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Exploration of Quality of Life of Diabetic Patients in State Retirement Homes in Turkey

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Abstract

Aims: We investigated diabetes mellitus among the elderly living in state retirement homes and determined their quality of life.

Methods: Our study was conducted on 134 volunteers out of 188 diagnosed with diabetes mellitus who met the inclusion criteria and lived in state retirement homes in Ankara, between February 2013 and April 2013. A survey of sociodemographic characteristics was performed. Examination results were recorded. The EuroQol 5D, a visual analogue scale, and the Audit of Diabetes Dependent Quality of Life scale were performed to assess the overall quality of life. Lastly, all volunteers underwent full physical examination.

Results: The average age was 79.37 ± 7.70 years. A statistically significant difference was observed between males and females between quality of life assessment groups (if they did not have diabetes) in Audit of Diabetes Dependent Quality of Life scores ($p < 0.001$). A statistically significant difference was observed in EuroQol 5D and Audit of Diabetes Dependent Quality of Life scores in the types of drug used ($p = 0.030$, $p < 0.001$ respectively).

Conclusions: We suggest that health professionals, especially primary healthcare professionals, should conduct regular health examinations and perform more regular follow-up of patients residing in retirement homes.

Keywords: Diabetes mellitus; Follow-up quality; Older people; Preventive medicine; Retirement homes

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia as a result of defects in insulin secretion. Continuous training and medical care is needed to prevent acute and chronic complications [1,2]. The prevalence of diabetes is estimated to increase incrementally worlwide between the years 2000 and 2030, particularly in subjects 65 years of age and older [3,4]. The prevalence of diabetes in males over 70 years of age is approximately 18% and in females over 70 years approximately 22% according to data from The Turkish Diabetes Epidemiology Study (TURDEP) [5].

In retirement homes, diabetic residents often clinically present with comorbid diseases such as hypertension, depression and cardiovascular diseases (CVDs). Physical changes—such as decreased physical activity, abdominal obesity and increased inflammatory status—influence the onset of diabetes [6].Adequate control and follow-up of DM is necessary to decrease mortality associated with DM.

Quality of life encompasses emotional, social and physical wellness and maintenance of daily functions. Objective and subjective assessments of the health and the physical, financial, familial and emotional status of a person are performed using this concept[7]. Applying a health-related quality-of-life scale to the elderly is appropriate as they exhibit a high rate of chronic diseases, which can affect their quality of life [8]. Numerous investigations demonstrated that follow-up and quality of life of diabetic patients is poor, and that their quality of life is associated with DM duration, age, female gender, diabetes complications, and comorbid diseases[9,10].

The quality of life in elderly diabetic patients is often poor and several studies have examined the associated factors [11,12]; however, no studies of the follow-up of diabetic patients to improve their quality of life have been performed in Turkey, especially in retirement homes.

In this study we evaluated the quality of life in the elderly with DM living in state retirement homes in Ankara.

Materials and Methods

Our study included elderly subjects living in state retirement homes in Ankara between February 2013 and April 2013 who volunteered to participate. Of 862 such subjects, 214 (24.8%) were diagnosed with DM.

Individuals (n = 26) with DM who refused to participate in the study, who could not be contacted, who were hospitalized during the study, who were permitted to be outside of the retirement home and whose examination results were missing when files were reviewed, were excluded from the study. The study was conducted with 188 volunteers (87.8% response rate) who met the inclusion criteria.

The study consisted of four parts. First, questions regarding sociodemographic characteristics were asked by the investigator. The survey questions included duration of DM, drugs used, frequency of DM control, suitability for medical nutrition, habits, smoking status, comorbid diseases, and physical complaints. Second, patient examination results were recorded using the medical records. Third, the EuroQol 5D (EQ-5D) scale, a visual analogue scale (VAS) and the Audit of Diabetes Dependent Quality of Life (ADDQoL) 19 scale, which was developed specifically for diabetes, were used for the assessment of overall quality of life. Lastly, a full physical examination was performed and the results were recorded.

Standards of the National Committee for Quality Assurance (NCQA) developed for promoting quality in health care were used to evaluate the follow-up quality of diabetic patients. NCQA is used in evidence-based surveys for certification by physicians and clinics providing outpatient follow-up service. The Performance criteria and scoring (Diabetes Recognition Program (DRP) Adult Measures-Performance Criteria and Scoring) 2009 [13] table was used for adult diabetics. Points were calculated according to glycated hemoglobin (HgbA1c), blood pressure, and low density lipoprotein (LDL) levels, foot and eye examination, effort to quit smoking, and detection of nephropathy. These criteria were assessed on a 100-point scale; a score of 75 points or higher was considered adequate. HbA1c and arterial tension values were grouped similarly for concordance with the table.

EQ-5D overall quality of life scale

The EQ-5D was developed by the Western Europe Life Quality Research Community EuroQ1 group in 1987 to define and evaluate overall health outcomes and is a standardized generic scale. The scale was first published in 1990 and has maintained the same features (5 dimensions) since 1991. The scale includes two parts The EQ-5D index scale consists of five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Responses to each dimension had three options: no problem, slight problem and major problem. As a result, 243 different health outcomes are defined using the scale. An index score between -0.59 and 1 is calculated from the five dimensions of the scale, with a value of 0 representing death and 1 representing perfect health in score functions, and negative values representing states of unconciousness, confinement to bed, etc [14] .

EQ-5D VAS

The EQ-5D VAS consists of a survey in which health states are scored on a visual analogue scale ranging from 0 (worst estimated health status) to 100 (best estimated health status) [14].

ADDQoL scale

The ADDQoL was developed in the early 1990s to measure the effect of diabetes on the quality of life of Type 1 and 2 DM patients. The scale has been translated into several languages, including Turkish [15], and consists of 19 items: spare time activities, employment status, local or long-distance travel, holidays, physical capabilities, family relations, friendships and social life, sex life, external appearance, self-confidence, motivation, reactions of other people, feelings about the future, financial status, life conditions, dependence on others, and eating and drinking habits.

ADDQoL starts with two questions assessing quality of life based on the presence or absence of DM. The assessment of these two questions is performed separately from the other questions. A +3 score in the first question is defined as perfect, 0 as neutral, and -3 as unwell. A -3 score in the second question is defined as much better, 0 same, and +1 worse. Other questions were regarding the perceived quality of life in the areas of concern if the patient did not have DM.

Each subject was questioned regarding the importance level of each item in the survey; a -3 score indicated a greater effect and +1 lesser effect. Importance was scored as 0 not important and +3 very important. This value varies between -9 (the most negative effect of DM) and +3 (the most positive effect of DM).

While calculating weighted average effect, points obtained from multiplications were summed for each case and divided by the total number of items. This value also varies between -9 (the most negative effect of DM) and +3 (the most positive effect of DM). These items were used to determine to what extent DM affects the quality of life of an individual [16].

Necessary authorizations from the Ministry of Family and Social Policies and Ethics Committee approval from Ankara Numune Training and Research Hospital were obtained.

Statistical Analysis

The obtained data in this study were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 software. The relationships between categorical variables were analyzed using the Chi-square test, and those between proportional variables using correlation analysis. The Mann-Whitney U-test was used in two-group comparisons and Kruskall-Wallis H test with Bonferroni adjustment was used in comparisons of three or more groups. A p-value < 0.05 was considered to indicate statistical significance.

Results

Our study was conducted with 188 volunteers who met the study inclusion criteria and resided in five state retirement homes in Ankara city center. The information from medical records were reviewed for all 188 patients. The average age was 80.6±7.6 years. The distribution of the sociodemographic characteristics of subjects is presented in Table 1.

Median EQ-5D value of the patients is 0.65 [IQR:0.28, min:-0.16, max:1.0], median VAS score is 54.5 [IQR:25, min:0, max:100], and ADDQoL questionnaires -0.90 [IQR:1.54, min:-6.06, max:0].

It has been detected that median EQ-5D score in males is higher than females (0.725 vs 0.639, p=0.010).

Median EQ-5D score was also higher in university graduates compare to other education levels, also, median EQ-5D score and VAS score was lower in illiterate subjects than the other education levels.

Median EQ-5D and ADDQoL scores have been determined high in patients with DM for 10 years and below compare to patients with DM for 11-20 years and more than 20 years.

Median EQ-5D and ADDQoL scores were higher in patients who are treated by only diet therapy compare to other patients treated by different treatments.

Other demographic findings wise, median EQ-5D score and VAS score have not been demonstrated any discrepancy. In 60-69 age group, ADDQoL score has been detected lower compare to other age groups (Table 1).

Variables	Values	EUROQol 5D skoru	p	VAS skoru	p	ADDQol skoru	p
Sex							
Male	76 (40.4)	0.725 [0.587-0.805]	0.010*	53.5 [50.0-72.5]	0.396	-0.93 [(-1.83)-(-0.31)]	0.942
Female	112 (59.6)	0.639 [0.516-0.725]		55.5 [41.0-70.0]		-0.88 [(-1.88)-(-0.34)]	
Age	80.6 ± 7.6						
60-69	23 (12.2)	0.710 [0.525-0.796]	0.830	50.0 [46-70]	0.949	-2.00 [(-2.87)-(-0.6)]	0.050*
70-79	53 (28.2)	0.710 [0.516-0.796]		58.0 [50-65]		-0.81 [(-1.44)-(-0.38)]	
80 and more	112 (59.6)	0.639 [0.516-0.796]		55.5 [42-74]		-0.87 [(-1.79)-(-0.26)]	
Education							
Illiterate	41 (21.8)	0.516 [0.002-0.630]	<0.001*	49.0 [40-58.5]	<0.001*	-1.035 [(-1.9)-(-0.53)]	0.852
Literate	24 (12.8)	0.718 [0.578-0.726]		58.5 [50-71.5]		-0.86 [(-1.50)-(-0.23)]	
Primary school	43 (22.9)	0.683 [0.587-0.848]		50 [45-75]		-0.94 [(-1.71)-(-0.38)]	
Junior High School	17 (9)	0.710 [0.525-0.796]		70 [60-80]		-1.07 [(-2.53)-(-0.33)]	
High school	35 (18.6)	0.656 [0.516-0.796]		50 [40-70]		-1.13 [(-1.94)-(-0.33)]	
University	28 (14.9)	0.753 [0.656-0.848]		59 [48-78]		-0.58 [(-2.43)-(-0.13)]	
Body Mass Index	27.9±5.6						
Underweight (<18.5)	4 (2.1)	0.377 [-0.043-0.796]	0.430	64.5 [35-94]	0.536	-2.77 [(-5.20)-(-0.33)]	0.088
Normal (18.5 – 24.9)	55 (29.3)	0.656 [0.516-0.805]		60 [42-73.5]		-0.41 [(-1.33)-(-0.13)]	
Overweight (25.0 – 29.9)	71 (37.8)	0.725 [0.556-0.796]		52.5 [48-73.5]		-1.00 [(-1.84)-(-0.38)]	
Obese (30.0 – 39.9)	55 (29.3)	0.639 [0.516-0.725]		50 [45-60]		-1.10 [(-1.93)-(-0.53)]	
Morbid obese (?40.0)	3 (1.6)	0.514 [0.028-1.000]		72.5 [60-85]		-1.12 [(-1.87)-(-0.36)]	
Length of Stay in Nursing Home	35 (2-286)						
1 year and below	36 (19.1)	0.7175 [0.516-0.796]	0.905	51 [44-70]	0.799	-0.93 [(-1.80)-(-0.50)]	0.922
1-5 years	102 (54.3)	0.656 [0.516-0.796]		54.5 [45-72]		-1.00 [(-1.87)-(-0.27)]	
5-10 years	31 (16.5)	0.71 [0.516-0.796]		60 [45-78]		-0.58 [(-1.88)-(-0.34)]	
10 years and above	19 (10.1)	0.639 [0.516-0.725]		50 [43-62.5]		-0.87 [(-1.92)-(-0.20)]	
Duration of DM	10 (0.5-60)						
10 years and below	76 (53.5)	0.725 [0.587-0.848]	0.012*	57 [50-78]	0.122	-0.53 [(-1.50)-(-0.27)]	0.001*
11 - 20 years	37 (26.1)	0.587 [0.516-0.725]		50 [43-70]		-1.50 [(-2.53)-(-0.94)]	
21 years and above	29 (20.4)	0.656 [0.516-0.725]		57.5 [40-70]		-1.06 [(-1.88)-(-0.43)]	
Type of DM							
Type 1	2 (1.1)	0.356 [0.002-0.71]	0.405	51 [32-70]	0.679	-3.72 [(-5.69)-(-1.75)]	0.090
Type 2	183 (98.9)	0.656 [0.516-0.796]		54.5 [45-70]		-0.88 [(-1.87)-(-0.33)]	
Treatments							
Diet	18 (9.7)	0.814 [0.623-1.000]	0.030*	60 [45-80]	0.156	-0.13 [(-0.31)-(0.00)]	<0.001*
Oral Antidiabetics (OAD)	111 (60)	0.683 [0.516-0.796]		57 [50-73]		-0.65 [(-1.40)-(-0.31)]	

Insulin	33 (17.8)	0.639 [0.196-0.725]		48 [32-70]		-2.00 [(-3.56)-(-1.13)]	
OADs and Insulin	23 (12.4)	0.6475 [0.516-0.71]		55[40-65]		-1.59 [(-2.53)-(-1.13)]	
DM training							
Yes	46 (24.5)	0.725 [0.587-0.779]	0.262	56 [38-75]	0.544	-0.94 [(-1.87)-(-0.33)]	0.816
No	142 (75.5)	0.656 [0.516-0.796]		53 [48-70]		-0.88 [(-1.88)-(-0.33)]	

Table 1: Distribution by demographic variables

The distribution of comorbidities is presented in Table 2. Median EQ-5D score was lower in patients who had cerebrovascular events (CVE) compared to those who did not. Median VAS score was lower in patients with hypertension than those who do not suffer from hypertension. Median EQ-5D score was higher in osteoarthritis patients than those who are not. Median EQ-5D score was lower in Parkinson patients than non-parkinsons and this result was statistically at the edge of significance. Patients with B12 deficiency demonstrated lower median EQ-5D score than those who do not have B12 deficiency. Dyspepsy patients showed lower median EQ-5D score and median VAS score compare to non-dyspeptics. Median EQ-5D score was lower in patients with iron deficiency anemia than those who do not have iron deficiency anemia. Median EQ-5D score was significantly lower in somnipathy patients than non-somnipathics. Cataract patients demonstrated higher ADDQoL score compare to non-cataract patients and dialysed patients showed lower ADDQoL score than non-dialysed patients. Other comorbidities wise, EQ-5D score, VAS score and ADDQoL score haven't shown a significant difference (Table 2).

Variables	**Values**	**EUROQol 5D skoru**	**p**	**VAS skoru**	**p**	**ADDQol skoru**
CVE (cerebrovascular event)						
Yes	38 (20.2)	0.552 [0.028-0.710]	0.004*	52.0 [40.5-65]	0.406	-1.17 [(-1.97)-(-0.20)]
No	150 (79.8)	0.710 [0.552-0.796]		55.5 [46-72]		-0.88 [(-1.8)-(-0.33)]
CAD (Coronary artery disease)						
Yes	53 (28.2)	0.710 [0.516-0.796]	0.705	50 [40-63]	0.227	-0.86 [(-1.88)-(-0.36)]
No	135 (71.8)	0.656 [0.516-0.796]		55 [47-72]		-0.93 [(-1.86)-(-0.33)]
CHF(Congestive heart failure)						
Yes	26 (13.8)	0.605 [0.516-0.822]	0.684	50 [42.5-54]	0.064	-0.87 [(-1.425)-(-0.26)]
No	162 (86.2)	0.656 [0.516-0.796]		57.5 [45-72]		-0.935 [(-1.88)-(-0.34)]
Kardiac dysrhythmia						
Yes	23 (12.2)	0.639 [0.525-0.796]	0.699	57 [48-70]	0.761	-0.53 [(-1.71)-(-0.38)]
No	165 (87.8)	0.656 [0.516-0.796]		54 [45-70]		-0.93 [(-1.88)-(-0.31)]
CRD (Chronic renal disease)						
Yes	25 (13.3)	0.622 [0.356-0.726]	0.225	49 [40-67.5]	0.245	-1.19 [(-1.97)-(-0.57)]
No	163 (86.7)	0.656 [0.516-0.796]		55.5 [47-70]		-0.88 [(-1.86)-(-0.31)]
PAH ???						
Yes	18 (9.6)	0.639 [0.516-0.710]	0.210	50 [46-60]	0.440	-2.00 [(-5.07)-(-0.13)]
No	170 (90.4)	0.656 [0.516-0.796]		55 [45-70]		-0.87 [(-1.75)-(-0.33)]
Neuropathy						
Yes	16 (8.5)	0.656 [0.587-0.796]	0.538	50 [40-70]	0.320	-0.80 [(-1.50)-(-0.50)]
No	172 (91.5)	0.656 [0.516-0.796]		55 [45-70]		-0.93 [(-1.88)-(-0.33)]
HT						

Yes	155 (82.4)	0.656 [0.516-0.796]	0.248	52 [45-70]	0.042*	-0.87 [(-1.88)-(-0.33)]
No	33 (17.6)	0.710 [0.639-0.796]		65 [50-88]		-1.40 [(-1.86)-(-0.38)]
HL						
Yes	67 (35.6)	0.656 [0.516-0.796]	0.644	50 [45-73]	0.827	-1.07 [(-2.00)-(-0.31)]
No	121 (64.4)	0.656 [0.516-0.779]		55 [45-70]		-0.87 [(-1.80)-(-0.33)]
COPD (Chronic obstructive pulmonary disease)						
Yes	38 (20.2)	0.620 [0.516-0.796]	0.368	50 [43-70]	0.493	-1.00 [(-2.00)-(-0.33)]
No	150 (79.8)	0.710 [0.516-0.796]		56 [45-70]		-0.87 [(-1.86)-(-0.33)]
Depression						
Yes	55 (29.3)	0.639 [0.196-0.725]	0.114	56[50-70]	0.852	-0.93 [(-1.6)-(-0.47)]
No	133 (70.7)	0.710 [0.516-0.796]		53 [44-73]		-0.88 [(-1.88)-(-0.31)]
Alzheimer's Dementia						
Yes	56 (29.8)	0.647 [0.516-0.779]	0.547	62.5[50-78]	0.084	-0.94 [(-2.43)-(-0.20)]
No	132 (70.2)	0.656 [0.516-0.796]		50 [45-70]		-0.88 [(-1.87)-(-0.33)]
Cancer						
Yes	14 (7.4)	0.691 [0.587-0.727]	0.674	65 [48-75]	0.522	-0.50 [(-1.00)-(-0.38)]
No	174 (92.6)	0.656 [0.516-0.796]		53.5 [45-70]		-0.94 [(-1.875)-(-0.33)]
Osteoarthritis						
Yes	17 (9)	0.725 [0.656-0.849]	0.039*	50 [45-67.5]	0.575	-0.97 [(-1.45)-(-0.545)]
No	171 (91)	0.656 [0.516-0.796]		55 [45-72]		-0.88 [(-1.88)-(-0.33)]
Parkinson						
Yes	11 (5.9)	0.516 [0.028-0.639]	0.050*	50 [40-56]	0.144	-1.13 [(-1.87)-(-0.2)]
No	177 (94.1)	0.656 [0.516-0.796]		55 [45-70]		-0.88 [(-1.87)-(-0.33)]
Osteoporosis						
Yes	50 (26.6)	0.656 [0.516-0.779]	0.379	50 [45-70]	0.467	-0.53 [(-1.87)-(-0.19)]
No	138 (73.4)	0.710 [0.516-0.796]		56 [46-70]		-1.00 [(-1.88)-(-0.38)]
Hypothyroidism						
Yes	18 (9.6)	0.622 [0.516-0.796]	0.685	50[41-70]	0.519	-0.50 [(-1.88)-(-0.13)]
No	170 (90.4)	0.656 [0.516-0.796]		55.5[45-70]		-0.93 [(-1.87)-(-0.335)]
D'Vit Deficiency						
Yes	17 (9)	0.725 [0.587-0.850]	0.272	50 [40-60]	0.260	-1.13 [(-2.43)-(-0.5)]
No	171 (91)	0.656 [0.516-0.796]		55 [45-72]		-0.87 [(-1.87)-(-0.31)]
B12'Defficiency						
Yes	48 (25.5)	0.587 [0.516-0.725]	0.034*	50 [40-60]	0.060	-0.88 [(-1.75)-(-0.36)]
No	140 (74.5)	0.710 [0.516-0.796]		58 [46-75]		-0.94 [(-1.93)-(-0.31)]
Vertigo						

Yes	19 (10.1)	0.639 [0.516-0.725]	0.269	50 [43-60]	0.376	-1.47 [(-2.53)-(-0.4)]
No	169 (89.9)	0.656 [0.516-0.796]		55 [45-70]		-0.88 [(-1.8)-(-0.33)]
BPH (Benign prostate hyperplasia)						
Yes	25 (13.3)	0.710 [0.639-0.848]	0.092	50 [50-80]	0.791	-0.94 [(-1.88)-(-0.19)]
No	163 (86.7)	0.656 [0.516-0.796]		56 [45-70]		-0.88 [(-1.87)-(-0.33)]
Dyspepsy						
Yes	83 (44.1)	0.604 [0.516-0.725]	0.004*	50 [40-70]	0.040*	-0.87 [(-1.875)-(-0.36)]
No	105 (55.9)	0.718 [0.587-0.815]		59 [50-73]		-0.94 [(-1.87)-(-0.31)]
Urinary incontinence						
Yes	169 (89.9)	0.710 [0.516-0.796]	0.238	56 [45-72]	0.752	-0.88 [(-1.87)-(-0.33)]
No	169 (89.9)	0.656 [0.516-0.796]		55 [45-70]		-0.94 [(-1.88)-(-0.33)]
Glaucoma						
Yes	19(10.1)	0.587 [0.516-0.779]	0.377	50 [43-52]	0.143	-1.00 [(-1.47)-(-0.38)]
No	169 (89.9)	0.656 [0.516-0.796]		57 [45-70]		-0.88 [(-1.88)-(-0.33)]
Cataract						
Yes	55 (29.3)	0.710 [0.516-0.796]	0.589	56.5[48-70]	0.823	-0.59 [(-1.44)-(-0.19)]
No	133 (70.7)	0.656[0.516-0.788]		52.5[45-71]		-1.00 [(-2.00)-(-0.39)]
Dialysis						
Yes	3 (1.6)	0.002 [-0.037-0.710]	0.116	46 [32-70]	0.436	-5.13 [(-5.69)-(-1.75)]
No	185 (98.4)	0.656 [0.516-0.796]		55 [45-70]		-0.88 [(-1.87)-(-0.33)]
RA (Rheumatoid arthritis)						
Yes	5 (2.7)	0.691 [0.622-0.761]	0.699	50 [47.5-60]	0.656	-1.17 [(-2.45)-(-0.715)]
No	183 (97.3)	0.656 [0.516-0.796]		55 [45-70]		-0.88 [(-1.87)-(-0.33)]
FMF (Familial mediterranean fever)						
Yes	1 (0.5)	0.779 [0.779-0.779]	0.582	80 [80-80]	0.269	-0.13 [(-0.13)-(-0.13)]
No	187 (99.5)	0.656 [0.516-0.796]		54 [45-70]		-0.93 [(-1.87)-(-0.33)]
Iron deficiency anemia						
Yes	10 (5.3)	0.272 [-0.034-0.648]	0.012*	57.5 [45-71]	0.899	-1.17 [(-2.45)-(-0.835)]
No	178 (94.7)	0.683 [0.516-0.796]		53.5[45-70]		-0.88[(-1.87)-(-0.33)]
Folic acid deficiency						
Yes	2 (1.1)	0.622 [0.587-0.656]	0.691	57.5 [35-80]	0.963	-0.30 [(-0.53)-(-0.07)]
No	186 (98.9)	0.656 [0.516-0.796]		54.5 [45-70]		-0.93 [(-1.875)-(-0.33)]
Constipation						
Yes	5 (2.7)	0.850 [0.796-1.000]	0.078	50 [50-70]	0.814	-0.33 [(-1)-(-0.13)]
No	183 (97.3)	0.656 [0.516-0.796]		55 [45-70]		-0.93 [(-1.87)-(-0.34)]
Xerophthalmia						

Yes	8 (4.3)	0.237 [(-0.043)-0.552]	0.068	44 [40-65]	0.105	-1.00 [(-1.88)-(-0.43)]
No	180 (95.7)	0.683 [0.516-0.796]		55 [45.5-70]		-0.91 [(-1.87)-(-0.33)]
Somnipathy						
Yes	19 (10.1)	0.520 [0.30-0.64]	0.023*	60 [50-77]	0.177	-0.93 [(-2.53)-(-0.20)]
No	169 (89.9)	0.710 [0.52-0.80]		72 [56-72]		-0.88 [(-1.87)-(-0.33)]
Polycytemia vera						
Yes	1 (0.5)	0.6	-	50.5	-	-0.88
No	187 (99.5)	0.656 [0.516-0.796]		54.5[45-70]		-0.905 [(-1.87)-(-0.33)]
Cirrhosis						
Yes	1 (0.5)	0.516	-	38	-	-1.25
No	187 (99.5)	0.656 [0.516-0.796]		55 [45-70]		-0.88 [(-1.87)-(-0.33)]

Table 2: Distributions based on comorbidities

The relationship between BMI and HbA1c was significant (r= 0.320, p = 0.032); as BMI increased, HbA1c values also increased while the ADDQoL score decreased (r=-0.370, p=0.010).

Clinical values	Criterion	Score	%	Retirement Home Point
HbA1c poor control > %9.0	Subjects ≤ 15%	12	46.3	0
HbA1c control < 8.0%	Subject lowest 60%	8	44.8	0
HbA1c control < 7.0%	Subject lowest 40%	5	28.4	0
Blood Pressure ≥ 140/90 mm Hg	Subject ≤ 35%	10	27.6	10
Blood Pressure < 130/80 mmHg	Subject lowest 25%	10	53.7	10
Eye examination	Subject lowest 60%	10	46.3	0
Quitting smoking or effort of quitting	Subject lowest 80%	10	97.8	10
LDL control ≥ 130 mg/dl	Subject ≤ 37%	10	46.3	0
LDL control < 100 mg/dl	Subject lowest 36%	10	34.3	0
Nephropathy assessment	Subject lowest 80%	5	19.04	0
Foot examination	Subject lowest 80%	5	8.1	0
	Total points	100		30
	For successful follow-up	75		

Table 3: Performance criteria and scoring table for adult diabetics

A total of 30 points was obtained on the NCQA 2009 DRP Adult Measures-Performance Criteria and Scoring Table (Table 3).

Discussion

Diabetes affects a patient's life biologically, psychologically and socially. A diabetic must maintain planned care throughout his/her life and needs to seek help from a specialist occasionally. Previous studies have demonstrated that as a result of a well-planned treatment and care, control of diabetes can be regulated, complications decreased, and quality of life increased [10,11].

The overall quality of life of males is higher than that of females [17,18] which is similar to our results. The fact that males have better social lives and engage in more physical activity—particularly in countries in which sex discrimination exists and females tend to take background roles—results in similar role distributions in aged individuals, which may explain the higher quality of life in males.

The ADDQoL score was high in subjects with an HbA1c value < 7% and a shorter DM duration in our study. Akıncıet al. conducted a study in Turkey (2008) showing that diabetes affects quality of life adversely. Furthermore, the quality of life was significantly higher in subjects with shorter disease duration and an HbA1c value < 7% [19]. The NHANES study conducted between 1999 - 2006 reported that HbA1c values higher than 8% were associated with adverse effects of diabetes [20]. Obtaining LDL cholesterol targets with HbA1c in diabetic patients is closely associated with microvascular complications, acute coronary syndrome, and cardiovascular surgery [21]. In our study, HbA1c levels were relatively high and regular follow-up frequency was low. Controlling HbA1c regularly for patients residing in retirement homes can be helpful for increasing awareness, obtaining feedback, and improving patient's efforts to control their disease.

Diabetes is a complex disorder; therefore, its treatment requires a complex program [22]. A majority of our subjects used OADs for diabetes treatment, and their treatment profile was in accordance with the results of the NHANES 1999 - 2006 study [20]. Insulin use was more frequent in retirement homes in a study performed in England. In addition, in this study, diabetics residing in nursing homes received more frequent insulin treatment than did those residing in retirement

homes [23]. In our study, the quality of life in subjects who used insulin was lower, as has been reported by others[15,17,24,25]. An extended diabetes duration is associated with a reduction in quality of life [17,26]. Both the overall quality of life and diabetes-dependent quality of life were high in subjects with a DM duration of 10 years or less in our study, similar to previous reports [15]. Limitations can exist such as the subject's participation in treatment programs, other health problems of the subject, home environment, economic conditions, and whether or not supportive care is provided [27]. In our study, which was conducted in retirement homes, controlling diabetes—a disease adversely affecting comfort—was more difficult because the subjects were elderly and in need of more supportive care. More support and care can increase the compliance of elderly subjects with their treatment, which would result in improvements in diabetes-dependent parameters and quality of life.

Diabetic patients are recommended to undergo retinopathy and nephropathy assessments once per year. In our study, the frequency of eye examinations, urinary albumin/creatinin measurements, and foot examinations in the last year was lower compared to previous reports [28,29]. Several studies have demonstrated that the quality of life decreases to an extent depending on the diabetes complication [20,30]. In this context, regular visits to retirement homes by health professionals, particularly primary care physicians, as well as diabetes training appear to be important for preventing complications.

The SHIELD study reported that diabetes significantly decreased the EQ-5D score The EQ-5D score we obtained was lower compared to other reports from Europe and the USA [24].A low EQ-5D score was associated with female gender, elderly, long-term diabetes patient, receiving insulin treatment, having complications, obesity, high fasting glucose levels, and high HbA1c levels [15]. These above-mentioned studies were performed on outpatient diabetics who visited clinics. In contrast, our study was performed on diabetic elderly patients residing in retirement homes. The inability to live by oneself due to, for example, health problems and/or need for care is the most common reason for residing in retirement homes. Therefore, the lower results reported herein compared to previous research not performed in retirement homes is plausible.

In our study of diabetic elderly patients in state retirement homes in Ankara city center, we assessed HbA1c, blood pressure, LDL cholesterol, eye and foot examination results, nephropathy, smoking status, and follow-up quality. Retirement homes received 30 points according to the NCQA 2009 DRP Adult Measures-Performance Criteria and Scoring Table; unfortunately, diabetes follow-up was determined to be a failure. The fact that patients, their relatives, and health professionals in retirement homes had not received diabetes training is a possible reason for this failure. Only 39 (29.1%) patients had received diabetes training in our study. Vajenet al. determined in their study performed in nursing homes in the USA in 2012 that 66.1% of diabetes-related appointments were to visit a primary care physician and 25.7% an internal disease specialist [28]. In our study, requests to visit primary care physicians were infrequent. The fact that primary care applications were recently initiated in Turkey compared to western countries explains the low frequency of follow-up by a primary care physician. Furthermore, because health applications in Turkey have no referral procedures, patients can visit numerous physicians for their diabetes; however, some health institutions do not provide examination results to patients and this can be one of the reasons.

One limitation of our study was that the records of participants were insufficient. Therefore, participants whose laboratory results were not available were excluded from the study. Follow-up of these patients was performed by their family members; however, their results were not transmitted to the health professionals in retirement homes. Examination results of some patients were not in their files because they were not transmitted to the retirement homes by some health institutions. Availability of more information would have enabled inclusion of a greater number of particpants.

Our study is the first conducted in Turkey in this area and with this scope, and results for a city were obtained by contacting all state retirement homes within the limits thereof. Our study draws attention to the quality of life of patients with diabetes living in retirement homes in our country.

Health check-ups for retirement home residents may not always be adequate and relatives may not always pursue follow-ups regularly for various reasons. To improve healthcare for elderly diabetics and overcome obstacles to disease management, cooperative efforts must be maximized. Primary care appointments are relatively new in Turkey. Health professionals are the most effective in terms of performing regular health check-ups for retirement home residents and eliminating the follow-up failure reported herein. We suggest that health professionals, especially primary healthcare professionals, should take more active roles in this respect.

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