Original Research Article

Effect of repetitive education on cognitive-social factors among type 2 diabetic patients

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ABSTRACT

Background: Psychological, cognitive and social factors are also effective in helping the diabetes patient show behavioral changes in terms of the treatment process. The purpose of this study was to examine the effect of repetitive education on cognitive-social factors and metabolic control variables among patients with type 2 diabetes (T2DM).
Methods: The study was conducted with one group using the same test at pre-determined times. 62 outpatients with T2DM were recruited for this study. The data was collected using a Patient Information Form that was prepared by the researchers, the Turkish multidimensional diabetes questionnaire, and the metabolic control follow-up form. The data was analyzed using SPSS 19 and descriptive statistics (Kolmogorov-Smirnov Test, Paired t Test, and Wilcoxon Signed-Rank Test).
Results: While there was a statistically significant difference between the mean scores of interference, severity, positive reinforcing behaviors, outcome expectancies before and after the diabetes education ($p<0.05$), a statistically significant difference was not found between mean values of fasting and random plasma glucose, HbA1C, HDL, LDL, triglyceride, waist circumference and body mass index ($p>0.05$).
Conclusions: Repetitive diabetes education provided to patients with T2DM positively affected other cognitive-social factors except for social support and self-efficacy, but did not affect metabolic control variables except for blood pressure.

Keywords: Cognitive-social, Diabetic, Education, Nursing, Patient

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a significant health problem all around the world that is on the rise. Obesity and insufficient physical activity are thought to be significant contributing factors for the development of T2DM.[1] According to the World Health Organization (WHO), for the year 2012, there were 347 million patients with T2DM in the world. While the frequency of patients with T2DM in Turkey between 1997 and 1998 was 7.2%, this rate rose to 13.7% in 2010. A rise of 90% in 12 years in the incidence points to a serious health problem.[2,3] Prevalence of diabetes is thought to reach 3.3 million among the adult population in Turkey, and the new diabetes development incidence is also estimated to be 360 thousand per year.[4]

DM is a disease that can be prevented or kept under control by means of good education and planning. Keeping diabetes under control and preventing complications are possible through the education of the patient. Raising awareness among patients through

education and enabling them realise the correct attitude towards treatment and care are significant factors in the management of diabetes.[5-8] Diabetes education and self-compliance are integral parts of any treatment program for patients with diabetes.[9,10] The most important purpose of education is to ensure the metabolic control of the patient, prevent acute and chronic complications, and enhance quality of life.[5] Diabetes affects the whole life of the individual due to its biological and psychosocial effects.[11,12] Therefore, it is important to evaluate the patient's psychosocial condition.[11-13]

The individual must have sufficient knowledge, skills, and positive attitudes in order to ensure diabetes control.[14,15] Since patients' glycemic controls are better ensured with diabetes education, it's prompt initiation is important.[16] In addition to the education's effectiveness in terms of changing individuals' attitudes towards the disease, it is also possible to ensure behavioral change in individuals and for them to change their life styles in this context.[15-19]

In addition to diabetes education; psychological, cognitive and social factors are also effective in helping the diabetes patient show behavioral changes in terms of the treatment process.[20,21] It is important to define the effect of cognitive-social factors in terms of ensuring behavioral change that leads to planned personal targets.[22] Perceptions of interference, severity, support, self-efficacy, and outcome expectancies in diabetic patients are thought to be associated with self-care behavior and functional sufficiency in ensuring diabetes control.[20-22]

Ensuring metabolic control of diabetic patients is also important in terms of avoiding complications. Low life quality may result due to metabolic control failure. The purpose of diabetes control is to ensure the patient's self-management, improve metabolic control, prevent the occurrence or progression of complications, and improve life quality by increasing the health level, all of which are possible through education.[5]

It has been reported in the studies of Nakahara et al. and Cosansu et al., that psychosocial factors are effective in ensuring glycemic control in the long term, and in the study of Mollaoğlu et al., it has been stated that education positively affects the patient's autonomy.[15,21,23] In this context, provision of frequent and recurringdiabetes education to T2DM patients can affect the cognitive-social factors and metabolic control variables.

The purpose of this study was to examine the effect of education on the cognitive-social factors and metabolic control variables of T2DM patients. Determination of the cognitive-social conditions that affect management of diabetes patients during the treatment process will establish usefulguideliness for the education of diabetes-care nurses.

METHODS

Study sample

Participation and data collection took place in the Endocrinology Outpatient Clinic at the Recep Tayyip Erdogan University Training and Research Hospital from August 2013 to February 2015. The study was initiated with 75 T2DM patients. who had the condition more than 6 months, did not receive insulin pump treatment, and met the study's criteria. 13 patients were excluded due to in attendance. Outpatients who were literate, communicative, aged 18-65, lacked advanced hearing and vision problems were included in the study. Patients living alone were excluded from this study because of reliability concerns raised in other studies.[21]

Study procedures

The investigator interviewed the patients who were included in the study at the policlinic three days a week. It took approximately 15-25 minutes to complete the Personal Information Form and the Turkish Multidimensional Diabetes Questionnaire (T-MDQ) for every patient in the first interview.[21]

Waist circumference, blood pressure, height and weight were measured and recorded. The patients' metabolic control variables were taken from the patient information system and were recorded. Patient groups consisting of 4-7 people were formed and the first diabetes education was provided in the seminar hall on the first day of the meeting with the patients at the outpatient clinic. After the education, the patients were provided with Diabetes Education Booklet.

Education was provided in three 45-minute sessions within the same day for each patient group. General information related to diabetes was provided in the first session; diabetes follow-up and treatment were dealt with in the second session, and possible diabetes health problems and important topics of diabetes controls were stated in the third session. A mixed education method including a plain expression with power point presentations, questions-answers, and demonstration was used as an education method and feedbacks were received.

Second and third diabetes education sessions were repeated with an interval of 1 month for each education group whose pre-test data were collected. Post-test data were collected from individuals 1 month after the completion of the education.

Evaluations

Questionnaires

The Individual Information Form that was developed by the investigator using literature, the TMDQ that evaluates

the social and cognitive factors of diabetic patients and Metabolic Control Follow-Up Form were used in order to collect data.[19,21]

Individual information form

The 10-item personal information form included the patients' socio-demographic characteristics (age, marital status, educational background, profession/employment status, cohabitants) and some information related to the disease (duration and method of treatment, of the disease, any previous specific education and training and familial presence).

The Turkish multidimensional diabetes questionnaire

This was developed by Talbot et al, in order to evaluate the cognitive- social factors related to diabetes.[20] The modified version of this test was used in this study, which has 36 items that are grouped into 3 main sections which are further subdivided into 6 sub-sections that can be used independently of each other.[21] The items are scales in nature that are graded for establishing a score.

The 1st section focuses on the perception of diabetes and social support. It consists of three sub-section that contain 16 items. 9 of these items question how negatively the daily activities (work, social and entertainment) of the diabetic patients are affected, which constitute the Interference Perception of the sub-section. The severity perception sub-section includes 3 items that measure individual perception of the severity of diabetes. Social Support Perception section consists of 4 items that question the perception of the social support provided by the important people in the lives (famiy, friends, health care providers). Responses given to the first section are obtained by using a 7-point (0- never, 6- very highly) Likert-type scale. The scores are added up and the mean is obtained by dividing them into the number of answered items. Higher scores indicate higher perceived interferences, social support and severity levels.

The 2nd section questions the levels of reinforcing and non-reinforcing behaviors of the diabetic patient's spouse or care-giver for self-care. This section contains two sub-sections and 12 items. The positive reinforcing behaviors section include 8 items that aim to determine the positive behaviors of the patient's spouse or care giver for disease's management. The misguided support behaviors section contains 4 items that determine the level of mis-management by the diabetic patient's spouse or care giver. Responses given to the second section are marked on the 7-point likert type scales before.

The 3rd section determines the individual's perceptions of self-efficacy and outcome expectancies regarding disease management. It contains two sub-sections and 13 items. Self- efficacy perception includes 7 items that determine the individual's self-confidence in terms of performing self-care activities. Responses are marked on the likert type scale. Outcome expectancy perception includes 6 items that evaluate the perception of self-care behaviors and the effect of treatment in order to ensure metabolic control and prevent complications. Responses are marked on the likert type scale ranging from 0-100 (0- not important at all, 100- very important). Higher scores indicate corresponding perceived self- efficacy and outcome expectancies.

The validity and reliability studies of the Turkish Multidimensional Diabetes Questionnaire were conducted by Cosansu et al.[21] One item in the social support sub-scale of the questionnaire's construct validity (How much do your doctor or the other members of the medical team support or help you with regard to your diabetes?) was omitted since it was distributed in rates similar to more than one factor. This scale, which was adapted to Turkish under the name "The Turkish Multidimensional Diabetes Questionnaire (TMDQ)", is considered to be a valid and reliable tool with its structure that consists of 6 sub-scales and 40 items.[21] Misguided support behaviors (0.58) sub-scale was also excluded from the study due to its insufficient reliability level. As a result of these explanations, TDMQ sub-scales of interference perception, severity perception, social support perception, positive reinforcing behaviors, self-efficacy perception and perception of outcome expectancies consisting of 36 items in total were used.

Metabolic control follow-up form

The metabolic control follow-up form was prepared in line with the literature data. The form involved items that determine fasting and random plasma glucose, HbA1c, HDL, LDL, triglyceride, blood pressure, BMI, and waist circumference measurement values of the patients. Metabolic control variables were obtained from the records of the patients on the day of the interviews for HbA1c, HDL, LDL and triglyceride values. Permission was obtained for the use of these data. Height, weight, BMI, waist circumference, and blood pressure values were measured and recorded by the investigator for each patient in the pre-test and post-test phases by using the height scale, weighing scale, blood pressure monitor, and tape measure in the clinic.

Patient education book

Patient education book was developed by the investigator for the patients' educational needs by reviewing the literature related to T2DM.[2,5,14,15,19,21,24-26] The education booklet consisted of four chapters, entitled general information related to diabetes, diabetes follow-up and treatment, possible health problems that may arise in diabetes and the importance of diabetes controls.

Statistical methods

The data obtained as a result of the study were assessed by using SPSS 18 (Statistical Package for Social Science)

package program. For the statistical analysis of the data, normal distribution of continuous variables was assessed with Kolmogorov-Smirnov test. While continuous variables were presented with mean and standard deviation, categorical variables were presented with percentages and numbers. While paired sample t-test was used for those that showed conformity with normal distribution between the analyzed numerical variables, Wilcoxon Signed Rank Test was used for those that did not show conformity. The statistical significance level was taken as $p<0.05$.

RESULTS

Table 1 illustrates the demographic characteristics of the sample group of 62 diabetic patients. The mean age was 50.73 ± 12.05 years and 76.0% of the participants were female. Most were married (74.0%) and had at least an elementary school degree (71.0%), 64.0% were housewives, and 52.0% lived with their spouses and children in the same home. It was determined that 87% and 50% of the patients had first and second degree relatives with a history of diabetes, respectively. However, only 58% of the patients previously participated in a diabetes education (Table 1).

Table 1: Demographic characteristics of patients (N=62).

Characteristics		Number (%)
Age (Mean±SD)		50.73 ±12.05
Gender	Female	47 (76)
	Male	15 (24)
Marital status	Married	46 (74)
	Single	16 (26)
Education status	Elementary school	44 (71)
	High school and above	18 (29)
Employment status	Housewife	40 (64)
	Unemployed	22 (36)
Cohabitation status	Living alone	5 (8)
	Spouse and children	32 (52)
	Only spouse or child or parents	25 (40)
Status of participation in diabetes education (before this study)	Attended	36 (58)
	Never participated	26 (42)
History of diabetes in family	Yes	54 (87)
	No	8 (13)
History of diabetes in first-degree relatives	Yes	54 (87)
	No	8 (13)
History of diabetes in second-degree relatives	Yes	31 (50)
	No	31 (50)

Table 2: Comparison of T-MDQ subscales before and after education (N=62).

T-MDQ Subscales	Before education Mean±SD	After education Mean±SD	p-value
Interference	3.51±1.19	4.18±0.91	<0.001
Severity	2.37±1.74	2.67±1.58	0.007
Social support	2.25±1.72	2.33±1.70	0.241
Positive reinforcing behaviors	2.47±1.95	3.60±6.64	0.002
Self-efficacy perception	50.93±19.28	54.13±22.42	0.224
outcome expectancies	78.73±19.96	99.89±0.85	0.001

Table 2 illustrates the T-MDQ subscales and the outcomes of interest in diabetes education before and after the tests.

The difference between mean values of interference perception ($p<0.001$), severity perception, positive reinforcing behaviors and outcome expectancy perception variables before and after education was found to be statistically significant ($p<0.05$). No significant difference was found in the other variables ($p>0.05$).

Table 3: Comparison of metabolic control variables before and after education (N=62).

Metabolic control variables	Before education Mean±SD	After education Mean±SD	p-value
Fasting plasma glucose	160.43±79	154.98±62	0.899
Random plasma glucose	181.42±66	174.33±61	0.146
HbA1C	7.71±1.9	7.58±1.9	0.318
HDL	46.58±10	47.33±10	0.283
LDL	122.09±36	126.24±42	0.510
Triglyceride	170.37±81	154.58±67	0.056
Systolic blood pressure	120.64±8	116.61±6	<0.001
Diastolic blood pressure	77.74±6	80.16±3	0.001
Waist circumference	112.93±14	113.30±14	0.075
BMI	33.96±7.26	34.07±7.09	0.058

Table 3 illustrates evaluation of metabolic control variables before and after education. The difference between mean values of metabolic variables of systolic blood pressure and diastolic blood pressure before and after education was found to be statistically significant ($p<0.05$).

No significant difference was found in other variables ($p>0.05$), (Table 3).

DISCUSSION

This study investigated the extent to which diabetes affectsdaily activities, social life, travelling, productive work, and relations with spouse/cohabitants in the interference perception subscale.

The results of this study show that the interference perception mean score increased after the education. In a study conducted by Gunal et al., it was reported that interference perception was high among patients with T2DM.[27] However, Sezgin et al, in a similar study, found no statistical difference in interference perception after diabetes education, and Mollaoğlu et al., reported that diabetes education did not create any statistically significant effect on the lives of patients.[15,24] Romero-Marquez et al., reported that physical and social relations of patients with T2DM and their environmental interactions were affected.[28] Wu et al, found that >74% and >50% of diabetic patients had difficulties in their daily life activities and assisted daily life activities, respectively.[29] In this study, it can be asserted that patients' awareness regarding diabetes increased after education: they felt even more hindered as they recognized some aspects that they were previously unaware of, and their awareness as to how much their daily or social lives were negatively affected and limited increased.

This study revealed that the severity perception increased after education. The difference between mean scores of severity perception before and after education was statistically significant. Sezgin et al, also reported that diabetes education resulted in an increase in severity perception.[24] The result of this study shows similarity with the results of previous similar studies.

No statistically significant difference was found between social support perception mean scores before and after education. Sezgin et al, too, reported that diabetes education did not cause a statistically significant difference in social support perception.[24]

In the subscale of positive reinforcing behaviors in the study, positive reinforcing behaviors of the diabetic patient's spouse or someone else that is important for them in terms of the management of the disease were examined, and evaluations were conducted by determining the positive reinforcing behavior mean scores of the sample group. It was found that mean scores of positive reinforcing behaviors increased after education, and the difference between them was statistically significant. As specified in the related literature, positive reinforcing behaviors shown by the diabetic patient's spouse or someone else that is important for them were effective on the management of the disease by the diabetic patient. The education provided for patients is disseminated to their immediate surroundings by the individuals, and awareness among spouses therefore increased. The result of the study shows similarity with the literature data.[20,30]

In the self-efficacy subscale of the study, the patients were followed up for their compliance with their dietary requirements, blood glucose measurements, regular exercise, keeeping weight and blood sugar under control, avoidance of food stuff that was deemed harmful and sticking to the anti-diabetic treatments. The evaluations were conducted by determining the mean scores of self-efficacy perception of the sample group. According to the result of the study, although there was no statistically significant difference between self- efficacy perception mean scores before and after education, self-efficacy perception mean score was found to be higher after education, which was in line with other studies inluding the study of Sezgin et al.[24] Similarly, Mollaoğlu et al reported that education affected the management of the disease by the patient positively.[15]

Outcome expectancy perception mean score of the patients was found to be significantly higher after education, similar to other studies including that of Sezgin et al.[24]

The result of the study revealed that there was a statistically significant difference between systolic blood pressure and diastolic blood pressure mean values among metabolic control variables before and after education. However, no statistically significant difference was found between the mean values of fasting plasma glucose, random plasma glucose, HbA1C, HDL, LDL, triglyceride, waist circumference, and BMI. In numerous studies, it has been determined that diabetes education can cause metabolic control variables to reach the desired level.[15,19,25,31,32] It was reported in the studies of Nakahara et al and Coşansu et al, that psychosocial factors were effective on ensuring glycemic control in the long term.[21,23] The result of this study revealed a positive change in metabolic control variables before education compared to metabolic control variables after education; however, the absence of any statistical difference may be associated with the fact that the patient follow-up after education was conducted within a period of time that was shorter compared to other studies and metabolic control variables required longer times to manifest the expected changes.

When mean scores of cognitive-social factors of the patients with T2DM were compared before and after education, it was observed that the mean scores of interference perception, severity perception, positive reinforcing behaviors and outcome expectancy perception increased after the education, and the difference between them was statistically significant. When mean scores of metabolic control variables before and after education were compared, it was observed that only systolic blood pressure and diastolic blood pressure mean scores decreased after the education, and the difference between them was statistically significant.

In this context, provision of diabetes education is required in oder to raise the awareness of all concerned for diabetes management and recognise and adopt lifestyle changes and diabetes self follow-ups. Similar studies with more participants and for longer durations must be performed for betterment of diabetic management.

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