Original Article

The effects of coping strategies and relaxation exercises on anxiety, hopelessness, life satisfaction, and well-beıng in the elderly people with diabetes: An experimental study

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Abstract

Aim: The aim of this study was to investigate the effects of coping strategies and relaxation exercises on anxiety, hopelessness, life satisfaction, and well-being in elderly people with diabetes.

Materials and Methods: A total of 30 participants were randomly assigned to three experimental conditions. In the first condition, the participants were informed about diabetes as well as how to cope with it. In the second condition, the participants were provided with breathing and relaxation exercises, which were accompanied by relaxing music, in addition to informing about diabetes and coping strategies. The control group was only informed about diabetes. The data were analyzed by ANOVA with 3 x 2 last factors repetitive.

Results: There was no difference between the conditions in terms of state anxiety, hopelessness and life satisfaction scores (p>0.05), but the difference after the intervention was significant (p<0.05). According to the Scheffe test, a) status anxiety score was determined between the first condition and the control group; b) life satisfaction score was significantly different between the first condition and second condition and between the second condition and control group. Significant differences were also found between pre-and post-intervention concerning anxiety, hopelessness and life satisfaction scores.

Conclusions: Findings suggest that explaining the methods of coping with diabetes can decrease the level of state anxiety, and the addition of breathing and relaxation exercises can enhance life satisfaction.

Keywords: Anxiety; elderly with diabetes; hopelessness; life satisfaction; well-being

INTRODUCTION

With prolonged life expectancy, diabetes is a more common disease in the elderly than in young people, and its prevalence in the geriatric population has been increasing over time (1,2). Approximately one-quarter of people aged 65 years and older have diabetes, and almost half of those in this age group have prediabetes disease (3). There are 425 million people with diabetes in the world, 98 million of whom are 65-79 years old. It is estimated that this number will reach 629 million in 2045 and the number of people with diabetes between the ages of 65-79 will reach 191 million (1). With increasing age and duration of disease, both micro and macrovascular complications are more prevalent in the elderly (4).

In elderly people, diabetes is a disabling disease, and co-existing morbidities, and the increased prevalence

of geriatric syndromes including cognitive and physical dysfunction (5). Diabetes has psychosocial effects in patients as well as physical complications. In addition to the normal problems of life, diabetes is a disease that affects the whole life of the individual and can lead to social or psychological adjustment problems, and can lead to depression and anxiety in particular and adversely affect the quality of life (6,7). Also, the diagnosis of diabetes has a significant psychological effect on the person and facilitates the emergence of psychosocial problems as it causes the person to rearrange many areas in his or her life (8).

Psychosocial factors are related to all aspects of diabetes management. The diagnosis of diabetes puts a life-long psychological burden on individuals and their families. Poor psychological functions can seriously affect the

self-management of diabetes, leading to poor medical outcomes and high costs (9). In a study, anxiety symptoms were found in 56.1% and depressive symptoms in 43.6% of the individuals with diabetes (10). In a meta-analysis by Anderson et al., depression was found to be twice as high in people with diabetes as compared to the general population (11). It is stated that 18% of people with diabetes develop problems that require psychiatric treatment, but 10% of these problems are not recognized (12). Besides, depression and anxiety symptoms have an interaction effect on poor glycemic control (9). Irregularities in blood sugar balance directly affect mental functions (13). When the metabolic equilibrium is disrupted, the negativity experienced by the individual causes them to experience feelings of hopelessness for the future and creates problems in control of the disease (14). However, good emotional health increases coping skills and protects against negative consequences of illness perception and increases self-management power (15). One research showed that health practices of individuals with high life satisfaction were better in terms of sleep, rest, and physical activity (16). Therefore, it is emphasized that the mental, emotional and behavioral status of diabetic individuals should be taken into consideration in addition to physical complaints (12). In order not to affect the quality of life of people with diabetes negatively, it is necessary to identify the causes of hopelessness and to identify the causes and to develop appropriate coping mechanisms (14). Findings of another research showed that the quality of life of diabetic individuals decreased and this situation had a significant effect on emotionally coping with the disease, suggesting that psychosocial support should be provided to these individuals (17).

To prevent the development of complications and not to deteriorate the quality of life, individuals with diabetes are expected to form a new way of life after diagnosis (18). Education is a priority issue to improve behavior and improve health in chronic diseases such as diabetes that require changes in individuals' lifestyles and habits. Training plans to create behavioral changes should first assess how a person's health and illness are perceived (19). Psychological evaluation of individuals in education is also recommended (20).

The individuals diagnosed with diabetes should be considered in a holistic manner, a inter-professional team approach should be used in their care and the psychological process of the individual should be given importance. The individuals diagnosed with diabetes experience denial, anger, depression, fear, anxiety, and guilt during the adjustment process. Therefore, it is very important to provide psychological support in addition to physical support to people with diabetes (14).

In the literature, there have been different studies describing psychosocial problems seen in individuals with diabetes (6, 9-11, 17, 20). However, anxiety, life satisfaction, well-being and hopelessness levels of elderly people with diabetes have not been evaluated together and only one intervention study aimed at eliminating or reducing psychosocial problems was found in the literature (21). Diabetes education is based on the patient learning to take of themselves with an inter-professional approach. This experimental study aimed to investigate the effects of diabetes coping methods and relaxation exercises on anxiety, hopelessness, life satisfaction, and well-being in elderly people with diabetes.

MATERIALS and METHODS

Study Design
This research was a randomized controlled experimental study, which was conducted in a public elderly day-care center. This center is a place where nurses monitored all patients more frequently than every three months at the latest in their home environment, where the health and social problems of the elderly are detected and services are provided for these problems.

Participants and Randomization
The population of the study consisted of elderly people with diabetes (n = 128) enrolled in the daycare center and 30 elderly people with diabetes who met the inclusion criteria. Inclusion criteria included the diagnosis of diabetes for at least one year, the absence of problems in verbal communication, the absence of hearing loss, the better cognitive functions for the elderly according to the re-arranged mini-mental test, the absence of a diagnosis of psychiatric illness, the resident in the same city during the research process and accepting to participate in the research. The number of samples was determined by power analysis. When calculating the sample size, NCSS PASS and G Power program was used. Since the standard deviation of Goodness, Life Satisfaction, Beck Hopelessness, State and Trait anxiety scales applied to each group was maximum 5, the statistical power was taken as 80% at $\alpha = 0.05$ level and each group was planned to form a sample of 8 elderly people with diabetes and as a result, research was completed with a total of 30 elderly patients with diabetes (22-24). When the application of the study was completed, the data was transferred to the computer environment and the sampling power was calculated again by using the arithmetic mean and standard deviation of the dependent variables. In the power analysis, the effect size was found over 0.40 for all dependent variables with type 1 error (α) level 0.05 and power value 0.80. This result showed that the large effect size and sample size were sufficient. (25).

A total of 128 participants were randomly assigned to three experimental conditions (intervention 1=46, intervention 2=41, control group=41) in the computer program (26) (Figure 1). The individuals in the center were given numbers according to the order of enrollment, and the numbers 1-128 were written in the randomization program since there were 128 people in the research population. According to the result of the assignment created by the randomization program, individuals were included in the intervention or control group. For example, the intervention group in the 25th rank was in the 1st, the 96th rank was in the 2nd, and the 61st was in the control group.
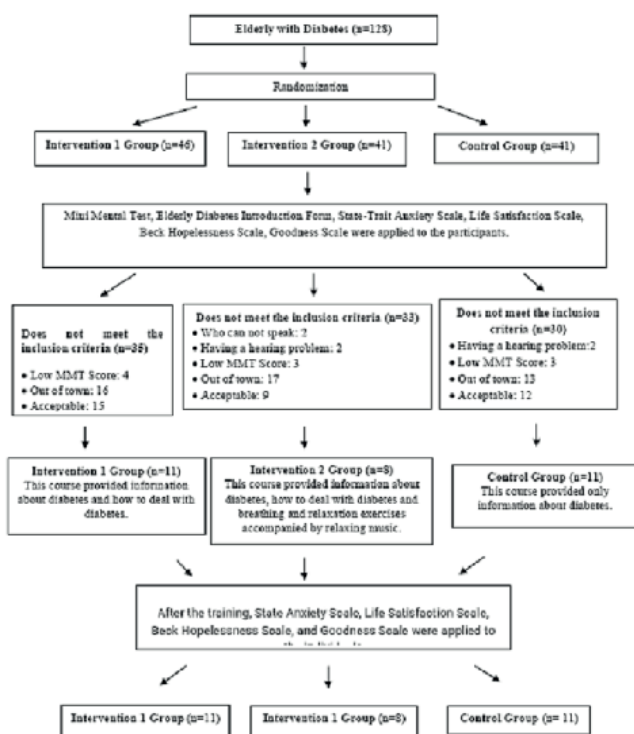
Figure 1. Assignment of Groups and Sample Diagram

Interventions

In the first condition (intervention 1), the participants were given group training for 20-25 minutes. This course provided information about diabetes and the strategies to deal with it. Information about the disease was provided by an academic nurse who had a specialization in diabetes nursing. Likewise, methods of coping with the disease were provided by a professor in psychology department. Information about diabetes included nutrition therapy, oral antidiabetic and insulin use, hypoglycemia-hyperglycemia, exercise, chronic complications of diabetes, diabetic foot, travel, and monitoring of the disease. The methods of coping with diabetes included learning to have positive feelings about the disease, accepting it, and dealing with the psychosocial problems associated with the disease.

In the second condition (intervention 2), in addition to the previous steps of informing about the disease and the coping strategies, the participants were given 10-15 minutes of breathing and relaxation exercises accompanied by relaxing music (Vivaldi-Spring) (27).

In the third condition (intervention 3), the control group was only informed about the disease.

All applications were conducted in a controlled environment by researchers, who were unaware of the purpose of the study. Home visits were made to all groups, two weeks before and following the application.

Data Collection Instruments

Mini-Mental Test (MMT): The test developed by Folstein et al. evaluates cognitive functions such as orientation, recording memory, attention and calculation, recall and language (21). In our country, validity and reliability study was conducted by Keskinoglu et al (28). For educated elderly, 22 points and below indicate possible cognitive impairment. On the other hand, 23 points and above indicate that cognitive status may be good. For the uneducated elderly, 18 or less probable cognitive impairment, and 19 points and above indicate that cognitive status may be good.

Patient information form: It has been created by scanning the literature and consists of two parts; sociodemographic features and features related to diabetes (4,5,7,15,18).

State-Trait Anxiety Inventory: It was developed by Spielberger et al (29). It consists of two sub-scales, each consisted of 20 questions, trait and situational. The state anxiety scale determines how an individual feels himself/herself at a given moment and under certain conditions, while the trait anxiety scale determines how an individual feels himself/herself, regardless of his or her circumstances. The validity and reliability study in Turkey was conducted by Oner and Le Compte. Cronbach alpha value of the scale of state anxiety scale was found to be 0.81, and cronbach alpha value of trait anxiety scale was found to be 0.82 (30).

Beck Hopelessness Scale: This scale was developed by Beck et al. to determine the pessimistic status of the future (31). The validity and reliability study in Turkey was conducted by Durak and Palabiyikoglu (32). The questions included emotional, motivational and cognitive dimensions. The scale consists of three factors: 'Emotions and Expectations about the Future', "Loss of Motivation" and "Hope". The validity study in our country was conducted in people with chronic-physical patients. The Cronbach alpha coefficient of the scale is 0.85 (32). In this study, the Cronbach alpha coefficient was found 0.46.

Life Satisfaction Scale: This scale was developed by Diener et al. and had 5 items. There is 7 options scale, ranging from Absolutely Disagree (1) - Absolutely Agree (7) (33). Turkish validity and reliability were made by Yetim (34). The Cronbach alpha coefficient of the scale is 0.86. In this study, the Cronbach alpha coefficient was found 0.78.

WBQ-22 Goodness Scale: It was developed by Bradley to investigate the positive or negative effects of changes in the treatment of patients on psychological well-being (35). In our country, validity and reliability studies were conducted by Sengul (36). The scale consists of four subscales measuring anxiety, positive well-being, depression and energy, and a total of 22 items. Each item was scored between "0" (never) and "3" (always). A high score indicates high satisfaction with diabetes treatment (36). The Cronbach alpha coefficient of the scale is 0.81. In this study, the Cronbach alpha coefficient was found 0.85. In this study, the Cronbach alpha coefficient was found 0.32.

Statistical Analysis

The data obtained were evaluated in a statistical program with a significance level of $P < 0.05$. The suitability of the distribution of data to normal distribution, Kolmogorov-Smirnov test ($p < 0.05$) and skewness and kurtosis coefficients (should be ± 1), which are accepted in the literature, were evaluated (36). Then data were analyzed with one-way ANOVA between groups and ANOVA with 3x2 the factor repeated within the group.

RESULTS

In this study, the effects of interventions on psychosocial problems and methods of coping with diabetes and relaxation exercises in three experimental conditions were examined.

The mean scores of state anxiety, hopelessness, life satisfaction, and well-being before and after intervention were compared between the conditions (Table 1). When the state anxiety scores were compared between the groups, it was found that there was no significant difference before the intervention ($P > 0.05$, F = 1.652) and there was a significant difference after the intervention ($P < 0.05$, F= 4.736). According to the Scheffe test, no significant difference was found between intervention 1 and intervention 2 groups, between intervention 2 and control groups ($P > 0.05$), and between intervention 1 and control groups ($P = 0.04$). The mean anxiety score of intervention 1 group ($\overline{x}$ = 33.00) was lower than that of the control group anxiety score ($\overline{x}$ = 39.09).

Table 1. Comparison of Mean. State Anxiety. Hopelessness. Life Satisfaction and Well-Being Scores Between Conditions Before and After Intervention (n=30)			
	I1 (n=11)	I2 (n=8)	C (n=11)	P*
Variables	$\overline{x}$ ± SD	$\overline{x}$ ± SD	$\overline{x}$ ± SD	
Score of state anxiety				
Before Intervention	40.73 ± 3.58	38.25 ± 2.25	39.82 ± 2.64	0.210
After Intervention	33.00 ± 4.67	32.88 ± 5.77	39.09 ± 5.47	**0.017**
Hopelessness Score				
Before Intervention	6.09 ± 3.18	4.75 ± 2.25	3.13 ± 2.10	0.565
After Intervention	5.64 ± 2.91	3.13 ± 2.10	3.55 ± 1.44	**0.040**
Life Satisfaction Score				
Before Intervention	24.18 ± 5.25	24.38 ± 3.70	27.73 ± 1.79	0.078
After Intervention	26.45 ± 3.11	30.13 ± 2.10	26.36 ± 3.20	**0.017**
Well-Being Score				
Before Intervention	108.68 ± 50.54	112.12 ±36.69	88.02 ± 39.35	0.408
After Intervention	104.85 ± 27.60	142.63 ± 47.12	122.08 ±39.89	0.120
*Paired Samples Test. I1 Intervention 1 group; I2 Intervention 2 group; C Control group				

When the mean scores of hopelessness were compared between the groups, there was no significant difference before the intervention ($P > 0.05$, F = 0.583), and a statistically significant difference was found after the intervention ($P < 0.05$, F = 3.634). According to the results of the Scheffe test, the mean hopelessness score after the intervention was highest in the intervention 1 group ($\overline{x}$ = 5.64) and least in the intervention 2 group ($\overline{x}$ = 3.13), but this difference was not statistically significant ($P > 0.05$).

When life satisfaction scores were compared between the groups, there was no significant difference before the intervention ($P > 0.05$, F = 2.801), and a statistically significant difference was found after the intervention ($P = 0.02$, F = 4.754). According to the results of Scheffe test, there was a significant difference between intervention 1 and intervention 2 groups and intervention 2 and control groups in terms of life satisfaction scores ($P < 0.05$), whereas there was no significant difference between intervention 1 and control groups ($P > 0.05$). The mean life satisfaction score of intervention group 1 ($\overline{x}$ = 26.45) was lower than that of intervention group 2 ($\overline{x}$ = 30.13). Intervention 2 group life satisfaction score ($\overline{x}$ = 30.13) was higher than the control group life satisfaction score ($\overline{x}$ = 26.36). The mean life satisfaction score ($\overline{x}$ = 30.13) was the highest in intervention 2 groups.

When the mean scores of well-being were compared between the groups, there was no significant difference before the intervention ($P > 0.05$), and a statistically significant difference was found after the intervention ($P = 0.02$). According to the Scheffe test, there was a significant difference between intervention 1 and intervention 2 groups and intervention 2 and control groups ($P < 0.05$), but no difference between intervention 1 and control groups ($P > 0.05$). The mean well-being score of intervention group 1 ($\overline{x}$ = 104.85) was lower than the mean of the well-being score of intervention group 2 ($\overline{x}$ = 142.63). The mean well-being score of the intervention 2 group ($\overline{x}$ = 142.63) was higher than the mean well-being score of the control group ($\overline{x}$ = 122.08). The mean score of well-being was highest in the intervention group ($\overline{x}$ = 142.63).

When trait anxiety scores were compared between the groups (Table 2), trait anxiety scores were highest in the intervention group ($\overline{x}$ = 45.00) and the lowest in the control group ($\overline{x}$ = 40.91). However, there was no significant difference between the three groups in terms of mean scores (P > 0.05).

Table 2. Comparison of Trait Anxiety Scores according to Before and After Intervention (n=30)		
	Trait Anxiety Score	**P***
Groups	$\overline{x}$ ± SD	
I1 (n=11)	44.91 ± 9.97	
I2 (n=8)	45.00 ± 5.07	0.391
C (n=11)	40.91 ± 6.36	
*One-way ANOVA. I1 Intervention 1 group; I2 Intervention 2 group; C Control group		

The mean scores of state anxiety, hopelessness, life satisfaction, and well-being were compared before and after the intervention (Table 3). There was a statistically significant difference between state anxiety, hopelessness, and life satisfaction scores before and after the intervention (P > 0.05). Findings showed that state anxiety and hopelessness scores decreased compared to pre-intervention intervention, hopelessness score decreased after the intervention ($\overline{x}$ = 4.20) compared to pre-intervention ($\overline{x}$ = 3.28), and life satisfaction score increased. The well-being score increased after the intervention ($\overline{x}$ = 122.08) compared to the pre-intervention ($\overline{x}$ = 122.08), but this increase was not statistically significant (P > 0.05).

Table 3. Comparison of Mean. State Anxiety. Hopelessness. Life Satisfaction and Well-Being Scores Before and After Intervention (n=30)		
Variables	$\overline{x}$ ± SD	**P***
Score of state anxiety		
Before Intervention	39.73 ± 3.01	**0.001**
After Intervention	35.20 ± 5.91	
Hopelessness Score		
Before Intervention	5.57 ±2.65	**0.006**
After Intervention	4.20 ±2.44	
Life Satisfaction Score		
Before Intervention	25.53 ± 4.10	**0.041**
After Intervention	27.40 ± 3.28	
Well-Being Score		
Before Intervention	102.02 ± 43.11	0.066
After Intervention	122.08 ± 39.89	
*Paired Samples Test		

DISCUSSION

Psychosocial problems are reported to be prevalent in individuals with diabetes worldwide (33). While solving these problems positively affects the management of the disease, it is known that most of the patients lack the solution resources. It is stated that only 10% of people with diabetes who have psychological problems receive adequate psychological treatment (38). It is stated that emotional well-being is associated with positive diabetes outcomes and that diabetes self-management training should include psychosocial problems (39).

In this study, when the mean scores of well-being were compared between the groups, there was no significant difference before the intervention (P > 0.05), but a significant difference was found after the intervention (P = 0.02). The difference was found between intervention 1 and intervention 2 group and intervention 2 and the control group, whereas there was no difference between intervention 1 and the control group. The mean score of well-being was found to be highest in the 2 groups ($\overline{x}$ = 142.63) in which information about diabetes, methods of coping with diabetes and breathing and relaxation exercises were performed. Bond et al. (2010) investigated the effect of six-month web-based training on the psychosocial well-being of older adults with diabetes. In the intervention group, there was a significant difference (P = 0.007) in terms of depression, social support, quality of life, and self-efficacy problems compared to the control group (38). These findings suggest that a web-based intervention is effective in improving participants' psychosocial well-being for six months. In current study, the mean well-being score increased after the training.

The deterioration of metabolic order in diabetic individuals affects the psychosocial status and causes hopelessness for the future. Negative emotions, such as hopelessness, increase the likelihood of complications associated with chronic disease (13). In this study, there was a significant decrease in hopelessness scores after the intervention (P < 0.05). Although not statistically significant, the mean score of hopelessness after the intervention was found to be the lowest in the intervention 2 groups. In a study examining the effect of psychological counseling on hopelessness, it was determined that there was a statistically significant decrease in hopelessness scores in the psychological counseling group (14). These results show that interventions for psychosocial problems are important in the care and follow-up of people with diabetes and support the findings of our study.

Diabetes is a disease that can lead to social or psychological adjustment problems, especially depression and anxiety (6). Sonmez and Kasim (2013) examined the anxiety, depression, and quality of life of 400 people with diabetes in their study (6). As a result of the study, 21.8% of the individuals had anxiety and 42.0% had depression. Depression (P = 0.001) and anxiety scores (P = 0.001) were higher in females than males. There was a significant relationship between depression and high education level, low socioeconomic level, duration of illness, accompanying hypertension, and the presence of any complications (P <0.05). Body mass index, duration of diabetes and presence of complications were associated with anxiety (P < 0.05). When the quality of life is evaluated, it was observed that the quality of life was significantly

lower in women who were overweight or hypertensive than normal (P < 0.05). In conclusion, diabetes affects individuals' depression, anxiety, and quality of life. Kucuk has reported that epinephrine secretion is stimulated in the body in case of anxiety and thus the insulin effect is reduced (13). Anxiety and depression are also associated with the duration and control of diabetes diagnosis. In a study, the relationship between duration and control of diabetes and depression and anxiety in individuals with type 2 diabetes was investigated. The study included 50 subjects (group 1) with diabetes duration <5 years, HbA1c <8%, and 52 subjects (group 2) with diabetes duration> 10 years, HbA1c ≥ 8%. In the study, depression and anxiety scores of the individuals in group 2 were found to be higher than those in the other conditions (20). In support of this finding, in current study, a statistically significant decrease was observed in the state anxiety score of the group that was only trained to deal with psychosocial problems compared to the control group. Changes in state anxiety scores in terms of training in coping with psychosocial problems and relaxation exercises were not significant. The reason for this is that the application is done once. This brief application may not be effective on state anxiety levels. Tankova et al. followed 201 people with insulin diabetes 6 months and 1 year after 5 days of training. They reported a significant decrease in well-being, depression, anxiety, quality of life, and metabolic controls after training (39). In a study, newly diagnosed type 2 diabetic patients were given training about diabetes self-management and anxiety, depression, and glucose levels were evaluated at the end of 6 months and the anxiety and depression scores of the educated group were lower than the control group. These findings supported the findings of this study.

When people with diabetes are compared with those without diabetes, they face more problems such as depression and anxiety, eating disorders, and post-traumatic stress symptoms (21). The presence of diabetes is a risk factor for the emergence of psychiatric disorders in individuals. Most individuals with newly diagnosed diabetes have self-care and psychosocial problems during the adaptation phase. It was also determined that anxiety problems were common and developed due to insufficient metabolic control. This intense anxiety can cause problems such as hopelessness and depression (40). Spielberger et al. expressed in response to an undesirable dangerous situation. On the other hand, continuous anxiety is defined as the development of long-term and severe anxiety, disproportionately, when there is a cause that can cause anxiety that is found without any objective reason (29). In this study, when the mean state anxiety scores were compared between the groups, no significant difference was found before the intervention (P > 0.05), but it was found that there was a significant difference after the intervention (P < 0.05). When the mean scores of state anxiety between the groups were compared, no significant difference was found (P > 0.05).

LIMITATION

This work is not without limitations. Although it is a power analysis, it has a relatively small sample size. It was planned to repeat the intervention performed in the research weekly. However, before starting the research, the participants stated in the preliminary interview that they cannot come every week.

CONCLUSION

In the present study, we examined the effects of coping strategies on the mental health of diabetic patients. In the literature, it was reported that optimistic coping reduced psychological problems such as anxiety and depression. Likewise, in the present study, a significant difference was found between state anxiety, hopelessness, and life satisfaction scores before and following the intervention. In conclusion, this findings determined that the state anxiety and hopelessness scores decreased and life satisfaction scores increased following an intervention in diabetic patients.

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