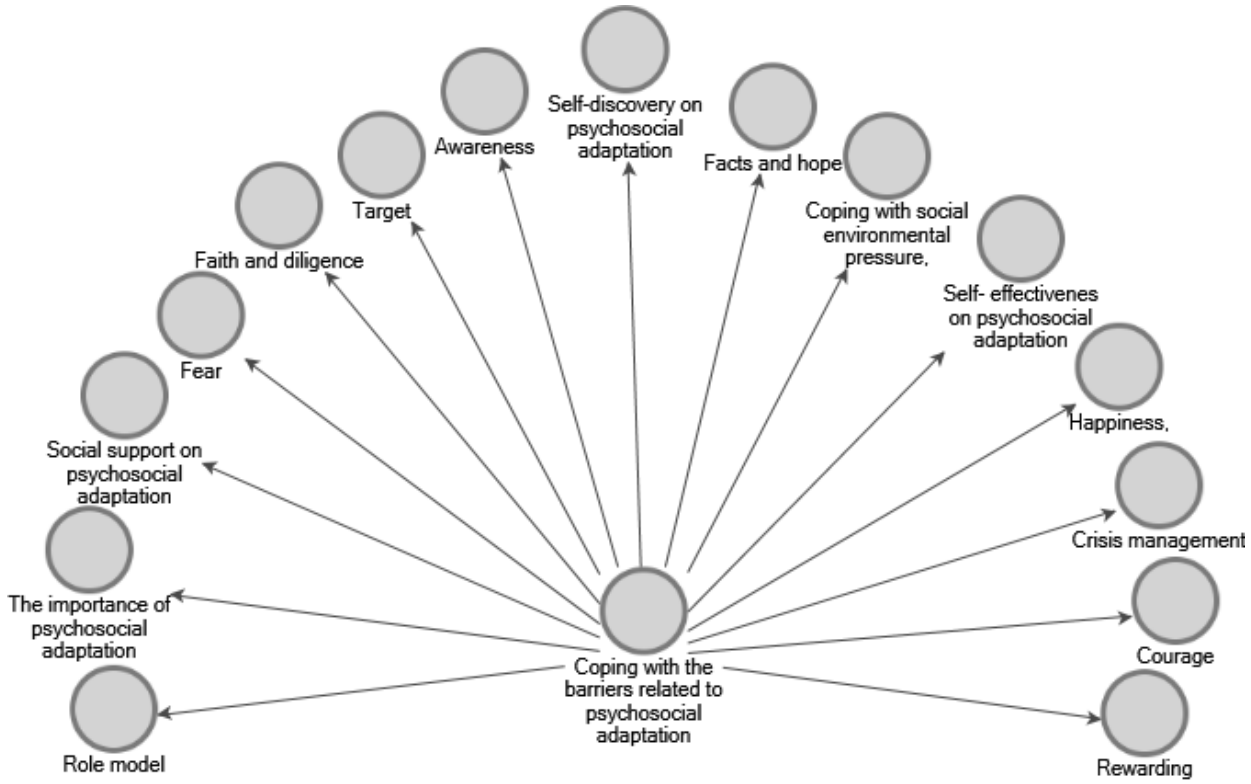

Figure 4. Coping with the barriers related to psychosocial adaptation

"Now, according to the information I have acquired, the effect of drugs on the body, that is, the benefit they will provide to you is important. It is necessary to be used regularly to be beneficial to the body, is it? For ourselves?" [Participant 1].

The meaning, the barriers and the way to cope with the barriers related to screening

Participants stated their views in the sub-theme of **importance of screening.** For example, two participants said:

"These are for health, to live healthily. Now, not to prolong life, but to live healthily." [Participant 1].

The meaning, the barriers and the way to cope with the barriers related to medication

"So, it is a requirement and no longer a burden on the shoulder. It is good in terms of both control and human self-knowledge." [Participant 2].

DISCUSSION

In this part of the study, MI effect on how to cope and adapt, diabetes self-efficacy and diabetes self-care levels of patients with T2DM diagnosis based on quantitative data were discussed analytically based on relevant literature. In addition, qualitative data regarding healthy diet, physical activity, daily foot care, psychosocial adaptation, SMBG, medication adherence, the screening meaning, barriers and how they cope with these barriers were discussed analytically based on relevant literature.

Discussion of quantitative data of participants with type 2 diabetes mellitus

By means of the motivational interview program, a significant increase was found in the diabetes self-care activities, self-efficacy, coping and adaptation levels of the participants. In studies in which the effectiveness of the Motivational Interview in T2DM was reviewed in the literature, it was determined that development in diabetes self-care behaviors was significant (20,21,22). These findings are parallel with the current research findings. On the other hand, in some studies, there was no difference statistically significant between the groups in adaptation with diabetes self-care behaviors such as exercise, diet, and medication adherence (23,24).

In the study there were differences statistically significant between the pretest, posttest results of participants' A1c, FBG, weight, BMI metabolic values.

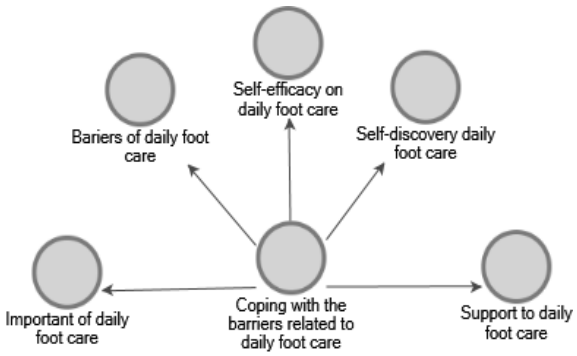

Figure 5. Coping with the barriers related to foot care

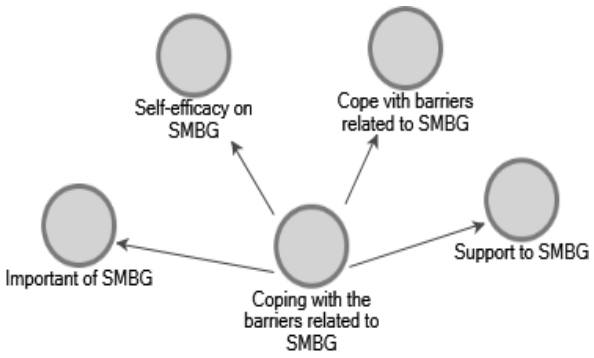

Figure 6. Coping with the barriers related to SMBG

In a study by Celano et al., it is stated that MI caused a decrease significant in A1C and BMI levels (25). In meta-analysis and systematic review studies of MI, it was stated that there was a decrease significant in A1C, LDL-c, BMI levels (22,26).

Discussion of qualitative data of participants with type 2 diabetes mellitus

In this study, it was understood that the main priority of the participants was a healthy diet. In the findings, the participants expressed their views on the **importance of healthy diet** in T2DM. In a study by Ribu et al. on patients diagnosed with diabetes, the finding that they have special needs for support in daily responsibilities, such as diet, is consistent with our research findings (27). For this reason, it can be said that the patients diagnosed with diabetes should be monitored continuously until they take their responsibilities regarding their compliance with diabetes.

On the other hand, some findings that were not mentioned in the literature emerged in this research. All the participants mentioned the **social environment pressure on healthy diet.** As stated, it can be considered as an important obstacle to healthy diet.

The social support on healthy diet theme had priority in the way to cope with the barriers related to diet. In the study by Chan et al. the importance of social support in the diets of patients diagnosed with diabetes is mentioned (28). This finding is consistent with our research findings. As can be seen, both the preventive and supportive role of the social environment emerges in healthy diet. In addition, although the themes of measurement and self-determination instead of a complete ban are not mentioned in the literature, it is thought to be effective in cope with the barriers related healthy diet.

In the findings, it was revealed that the second priority of the participants was physical activity. The participants expressed their views on the **importance of physical activity** in T2DM. This finding is also parallel with the opinions stated in the literature that physical activity is one of the significant components of diabetes management (29,30). Similarly, Pati et al. stated that women should focus on physical activity barriers and increasing their motivation (31). These findings are consistent with our research findings. Additionally, Collberg et al. recommended that physical activity should be designed to meet needs specific to each patients (32).

One of the themes not mentioned in the literature but mentioned in the way to cope with the barriers related to physical activity was **self-discovery on physical activity.** For example, Participant 10 stated, "In the evening about physical exercise it was difficult. I started walking in the morning. I used to get up in the morning, I was walking at about half past eight, I was coming home, bathroom and breakfast were at 11, so my work was disrupted. I found a new method there; I get up at about six or half past six. This time I go to bed early in the evening… Of course, I followed the weather report to be able to walk."

As understood from the views of the participants on psychosocial adaptation, they expressed the **importance of psychosocial adaptation**. For example, Participant 9 said, "I was very happy, I am flying. It is very healthy. There is God, I am glad that I had diabetes otherwise I would not lose that weight. If this disease did not come, I would eat and maybe I would die of a heart attack, maybe it would be something else." In a study by Ramkisson et al. the importance of psychosocial adaptation is mentioned (33). It is stated that emotive well-being is a significant component of diabetes self-care and diabetes self-

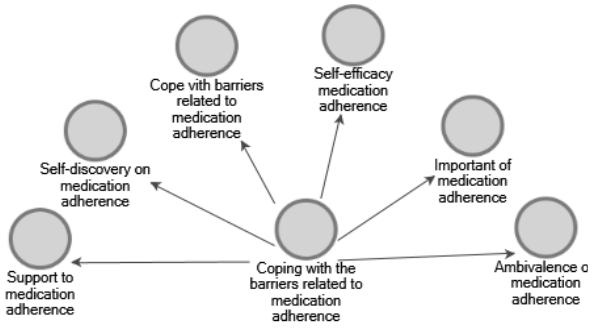

Figure 7. Coping with the barriers related to medication adherence

management. In addition, it is stated that psychological and social problems in patients diagnosed with T2DM and their families may put their diabetes care duties at risk and disrupt the patient's ability to cope. These findings are consistent with our research results.

Participants mentioned the **social support on psychosocial adaptation** sub-theme in the way to cope with the barriers related to psychosocial adaptation. For example, participant 2 said, "The glucose level will rise, it is comforting someone to have it, it is good that someone next to him has support in that way... For example, our relatives (he meant his family) reduced the glucose..." Similarly, the finding that social support has a positive contribution is parallel with the findings of Ramkisson et al. and Young-Hyman et al. (33,34). However, as can be understood from the participants' views, there are two kinds of effects of social support in the process of psychosocial adaptation. It can be stated that it is both negative in psychosocial barriers and positive in cope with psychosocial adaptation.

One of the themes not mentioned in the literature but mentioned in the way to cope with the barriers related to physical activity was **self-discovery on psychosocial adaptation**. According to this theme; each participant has its own unique solutions for their adaptation to T2DM. Therefore, individual-centered MI can be said to be effective.

When the opinions of the participants regarding daily foot care were evaluated in general, the **importance of daily foot care** sub-theme emerged. This is consistent with information about the importance of foot care in diabetes guidelines (2,29,30).

As can be understood from the opinions of the participants, the theme emerged as **support to SMBG** in the way to cope with the barriers related to SMBG. In Harvey's study on patients diagnosed with diabetes, the fact that he stated that they had special requirements for support in daily responsibilities such as diet, exercise medication adherence and SMBG is similar to the results of our research (4). Additionally, in the study done by Marengo et al. it was determined that there was a correlation between poor blood sugar control and distress in diabetes[35].

When the opinions of the participants were analyzed in terms of meaning, barriers and cope with the barriers related to medication adherence. **The importance medical adherence** sub-theme emerged. For example, Participant 1 stated that "Now, according to the information I have obtained, the effect that drugs will have on the body, that is, the benefit it will provide to you is important. Isn't it necessary to use it regularly? Yes, it is necessary to take it regularly." These findings are parallel with information on the importance of medication adherence in the guidelines (2,29).

When the opinions of the participants were analyzed in terms of meaning, barriers and cope with the barriers related to screening. **The importance of screening** sub-theme emerged. For example, Participant 4 said, "It is important for myself, not for the doctor, for myself or for reducing the dose of medications I use or cutting the medication for him, there may be changes, different or something else, they want a test, I feel comfortable every time I go to the doctor. I feel comfortable when I see that I am there." This finding is similar to the information about the importance of screening stated in the guidelines (2,29,30).

T2DM diagnosis was carried out with the participants who came to Endocrinology and Metabolism Outpatient Clinic for healthcare and who were diagnosed in the last 6 months. Therefore, the results of the research can be generalized only to the individuals included in the research. Another limitation of the study is that it took three months to evaluate the effectiveness of the intervention due to problems that may occur during the follow-up process with individuals diagnosed with T2DM (such as not coming to follow-up, not agreeing to continue the research).

CONCLUSION

This study adds to health psychology, the study of behavioral and psychological processes in illness, health, and health care. It was found that the MI program increased the level of the coping and adaptation of the participants with T2DM, and Type 2

diabetes self-efficacy and diabetes self-care activities. Additionally, in metabolic variables of participants diagnosed with T2DM, it was determined that there were decreases in A1c, APG, weight and BMI.

Regarding diabetes self-care of individuals diagnosed with Type 2 Diabetes Mellitus, a Motivational Interview program, can be suggested for an expansion of the participants' self-awareness as individuals for the obstacles related to healthy diet, physical activity, daily foot care, psycho-social compliance, self-*monitoring of blood glucose*, medication adherence, and screening.

Regarding diabetes self-care of patients diagnosed with Type 2 Diabetes Mellitus, the MI program can also be used for an expansion of the patient' self-awareness as individuals for the obstacles related to healthy diet, physical activity, daily foot care, psychosocial adaptation, self-monitoring of blood glucose, medication adherence and screenings. Health professionals dealing with diabetes patients should receive training and MI experience to be able to perform MI.

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