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The Effect on Quality of Life and Psychiatric Symptoms of other Co-morbid Chronic Diseases on Patients with Type 2 Diabetes Mellitus

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Abstract

Objective: This study was intended to examine the associations between psychiatric symptoms and quality of life in patients with diabetes and other co-morbid chronic physical diseases and sociodemographic variables.

Method: One hundred randomly selected consecutive patients with type 2 diabetes mellitus (DM) admitted to the Department of Endocrinology out-patient clinic at the Karadeniz Technical University were enrolled. One hundred age-, gender- and marital status-matched volunteers served as the control group. The sociodemographic data form, Hospital Anxiety and Depression Scale (HAD) and Short Form-36 (SF–36) were completed for all participants.

Results: Patient group education and income levels were lower than those of the controls. When SF-36 scores were compared in terms of presence or absence of co-morbid disease in addition to diabetes, mean scores of subjects with chronic disease were lower in the patient and control groups. When HAD-A and HAD-D mean scores were compared in terms of the presence or absence of other co-morbid chronic disease, both sub-scale scores were higher in those members of the patient group with chronic diseases.

Conclusions: This study establishes that diabetes causes an extreme deterioration in patients' quality of life and gives rise to many accompanying clinical signs. Our study thus emphasizes the need for consultation and liaison between departments.

Keywords: Diabetes mellitus; Type 2- psychiatric symptoms; Quality of life; Chronic disease

Introduction

Type 2 is the most commonly encountered form of diabetes, representing 90% of cases. The current figure of 150 million diabetics is expected to rise to 300 million in 2025 [1]. Type 2 diabetes mellitus (DM) gives rise to acute metabolic complications developing in the long term (coronary disease, peripheral artery disease, cerebrovascular disease) and to microvascular complications (nephropathy, retinopathy) [2]. Although type 2 DM is essentially a disease of the endocrine system, it also has psychosocial and psychological dimensions that impact on several systems. It can also lead to psychiatric disorders by affecting cerebral functions, and perception of the disease and its impact on the patient's spheres of life can also give rise to psychiatric problems [3,4]. In addition to physical treatment, consideration of patients with diabetes as a whole requires diagnosis and treatment of the mental, psychological, psychophysical and psychosocial pictures accompanying the disease. The majority of studies aimed at determining quality of life in patients with diabetes have shown a decline in quality of life with increasing duration of type 2 DM [5,6]. The presence of complications, failure to establish sufficient metabolic control, the presence of other chronic diseases and previous psychological diseases, all have a negative impact on quality of life [7]. In another study, quality of life in patients reported as receiving insulin treatment was lower than that of patients receiving oral treatment. Conditions accompanied by obesity and complications also accompany a low quality of life [8]. In the presence of changes in blood glucose levels, disease-associated complications and other co-morbid chronic diseases, physical functioning impairment, problems and psychiatric disorders emerging as the duration of the disease increases all have an effect on emotional state and the difficulties imposed on the patient by the disease. These difficulties in turn impact on social functioning. Quality of life has been reported to be worse in diabetic individuals compared to the general population in several studies [9,10].

Significant advances in the treatment of diseases have led to an intensification of efforts directed toward the extension of average life expectancies and, in association with this, increasing quality of life in individuals with chronic diseases. Studies evaluating the effect on quality of life in patients with type 2 DM of different treatment modalities, symptom severity and other physical diseases accompanied by complications, report that these all have a negative impact [11-13].

The aim of this study was to investigate the associations between quality of life and psychiatric symptoms observed in patients with type 2 DM and other co-morbid chronic physical diseases and sociodemographic variables.

Methods

Sample groups

The cases enrolled in the study were selected from consecutive patients under observation with a diagnosis of type 2 DM at the

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Karadeniz Technical University Endocrinology Clinic, Turkey, between 1 January and 31 March, 2007. The study was approved by the Local Ethics Committee of the Karadeniz Technical University Medical Faculty. Informed consent was obtained from the participants after all procedures had been fully explained. One hundred patients who agreed to participate and signed informed consent forms after being briefed about the aims and methods of the study were enrolled. Patients with psychotic disorders, dementia, and psychiatric diseases over the previous 6 months or a history of psychotropic drug use were excluded. Patients lacking sufficient education to understand the tests or with mental or social retardation were also excluded. A control group was established from among hospital staff or friends or relatives accompanying patients who volunteered to participate after being informed about the aims and methods of the study, with no ongoing psychiatric disease or psychiatric treatment and who matched the patient group in terms of age, sex and marital status. All volunteers completed the study.

Measures

Sociodemographic data collection form: Patients complete a form containing questions on age, education, sex, marital status, economic status, duration of illness, occurrence of other medical disorders, family history of psychiatric disorders and duration and type of drugs being used. The participants were categorized into 3 groups on the basis of their the economic status, in other words, their total monthly income (total contribution of all family members was considered): (1) 404 New Turkish Lira (YTL) or less, (2) 404–807 YTL and (3) 807 YTL and above.

Hospital Anxiety and Depression scale (HAD): This is a measure developed in order to determine anxiety and depression in terms of risk in patients with physical diseases and applying to primary health care services, and to measure changes in levels and severity. Developed by Zigmond and Snaith, it consists of 14 questions on a 4-point Likert scale, of which 7 (odd numbers) measure anxiety and 7 (even numbers) measure depression. It has been shown to be valid and reliable in Turkish patients. Studies in Turkey have established a cut-off score of 10/11 for the anxiety sub-scale (HAD-A) and of 7/8 for the depression sub-scale. Patients with scores above these are regarded as being at risk. The lowest possible score in both sub-scales is 0 and the highest 21 [14].

Short Form-36 (SF-36): Developed by the Rand Corporation [15] and used in order to evaluate quality of life, this is a self-administered measure with generic criteria. It was particularly developed in order to measure quality of life in patients with physical diseases. However, it is also successfully used in healthy individuals and psychiatric patients. It can evaluate both positive and negative aspects of health status and is highly sensitive in determining small changes in levels of handicap. SF-36 investigates 8 dimensions: physical functioning, role limitation (associated with physical and emotional problems), social functioning, mental health, vitality (energy), bodily pain, general health perception and general mental health under 36 items. The measure has no raw score; the total 8 sub-scale scores are simply calculated. Sub-scale scores range from 0 to 100. The total scale score is not calculated. It has also been shown to be valid and reliable in Turkish patients [16].

Statistical analyses

SPSS for Windows 10.0 was used for the evaluation of data. The Kolmogorov–Smirnov test was used to test the normal distribution of the data. As these were normally distributed, the differences in the HAD-A, HAD-D and SF-36 scores between the patients and the control group were compared using Student's *t*-test. The Mann-Whitney *U* test was used for those data which did not conform to normal distribution. Qualitative data were analyzed using the chi-square test. Data obtained by measurement are shown as mean ± standard deviation, and data obtained by counting as numbers (%).

Results

One hundred patients diagnosed with type 2 DM constituted the study group and 100 healthy volunteers the controls. Mean age of the control group was 53.9 ± 7.44 years, compared to 55.7 ± 7.14 in the patient group. No statistically significant difference was determined between the groups in terms of age, sex or marital status. A statistically significant difference was, however, determined in terms of education and income levels (p=0.001; p<0.001). Study group sociodemographic characteristics are shown in table 1.

Duration of disease in the patient group ranged from 1 to 30 years, with an average of 11.06 ± 7.20 years. Fifty-four patients (54%) were using oral antidiabetics and 45 (45.0%) insulin; 56 (56.0%), 20 (20.0%)

	Type 2 DM (n=100) n (%)	**Control (n=100) n (%)**		
		Statistical test		p
Gender			χ^2=0.02	0.888
Female	50 (50%)	51(50.5%)		
Male	50 (50%)	49(49.5%)		
Marital status			χ^2=1.52	0.217
Married	88 (88%)	94(94%)		
Single/ Other	12(12%)	6 (6%)		
Education			χ^2=13.69	0.001
No formal education	30(30%)	11(11%)		
Primary school	39 (39%)	38(38%)		
High school or higher	31 (31%)	51(51%)		
Economic status			χ^2=29.46	<0.001
<404 YTL	9 (9%)	2 (2%)		
404–807	47 (47%)	17(17%)		
≥807	44 (44%)	81(81%)		
	Mean ± S.D.	Mean ± S.D		
Mean age	55.7 ± 7.14	53.9 ± 7.44	t= 1.65	0.099

χ^2: chi-square test; t: Student's *t*-test

Table 1: Sociodemographic characteristics of the study groups.

and 24 (24.0%) patients were using other, non-DM related drugs for hypertension, coronary disease and hyperlipidemia, respectively. Patient group clinical characteristics are shown in table 2.

Fifty-seven cases of history of non-diabetic disease were determined in the control group and 74 in the patient group. Fourteen histories of psychiatric disease were determined in the control group and 27 in the patient group. Twenty-one cases with a family history of psychiatric disease were identified in the control group and 15 in the patient group. Comparisons of the groups' non-diabetic disease, psychiatric disease history and family history of psychiatric disease are shown in table 3.

HAD-A (p=0.006) and HAD-D (p=0.008) mean scores were higher in subjects with chronic non-diabetic disease accompanying type 2 DM, and the difference was statistically significant. At examination of SF-36 sub-scales, quality of life scores were lower in all areas except for emotional role limitation (p=0.246) and general health perception (p=0.050) (physical functioning p<0.001; physical role limitation p=0.049; bodily pain p=0.007; energy p=0.006; social functioning p=0.007; mental health p=0.003), and the difference was again statistically significant. Control group subjects with non-diabetic chronic disease had higher mean HAD-A scores, and the difference was again significant (p=0.034). Mean HAD-D score was higher compared to those with no such chronic disease, but the difference was not statistically significant (p=0.103). In terms of mean SF-36 sub-scale scores, these were lower in all fields, but apart from pain (p=0.035) and energy (p=0.021) the difference in quality of life scores was not statistically significant (p=0.103). Comparisons of HAD and SF-36 scores in patients with type 2 DM and control groups in terms of presence or absence of co-morbid disease are shown in table 4.

Discussion

This descriptive and cross-sectional study established that, in the presence of other co-morbid chronic diseases, patients with type 2 DM had higher levels of psychiatric symptoms and lower quality of life compared to the control group. At analysis of the clinical characteristics of our patient group, disease duration ranged between 1 and 30 years, with a mean duration of 11.06 ± 7.20 years. Duration was 10 years or above in 56% of patients and less than 10 years in 44%.

	Type 2 DM (n=100)	%
Duration of disease		
Less than 10 years	44	44.0
10 years or above	56	56.0
Treatment modalities		
Diet	1	1.0
Oral antidiabetic	53	54.0
Insulin	45	45.0
Non-DM related drugs		
Hypertension	56	56.0
Coronary disease	20	20.0
Hyperlipidemia	24	24.0

Table 2: Clinical characteristics of the patient group.

	Type 2 DM n (%)	Control n (%)	p
Non-diabetic disease			0.011
Yes	74 (74.0%)	57 (57.0%)	
No	26 (26.0%)	43 (43.0%)	
History of psychiatric disorder			0.036
Present	27 (27.0%)	14 (14.0%)	
Absent	73 (73.0%)	86 (86.0%)	
Family history of psychiatric disorder			0.357
Yes	15 (15.0%)	21 (21.0%)	
No	85 (85.0%)	79 (79.0%)	

Table 3: Comparisons of the groups' non-diabetic diseases, psychiatric disorder history and family history of psychiatric disease.

	Type 2 DM			Control Group		
	Co-morbid chronic disease mean ± SD	No additional disease mean ± SD	p	Co-morbid chronic disease mean ± SD	No additional disease mean ± SD	p
HAD-A	7.77 ± 5.03	5.15 ± 3.60	0.006	7.68 ± 4.143	5.91 ± 4.02	0.034
HAD-D	8.08 ± 4.92	5.19 ± 4.03	0.008	6.05 ± 3.40	4.95 ± 3.17	0.103
Physical functioning	55.95 ± 28.96	77.11 ± 23.25	<0.001	73.33 ± 23.23	82.56 ± 18.50	0.145
Physical role	34.46 ± 41.73	49.04 ± 42.71	0.049	75.00 ± 36.29	86.05 ± 25.77	0.090
Pain	58.26 ± 66.73	70.35 ± 24.93	0.007	67.44 ± 19.82	66.80 ± 19.83	0.035
General health	41.23 ± 27.33	53.31 ± 24.51	0.050	57.56 ± 17.13	65.80 ± 17.73	0.872
Energy	46.15 ± 28.56	64.04 ± 25.18	0.006	59.91 ± 16.84	65.00 ± 15.58	0.021
Social functioning	59.12 ± 34.08	79.33 ± 26.44	0.007	76.32 ± 19.29	78.49 ± 15.51	0.126
Emotional role	36.04 ± 39.31	47.44 ± 42.35	0.246	67.25 ± 41.54	80.62 ± 33.52	0.546
Mental health	54.64 ± 21.97	66.92 ± 15.74	0.003	65.96 ± 15.86	68.28 ± 10.92	0.390

Table 4: Comparisons of HAD and SF-36 mean scores in the patient and control groups in terms of presence or absence of co-morbid disease.

In one previous study, 72.6% of patients enrolled had the disease for less than 10 years and 33.4% for more [17]. In another study, 48.7% of patients had disease duration of 10 years and above, and 51.3% of less than 10 years [18].

In terms of treatment modalities in patients with type 2 DM, 54% used oral antidiabetic drugs and 44% insulin, while metabolic control was established through diet in 1%. In a similar study, 45.5% of patients used antidiabetic drugs and 19.5% insulin, while metabolic control was established through diet and exercise in 35% [19]. In another study, the level of insulin use was 65% and of oral antidiabetic drugs use 30%, with blood glucose being regulated through exercise alone in 5% [20]. The level of oral antidiabetic drug use was 49.1% in another study, compared to insulin use at 9.4% and combined oral antidiabetic drug and insulin use at 31.7%, with blood glucose being regulated through diet and exercise alone in 5.7% [21].

Comparing our patient and control groups in terms of non-diabetic disease, a history of psychiatric disease and a family history of psychiatric disease, 74% of the patient group and 57% of the control group had a non-diabetic disease, while a history of psychiatric disease was determined in 27% of the patient group and 14% of the control group, and a family history of psychiatric disease in 15% of the patient group and 21% of the control group. HAD-A and HAD-D mean scores were higher in the patient group in the presence of chronic disease accompanying type 2 DM; in other words, anxiety and depression levels rose, while although HAD-A and HAD-D mean scores in the control group were high, the increase was only significant with respect to respect of anxiety levels. In agreement with our results, depression levels have been reported to rise in type 2 DM accompanied by cardiovascular disease [22]. In a cohort study performed between 1989 and 2001 by Brown et al., when patients with severe, chronic non-diabetic disease were compared with non-diabetics, in contrast to our study, type 2 DM was not reported as an increasing risk for the development of depression. Those authors suggested that complications and co-morbid non-diabetic chronic disease represented an enhanced risk for depression [23].

When quality of life sub-scales in the patient and control groups were compared in terms of presence or absence of chronic, non-diabetic disease, scores in the control group were lower in all fields in the presence of co-morbid chronic disease, except for the SF-36 sub-scale emotional role strength and general health fields. In the control group, apart from the bodily pain and energy fields, the difference in the other fields was not significant. Similar to our own, one study in the literature reported that co-morbid chronic non-diabetic disease had a negative impact on the fields of physical function, pain and energy [7]. In a study of diabetic Pima indigenous peoples, significantly lower scores were reported in 6 out of 8 quality of life sub-scales in the presence of chronic disease [24]. Again in agreement with our study, one study in which retrospective data were analyzed compared case and control groups in terms of quality of life in the presence of co-morbid chronic disease; scores in the physical functioning, social functioning and general health fields were lower in the patient group, while no difference was determined in the fields of mental health and bodily pain [25]. Another study, using SF-20, reported that low quality of life scores accompanied the presence of chronic disease [20]. Similarly, in another study, SF-36 sub-scales were grouped as mental and physical compounds; lower quality of life scores were determined in the physical compound in the presence of accompanying chronic disease following two evaluations, one at time of diagnosis and the other after 1 year [26]. In a study of a group of patients with type 2 DM in Greece, significant differences were reported in 4 of the SF–36 sub-scales [27]. A study conducted in northern countries using several quality of life measures reported that presence of accompanying chronic disease was a powerful determinant of quality of life [28]. Martin et al. reported low physical functioning, pain, general health and energy field scores in patients with type 2 DM in the presence of co-morbid chronic disease [29]. A study of African Americans using SF-36 also reported negative quality of life scores in the presence of co-morbid disease [30]. To put it another way, the majority of studies in the literature support our own findings and report that quality of life declines in the presence of chronic disease accompanying diabetes.

In conclusion, our study reveals the need for consultation and liaison between departments. It is important for cases to be investigated in bio-psycho-social terms and for requests for psychiatric help to be supported. Co-operation between departments will result in an improvement in patients' quality of life, lower treatment costs and less time being wasted by therapeutic teams and patients.

This study has a number of limitations. The fact that it is cross-sectional with patients being selected from a single center, and that during the psychiatric evaluation of cases no structured interviews of diagnostic value were administered makes generalization impossible. In addition, bearing in mind that the mean disease duration of the patients in the study is quite long, 11.06+7.20 years, sexual function impairment, a frequently encountered complication in patients with type 2 DM, might also be expected to arise and also to have a negative impact on quality of life. The fact that SF-36 does not enquire into sexual functions, and that quality of life in that field is not evaluated, may be thought of as representing another limitation. For that reason, the use in future studies of a quality of life measure specifically developed for diabetes may permit sounder results to be obtained. Despite these limitations, we believe that in terms of its involving a control group and the results obtained from it, our study can light the way for future research.

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