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Comparing the effectiveness of motivational interviewing and self-development education on type II diabetes mellitus patients' lifestyle

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Abstract:

BACKGROUND: Lifestyle can play an important role in controlling type II diabetes (T2D), and a high-risk lifestyle can exacerbate its effects. The aim of this study was to compare the effectiveness of motivational interviewing with self-development education on T2D patients' lifestyle.

MATERIALS AND METHODS: This was a quasi-experimental study in 2017–2018. The design was pretest–posttest with an active comparison group. The population of this study was T2D patients of Firouzgar and Imam Reza Hospitals in Tehran. Using targeted sampling, 80 patients were selected and randomly assigned into experimental and comparison groups. The instrument was a tool for assessing lifestyle determinants in T2D patients (determinants of lifestyle behavior questionnaire) based on the theory of planned behavior. Intervention program was initially performed, and motivational interviewing was conducted on Firouzgar Hospital's patients for 10 sessions while self-development education was conducted on Imam Reza Hospital's patients for 10 sessions (active comparison group). To analyze the data, independent *t*-test and Chi-square test were used.

RESULTS: The results showed that the patients who received motivational interviewing had significant improvement in their lifestyles with a 95% confidence level at $P = 0.042$, compared to the patients who had been trained with self-development education.

CONCLUSION: Motivational interviewing improves the lifestyle of T2D patients compared to self-development education. It is recommended that motivational interviewing be used to help the rehabilitation of these patients. This method helps patients control their blood sugar while improving their lifestyle.

Keywords:

Attitude, behavior change, blood glucose, interviewing, lifestyle, motivational, self-control, type II diabetes

Introduction

Diabetes mellitus is a chronic metabolic disease characterized by symptoms such as insulin resistance and its side effects.^[1] In medical texts, there is no definite treatment mentioned for diabetic patients, and the only way to confront the disease is to control it and prevent its side effects.^[2] One of the factors involved in the side effects of type II diabetes (T2D) is the lifestyle of the patients.

Lifestyle is a way of life based on recognizable patterns derived from the interplay of personality traits with social interventions and living conditions.^[3] Among the unhealthy lifestyle behaviors, inappropriate diet, smoking, and lack of physical activity, and as a result, obesity can be mentioned. Unhealthy lifestyle exacerbates the side effects of diabetes to the extent that a significant number of cardiovascular diseases, blindness, advanced renal failure, and amputation are due to

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diabetes.^[4] Considering the significant prevalence of T2D, as well as considering the problems related to this disease such as health problems and treatment costs, taking the necessary measures to reduce these problems is important. There may not be an immediate and direct way to do this, but indirect methods such as lifestyle changes can help. Therefore, different educational and self-care methods have been used to change the lifestyles of diabetic patients. These include self-care techniques, cognitive and behavioral techniques, family participation training, and lifestyle education.^[5] It seems that a significant percentage of these educational and therapeutic programs have not had satisfactory results because they have made an assumption that clients have the motivation to change their lifestyles.^[6] However, the fact is that most clients do not have a strong incentive to change at the beginning of the treatment.^[7] Most health behavioral professionals are interested in knowing how to encourage patients to change health-related behaviors. Giving enough encouragement to change one's behavior has not always been a simple task, and in many cases, experts are faced with difficulty. One of these hardships is when the patient resists changes, hesitation, and duality.^[8] According to the necessity of making changes in resistant and hesitant patients, we need to distinguish between motivation and cognition in lifestyle changes. Therefore, on the one hand, we must consider the method that is the most compatible with the internal structures of motivation such as behavioral intention based on the theory of planned behavior (TPB), so we can change the behaviors that are related to lifestyles. According to this theory, the result of the behavior change process is considered as a lifestyle, in general.^[9] In this theory, behavioral intention is predicted with three factors: attitude toward behavior, subjective norms, and perceived behavioral control. The necessity of using this model, at the theoretical level, indicates the existence of behaviors in the lifestyle of diabetic patients and that they should have intentions to change their behaviors or improve them. Practically, a method should be followed that is related to this theory by discovering the patient's hesitations to change high-risk behaviors through behavioral intention. Motivational interviewing seems to be related to this theory according to its goals. Motivational interviewing is defined by discovering and eliminating doubt and increasing the motivation for changing. The components of motivational interviewing include collaborative effort, client-centeredness, nonjudgmental, trust building, reduced resistance, increased readiness for change, increased self-efficacy, increased perceived incongruence, reflective listening, call-to-change conversation, discovery, and listening with empathy.^[10] It is supposed to emphasize the three perceived high-risk factors, positive outcomes, and optimistic self-efficacy when using the motivational interviewing method for diabetic patients. On the other hand, to compare, we used a method that is designed based on cognition for lifestyle changes. Self-development education is a method based on Schoeneman's theory, which is based

on the principle of consciousness and self-regulation. According to this view, psychological disorders arise from the imbalance between the sources of self-knowledge at the individual, family, and social levels.^[11,12] By taking a glance at humans, we can see the presence of three sources in the process of self-development. These three sources are (a) self-observation; (b) social comparison; and (c) social feedback. Therefore, we compared motivational interviewing with self-development education to see that whether motivation is more important than cognition in lifestyle behavior change in T2D patients.

Therefore, the present study aims to investigate the effect of motivational interviewing on the lifestyle of patients with T2D, as compared to self-development education.

Materials and Methods

Study design and setting

This was a quasi-experimental study with a pretest-posttest design and an active comparison group. This study was a trial that was performed in Imam Reza and Firouzgar Hospitals in Tehran during November and December 2017 and January and February 2018.

Study participants and sampling

The population of this study consisted of T2D patients who were referred to Imam Reza and Firouzgar Hospitals in Tehran during November and December 2017 and January and February 2018. Despite the high number of diabetic patients, there was no number of patients from one hospital who could attend the study simultaneously over a 3-month period. Therefore, the study patients were selected from two different hospitals. Therefore, to select the samples, out of 321 patients who were selected according to the inclusion and exclusion criteria, 80 were selected by the targeted sampling method. According to the following formula, approximately 35 patients were required for each group. Due to the possibility of missing samples, 40 patients were considered for each group instead of 35 patients.

$$n = \frac{(p_{1d}(1-p_{1d}) + p_{2d}(1-p_{2d}))(z_{\alpha} + z_{\beta})^2}{(p_{1d} - p_{2d})^2}$$

Each patient was assigned a random number, and the patients were randomly assigned to the experimental and active comparison groups based on random numbers. Then, the lottery was conducted by a person outside of the study via removing the numbers from the envelope. One by one, the patients were included in the experimental or comparison group. Inclusion criteria included patients of 35 years of age and above, with no other chronic illnesses, and having T2D, and the exclusion criteria included patients with

a history of an illness in <1 year, use of nondiabetic drugs, alcohol consumption or substance abuse, and participating in other psychoeducational programs simultaneously.

Data collection tool and technique

To collect data, a lifestyle questionnaire translated by Yekaninejad and Rahmati about a tool for assessing determinants of lifestyle behavior questionnaire (DLBQ) in T2D patients was used.^[13] DLBQ in T2D patients is based on the planned behavior theory and includes the questions about attitude, subjective norms, perceived behavioral control, and intent. The questionnaire (DLBQ) consists of three sections that include three different lifestyle behaviors: physical activity, nutritional behavior, and smoking. The content validity of this tool is about 0.79. Cronbach's alpha was between 0.89 and 0.96. The questionnaire scored 5 points in Likert scale (strongly agree = 5 and strongly disagree = 1). To conduct the study, both groups initially performed a pretest. Then, the patients of Firouzgar hospital were exposed to a motivational interviewing method for 10 group sessions (each 1.5 h) that were held once a week. The contents of the motivational interviewing intervention are presented in Table 1.

Imam Reza Hospital's patients (active comparison group) were exposed to self-development education for 10 group sessions (each 1.5 h) that were held once a week. The contents of self-development education intervention are presented in Table 2. In this study, self-development education is used for the comparison group. Both trainings were presented by the first author in the training halls of Firouzgar and Imam Reza hospitals. Finally, the posttest was conducted in the last session (February 22, 2018). To analyze the data, SPSS 21 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) software was used. To determine the difference in demographic variables in the patients who received motivational interviewing compared to the patients who were trained with self-development education, Chi-square test was used. Further, to compare the mean scores of the two groups in total lifestyles and the mean indicators which included the physical activity – smoking and nutrition, as well as the difference between the mean lifestyle indicators based on the TPB in the two groups included the consciousness, attitude, subjective norms, perceived behavioral control, and behavioral intention, thus, an independent *t*-test was used. Kolmogorov–Smirnov test was used to determine the normality of the data.

Table 1: Motivational interviewing protocol (summarized)

Number	Content
Session 1	In this session, therapists and T2D patients discussed the problems related to the diabetes. Patients were asked to list their most important problems for the next session, especially their lifestyle-related behavioral problems
Session 2	In this session, while reviewing the assignment of the previous session, the factors affecting the diabetes were discussed. One of these factors was lifestyle. In this session, the concept of lifestyle and related fields was discussed. For the next session, participants had to gather information related to their areas of lifestyle, including physical activity, nutrition, smoking, and sleep hygiene
Session 3	In this session, while reviewing the task of the previous session, the concept of change was discussed. What is the meaning of change? How to change and not to want to change. Preparation-action stage-stage of commitment and sustainability. For the next session, patients tried to determine where these stages of change were
Session 4	In this session, by reviewing the task of the previous session, it was determined which stage each patient was at? Further, in this session, patients discussed the doubts about change. For the next session, patients had to identify a few examples of their doubts (especially their hesitations about behaviors such as smoking or not smoking, dieting or not, and engaging in sports or not doing sports) and how to solve these doubts
Session 5	In this session, each patient tried to discover the doubts related to lifestyle changes within themselves and bring them to the surface. Moreover, he/she tried to identify the clients of attraction factors for change and the obstacles to change. For the next session, clients should identify barriers and attractions to change as target behaviors
Session 6	In this session, while examining the task of the previous session, patients were confronted by themselves about the benefits and harms of maintaining the present status and the benefits and harms of changing
Session 7	In this session, the therapist used empathy techniques - open-ended questions - reflecting and summarizing. For the next session, clients had to plan their behavior and choose the target behaviors to change
Session 8	In this session, T2D patients selected the target behaviors for change and planned how to perform them. Future situations were also identified, which may have brought the changed behavior back to the previous conditions. Strategies were proposed to deal with it. For the next session, patients took action to change the behaviors agreed upon in the session. For example, increasing exercise or reducing smoking
Session 9	In this session, the target behaviors that patients had to perform were discussed. Obstacles were identified. The therapist supported and considered altered behaviors. They also discussed about self-efficacy and self-encouragement. The patient's behaviors that exacerbate the disease are controlled by the patient, as well as his or her encouragement that their behavior is changing
Session 10	In this session, the changed behaviors and their impact on reducing problems were discussed and how these changes could be stabilized. There was a discussion about lapse and how to commit to behavioral changes

T2D=Type II diabetes

Table 2: Self-development education protocol (summarized)

Number	Content
Session 1	Counselor explained to the members the goals of the group. The counselor taught the members his/her self-development (three sources include self-observation, social feedback, and social comparison). Patients were also scheduled for the next session to identify the three sources of their self-development as homework
Session 2	The homework of the previous session was reviewed and the members commented on each other's homework and they determined that how much each patient uses the three sources and in their opinion what amount can be harmful
Session 3	After reviewing the previous session, the counselor and members discussed alienation
Session 4	After reviewing the previous session, the concept of self-observation was discussed
Session 5	Members discussed their evaluations from the perspective of others or social feedback. Homework was also set for the next meeting
Session 6	Previous session was reviewed. Members discussed the good work they have done over the past year and gave each other a score of 10-20
Session 7	Members discussed the concept of social comparison. Members evaluated themselves from a social comparison perspective. Homework on social comparison was set for the next session
Session 8	This session was focused on acting and role-playing. Each member took on the role of a character, such as a hero or ... and expressed his/her feelings. Further, they discussed the issues of society and self-development. Then, a social comparison and a discussion about the lives of the parents and families took place. For the next session, members will determine which one of the three sources of self-development, they are most influenced by
Session 9	The previous session was reviewed. Members then discuss setting up the other members' triple resources. Members also rate other members' self-confidence. For the next session, individuals are asked to write ways to increase self-confidence as a task
Session 10	The previous session was reviewed. The members then discussed the increase in self-confidence, and finally the members, under supervision, concluded the sessions.

Ethical consideration

To observe the ethical issues, informed consent was obtained from all patients before being enrolled in the study which included secrecy and confidentiality of information. This study is registered with the ethics code: IR.BMSU.REC.1396.311 and with IRCT code: IRCT20180710040411N2.

Results

Kolmogorov–Smirnov test showed that the data were normal [Table 3]. Demographic findings of this study are presented in Table 4. The results show that T2D patients in motivational interviewing group and self-development education have been matched by gender, age, marital status, and job status and with no differences between the two groups of motivational interviews (trial) and self-development education group (active comparison group). Further, the results of this study showed that motivational interviewing, in contrast to self-development education, leads to changes in the lifestyles of T2D patients. As Table 5 indicates, these changes are significant at the level of $P = 0.042$. Specifically, motivational interviewing, in comparison with self-development education, has a significant effect on physical activities, nutritional control, and reduced smoking [Table 5]. In terms of process, motivational interviewing, in contrast to self-development education, causes lifestyle changes based on the TPB in the variables of attitude, perceived behavioral control, and behavioral intention. These changes were significant in $P = 0.019$, $P = 0.031$, and $P = 0.027$, respectively [Table 6]. However, motivational interviewing did not make any significant changes compared to self-development education

Table 3: KolmogorovSmirnov test for normality

Variables	Score Z	Kolmogorov-Smirnov P
Physical activity	0.14	0.33
Nutrition	0.18	0.56
Smoking	0.20	0.51
Total	0.17	0.43

in the variables of consciousness and subjective norms [Table 6].

Discussion

The purpose of this study was to compare the effectiveness of motivational interviewing and self-development education on the lifestyles of T2D patients. The results showed that the motivational interviewing method significantly changed the lifestyles of T2D patients in comparison with the method of self-development education. The concept of self-efficacy seems to play a role in explaining this finding. In essence, motivation is related to the patient's evaluation of the end and the result of the work in a positive direction, which creates the concept of self-efficacy. In the present study, motivational interviewing also used the technique of boosting self-efficacy in T2D patients. These results are in accordance with the results of Pourisharif *et al.*,^[14] who concluded that motivational interviewing can be effective in self-care and the quality of life of T2D patients. In addition, the results are in line with Chen *et al.*,^[15] which showed that motivational interviewing improves self-efficacy of T2D patients in controlling their glycosylated hemoglobin.

This suggests that self-efficacy is one of the basic techniques and principles in motivational interviewing.

Table 4: Demographic indicators of motivational interviewing and self-development training groups

Variables	Variable levels	Motivational interviewing, n (%)	Self-development training, n (%)	P	Tests
Sex	Man	25 (31.25)	23 (28.75)	0.65	χ^2
	Woman	15 (18.75)	17 (21.25)		
Age	35-45	7 (8.75)	8 (10)	0.71	χ^2
	46-55	1 (1.25)	2 (2.5)		
	56-65	18 (22.5)	20 (25)		
	66-75	13 (16.25)	9 (11.25)		
	Above 75	1 (1.25)	1 (1.25)		
Marriage status	Married	22 (27.5)	23 (28.75)	0.57	χ^2
	Single	6 (7.5)	5 (6.25)		
	Widow	9 (11.25)	10 (12.5)		
	Divorced	3 (3.75)	2 (2.5)		
Vocational status	Unemployed	5 (6.25)	4 (5)	0.62	χ^2
	Employee	9 (11.25)	11 (13.75)		
	Worker	7 (8.75)	6 (7.5)		
	Homemaker	11 (13.75)	10 (12.5)		
	Retired	3 (3.75)	3 (3.75)		
	Military	5 (6.25)	6 (7.5)		
Education	Illiterate	7 (8.75)	6 (7.5)	0.36	χ^2
	Elementary	6 (7.5)	7 (8.75)		
	Guidance	5 (6.25)	5 (6.25)		
	Diploma	10 (12.5)	11 (13.75)		
	Bachelor	8 (10)	6 (7.5)		
	MA	4 (5)	5 (6.25)		

Table 5: Comparison of lifestyle behaviors in pre- and post-intervention in both groups

Variables	Intervention (40): MI, mean±SD		Mean differences	Active comparison (40): PD, mean±SD		Mean differences	P Independent t-test
	Before	After		Before	After		
Physical activity	31.45±10.65	37.00±8.91	5.55	31.70±10.65	32.37±10.61	0.67	0.029
Nutrition	35.55±8.92	43.97±14.25	8.82	35.47±8.92	34.07±12.59	1.4	0.037
Smoking	27.25±5.33	19.22±13.62	8.03	5.33±26.27	25.90±1047	0.37	0.043
Total	89.25±14.74	111.2027.22	21.95	93.45±14.74	135.35±25.75	41.9	0.042

Intervention=Motivational interviewing, MI=Motivational interviewing, PD=Personal development (self-development), SD=Standard deviation

Table 6: Comparison of the theory of planned behavior variables in pre- and post-test in both groups

Variables	Intervention (40): MI, mean±SD		Mean differences	Active comparison (40): PD, mean±SD		Mean differences	P Independent t-test
	Before	After		Before	After		
Consciousness	4.27±2.37	4.05±3.32	0.22	3.82±3.01	3.90±3.33	0.08	0.49
Attitude	6.68±6.02	5.15±4.96	1.65	3.54±2.13	3.61±3.03	0.07	0.019
Subjective norms	5.94±3.36	6.01±3.07	0.07	5.23±4.02	5.06±4.27	0.17	0.31
Perceived behavioral control	6.28±4.23	4.73±4.18	1.55	4.56±3.72	4.63±4.08	0.07	0.033
Behavioral intention	3.32±0.33	1.91±0.41	30.39	2.52±0.31	2.48±0.28	0.04	0.027

Intervention=Motivational interviewing, PD=Personal development (self-development), MI=Motivational interviewing, SD=Standard deviation

Another process that can be explained in the results of this study is the process of behavior changes. Motivation seems to be more related to the process of behavior changes than the content of change that may be provided in the form of a knowledge-based educational program. In fact, motivation is different in the stages of behavior changes. In the contemplation and preparation stages, there is low motivation, and in the later stages, including action and maintenance, there is high motivation. Thus, motivational interviewing has helped T2D patients to move from the early stages to the action and maintenance

stages, resulting in significant changes in the lifestyle of these patients. Therefore, the findings of this study are in line with the findings of Mostafavi and Pirzadeh's study, which showed that self-efficacy is related to the process of behavior changes based on a transtheoretical model in physical activity among female employees.^[16] It is also in line with the findings of Purnarani *et al.*'s study, which showed that educating based on the transtheoretical model on self-efficacy and decisional balance of primary school's students in breakfast consumption has a positive effect.^[17] On the one hand, in explaining the results of

this study, we can mention the role of self-protective behaviors. On the other hand, motivational interviewing, by raising the risks of high-risk behaviors in patients with T2D, has provided the hope of controlling the disease by adopting a healthier lifestyle. These findings are consistent with the research that was done by Mirkarimi *et al.*,^[18] which concluded that after applying motivational interviewing, the motivation for self-protecting behaviors in obese individuals increases. In addition, these findings are consistent with Navidian *et al.*'s research^[19] who reported in their research that, in controlling and preventing hypertension, adding motivational interviewing to the lifestyle training is an effective way to improve one's lifestyle and ultimately reduce the risk factors of cardiovascular diseases including hypertension. In addition, according to the TPB, it can be stated that motivational interviewing leads to the increase of the motivation and understanding of behavioral control. In other words, a patient with diabetes can increase his/her motivation to make positive changes. In fact, intentions contain motivational factors that affect behavior and indicate how much people want to behave and how hard they try to do it. Therefore, motivational interviewing is the method that provides the platform to activate the motivation's motor in T2D patients. This finding is different from Pirzadeh *et al.*'s study which showed that educational program based on the belief, attitude, subjective norm, and enabling factors (BASNEF) model is effective on changing the nutritional behavior among students. The implication of their study seems to indicate that knowledge is not separate from motivation. In other words, according to the BASNEF model, in the process of behavior changes, knowledge is either a part of motivation or is as important as motivation in behavior changes.^[20] Furthermore, the findings of this study are contradictory to the study done by West *et al.*^[21] In their research, they found that motivational interviewing improves weight control in T2D women; however, that change was not directly due to increased motivation. In fact, motivational interviewing initially affects people's cognition, so they think more about the effects of their behavior. Hence, at first, the cognition changes and then so does the motivation which is the result of the change in cognition. Rubak *et al.*^[22] found contradictory results to the findings of the present study. They showed that to make positive changes in behaviors associated with T2D, motivational interviewing would provide the necessary cognition in patients. In general, the contradictory results are more related to the mechanism of change through motivational interviewing in T2D patients. Dellasega *et al.*^[23] examined the method of responding in T2D patients and concluded that motivational interviewing leads to a kind of cognitive dissonance rather than a direct change in motivation, and to resolve this inconsistency, the patient has to decide to change their behavior. This finding is also in line with some other studies on the positive effects of

motivational interviewing on lifestyle.^[24,25] This study compares a purely educational method with a method that is based on discovering motivation in changing the lifestyle of T2D patients. Hence, it is a new study. It is recommended that motivational interviewing should be used for health-based changes in the lifestyle of diabetic patients.

Limitation and recommendation

This study did not include patients who were recently diagnosed with T2D and patients who stuck to their former lifestyle and found it difficult to change their lifestyle. It is suggested that a similar study be performed on chronic patients other than T2D patients to change their lifestyle. Further, the effects of motivational interviewing should be compared with a noncognitive treatment in T2D patients.

Conclusion

According to the results of this study, it seems that in relation to the behavior changes associated with the lifestyles of T2D patients, motivation is more effective than knowledge. As we have seen, in the five factors of consciousness, mental norms, perceived behavioral control, attitude, and behavioral intentions, changing the patient's lifestyle requires more motivation than knowledge. Further, regarding the behaviors associated with physical activity, nutrition, and smoking, it seems that increased knowledge contributes to the positive lifestyle behaviors rather than eliminating the negative lifestyle behaviors associated with physical harmful conditions in chronic illnesses such as diabetes. Eliminating the negative behaviors that have become habitual and have overwhelmed the lifestyle is affected by motivation rather than knowledge. Therefore, it is suggested that motivational interviewing should be included in the health education programs for diabetes or other chronic diseases. Thus, the motivational interviewing method provides the cornerstone for the behavioral changes that requires intrinsic motivation.

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This study was approved by the Health Research Center of Baqiyatallah University of Medical Sciences with the code of ethics: IR.BMSU.REC.1396.311. Further, this study is registered with the ethics code: IR.BMSU.REC.1396.311 and with IRCT code: IRCT20180710040411N2 Therefore, we are very grateful to the members of this research center. We are also very thankful to the officials at Firouzgar Hospital and Imam Reza Hospital who helped us with this study.

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Conflicts of interest

There are no conflicts of interest.

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