

The effect of depression and life quality of geriatric diabetic patients on their glycemic control levels

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ABSTRACT

Objective: This study was aimed to determine the effect of quality of life and depression on the levels of glycemic control in geriatric diabetic patients.

Methods: The sample of this analytical and descriptive study consisted of 138 geriatric diabetic patients over 65 years of age in 7 months. The sociodemographic form with 12 questions, Quality of Life Scale for Elderly People (WHOQOL-OLD) with 24 items and 4 subscales, Geriatric Depression Scale with 30 items, also patients' HbA1c, fasting plasma glucose and postprandial plasma glucose values evaluated with ADA Glycemic Control Evaluation Form. Ethics committee and institution application permissions were obtained. Verbal and written consents of the participants were obtained.

Results: 55.8% of the participants were between the ages of 65-69. The half of the patients used only oral antidiabetic drugs and 31.2% of them used insulin. 38.4% of the patients had definite depression. 53.6% of participants had poor HbA1c levels, 69.6% had high fasting blood glucose values and 52.2% had poor postprandial blood glucose levels. The average score for quality of life was 72.88 ± 9.57 , which indicates a moderate quality of life. As their quality of life increased, the mean depression score of the patients decreased. There was also a positive correlation between HbA1c, fasting plasma glucose and postprandial plasma glucose values. **Conclusion:** As the patients' quality of life increased, their depression scores significantly decreased; however, their quality of life and prior depression didn't have an influence on the levels of glycemic control.

Keywords: Depression, diabetes mellitus, geriatric patient, glycemic control level, quality of life.

1. INTRODUCTION

The world population continues to grow older rapidly. While the elderly population currently accounts for 8 or 8.5% of the world population, it is estimated that this proportion will rise to 17% in 2050, and the number of



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elderly people will reach 1.6 billion in that year. In 2015, the population aged 65 and over was 26.6% in Japan and 1% in Qatar and the United Arab Emirates. In 2015, Germany or Italy ranked first among the 25 oldest countries in the world in the ranking of European countries. In 2050, it is predicted that Bulgaria and Slovenia will be the oldest European countries (He et al., 2016; U.S. Census Bureau, 2013).

According to the data of the Turkey Statistical Institute in 2018, the proportion of people aged 65 and over in Turkey had reached 8.8%, while the number of elderly people reached about 7.2 million. It is estimated that this percentage will reach 16.3% in 2040 (TSI, 2018). Aging is a period that should be assessed as a whole and in combination with its physical, psychological and social dimensions. In the last diabetes update, the American Diabetes Association (ADA) recommended that glycemic targets should be personalized, especially in elderly patients. In addition, more flexible treatment modalities should be used in these patients instead of strict glycemic control (ADA, 2018).

Diabetes mellitus (DM) is both a physical disease and an endocrine disorder. Currently, DM prevalence is increasing due to increases in urbanization, aging, obesity and physical inactivity. In Turkey, DM prevalence was found to be 7.2% in the Turkey Diabetes Epidemiology-1 study (TURDEP-1) while the TURDEP-2 study determined this percentage to be 13.7% (Satman et al., 2002; Satman & Grup, 2011). The most important reasons for diabetes are insulin resistance. The incidence and prevalence of DM in older people gradually increases as life expectancy and insulin resistance increase. The presence of diabetes in the elderly is a risk factor for the increase of other geriatric syndromes such as polypharmacy, functional disability, depression, cognitive impairment, falls and chronic pain. In determining a treatment strategy, comorbidities that influence diabetes as a multisystemic disease require that elderly diabetic's be closely followed-up.

Old age is a period in which quality of life decreases while dependency on others and the rate of depression increases. However, the prevalence of depression in the elderly population does not differ greatly from that in the young adult population. Depression prevalence in elderly was found to be 18% in a study conducted with 1018 individuals over the age of 70 in 2005 in Turkey. In another study conducted with individuals who applied to a geriatric polyclinic, major depression was diagnosed in 30.7% of the individuals and 35% of the inpatients (Duru & Ozdemir, 2009; Sahin et al., 2012). According to the World Health Organization (WHO) it is estimated that depression will be the second leading cause of pathology in the world and its prevalence in developing countries will increase by 2020 (WHO, 2018). Depression has significant effects on physical, psychological and social functions. According to the results of many studies, the risk of dementia is higher in elderly individuals with recurrent depression (YaLie, 2018). In the 21st century, the developmental level of countries is not expressed by economic and military power but by quality of life. In 1993, the WHO Quality of Life (WHOQOL) study group defined quality of life as individuals' perceptions about their life situations in terms of the expectations they had and their cultural values (Gunaydin, 2010; Sozen, 2014).

In diabetic patients, quality of life is accepted as indicating the well-being of patients. Therefore, the idea of the QOL of diabetic patients has gained importance in recent years. Quality of life is a concept that covers a wide area and is influenced by many factors in complex ways. It is affected by physical health, psychological state, personal beliefs, social relations and the interest an individual shows in various events. Old age is one of the situations in which QOL decreases. In this period, individual negative characteristics, functional impairment, a decrease in both the activities of daily life and getting around, anxiety due to problems of mobility and vision, sleep problems, and other conditions and situations causing disability lead to a decrease in the quality of life. The increase in the frequency of chronic degenerative diseases in elderly individuals is considered an important factor in accelerating this process. In old age, hearing loss, osteoarthritis, vision problems, Alzheimer's disease and other types of dementia, and conditions such as ischemic heart disease, severely affect the QOL of individuals (Sozen, 2014; Boggatz, 2016). As in all chronic diseases, DM affects the QOL and decreases individuals' satisfaction with life; their social and physical functioning is adversely affected. The holistic treatment of diabetic patients requires physical treatment as well as the diagnosis and treatment of the mental and psychosocial symptoms accompanying the disease (Altunoglu et al., 2012).

Aim of the study

In diabetic patients it is not always possible to provide glycemic control with drug therapy. According to studies conducted in Turkey and around the world, glycemic control is not achieved in most diabetic patients, despite drug therapy (Avci & Selcuk, 2016; Satman et al., 2013). It has thus been reported that depression in diabetic patients may be associated with glycemic control; depressive symptoms are more common in patients with poor glycemic control (Avci & Selcuk, 2016; Shah et al., 2015; Singh et al., 2014). In diabetic patients, depression prevents glycemic control by allowing them to develop a resistance to insulin and affects patients' compliance with treatment (Avci & Selcuk, 2016; Singh et al., 2014). Although depression is common in patients with poor glycemic control and adversely affects the QOL of people with diabetes, it is one of the most frequently neglected health problems

(WHO, 2018; WHO, 2011). When all these factors are considered, it is important to diagnose the effects of depression and QOL on the glyceimic control levels of diabetic patients and to provide appropriate treatment and care.

The aim of the study was thus to determine the effect of depression and QOL on the levels of glyceimic control in geriatric diabetic patients. It was thought that this would be useful in planning and implementing nursing interventions to improve both patients' compliance to the treatment and their QOL. This study will contribute to the literature with regard to the situation in Turkey. The evaluation of psychological factors in the treatment of diabetic patients will help us understand obstacles in glyceimic control and to better deliver treatment.

2. MATERIALS AND METHODS

This study was planned as a prospective, analytical and descriptive study. It was conducted with the geriatric diabetic patients over 65 years of age who had been admitted to the endocrinology outpatient clinic of a training research hospital between August 2018 – February 2019. The sampling selection method was not used. The sample consisted of 138 elderly patients who applied between the specified dates and agreed to participate in the study. Patients with Alzheimer's, dementia, speech and hearing problems were excluded. The data were collected by the face-to-face interview method using the sociodemographic form, Quality of Life Scale for Elderly People (WHOQOL-OLD), Geriatric Depression Scale (GDS) and Glyceimic Control Evaluation Form. Ethics committee approval (Date: 21.03.2018 / No: 125), institutional application approval and the participants' written consent were obtained.

Sociodemographic Form has 12 questions from literature about diabetic patients' sociodemographic characteristics such as gender, age, marital status, education status, drug use, etc. (Satman et al., 2002; Satman & Grup, 2011; Duru & Ozdemir, 2009; Sahin et al., 2012; WHO, 2018; YaLie, 2018; Boggatz, 2016; Altunoglu et al., 2012; Avci & Selcuk, 2016; Satman et al., 2013; Shah et al., 2015; Singh et al., 2014).

The WHOQOL-OLD was tested on convenience samples of older people across cultures. This scale is a measure of QoL and has six subscales (24 items): sensory abilities, autonomy, past present and future activities, social participation, death and dying, and intimacy (4 items per subscale). The scores that can be obtained from the scale range between 24-120 and the higher the score, the higher the life quality. Response scales are all 5-point but vary in their wording ("Not at all" to "An extreme amount"/"Completely"/"Extremely," "Very poor" to "Very good;" "Very dissatisfied" to "Very satisfied;" "Very unhappy to Very happy") (Power et al., 2005; Bowling, 2009).

The 30-item Geriatric Depression Scale was designed for rating depression in the geriatric population (Yesavage et al., 1983). The patient marks each item as "Yes" and "No". 10 of the 30 items were designed as negative and 20 of them as positive. It questions a time period of "last week". There was no depression between 0-9 points, mild depression between 10-19 points and severe depression between 20-30 points. The Turkish adaptation of the scale was evaluated by Ertan et al., (1997).

Glyceimic Control Evaluation Form has been prepared according to ADA 2018 guideline and is a form in which HbA1c, fasting plasma glucose and postprandial plasma glucose values are recorded (ADA, 2018):

<u>Glyceimic Controls Parameters</u>	<u>ADA 2018 Values</u>
HbA1c Levels	7% and below (Normal)
	7% above (Bad)
FPG Levels	80 mg/dl below (Low)
	80-130 mg/dl (Normal)
	130 mg/dl above (High)
PPG Levels	180 mg/dl below (Normal)
	180 mg/dl and above (Bad)

The SPSS 25 statistical package program was used to analyze the data. Mean ± standard deviation and median (maximum-minimum), percentage and frequency values were used. The variables were analyzed after checking the preconditions for normality and the homogeneity of variances (Shapiro-Wilk and Levene Tests). In the analysis of the data, the Student t test was used for the comparison of the two groups while the Mann Whitney-U test was used when they did not fulfill the preconditions. For the comparison of three or more groups, One-way Variance Analysis was used, while the Kruskal Wallis and Bonferroni-Dunn tests were used when this was not fulfilled with the Tukey HSD test. The relationship between the two continuous variables was analyzed with Pearson's Correlation Coefficient while it was analyzed with Spearman's Correlation Coefficient when it did not meet the preconditions for the parametric test. Fisher's Exact Test and Chi-Square Test were used for the categorical data. In

situations in which the expected frequencies were lower than 20%, they were analyzed with the Monte Carlo Simulation Method for these frequencies. $p < 0.05$ and $p < 0.01$ were accepted as statistically significant.

3. RESULTS

60.1% of the patients in the study were women, 55.8% of them were between the ages of 65-69, 88.4% of them were married and 53.6% of them were primary or secondary school graduates. 89.1% of the patients stated that they took their drugs regularly. 50% of the patients used only oral antidiabetic drugs while 31.2% of them used insulin (Table 1). 38.4% of the patients had depression; a further 29.0% of them probably had depression. When the glycemic control levels of the patients were examined, 53.6% of them were found to have poor HbA1c levels and the mean HbA1c level was 7.35 ± 1.73 . 69.6% of them had high fasting plasma glucose levels and their mean fasting plasma glucose level was 174.22 ± 69.04 . Their mean quality of life score was above the average at 72.88 ± 9.57 (Table 1).

Table 1 Distribution of Sociodemographic Characteristics of Patients (n=138)

Sociodemographic Characteristics		n	%
Gender	Male	55	39.9
	Female	83	60.1
Age	65-69 Age	77	55.8
	70-74 Age	45	32.6
	75-79 Age	11	8.0
	80 Age and Older	5	3.6
Marital Status	Single	2	1.4
	Married	122	88.4
	Divorced / Separate	14	10.1
Education Status	Not literate	9	6.5
	Primary or Secondary School	74	53.6
	High school	52	37.7
	University and above	3	2.2
Drug Use Status	Regularly	123	89.1
	Sometimes	12	8.7
	No medication	3	2.2
Treatment Methods of DM	Oral Antidiabetic Drugs (OAD)	69	50.0
	Insulin	43	31.2
	OAD + Insulin	24	17.4
	Exercise + Nutrition	2	1.4
Depression Status	No Depression	45	32.6
	Possible Depression	40	29.0
	Definite Depression	53	38.4
HbA1c	Normal	64	46.4
	Bad	74	53.6
	The mean HbA1c Level	7.35 ± 1.73	
Fasting Plasma Glucose (FPG)	Low	1	0.7
	Normal	41	29.7
	High	96	69.6
	The mean FPG Level	174.22 ± 69.04	
Postprandial Plasma Glucose (PPG)	Normal	66	47.8
	Bad	72	52.2
	The mean PPG Level	175.22 ± 155.05	
The Mean Quality of Life Score		72.88 ± 9.57	

There was no significant relationship between gender, age, marital and educational status, depression, QOL, and glycemic control levels ($p>0.05$). However, there was a significant relationship between drug use and HbA1c, and also DM treatment methods and HbA1c, FPG and PPG levels ($p<0.05$) (Table 2).

Table 2 Comparison of HbA1c, FPG, PPG and Demographic Characteristics

		HbA1c		P	FPG			P	PPG		Total	p		
		Normal	Bad		Low	Normal	High		Normal	Bad				
Gender	Male	n	23	32	0.391	1	14	40	0.329	24	31	55	0.488	
		%	41.8	58.2		1.8	25.5	72.7		43.6	56.4	100.0		
	Female	n	41	42		0	27	56		42	41	83		
		%	49.4	50.6		0.0	32.5	67.5		50.6	49.4	100.0		
Age	65-69 age	n	34	43	0.103	0	19	58	0.198	37	40	77	0.83	
		%	44.2	55.8		0.0	24.7	75.3		48.1	51.9	100.0		
	70-74 age	n	23	22		1	19	25		22	23	45		
		%	51.1	48.9		2.2	42.2	55.6		48.9	51.1	100.0		
	75-79 age	n	7	4		0	2	9		4	7	11		
		%	63.6	36.4		0.0	18.2	81.8		36.4	63.6	100.0		
	80 age and older	n	0	5		0	1	4		3	2	5		
		%	0.0	100.0		0.0	20.0	80.0		60.0	40.0	100.0		
Marital Status	Single	n	0	2	0.053	0	1	1	0.91	1	1	2	0.89	
		%	0.0	100.0		0.0	50.0	50.0		50.0	50.0	100.0		
	Married	n	54	68		1	35	86		59	63	122		
		%	44.3	55.7		0.8	28.7	70.5		48.4	51.6	100.0		
	Divorced	n	10	4		0	5	9		6	8	14		
		%	71.4	28.6		0.0	35.7	64.3		42.9	57.1	100.0		
Education Status	Not literate	n	5	4	0.386	0	4	5	0.659	4	5	9	0.534	
		%	55.6	44.4		0.0	44.4	55.6		44.4	55.6	100.0		
	Primary or Secondary School	n	33	41		1	21	52		39	35	74		
		%	44.6	55.4		1.4	28.4	70.3		52.7	47.3	100.0		
	High school	n	26	26		0	16	36		21	31	52		
		%	50.0	50.0		0.0	30.8	69.2		40.4	59.6	100.0		
	University and above	n	0	3		0	0	3		2	1	3		
		%	0.0	100.0		0.0	0.0	100.0		66.7	33.3	100.0		
Drug Use Status	Regularly	n	61	62	0.011*	1	40	82	0.16	58	65	123	0.668	
		%	49.6	50.4		0.8	32.5	66.7		47.2	52.8	100.0		
	Sometimes	n	1	11		0	0	12		7	5	12		
		%	8.3	91.7		0.0	0.0	100.0		58.3	41.7	100.0		
	No medication	n	2	1		0	1	2		1	2	3		
		%	66.7	33.3		0.0	33.3	66.7		33.3	66.7	100.0		
DM Treatment Methods	OAD	n	38	31	0.027*	0	27	42	0.023*	39	30	69	0.033*	
		%	55.1	44.9		0.0	39.1	60.9		56.5	43.5	100.0		
	Insulin	n	18	25		1	8	34		18	25	43		
		%	41.9	58.1		2.3	18.6	79.1		41.9	58.1	100.0		
	OAD+Ins	n	6	18		0	4	20		7	17	24		
		%	25.0	75.0		0.0	16.7	83.3		29.2	70.8	100.0		
	Exercise + Nutrition	n	2	0		0	2	0		2	0	2		
		%	100.0	0.0		0.0	100.0	0.0		100.0	0.0	100.0		
	Total	n	64	74		1	41	96		66	72	138		138
		%	46.4	53.6		0.7	29.7	69.6		47.8	52.2	100.0		100.0

* $p<0.05$

When their mean depression scores were compared with some diseases associated with diabetes, the geriatric diabetic patients with hypertension and other diseases (endocrine, neurological, urological and musculoskeletal disorders) were found to probably be depressed. It was found that the geriatric diabetics with cardiovascular diseases and cancer were definitely depressed. A statistically significant difference was found between the depression status of the geriatric diabetics in terms of comorbidities ($p<0.05$) (Table 3).

Table 3 Comparison of Some Diseases with QOL, Depression Score and Glucose Levels

Some Diseases Factors	Hypertension (n=82)	CVD (n=6)	Cancer (n=4)	Others ⁺ (n=46)	P
Total QOL Score	72.9±9.84	72.5±6.22	67.25±13.35	73.39±9.22	0.68
Depression Score	12.79±4.22 ^a	17.17±10.57 ^b	17.75±8.18 ^b	12.11±4.39 ^a	0.02*
HbA1c	7.25±1.69	7.97±1.28	7.4±1.07	7.44±1.91	0.77
FPG	162.85±62.43 ^a	241.33±107.4 ^b	184±55.18 ^c	184.89±71.09 ^c	0.03*
PPG	182.74±156.29	201.17±226.2	108.75±125.59	164.2±147.57	0.73

+ Others: Endocrinological, urological, neurological, musculoskeletal disorders

*p<0.05

The mean FPG level of the geriatric diabetics was higher than the normal level (according to ADA 2018, more than 130 mg/dl). There was a statistically significant difference between the mean FPG levels in terms of the comorbidities found in the geriatric diabetic patients. When the drug usage of the patients was examined, it was found that there were significant differences between mean HbA1c and FPG levels of the patients who took their drugs regularly and the patients who never took drugs (p<0.05) (Table 4). When the treatment method for diabetes was assessed (OAD, insulin, OAD+insulin, exercise+nutrition), it was determined that the mean FPG level was different according to the treatment method used for DM (p<0.05).

Table 4 Comparison of Drug Use Status with QOL, Depression Score and Glucose Levels

Drug Use Status Factors	Regularly (n=123)	Sometimes (n=12)	No medication (n=3)	P
Sensory Abilities	11.76±2.33	11.75±1.22	14.33±1.53	0.15
Autonomy	11.88±2.68	12.08±2.15	11.33±0.58	0.9
Past-Present-Future Activities	12.38±2.33	11.33±2.9	14±2.65	0.17
Social Participation	12.54±2.73	11.33±2.5	15.33±1.53	0.06
Intimacy	13.09±2.69	11.92±2.27	13.67±2.52	0.32
Death And Dying	11.37±3.23	11.42±3.63	10.67±3.51	0.93
Total QOL Score	73.02±9.65	69.83±8.71	79.33±7.23	0.27
Depression Scores	12.79±4.85	13.92±5.88	13.33±4.51	0.74
HbA1c	7.17±1.6 ^a	9.39±1.97 ^b	6.6±0.62 ^a	0.001**
FPG	167.53±65.87 ^a	247.33±67.8 ^b	156.33±35.92 ^c	0.001**

*p<0.05

It was found that there was a significant relationship between the mean scores of the patients for the whole QOL scale and its subscales – past present future activities, social participation, intimacy – and their mean depression score on the Geriatric Depression Scale. As their subscales of lifequality increased, the mean depression score of the patients decreased ($r_{\text{past}} = -, 182$; $r_{\text{social}} = -, 275$; $r_{\text{intimacy}} = -, 300$; $r_{\text{QOL}} = -, 178$; $p < 0.05$). There was also a positive correlation between HbA1c, FPG and PPG values ($r = 523$; $r = 316$; $r = 353$; $p = 0.000$) (Table 5).

Table 5 Comparison of Drug Use Status with QOL, Depression Score and Glucose Levels

	Sensory Abilities	Autonomy	Past-Present-Future Activities	Social Participation	Intimacy	Death and Dying	Total QOL Score	Depression Scores	HbA1c	FPG	PPG
Sensory Abilities	r .327**										
	p 0.000										
	n 138										
Past-Present-Future	r .381**	.303**									
	p 0.000	0.000									

Activities	n	138	138								
Social Participation	r	.365**	0.083	.641**							
	p	0.000	0.333	0.000							
	n	138	138	138							
Intimacy	r	.209*	-0.011	.453**	.567**						
	p	0.014	0.902	0.000	0.000						
	n	138	138	138	138						
Death And Dying	r	.217*	.361**	0.042	-0.061	-0.134					
	p	0.011	0.000	0.626	0.480	0.116					
	n	138	138	138	138	138					
Total QOL Score	r	.657**	.569**	.747**	.692**	.554**	.445**				
	p	0.000	0.000	0.000	0.000	0.000	0.000				
	n	138	138	138	138	138	138				
Depression Scores	r	0.015	-0.103	-.182*	-.275**	-.300**	0.159	-.178*			
	p	0.863	0.229	0.033	0.001	0.000	0.063	0.037			
	n	138	138	138	138	138	138	138			
HbA1c	r	-0.106	0.091	-0.071	-0.159	-0.036	0.137	-0.027	0.062		
	p	0.217	0.289	0.410	0.063	0.673	0.110	0.753	0.469		
	n	138	138	138	138	138	138	138	138		
FPG	r	-0.077	-0.086	-0.020	0.002	-0.056	-0.032	-0.072	0.035	.523**	
	p	0.369	0.318	0.815	0.984	0.511	0.713	0.398	0.684	0.000	
	n	138	138	138	138	138	138	138	138	138	
PPG	r	-0.094	-0.098	-0.043	-0.079	0.025	-0.167	-0.132	0.067	.316**	.353**
	p	0.275	0.251	0.616	0.359	0.772	0.051	0.123	0.433	0.000	0.000
	n	138	138	138	138	138	138	138	138	138	138

*p<0.05

**p<0.01

4. DISCUSSION

Diabetes is increasingly prevalent as people age, and is one of the most common causes of morbidity and mortality in old people. The mortality of elderly individuals with diabetes is associated with indicators of glycemic control, such as long-term plasma glucose and HbA1C. Diabetic patients over the age of 65 years constitute 40% of all diabetics. 20% of individuals in the geriatric age group have impaired glucose tolerance. It is also known that 10% of elderly individuals have undiagnosed diabetes (Meneilly, 2006). In a study conducted by Avci and Selcuk, it was found that 61.6% of the patients were over 65 years old and 55.2% of them were female. The prevalence of diabetes is higher in women than in men in developing societies (Avci & Selcuk, 2016). The results of our study are in parallel with the findings in the literature.

Diabetes is a physical disease but also has psychological and psychosocial dimensions. Hyperglycemia can have an impact on psychiatric disorders by affecting brain functions. It can cause psychiatric symptoms as a result of the patient's perception of the disease and its effect on their life. The coexistence of diabetes and depression is a serious and chronic condition. Depressive symptoms tend to recur; moreover, depression may recur over a five-year period in 80% of cases. The depression etiology of diabetic patients is not clear. The prevalence of major depression in DM patients is 52% higher than in nondiabetic patients (Naranjo et al., 2011). In a study by Kovacs et al., (1997) 47.6% of diabetic patients had psychiatric disorders at ten-year follow-up period. The highest number of cases of major depression was found and more frequently observed in the first year of the disease. In the study of Guven (2007), metabolic values were compared with major depression and depressive symptoms. When control of the diabetes declined, it was observed that major depression and depressive symptoms increased and this condition was statistically significant (Guyen, 2007). The presence of depression negatively affected the control of plasma glucose level and the treatment compliance of the patients.

Insulin resistance has been reported in diabetic patients with depression. The study results conducted by Ozdemir et al., (2011) on the life quality and the mental symptoms of the patients with DM also support our results. As a result of this study, between depression and life quality was found a negative correlation. Gokdogan and Cicek (2013) found that the rate of hospitalization in the previous year of elderly diabetic patients who were at risk of developing depression was approximately twice as high (22.2%).

Eren & Erdi, (2004) found that QOL levels were low while the anxiety and depression levels were high in patients with diabetes-induced complications. Altunoglu et al., (2012) found that anxiety and disability significantly increased as the rate of diabetes-related complications increased. Tellez-Zenteno and Cardiel (2002) found that 33% of DM patients were depressive. According to our results, 38.4% of patients experienced depression and 29% of them were likely to have depression.

The mean HbA1c value, which is considered as the most reliable measure of metabolic control in diabetic patients, was calculated to be 7.35 ± 1.73 . In the study of Badur (2009), the mean HbA1c value of Turkish geriatric patients was 7.15 ± 1.54 , while the HbA1c value of Turkish geriatric patients was found to be 7.05 ± 1.4 in the study of Arisoy (2013). In a study which was conducted with diabetic patients, the scores on all subscales of the QOL scale decreased in parallel with increasing HbA1c values when the HbA1c and life quality levels were compared. This finding was statistically significant (Güven, 2007).

Glycemic control is the crux for preventing diabetes' complications, improving patients' quality of life and reducing health expenses. In this study, between the mean QOL score of the patients and their mean depression score was a significant negative correlation. It was also determined that between HbA1c, fasting plasma glucose and postprandial plasma glucose values had a positive correlation (Katon, 2008). Our results were similar in the literature.

Diabetic individuals are faced with a number of problems in terms of the physical, social and spiritual aspects of the disease, and also experience stress and anxiety. Anxiety, depression and stress in particular have a negative impact on diabetes' control and aggravate diabetes. Our findings and the literature have shown that diabetic patients should be psychologically assessed and supported during their disease-specific medical treatment. We consider that psychiatric support of groups at risk will contribute to the metabolic control of the patients as well as improving their life quality and reducing disability.

5. CONCLUSION

In conclusion, DM is a metabolic disease and negatively affects the quality and duration of life of older individuals. It has been reported that psychiatric disorders, such as anxiety or depression, are more common in diabetic patients than in the general population. Similarly, the prevalence of depression gradually increases in old age, which is a period in which the quality of life decreases. It was found that the majority of patients in this study had poor glycemic control levels; the patients were definitely or possibly depressive while their quality of life was moderate. Increasing the QOL of the patients also improved their depression. However, it was concluded that the QOL and depression levels did not have any effect on glycemic control parameters. Although no effect was detected, close monitoring of glycemic parameters in geriatric diabetic patients is important in terms of preventing disease complications.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed Consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

The study was approved by the Medical Ethics Committee of Izmir Katip Celebi University (ethical approval code: 125).

Oral Presentation

1st International Congress on Internal Diseases Nursing for the oral presentation.

Data availability

All data associated with this study are present in the paper.

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