



Comparison of Quality of Life, Depression and Anxiety According to the Type of Treatment in Type 2 Diabetes

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Abstract

The aim of this study was to compare the quality of life (QoL) and the prevalence of depression and anxiety in patients with type 2 diabetes mellitus according to the type of treatment: insulin, oral therapy or both therapies. A cross-sectional study that included adults with diabetes mellitus type 2 was conducted at Hassan II University Hospital in Fez, Morocco. Patients are divided into 3 groups: the anti-diabetic agents' group, the insulin therapy group and the combined therapy group. The Hospital Anxiety and Depression Scale (HADS) was used to measure depression and anxiety. A 12-Item Short-Form Health Survey questionnaire (SF-12) was employed to assess QoL. All statistical analyses were conducted using SPSS Version 26. A total of 176 diabetics with type 2 were included in the study: (61.9%) in the hypoglycemic drug group; (14.2%) in the insulin group and (23.9%) in both therapy groups. The mean age of the patients was 54.36 ± 10.18 years with a female predominance (60.8%). Our study showed a significant association between the scores of QoL ($p < 0.05$), the prevalence of depression ($p = 0.03$) and the type of therapy. A high prevalence of depression and poor QoL have been observed in patients on insulin therapy. Patients on insulin therapy have a high prevalence of depression and a more significant impairment of QoL. In fact, their evaluation must be integrated into the management of type 2 diabetics on insulin.

Subject Areas

Diabetes & Endocrinology, Epidemiology

Keywords

Diabetes Type 2, Type of Treatment, Insulin, Depression, Anxiety,

1. Introduction

Diabetes mellitus is a major public health problem. Its prevalence is increasing, from 285 million in 2009 to 463 million in 2019 [1]. Type 2 diabetes accounts for 90% of all diabetes worldwide [2]. In 2017, approximately 6.28% of the world's population were affected by type 2 diabetes corresponding to a prevalence rate of 6059 cases per 100.000 [2]. In Morocco, the prevalence of diabetes is also high. Consequently, it represents an important socio-economic burden [3] [4].

Type 2 diabetes can cause significant psychological difficulties for the patient and family members and may affect the quality of life (QoL). The data in the literature have shown that diabetes patients have high rates of depression and anxiety [5] [6]. Numerous studies [7] have been conducted to explore QoL in people with type 2 diabetes and its associated factors. Socio-demographic factors (age, gender, socio-economic level), level of glycemic control, duration of diabetes, type of treatment, therapeutic compliance, complications, mental health, and presence of other comorbidities are the factors influencing the QoL of these patients [7] [8] [9] [10].

The management of diabetes is based on different therapies to achieve good metabolic control: changes in lifestyle (diet, physical activity), oral agents and insulin therapy [11]. Factors related to the treatment and its properties such as effectiveness, risk of hypoglycemia, ability to reduce diabetes complications, effect on body weight and side effects may have an effect on the QoL and mental health of patients.

The meta-analysis by de Bai *et al.* [12] and the study by Šurkienė G *et al.* [13] have investigated the relationship between depression and the type of treatment, but this association remains controversial. Results of studies, that examined the impact of treatment on QoL, have been mixed, with the type of therapy showing decreased, enhanced, or no impact on QoL [14]. In Morocco, mental health promotion is one of the priorities of the National Multisectoral Strategy for the Prevention and Control of Non-transmissible Diseases 2019-2029 [15]. However, QoL and psychological disorders, especially in diabetic patients, are not sufficiently studied. The aim of the present study was to compare the QoL and prevalence of depression and anxiety in patients with type 2 diabetes mellitus according to the type of treatment: insulin, oral therapy or both therapies.

2. Methods

2.1. Study and Population

A cross-sectional study, including adult patients with a confirmed diagnosis of type 2 diabetes who use oral medications, insulin or both therapies, was carried out at Hassan II University-Hospital of Fes, Morocco. We excluded type 1 di-

abetics, pregnant women and patients with impairment from auditory, mental and cognitive conditions.

2.2. Data Collection and Scoring

An anonymous face-to-face questionnaire was used to collect data. It included:

The socio-demographic and socio-economic variables: age, gender, residence, marital status, employment status and monthly income.

Clinical variables: type of treatment used (oral therapy, insulin or both therapies), duration of disease, and presence of comorbidities.

2.3. Measure of Depression and Anxiety

The study utilized the Hospital Anxiety and Depression Scale (HADS) [16] to evaluate the levels of anxiety and depression. This is a self-assessment tool that contains 14 items, seven of which pertain to anxiety and the other seven relate to depression. Respondents indicate the intensity of their symptoms over the past week by scoring each item from 0 to 3. The scores range from 0 to 21 for each subscale, with higher scores indicating more severe symptoms. The HADS also provides threshold values for each subscale: scores ranging from 0 to 7 are considered normal, while scores above 7 indicate symptoms of anxiety or depression [16].

2.4. Measure of Quality of Life

For assessment of quality of life, a 12-Item Short-Form Health Survey (SF-12) in its translated and validated Moroccan version was used [17]. The SF-12 is an instrument for evaluating health-related quality of life that employs twelve questions to gauge physical and mental well-being across eight health domains. Physical health domains include General Health (GH), Physical Functioning (PF), Role Physical (RP), and Body Pain (BP). Meanwhile, mental health domains include Vitality (VT), Social Functioning (SF), Role Emotional (RE), and Mental Health (MH). Each quality of life domain is scored from 0 to 100, where a higher score indicates a better quality of life [18].

2.5. Statistical Analysis

The participants are divided into 3 groups: the oral medication group, the insulin group and the combined therapy group. The Chi2 and Fisher tests were used to test associations between socio-demographic and clinical variables, depression and anxiety, and the treatment groups. The ANOVA test was used to compare scores of quality of life between groups of treatments. In all the analyses, the level of significance was kept at 0.05. Statistical analyses were performed using SPSS Version 26 software.

2.6. Ethics Statement

Ethical approval was obtained from the Ethics Committee of Hassan II University Hospital, Fez, Morocco (N 26/18). All participants provided their informed

consent after being made aware of the conditions related to the study.

3. Results

3.1. Baseline Characteristics of Participants

A total of 176 diabetes type 2 patients were included in the study. The mean age of the patients was 54.36 ± 10.18 years with a female predominance (60.8%). More than two-thirds (61.9%) of the participants were unemployed or housewives; 83.3% were from urban areas; and 53.4% had comorbidities.

Depending on the type of treatment, 61.9% were taking hypoglycemic drugs, 14.2% were taking insulin and 23.9% were taking both. There was no statistically significant difference between the three groups in terms of socio-demographic, socio-economic and clinical parameters.

Table 1 shows the baseline characteristics of the participants.

Table 1. Baseline characteristics of participants (n = 176).

Variables	Total population	Oral therapy	Insulin therapy	Both therapies	p-value
	n = 176	n = 109	n = 25	n = 42	
	n (%)	n (%)	n (%)	n (%)	
Age (mean \pm SD)	54.36 \pm 10.18	54.91 \pm 9.65	50.84 \pm 12.68	55.02 \pm 9.68	0.17
Gender					0.83
Female	107 (60.8)	68 (62.4)	15 (60.0)	24 (57.1)	
Male	69 (39.2)	41 (37.6)	10 (40.0)	18 (42.9)	
Marital status					0.97
Married	124 (75.2)	77 (75.5)	19 (76.0)	28 (73.7)	
Not married	41 (24.8)	25 (24.5)	6 (24.0)	10 (26.3)	
Profession					0.43
Unemployed or housewife	109 (61.9)	64 (69.6)	16 (64.0)	29 (78.4)	
Employed	45 (25.6)	28 (30.4)	9 (36.0)	8 (21.6)	
Residence					0.84
Rural	29 (16.7)	18 (16.7)	5 (20.0)	6 (14.6)	
Urban	145 (83.3)	90 (83.3)	20 (80.0)	35 (85.4)	
Monthly income					0.27
≤ 2000	102 (62.2)	58 (58.6)	19 (76.0)	25 (62.5)	
> 2000	62 (37.8)	41 (41.4)	6 (24.0)	15 (37.5)	
Duration of disease					0.29
≤ 5 years	139 (79.0)	90 (82.6)	19 (76.0)	30 (71.4)	
> 5 years	37 (21.0)	19 (17.4)	6 (24.0)	12 (28.6)	
Comorbidities					0.18
No	82 (46.6)	56 (51.4)	8 (32.0)	18 (42.9)	
Yes	94 (53.4)	53 (48.6)	17 (68.0)	24 (57.1)	

SD: standard deviation; % percentage.

3.2. Depression and Anxiety

Our results showed a significant difference in the prevalence of depression between the different groups ($p = 0.03$). The prevalence of depression was higher in patients on insulin (32.0%), followed by patients on oral therapy (21.1%) and patients who received both therapies (7.1%).

There was no significant difference in the prevalence of anxiety between the different groups ($p = 0.88$). The prevalence was 28.4%, 24.0%, and 26.2% in patients receiving oral therapy, insulin therapy, or both therapies, respectively.

Figure 1 shows the prevalence of depression and anxiety between the treatment groups.

3.3. Quality of Life

Our study showed a significant association between the scores of QoL (physical or mental) and type of treatment ($p < 0.05$) except for general health. In all domains, QoL was most impaired in patient insulin treated patients.

Table 2 and **Table 3** show the results of physical and mental QoL between the treatment groups.

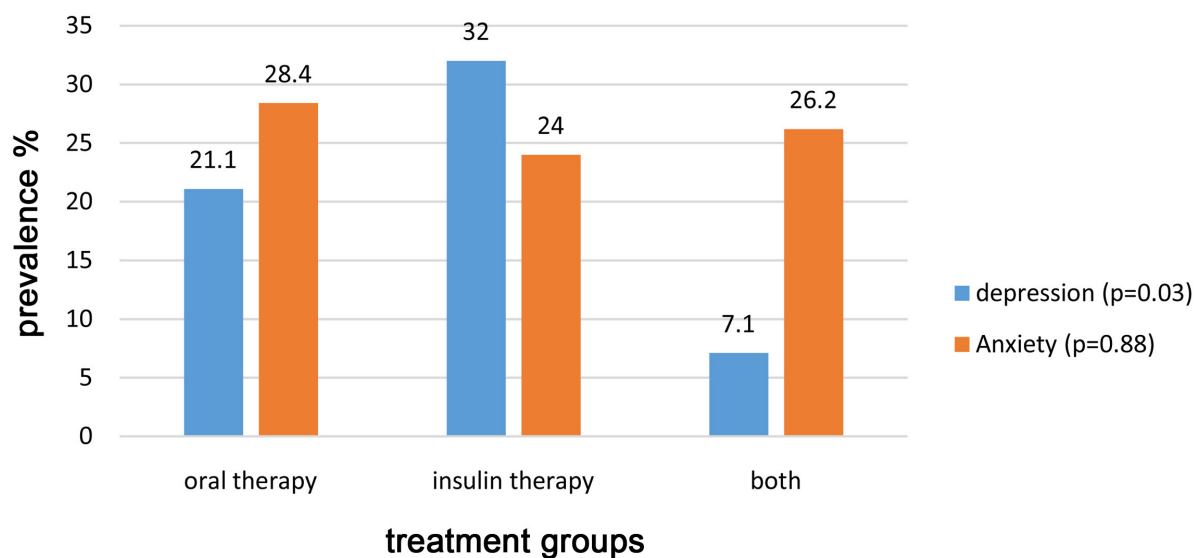


Figure 1. Prevalence of depression and anxiety in type 2 diabetics according to type of treatment.

Table 2. Physical quality of life in type 2 diabetics according to type of treatment.

	PF	RP	BP	GH	PCS
Oral therapy	48.74 ± 9.41	47.54 ± 10.84	48.84 ± 9.11	46.42 ± 13.44	60.17 ± 11.15
Insulin therapy	40.31 ± 9.04	35.43 ± 10.92	38.28 ± 15.93	41.03 ± 13.54	49.19 ± 12.14
Both therapies	48.89 ± 9.52	46.31 ± 11.27	49.92 ± 9.02	46.28 ± 13.58	59.66 ± 11.04
p-value	<0.0001	<0.0001	<0.0001	0.18	<0.0001

General Health (GH); Physical Functioning (PF); Role Physical (RP); Body Pain (BP); Physical Score (PCS).

Table 3. Mental quality of life in type 2 diabetics according to type of treatment.

	VT	RE	SF	MH	MCS
Oral therapy	56.98 ± 7.26	44.38 ± 8.00	45.72 ± 9.59	53.30 ± 9.05	48.30 ± 7.39
Insulin therapy	50.56 ± 11.80	38.18 ± 10.58	39.60 ± 13.26	43.57 ± 15.44	42.27 ± 12.60
Both therapies	57.33 ± 7.01	44.76 ± 8.14	48.87 ± 8.28	55.39 ± 9.54	50.42 ± 8.19
p-value	0.001	0.003	0.001	<0.0001	0.001

Vitality (VT); Social Functioning (SF); Role Emotional (RE); Mental Health (MH); Mental Score (MCS).

4. Discussion

Our study aimed to compare QoL and the prevalence of depression and anxiety between the groups of treatment: the anti-diabetics agents group, the insulin group and both therapy groups in diabetic type 2 patients.

The prevalence of depression was higher in patients on insulin compared to those on oral anti-diabetics or both treatments. This result is consistent with the literature [12] [13]. On the other hand, other studies [9] [19] have not found a significant difference between the prevalence of depression and the type of treatment.

The high risk of depression in patients on insulin may be explained by psychological resistance to insulin (PIR). The international research study by Polonsky *et al.* [20] showed a 17.2% prevalence of PIR in patients with type 2 diabetes. PIR is mainly due to negative beliefs about insulin: the technical aspect, the risk of weight gain and hypoglycemia, feelings of dependence, guilt or injustice and the severity of diabetes [21].

Besides, insulin therapy is usually prescribed after the failure of oral therapy. Therefore, its use is a symbol of advanced diabetes. According to the results of the DESMOND trial [22], depressive symptoms in diabetes do not manifest until at least 1 year after diagnosis. This may also explain the high prevalence of depression in patients on insulin.

In this study, we have not found any significant association between the type of treatment and anxiety. The same result was observed by Palizger *et al.* [23] and Trento *et al.* [24]. But researches [13] have shown a high prevalence of anxiety in patients on insulin.

Physical and mental QoL were more impaired in patients on insulin therapy. This result is in line with other studies [10] [25] [26]. The alteration of the QoL in our research may be related to the type of insulin therapy used. A prospective cohort study [27], of patients with insulin-dependent diabetes, that intensive insulin therapy with pens and pumps improves QoL more than traditional insulin therapy. However, other studies [28] found that insulin was associated with significantly greater improvements in QoL among patients with type 2 diabetes mellitus. These studies conclude that insulin therapy can indirectly contribute to good QoL by improving glycemic control and thus the prevention of diabetes

complications. The results from the UKPDS [29] showed that a switch to insulin therapy probably does not impact QoL. The differences in the results concerning the impact of treatment on QoL are due to the use of different measurement scales and the cultural variations of the populations.

This study is the first to our knowledge that investigated psychiatric disorders and quality of life according to type of the treatment in type 2 diabetics in Morocco. However, it has some limitations: First, because the study was conducted in a single hospital, the results may not be generalizable to all diabetics. Secondly, the study did not include diabetics followed in primary health care facilities, these patients may have different socio-demographic, economic and clinical characteristics than patients followed in the university center, which may affect the assessment of QoL and depression and anxiety.

5. Conclusion

In conclusion, patients with T2DM on insulin were associated with a high prevalence of depression and altered QoL. For insulin users, careful monitoring of depressive symptoms and continuous assessment of QoL should be incorporated into the management of the disease. After insulin initiation, communication with patients about their beliefs about insulin is necessary to overcome psychological resistance to insulin.

Declaration of Interests

The authors declare that they have no competing interest.

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