

# A cross-sectional assessment of health-related quality of life among type 2 diabetes patients in Riyadh, Saudi Arabia

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## Abstract

**Objective:** This study aimed to describe the health-related quality of life profile among type 2 diabetes patients in Riyadh, Saudi Arabia.

**Method:** A cross-sectional study was undertaken using a cohort of 75 patients attending the University Diabetic Centre at King Abdulaziz University Hospital, Riyadh, Saudi Arabia. EuroQoL-5 dimension (EQ-5D) scale was used for the assessment of health-related quality of life. EQ-5D was scored using values derived from the UK general population survey. Inferential statistics were applied to evaluate associations between study variables. The Statistical Package for Social Sciences version 20.0 was used for data analysis;  $p < 0.05$  was set as the level of statistical significance.

**Results:** Fifty-eight (77.35%) respondents were male with a mean  $12.6 \pm 8.4$  years of history of diabetes. Thirty-four (45.3%) were categorised into the age group of 45–55 years with a mean age of  $54 \pm 9.2$  years. Forty-four (58.7%) were using oral hypoglycaemic agents and 40 (53.3%) had a university level of education. A moderate level of health-related quality of life ( $0.70 \pm 0.22$ ) was measured in the study cohort. Gender was significantly associated with health-related quality of life scores ( $p = 0.001$ ). The mean EQ-5D score was lower in females compared to male patients ( $0.58 \pm 0.23$  vs  $0.74 \pm 0.20$ ). There were no statistically significant associations between health-related quality of life scores and age groups, duration of diabetes, marital status, educational level and type of treatment.

**Conclusion:** This study has highlighted that Saudi diabetes patients have low levels of health-related quality of life. Healthcare professionals need to consider this when planning holistic patient treatment approaches.

## Keywords

Type 2 diabetes, quality of life, Saudi Arabia, EuroQoL

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## Introduction

Diabetes refers to a group of metabolic diseases characterised by chronic hyperglycaemia that results from defects in insulin secretion, insulin action or both.<sup>1</sup> It is the most common chronic endocrine disorder, affecting nearly 5%–10% of the adult population in industrialised countries throughout the world.<sup>2</sup> There are two major types of diabetes: type 1 and type 2. Type 2 diabetes, which is non-insulin-dependent, is the most common type, affecting 90%–95% of diabetes patients.<sup>1</sup> The International Diabetes Federation (IDF)<sup>3</sup> has estimated that approximately 246 million adults had diabetes in 2007, an increase of 52 million since 2003; this is projected to increase to approximately 380 million by 2025. In the United States, diabetes affects approximately 23.6 million people

representing 7.8% of the population. In the Gulf region, the prevalence of diabetes mellitus has been estimated at 25.7%

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in Bahrain, 16.1% in Oman<sup>4</sup> and 21% in the United Arab Emirates.<sup>5</sup> In Saudi Arabia, the overall prevalence of diabetes was estimated to be 23.7%; the prevalence was higher in urban (25.5%) than rural regions (19.55%).<sup>6</sup>

Diabetes, in the long term, might have an adverse effect on the patient's health in general and his or her quality of life (QoL) in particular. Long-term diabetes is associated with micro-vascular complications (e.g. retinopathy and neuropathy) and macro-vascular complications (e.g. myocardial infarction, angina pectoris and stroke).<sup>7,8</sup> In addition to the long-term complications, incidents of hypoglycaemia, fear of hyperglycaemia and a sedentary life style also lead to a reduction in health-related quality of life (HRQoL).<sup>9</sup>

HRQoL is one of the essential measures that are used to assess the effect on health of the management of chronic disease.<sup>10</sup> HRQoL indicates the physical, psychological and social domains of the health state and is influenced by the person's expectations, beliefs, experiences and perceptions.<sup>11</sup> Health care does not only focus on decreasing morbidity and mortality and cost but also on the QoL for most chronic diseases.<sup>12</sup> Healthcare providers and researchers use HRQoL to understand the factors and aspects of the disease and treatment that have an effect on patients' HRQoL.<sup>12</sup> There are different aspects of HRQoL in diabetes patients including physical aspects, such as an inability to carry out physical activities due to diabetes-related complications, and psychological aspects, such as frustration because of high blood glucose levels.<sup>13</sup> In general, the QoL of an individual with diabetes is worse than that of a similarly aged person without diabetes, and an increase in the number of complications is associated with a poorer QoL.<sup>14</sup> HRQoL measures are needed to comprehensively evaluate patients' health states and add to the clinical data in order to obtain good diabetic outcomes.

In the Gulf region in general, and Saudi Arabia in particular, there is a paucity of data regarding the HRQoL of type 2 diabetes patients. Therefore, the objectives of this study were to measure HRQoL in Saudi type 2 diabetes patients and to determine the socio-demographic factors that affect QoL.

## Method

### Study design, settings and recruitment of subjects

A cross-sectional preliminary study of 75 people diagnosed with type 2 diabetes was conducted in the period from April to July 2012 at the University Diabetic Centre, King Abdulaziz University Hospital in Riyadh, Saudi Arabia. Type 2 diabetes patients attending the Diabetic centre for their normal visit were asked to participate in the study. The inclusion criteria for this study were patients of age 18 years and above diagnosed with type 2 diabetes for at least 1 year and willing to participate in the study. Patients who were pregnant, or planning to become pregnant, or with documented psychological problems, mental illness or renal failure were excluded from the study. All others meeting the

inclusion criteria were invited to participate; their written informed consent was obtained prior to data collection. They were assured of confidentiality of their responses and that they could drop out of the study with no penalty or effect on their healthcare provision.

### Ethics approval

The study was approved by the Institutional Review Board (IRB) Committee of the College of Medicine, King Saud University (IRB number: E-12-571).

### Study instruments

To measure HRQoL, we used the EuroQol 5-D instrument, which was developed in 1987 by EuroQol<sup>15</sup> research groups to measure HRQoL. It is a widely used and validated generic instrument and has the advantages of generalisability and comparability across studies that focus on patients' general well-being and ability to function in everyday life.<sup>16</sup> The EuroQoL-5 dimension (EQ-5D) involves patient self-reporting of their health status in terms of five dimensions: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (P/D) and anxiety/depression (A/D). Each dimension has a three-level scale (*no problems, some or moderate problems and extreme problems*). The scales are scored from 1 (*no problem*) to 3 (*extreme problem*) in each question. Five-digit codes for the HRQoL of each patient are obtained from the score digits; there are 243 possible sets of values for EuroQol 5-D (i.e. 3<sup>5</sup>). Response to the first part of the EQ-5D can be presented separately for each dimension in terms of a profile (EQ-5D<sub>profile</sub>) or converted to into a single weighted index score (EQ-5D<sub>index</sub>) using population preference scores.<sup>17</sup> The set of possible value yields an HRQoL score of between -0.59 and 1, where 1 represents preferred health, 0 represents death and a score of less than 0 represents health states worse than death.

The second part of the EQ-5D consists of 20 cm visual analogue scale (VAS) with endpoints of 0 denoting the worse imaginable state and 100 denoting the best health state; these are used to record the subject's perception of his or her QoL (EQ-5D<sub>VAS</sub>).

### Data analysis

Descriptive statistics were used to elaborate demographic and disease-related information. Percentages and frequencies were used for the categorical variables, while for continuous variables means and standard deviations (SDs) were calculated. Inferential statistics were applied to evaluate associations between study variables. The Kruskal–Wallis test for nonparametric variables was used to test the significance of differences between more than two groups and the Mann–Whitney U test was used to test significant differences between two groups. The Statistical Package for Social Sciences (SPSS) version 20.0 was used for data analysis;  $p < 0.05$  was taken as the level of statistical significance.

**Table 1.** Characteristics of the patients.

Variables	Frequency	%
Gender		
Male	58	77.3
Female	17	22.7
Age, years (mean $\pm$ SD = $54 \pm 9.2$ )		
Less than 45	8	10.7
45–55	34	45.3
56–65	24	32.0
Over 65	9	12.0
Marital status		
Married	69	92
Not married	6	8
Educational level		
Primary	14	18.7
Secondary	15	20.0
Intermediate	6	8.0
University	40	53.3
Job type		
Governmental	52	69.3
Business	10	13.3
Unemployed	13	17.3
Duration of diabetes, years (mean $\pm$ SD = $12.6 \pm 8.4$ )		
5 or less	18	24.0
6–10	18	24.0
11–15	14	18.7
16–20	14	18.7
More than 20	11	14.7
Type of treatment		
Diet only	3	4.0
Oral	44	58.7
Insulin only	5	6.7
Oral and insulin	23	30.7

SD: standard deviation.

## Results

### Patient characteristics

Seventy-five type 2 diabetes patients were included in this study. The socio-demographic characteristics and disease-related data of the patients are described in Table 1. The mean age of the cohort was  $54 \pm 9.2$  years. Thirty-four (45.3%) were categorised into the age group of 45–55 years. Fifty-eight (77.3%) were male and the mean duration of their diabetes was  $12.6 \pm 8.4$  years. A total of 69 (92%) were married. Forty (53.3%) had a university level of education and 52 (69.3%) worked for the government. Forty-four (58.7%) were using oral hypoglycaemic agents.

### EQ-5D and EQ-VAS

As shown in Table 2, the mean EQ-5D and EQ-VAS scores were  $0.71 \pm 0.22$  and  $68.5 \pm 16.8$ , respectively. The EQ-5D was scored using population preference scores in the United

Kingdom.<sup>17</sup> There was a statistically significant difference between gender and the mean score of HRQoL ( $p=0.001$ ). The mean EQ-5D and EQ-VAS scores were lower in female compared to male patients ( $0.58 \pm 0.23$  vs  $0.74 \pm 0.20$  for EQ-5D and  $62.6 \pm 12.5$  vs  $70.2 \pm 17.5$  for the EQ-VAS score). Patients older than 65 years produced higher EQ-5D and EQ-VAS scores than patients less than 45 years, but the difference was not statistically significant. Similarly, married patients produced higher HRQoL scores than unmarried patients, but the difference was not statistically significant.

There was no significant association between HRQoL scores and other variables, such as job type, duration of the disease and educational level. There was no statistically significant relationship between treatment type and EQ-5D score. The EQ-5D score was  $0.81 \pm 0.15$  in patients receiving diet and exercise therapy,  $0.75 \pm 0.20$  in those receiving oral hypoglycaemic agents,  $0.68 \pm 0.04$  in those receiving insulin and  $0.62 \pm 0.26$  in those receiving oral hypoglycaemic agents and insulin. There was a significant correlation between EQ-5D and EQ-VAS scores (Pearson coefficient 0.455,  $p < 0.001$ ).

A total of 20 different (EQ-5D<sub>profile</sub>) health states were reported by the patients. Of the respondents, 16% ( $n=12$ ) showed no problems in any of the five domains (11111). Eleven respondents (14.7%) reported no problems in the second, third and fifth domains, and moderate problems in the first and fourth domains (21121), and 13.3% ( $n=10$ ) reported no problems in the first, second and third domains, while there are moderate problems in the fourth and fifth domains (11122). The five dimensions (MO, SC, UA, P/D and A/D) can take one of three responses. The responses record three levels of severity (no problems/some or moderate problems/extreme problems) within a particular EQ-5D dimension. The results are shown in Table 3.

## Discussion

HRQoL is one of the important outcomes used to evaluate the effect on health of the management of chronic diseases. To our knowledge, this is the first study to investigate the HRQoL of type 2 diabetes patients using the EQ-5D instrument in the Saudi population. We calculated the EQ-5D scores and evaluated the relationships between the EQ-5D and VAS scores, and the socio-demographic characteristics of type 2 diabetes patients that correlate with HRQoL. Other studies have showed that the EQ-5D has been used to measure the HRQoL of diabetes patients.<sup>18–22</sup> We used the EQ-5D in this study because it is simple to use and takes a short time to complete, compared to other generic instruments.<sup>23</sup> In this study, the mean age of the participants was  $54 \pm 9.2$  years, which was similar to the patients in the study conducted in Saudi Arabia by Al-Tuwijri et al.<sup>24</sup> It is apparent from previous studies that type 2 diabetes patients have moderately lower scores of HRQoL than the general population of similar age.<sup>10,25</sup> The mean score in our study of EQ-5D in type 2

**Table 2.** Demographic characteristics of the study patients with differences in EQ-5D and EQ-VAS (N=75).

Variables	N	EQ-5D score				p-Value	EQ-VAS score					
		Mean	SD	Median	IQR		Mean	SD	Median	IQR	p-Value	
Gender <sup>a</sup>						0.001*						0.03*
Male	58	0.74	0.20	0.72	0.13		70.2	17.5	70.0	20.0		
Female	17	0.58	0.23	0.62	0.30		62.6	12.5	65.0	20.0		
Age, years <sup>b</sup>						0.717						0.556
Less than 45	8	0.66	0.29	0.76	0.46		65.0	14.8	67.50	16.25		
45–55	34	0.69	0.23	0.72	0.16		68.0	18.1	70.00	21.25		
56–65	24	0.71	0.21	0.72	0.22		68.7	12.7	70.00	20.00		
More than 65	9	0.79	0.11	0.81	0.14		72.7	23.5	80.00	27.50		
Marital status <sup>a</sup>						0.219						0.068
Married	69	0.72	0.21	0.72	0.19		69.3	16.9	70.00	20.00		
Not married	6	0.54	0.32	0.67	0.66		59.2	12.0	62.50	22.50		
Educational level <sup>b</sup>						0.163						0.973
Primary	14	0.62	0.23	0.70	0.18		68.5	13.6	70.00	22.50		
Intermediate	6	0.63	0.31	0.69	0.31		67.5	14.7	70.00	21.25		
Secondary	15	0.75	0.19	0.79	0.19		68.3	18.6	70.00	20.00		
University	40	0.73	0.21	0.72	0.12		68.7	17.8	70.00	20.00		
Job type <sup>b</sup>						0.154						0.187
Governmental	52	0.70	0.23	0.72	0.19		67.8	15.9	70.00	20.00		
Business	10	0.80	0.14	0.85	0.18		76.0	15.0	75.00	22.50		
Unemployed	13	0.64	0.20	0.72	0.15		65.3	20.7	65.00	30.00		
Duration of diabetes, <sup>b</sup> years						0.943						0.317
5 or less	18	0.66	0.28	0.72	0.31		67.7	21.9	70.00	27.50		
6–10	18	0.73	0.22	0.74	0.26		71.1	13.0	70.00	16.25		
11–15	14	0.72	0.20	0.69	0.23		66.4	12.6	70.00	22.50		
16–20	14	0.72	0.20	0.72	0.20		74.2	15.9	80.00	26.25		
More than 20	11	0.70	0.17	0.72	0.12		60.9	17.7	65.00	15.00		
Type of treatment <sup>b</sup>						0.072						0.864
Diet only	3	0.81	0.15	0.72	0.00		65.0	8.6	70.00	0.00		
Oral	44	0.75	0.20	0.76	0.12		68.6	18.7	70.00	20.00		
Insulin only	5	0.68	0.04	0.69	0.08		70.0	10.0	70.00	20.00		
Oral and insulin	23	0.62	0.26	0.69	0.17		68.4	15.4	70.00	30.00		

EQ-5D: EuroQoL-5 dimension; SD: standard deviation; VAS: visual analogue scales; IQR: interquartile range; HRQoL: health-related quality of life. The mean HRQoL score was  $0.71 \pm 0.22$  with VAS score of  $68.5 \pm 16.8$ .

<sup>a</sup>Mann–Whitney test.

<sup>b</sup>Kruskal–Wallis test.

\* $p < 0.05$ .

diabetes patients was 0.71 which is consistent with studies conducted in other countries that reported mean EQ-5D scores of 0.74, 0.69, 0.70 and 0.70.<sup>10,20,26,27</sup>

The HRQoL of type 2 diabetes patients is influenced by various socio-demographic characteristics. There was a significant difference in the HRQoL between males and females in our study; the mean score of the EQ-5D was lower in female compared to male patients. This is similar to the findings of other studies that reported a better HRQoL in diabetes males than females.<sup>19–21,28</sup> This difference could be due to lifestyle behaviour differences between men and women in Saudi society as women normally spend most of their time in their houses; this can lead to lower physical activity and bad habits in eating.<sup>24</sup> In addition, men were able to control their

diabetes more and were less likely than women to have depression or anxiety.<sup>29</sup>

There was no significant difference between age groups. In contrast, different studies reported that increased age was associated with lower HRQoL.<sup>20,26,28</sup> However; O'Reilly et al.<sup>27</sup> reported that HRQoL increased with age. The literature suggests that marital status is associated with HRQoL, but our results showed that patients who were married had higher HRQoL scores than diabetes of other marital status. Nevertheless, the difference was not statistically significant which is in line with the findings of Amer et al.<sup>13</sup>

The duration of diabetes was not associated with HRQoL and this result is in line with the findings reported by some studies which found no association between diabetes

**Table 3.** Frequency of self-reported (EQ-5D) health states.

EQ-5D states	N	% Age
11111	12	16.0
11112	3	4.0
11121	4	5.3
11122	10	13.3
11123	3	4.0
11221	1	1.3
12223	1	1.3
12232	1	1.3
13122	1	1.3
21111	7	9.3
21112	1	1.3
21121	11	14.7
21122	6	8.0
21211	1	1.3
21221	2	2.7
21222	7	9.3
21223	1	1.3
22122	1	1.3
22322	1	1.3
23222	1	1.3

EQ-5D: EuroQoL-5 dimension.

duration and HRQoL.<sup>13,18,30–32</sup> However, a number of studies found an association between increased duration of diabetes and a decrease in HRQoL.<sup>26,27,33</sup> In addition, EQ-5D and VAS scores in our study revealed no significant association between the type of treatment (diet, oral agents, insulin only, oral and insulin) and HRQoL in patients with type 2 diabetes which is consistency with previous studies.<sup>21,26</sup> With respect to the self-reported (EQ-5D) health states and the domain that has more influence among type 2 diabetes patients, the SC domain was more influential in our study, which is in linewith the findings of study from Norway.<sup>22</sup>

## Limitations

This study had some limitations. The study was conducted in one hospital in Riyadh city. In addition, the sample size is small and no sample size calculation was performed. However, it can provide a preliminary data about the current level of HRQoL. Moreover, the study was able to determine some factors affecting the HRQoL, particularly the gender of the patient. However, due to these limitations, the results of this study cannot be generalised to the whole country. Thus, the findings of this study warrant a large-scale study to assess the level of HRQoL of diabetes patients in Saudi Arabia.

## Conclusion

This study has highlighted that Saudi diabetes patients have low levels of HRQoL. Healthcare professionals need to take this factor into account when planning holistic patient treatment approaches.

## Declaration of Conflicting Interests

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