ORIGINAL ARTICLE

The effect of motivational interview persons with diabetes on self-management and metabolic variables

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Abstract

Objectives: To evaluate the effect of motivational interviewing on diabetics related to perceived self-management and metabolic variables.

Methods: The randomised controlled and experimental study was conducted at a public hospital located in the city of Gaziantep in Turkey and comprised diabetes patients attending the outpatient clinic of endocrinology and metabolic diseases from April to July 2015. The subjects were randomised into two equal intervention and control groups. Four motivational interviewing sessions, each of which took about 15-20 minutes, were conducted by a nurse to the intervention group. Data was collected using a questionnaire and the Perceived Diabetes Self-Management Scale.

Results: Of the 60 subjects, there were 30 (50%) in ach of the two groups. The perceived self-management perception mean score of the intervention group was 17.1 ± 5.6 at baseline and increased to 35.0 ± 4.1 post-intervention ($p<0.05$). Mean scores of body mass index, fasting and postprandial blood glucose, glycated haemoglobin, cholesterol, triglyceride, low density lipoprotein cholesterol and systolic and diastolic blood pressures of subjects in the intervention group decreased after the intervention, and their high density lipoprotein cholesterol mean scores increased ($p<0.05$).

Conclusions: Motivational interviewing technique positively affected the metabolic control indicators of the diabetes patients and increased their perceived self-management.

Keywords: Diabetes, Metabolic variables, Motivational interviewing, Nursing, Perceived self-management. (JPMA 69: 294; 2019)

Introduction

Chronic diseases constitute a significant part of deaths in the 20-64 year age group that covers the productive period of life and such cases are increasing across the world.[1] Diabetes, one such disease, has life-long acute and chronic complications, bringing material and spiritual burden to individuals, their families and society, affecting the lifetime negatively, and being required to be followed up in a multidisciplinary setting. This problem is also threatening large poppulations and the number of persons with diabetes is gradually increasing. While the number of persons with diabetes in the world was 30 million in 1980, it has reached 280 million today. In 2030, the number of persons with diabetes in the world is estimated to reach 430 million.[2] Turkey is the country with the highest diabetes prevalence in Europe. In Turkey, one in every seven adults is a diabetic which means, a total of 7.2 million people. It is estimated that by 2035, Turkey would be home to 12 million persons with diabetes.[3] For this reason, an effective and continuous care and follow-up programme is needed for diabetics to enhance their quality of life, protect them from complications and ensure their metabolic control.[2]

Health behaviours are an important determinant, especially in the formation of chronic diseases. Although it is difficult to change negative health behaviours, providing the change is very important for the recovery of patients.[4] and individual-oriented programmes are known to be more effective. However, the success of individual-oriented initiatives is possible if the individual does a large part of what is said and the individual and the expert communicate with each other. Motivational interviewing (MI) individual-oriented counselling has been developed by receiving support from many models such as cognitive behavioural therapy, social cognitive theory, health belief model and transtheoretical model. The goal in MI is to support the self-efficacy of the individuals by demonstrating an empathetic approach to help analyse their contradictions in behavioural change, and ensure that the individuals achieve the targetted behavioural change.[5] MI is a client-centred interview method recommended to ensure behavioural change by helping

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patients to know and solve their problems. In addition, this method is an effective communication technique for nurses in terms of ensuring the change towards healthy behaviour.[4] Main MI components include showing empathy, finding out conflicts, working with resistance, and supporting self-sufficiency. During this interview, the therapist should not be authoritarian in approach and can utilise techniques such as asking open-ended questions, reflective listening, summarising, accepting, and speaking the change.[6]

Self-management is very important in people with diabetes. This is because the metabolic variables of diabetic individuals who manage their disease well are at a more desired level. It is stated that concerning behavioural change, traditional attitudes that are frightening, advisory and annoying for persons with diabetes are challenging; on the other hand, as is in MI, counselling techniques which encourage the patient, are instructive, and include psycho-social understanding and behavioural change in a short time, are facilitating.[7]

There are a limited number of studies investigating the MI technique in persons with diabetes in Turkey. Therefore, the current study was planned to investigate the effect of MI on perceived self-management and metabolic variables of persons with diabetes.

Subjects and Methods

The randomised controlled study was conducted at a public hospital located in the city of Gaziantep in Turkey, and comprised diabetes patients attending the outpatient clinic of endocrinology and metabolic diseases from April to July 2015.

Power analysis was used to calculate the sample size. When comparing glycated haemoglobin (HbA1c) values before and after MI based on related studies[8,9] the minimum sample size was calculated with α =0,05, and the power of the test (1-β) at 0.80. After obtaining permission from the Gaziantep University Ethics Committee and the institution concerned, subjects were enrolled after taking informed consent from each of them.

After routine outpatient clinic practices, the subjects were divided into two equal groups; the MI group (intervention group) and the non-MI group (control group). Randomisation of control and intervention groups was made in accordance with admittance (single number, intervention; double number, control group) order of the patients. Persons with diabetes aged 18-79 years, diagnosed with type-2 diabetes within the preceding six months in accordance with criteria of American Diabetes Association,[3] who had no communication problem, mental confusion and no psychiatric problem were included. None of the subjects withdrew from the study. Subsequently, the subjects were referred to diabetes education nurse to receive routine education on diabetes. MI was also conducted with patients in the intervention group.

Data was collected using a questionnaire prepared by the researchers in line with relevant literature[1-3] and the Perceived Diabetes Self-Management Scale (PDSMS).[10]

The questionnaire involved questions on socio-demographic characteristics (such as age, gender, marital status, educational status, working status, economic condition), disease-related characteristics (such as duration of diabetes, family history of diabetes, diabetes treatment, diabetes complications, number of hospitalisations in the preceding one year) and some metabolic variables (such as height, weight, body mass index [BMI], fasting and postprandial blood glucose [PBG], HbA1C). The questionnaire was administered by using face-to-face interview technique and the subjects' responses were recorded. Values for the metabolic variables were taken from the subjects' files. In accordance with routine administration of the outpatient clinic where the study was conducted, blood was drawn regularly from persons with diabetes and recorded for metabolic variables.

The Turkish version of PDSMS was already tested for validity and reliability study.[11] There are eight items in the scale and they are assessed on a five-point Likert scale. Responses range between "I strongly disagree" (1), I disagree (2), "Undecided" (3), "I agree" (4), and "I strongly agree" (5). Four items of the scale (1, 2, 6, 7) are negatively asked. While the lowest score to be obtained from the scale is 8, the highest score is 40. High total score signifies that the individual has high awareness on diabetes management. This scale can be used practically in evaluating self-efficacy of persons with diabetes in the clinic.[11]

The subjects in both the groups first filled out the questionnaire and PDSMS. MIs were started with the intervention group after the initial data were collected. MIs were carried out in the room of the diabetes education nurse where only the client and the advisor were present. The subjects were again briefed about the interview and its purpose, and during the interview, the nurse tried to be tolerant, not to be authoritarian, and not to reflect his/her own thoughts. Each interview lasted 15-20 minutes. A total of four interviews were carried out

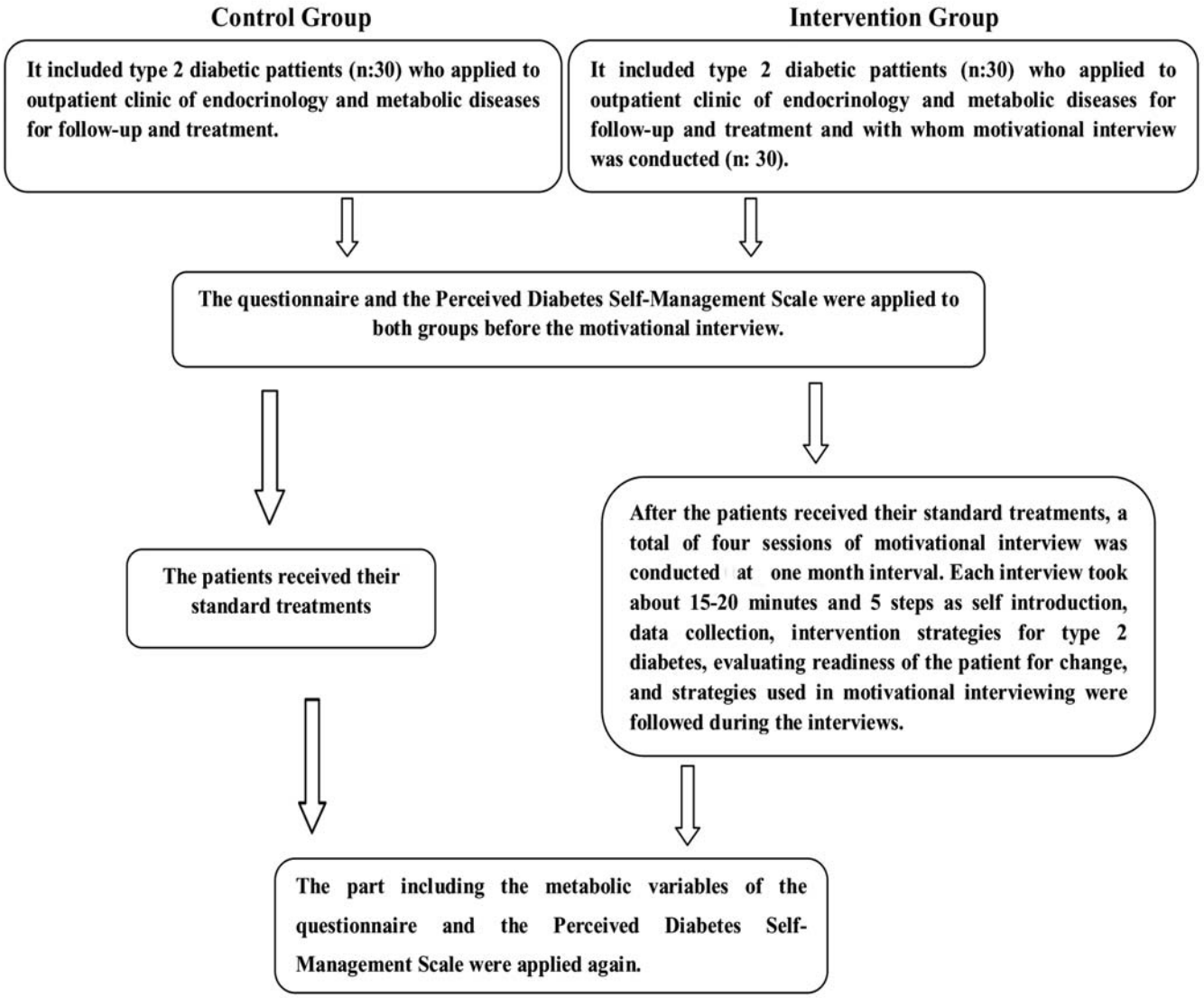

Figure: Flow chart of the application.

with each client with approximately one-month interval. At the end of each interview, the date and time for the next interview were decided. Frequency and duration of MI were decided by taking the expert's opinion and reviewing the relevant studies.[8,9] Before starting the study, researchers who would do the MI received certified training on MI. As suggested by literature,[12] MI was conducted in 5 steps.

The first step was self introduction at which stage all the clients were asked to introduce themselves and diabetes. Step 2 involved data collection. Individuals were encouraged to talk about subjects like diabetes, self-management of diabetes and they were generally asked open-ended questions. The interviewer, adopting sincere and sensitive approach, tried to obtain the necessary information by minimising the negative feelings of the individuals.

The third step related to intervention strategies for type 2 diabetes. Patients' knowledge and behaviour about the self-management of diabetes were recorded by the interviewer. During the interview, the interviewer kept making sure if the client was at the stage of being ready for change or not.

The fourth step comprised evaluating readiness of the patient for change. The level of readiness was determined according to the client's response. Thus, the interviewer also determined the personal intervention strategies.

The final step involved strategies used in MI. These

strategies were the basic consulting skills gained from human-centred counselling. It was used to encourage the clients to talk about their behaviours, investigate their pessimism and tell the changing reasons.[12] These strategies were also used in the study. In addition, empathy, uncovering of the contradictions, resilience and support for self-efficacy which are the basic principles of MI were also used during the interviews.[11] It was focussed on understanding diabetes (definition) in the first MI session, while healthy lifestyle (exercise, diet, etc.) was mainly interviewed in the second session. Drugs used (insulin, oral anti-diabetics, etc.) were interviewed in the third interview and complications of diabetes were interviewed in the fourth session. At the end of the fourth MI, the part of the questionnaire containing some metabolic variables and PDSMS were reapplied to the control and intervention groups (Figure).

Data obtained was analysed with chi square, student's t and paired t tests. Baseline values were compared with post-intervention data. P<0.05 was taken as statistically significant.

Results

Of the 60 subjects, 20(66.7%) of the patients in the intervention group, 21 (70.0%) of the control group were aged 45 or more years, 19 (63.3%) of the patients in the intervention group, 22(73.3%) of the control group were female. Besides, 7(53.8%) subjects in the intervention group and 12(80.0%) in the control group had hypertension associated with diabetes. There was no difference between both groups in terms of age, gender, educational status, financial status, marital status, occupation, cohabitant, presence of other chronic illness, smoking, and alcohol use (p>0.05 each).

Further, 13(43.3%) subjects in the intervention group and 18(60%) in the control group had a diabetes duration of 0-5 years. Of the patients in the intervention group, 13 (43.3%) of the control group 18(60.0%) had family history of diabetes, and 11(36.7%) subjects in the intervention group and 10(33.3%) in the control group did not go regularly for diabetes control. In the intervention group 7(63.6%) and 7(70%) in the control group did not go to the doctor because they could not find time. Also, 7(63.3%) in the intervention group and 7(83.3%) in the control group did not exercise regularly, 11(36.7%) in the intervention group and 15(50%) in the control group did not comply with their diet plans, 16(53.3%) in the intervention group and 21(70%) in the control group were treated with oral anti-diabetics. In the intervention group 24(80.0%) and 29(96.7%) in the control group tested their blood glucose between 0 and 2 time daily. There was no difference in the groups in terms of the duration of diabetes, the presence of diabetes in the family, the annual number of hospitalisations, going to the doctors, doing regular exercise, eating in compliance with the diet, number of meals, number of blood glucose measurements, and types of diabetes treatment (p>0.05 each).

The perceived self-management mean score in the intervention group was 17.1 ± 5.6 at baseline which increased to 35.0 ± 4.1 after MI (p<0.05). Corresponding score in control group decreased from 21.7 ± 3.3 ay baseline to 16.5 ± 2.6 at the end of the study period (p>0.05) (Table-1).

The difference between the mean BMI,FBG,PBG,HbA[1]C, cholesterol, triglyceride, LDL and HDL are shown in Table 2.

In the control group, the changes seen in terms of all the above variables were not statistically significant (p>0.05 each) (Table-2).

Discussion

Diabetes is a major public health problem which has increased significantly in recent years in particular. For this reason effective treatment of diabetes is very important. Diabetes treatment consists of medical nutrition therapy, physical activity, blood glucose monitoring, oral anti-diabetic/insulin therapy and diabetes self-management training (DSMT)3. In recent years, DSMT has been especially focussed on the management of diabetes and it has been argued that disease management should be made by diabetics themselves.[13] MI, which is accepted as a treatment

Table-1: Comparison of perceived self-management mean scores before and after motivational interviewing.

Characteristics	Intervention group X±SE	Control group X±SE	P
Previous perceived self-management	17.1±5.6	21.7±3.3	p<0.001
Next perceived self-management	35.0±4.1	16.5±2.6	p<0.001
Before-after difference	-17.9±1.1	5.2±0.5	
p	0.003	0.088	

SE: Standard error.

Table-2: Comparison of some variables of the patients before and after motivational interviewing.

Characteristics	Intervention group X±SE	Control group X±SE	p
Previous BMI	30.1±8.1	32.3±6.7	.245
Next BMI	29.1±7.1	33.7±6.9	.016
Before-after difference	0.96±0.3	-1.3±1.1	
P	0.010	0.263	
Previous FBG	255.3±104.7	197.7±74.7	.17
Next FBG	210.1±82.1	208.7±70.9	.944
Before-after difference	45.2±9.7	-11.0±7.3	
P	0.000	0.143	
Previous PBG	268.3±104.7	270.8±111.6	.930
Next PBG	213.8±94.6	316.1±109.1	p<0.001
Before-after difference	54.4±11.3	-45.3±18.4	
P	0.000	0.020	
Previous HbA1C	10.1±2.9	8.4±2.2	.012
Next HbA1c	9.1±2.5	8.9±2.4	.759
Before-after difference	1.0±0.1	-0.5±0.5	
P	0.000	0.000	
Previous cholesterol	199.9±59.1	214.1±56.9	.346
Next cholesterol	166.4±45.8	236.5±68.2	p<0.001
Before-after difference	33.4±6.4	-22.4±10.7	
P	0.000	0.045	
Previous Triglyceride	156.4±90.0	183.3±66.2	.192
Next Triglyceride	135.7±74.4	179.8±60.0	.014
Before-after difference	20.6±4.7	3.5±6.8	
P	0.000	0.606	
Previous LDL	114.7±38.3	114.0±39.9	.950
Next LDL	98.4±30.3	117.4±35.1	.029
Before-after difference	16.2±4.0	-3.4±5.3	
P	0.000	0.532	
Previous HDL	44.6±14.7	48.0±18.9	.438
Next HDL	42.1±11.7	52.6±15.1	.004
Before-after difference	2.5±1.6	-4.6±3.3	
P	0.133	0.117	

SE: Standard Error
BMI: Body Mass Index
FBG: Fasting Blood Glucose
PBG: Postprandial Blood Glucose
HbA1C: Glycated Haemoglobin
LDL: Low Density Lipoprotein
HDL: High Density Lipoprotein

method in this respect, is widely used in areas where behavioural changes are effective. This method is client-centred and aims at overcoming ambivalence. In recent years, evidence-based methods are especially emphasised and in this respect efficiency of MI has been proven and this has been determined to be a method that is easy to learn and apply.[11] Particularly objective-focussed activities are suggested to be effective in prompting problem-solving, creativity, learning, motivation and the resources of the client.[14] It is also stated that MI is very effective in the management of situations like asthma, diabetes, weight loss, smoking cessation, drug dependence, anorexia nervosa, close partner violence, interpersonal communication, generalised anxiety disorder, hypertension, suicidal tendency, physical activity, dyslipidaemia, adolescent depression and cardiovascular health and its usage area becomes more widespread.[14]

MI is a counselling technique that is easy to implement and effective in achieving the aimed behavioural change. This technique enhances self-efficacy of individuals and creates positive outcomes in behavioural change.[15] In the present study the perceived self-management perception mean score of persons with diabetes in the intervention group was 17.1 ± 5.6 before MI and increased to 35.0 ± 4.1 after MI and this difference was statistically significant. It was

determined in a previous study that the MI technique could be applied by the diabetic education nurse to provide self-management in diabetic individuals and to correct wrong health behaviours.[6] In a study with patients type 2 diabetes, MI was found to positively influence persons with diabetes beliefs about treatment,[16] to facilitate their understanding of diabetes, and to act towards behavioural change.[17] A study comprising semi-structured MI technique on 104 subjects with human immunodeficiency virsu (HIV)concluded that MI was utilised for providing a successful treatment and the patients' compliance to treatment.[18] In a study conducted on patients undergoing dialysis, it was reported that MI helped in lesser weight gain between two dialysis sessions, improved treatment compliance, and positively affected albumin levels. It was concluded in another study that MI helped to determine the dilemma experienced by the client and helped the patient to act to resolve this dilemma.[19] There are also studies indicating that MI helps in smoking cessation and alcohol withdrawal.[20,21]

It is stated that the MI technique can be used to improve the compliance of diabetic individuals with disease management and to change their health-related behaviours in a positive way. It is shown that with this technique, a general improvement is achieved in glycaemic control and physical activity levels and significant progresses are recorded during the change phases.[15] It was reported in a study that MI had a positive effect on metabolic control in diabetes management and provided benefits in providing self-management and correction of wrong health behaviours. It was also stated that the MI technique applied by the diabetes education nurse could be used to achieve behavioural change.[6] The present study determined that the difference among all parameters before and after MI was significant in favour of the intervention group and MI affected the perceived self-management scores and some metabolic variables of diabetic individuals positively. In previous studies,[3,17,18] MI was also applied in different patient groups and positive results were obtained. Also, it was found that MI led to positive results in obese children and adolescents.[18] Another remarkable and important result of the present study was that according to the American Diabetes Association's criteria, patients' BMI, FBG, triglyceride and HDL cholesterol levels were at the bad control level, the mean HbA1c and total cholesterol levels were at borderline, and the blood pressure levels were at the good control border. Previous studies conducted in Turkey demonstrated that mean FBG, PBG and HbA1c values were higher and they complied with the bad control limits and total cholesterol and triglyceride levels were at good control level.[22,23] These results indicated that a significant part of persons with diabetes did not have metabolic control variables at the desired level and needed more help in managing diabetes. As the diabetic patients' problems about controlling their disease increased, their blood pressure, total cholesterol, LDL cholesterol and BMI increased. Upon the elimination of the control problems, these parameters were stated to reach the targeted levels more easily.[24] In the current study, when some metabolic variables of persons with diabetes before and after MI were compared, it was observed that there was a statistically significant improvement in BMI, FBG, PBG, HbA1C, cholesterol, triglyceride, LDL cholesterol and SBP of persons with diabetes in the intervention group ($p<0.05$). In conclusion, MI was seen to have a very positive effect on the treatment. A study stated that individualised early intervention based on MI had an effect on children losing weight and offered an opportunity for parents to determine effective ways for providing feedback about their children's weight status.[22] It is observed that the improvement of some variables of persons with diabetes included in the current study after MI comply with the literature as cited above.

As a result, health behaviours (diet, physical activity and tobacco cessation etc.)[25] and communication[26] are important determinants, especially in chronic diseases. MI is a very effective method for acquiring these behaviours. Although there is no specific training for MI within the scope of nursing education, most of the nurses in professional life have the knowledge and skills to put the principles of MI into practice. In addition, nurses who want to develop knowledge and skills for MI can participate in the trainings offered in Turkey and abroad, and apply this technique. This is because MI provides very positive results in protective, therapeutic healthcare services, rehabilitation and increasing self-efficiency. For this reason, by increasing knowledge and experience on MI technique whose effectiveness has been proven by numerous studies, it is possible to use this technique in areas where behavioural change is expected, and counselling can be given to refer individuals to a healthy behavioural change.[4] The same is also in question for diabetes.[6] However, it should be remembered that when using this technique, MI should be integrated with other treatment approaches. Due to a vast number of patients and insufficient time on the part of nurses in

Turkey, diabetics are widely provided classical patient education, and techniques to be used for benefits of persons with diabetes such as MI are not utilised adequately. If the nurses and institutions are informed about the significance of time to be allocated for MI and contributions to be made by this intervention, it would affect patient outcomes positively.

The limitation of the current study is that patients with type 1 diabetes were not included. Besides, the study was conducted only at one centre with a small sample and was not carried out qualitatively. The results, as such, are limited to one region of Turkey, and cannot be generalised.

On the basis of our results, however, we recommended that diabetics should be assessed for missing or incorrect information about their condition, and factors that increase or decrease diabetes should be identified. Diabetes education in diabetics can be done safely on a motivational basis. MI technique by nurses should be included in the training programmes at undergraduate and graduate levels.

Conclusion

Perceived self-management scores of type 2 diabetes patients were very low and MI applied to the intervention group positively affected the subjects' metabolic control indicators, and increased their perceived self-management.

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