Can Quality of Life Questionnaires be Used in Diabetics to Assess the Relation between HbA1c and Patients' Domain Aspects?

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Abstract- Over the past few decades, quality of life (QOL) has become an important concept in medical researches and treatments. Different meaningful reasons are given for this development. In the current research two standard questionnaires for evaluating of QOL were selected. First one, was a questionnaire from The World Health Organization (WHOQOL-BREF 26) and the second one, The Iranian Diabetics' Quality of Life (IRDQOL). The goal of this study is to assess the relation between different domains of these questionnaires and HbA1c in diabetics. A random sample of Iranian adult outpatient diabetics (n=76) was selected and they completed the WHOQOL and IRDQOL assessment instruments. In addition HbA1c was measured in these patients by calorimetric method. Comparisons were made between scores of "questionnaires' domains" and "HbA1c". Data analysis was carried out by the use of T-test, Spearman correlation coefficient, Pearson's correlation coefficient, and non-parametric statistical methods including Spearman correlation coefficient. Data analysis shows Psychological domain score in IRDQOL is lower than in WHOQOL and it is significant ($P<0.0001$). Physical domain score in IRDQOL is lower than WHOQOL and it is significant ($P<0.0001$). In WHOQOL questionnaire, analysis data showed when the patient's age increased, physical and psychological domain's score decreased. There is probably no relation between questionnaire domains and HbA1c in diabetics. Based on the findings in this research, there was obviously almost no difference between the two questionnaires for checking the QOL, but in IRDQOL spiritual domain is a very unreliable domain.

Introduction

Quality of life (QOL) is an important outcome in clinical trials and health care interventions (1). Generic instruments, particularly those measuring health status and symptoms, were shown to be useful in providing information about functional health status (2). Several basic types of them have been used studies on QOL in individuals with diabetes mellitus. The weighted scores obtained allow researchers and clinicians to identify life domains of importance to a patient, and which of them are most negatively affected by diabetes (3).

Literature review shows that the World Health Organization Quality of Life questionnaire (WHOQOL-BREF 26) is one of the most popular instruments in QOL assessment. It has developed as an internationally-applicable QOL assessment instrument. There are four main principles emerged from the vast literature on QOL assessment in WHOQOL questionnaire (4) including psychological, social, environmental and physical aspects of health, which have been increasingly recognized over the last decade (5).

On the other hand, one of the most recent reliable, valid, standard Persian questionnaires in QOL is the IRDQOL which has four broad domains including:

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Physical, Psychological, Social Relations and Spiritual (6). The aim of this study was to assess the relation between different domains of these questionnaires and HbA1c in diabetics. For best results we evaluated the relationship between glycemic control and QOL (Total QOL, QOL domains) in the two questionnaires.

Patients and Methods

This cross-sectional study was carried out in an urban federally-funded diabetics' clinic in Bandar Abbas – Iran - during June, July and august 2006. 76 patients with diabetes type I and II (46 women, 30 men) were chosen from out-patients. All the cases were diagnosed as diabetic for at least one year before the study. First, patients were visited by an internist. The glycemic control was determined by measuring HbA1c on the same day at the time of questionnaire completion (7). Hb1Ac was measured by calorimetric method (8). Both WHOQOL-BREF 26 and IRDQOL questionnaires were filled out by interview.

WHOQOL-BREF is the abbreviated version of the original WHOQOL instrument which includes 100 items. It is a 26-item generic QOL instrument developed by WHO as a multilingual, multidomainal profile of QOL for cross-cultural use (9,10). WHOQOL-BFEF has four broad domains namely: Physical, Psychological, Social Relations and Environmental domains. The instrument assesses satisfaction with life as well as the impact of disease or illness, and it captures positive and negative aspects of QOL. It was validated for Persian by Aghamolaei et al. (5). Individual items are rated on a 5 point Likert scale where 1 indicates low, negative perceptions and 5 indicates high, positive perceptions. As such, domain and facet scores are scaled in a positive direction where higher scores denote higher quality of life (9). IRDQOL has 41 items and is divided into four broad domains namely: Physical, Psychological, Social Relations and Spiritual. One item is specific to married patients (*my wife/husband supports me…*) and one item is specific to unmarried patients (*diabetes has restricted my chance for marriage*). The score of the questionnaire is from 40 to 160. The higher score shows better QOL. Individual items are rated on a 4 point Likert scale where 1 indicates lowest negative perceptions and 4 indicates highest positive perceptions. As such, domain and facet scores are scaled in a positive direction where higher scores denote higher quality of life (6). We converted score domains as percentile in two questionnaires, each of the questionnaires was analyzed separately (11). The patients were classified into

different groups based on glycemic control (3 groups), duration of diabetes (2 groups), sex (2 groups), literacy level (2 groups) and mode of treatment (3 groups). Each of the questionnaires was analyzed separately.

Data analysis was carried out by the use of T-test, Spearman correlation coefficient, Pearson's correlation coefficient, and non-parametric statistical methods including Spearman correlation coefficient. Cronbach's alpha coefficient was calculated for WHOQOL and IRDQOL to determine reliability and internal consistency (12). The level of significance was defined as $P < 0.05$. Data analysis based on Pearson correlations in the two questionnaires showed all subscales and Total QOL has highly acceptable test-retest reliability. Cronbach α for internal consistency reliability for the overall WHOQOL score was 0.896 and for the overall IRDQOL was 0.866.

Results

Table 1 shows demographic characteristics and Chart1 shows BMI status in total patients.

Table1. Demographic and Clinical Data

N=76		n (%)
Age (years)		**47 ± 12.04**
Sex	Male	39.5(%)
	Female	60.5(%)
Marital status	Married	89.6 (%)
	Single	10.4(%)
Education	Literate only	35.1(%)
	Nine years	46.8(%)
	Twelve years and over	18.1(%)
Smoking	Not smoking	85.7(%)
	Currently smoking	14.3(%)
Type of diabetes	Type 1	11.8(%)
	Type 2	88.2(%)
Type of treatment	Diet alone	4.2(%)
	Oral pills	71.1(%)
	Insulin	24.7(%)
Other conditions	Cardiac disease	6.57(%)
	Hypertension	28.94(%)
	Severe loss of vision	2.63(%)
	Renal disease	2.63(%)
	Without any condition	59.23(%)
HbA1c	Good (<7.5%)	28.57(%)
	Acceptable (7.5-8.4%)	25.4(%)
	Poor (=>8.5%)	46.03(%)
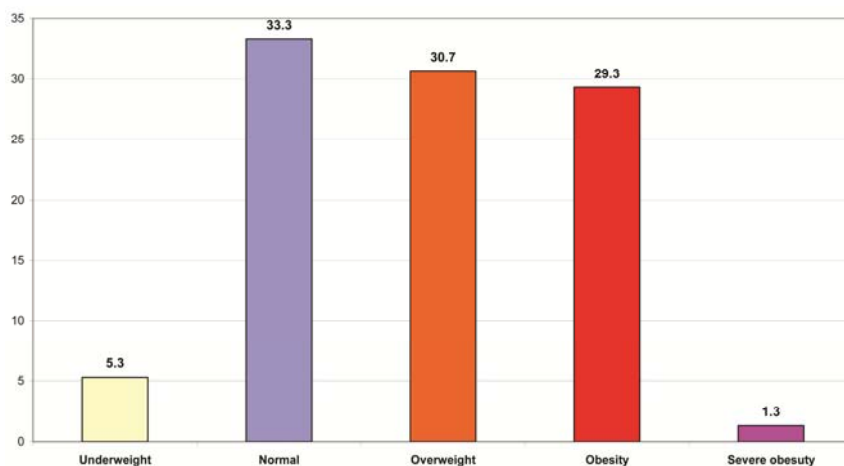
**Figure1.** Frequency of patients in according body mass index (BMI)

Data analysis shows Psychological domain score in IRDQOL was lower than in WHOQOL and it was significant (59.5±9.1 vs. 66.52±12.25; $P<0.0001$). The physical domain score in IRDQOL was lower than in WHOQOL and it was significant (57.03±13.83 vs. 65.45±9.81; $P<0.0001$). The total IRDQOL score was the same as the total WHOQOL score and it was not significant (63.13±9.89 vs.; 65.54±10.52). Comparisons between Social score in IRDQOL and WHOQOL shows it was not significant (Figure 2).

Data analysis in WHOQOL questionnaire showed psychological domain in patients with "less than 6 years education" was lower than patients with more education and it was significant ($P=0.041$). No other significant results were observed in the study.

There was a positive correlation between age and duration of diabetes (r=-296, $P<0.001$). Table 2 shows Correlation between social, psychological and physical domain between two questionnaires respectively.

Total QOL is more highly correlated with social and physical domains in IRDQOL. In WHOQOL, Total QOL is more highly correlated with psychological and environmental domains. In IRDQOL spiritual domain is not correlated with Total QOL and other domains (Table 3).

There was not any other significant correlation between other clinical and demographic variables with different domains of quality of life in two questionnaires (Table 4).
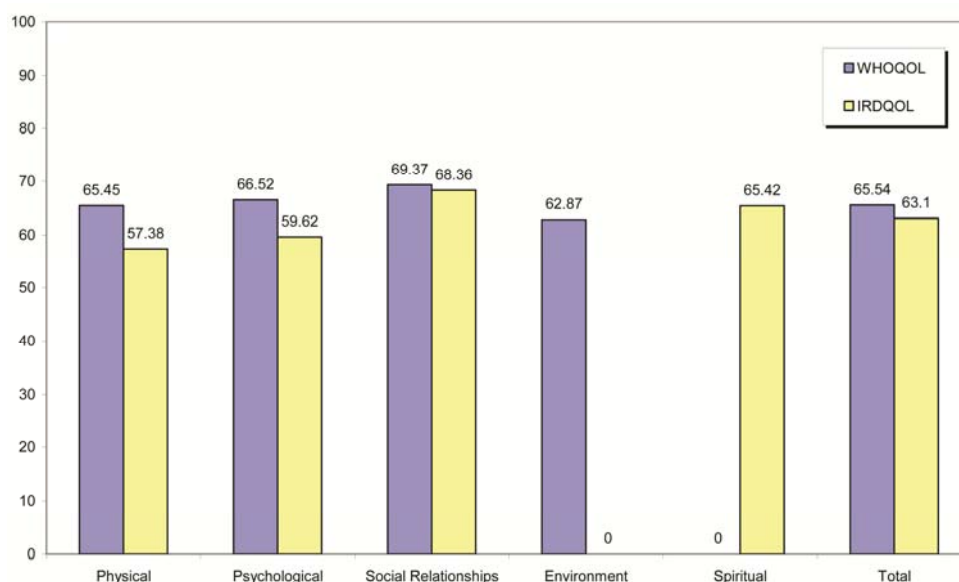
Figure 2. Compare two questionnaires in different dimensional aspects (in percentile level)

Table 2. Correlation between WHOQOL and IRDQOL domains

Questionnaire Domain	WHOQOL μ ± SE	IRDQOL μ ± SE	Correlation r	P
Psychological	66.52 ± 1.47	59.54 ± 1.1	0.257	0.033
Physical	65.45 ± 1.2	57.03 ± 1.7	0.370	0.002
Social	69.37 ± 1.88	69.53 ± 1.63	0.353	0.004

WHOQOL = World Health Organization Quality of Life.

IRDQOL = Iranian Diabetes Quality of Life.

r = Pearson's correlation coefficient.

P < 0.05 indicates statistically significant relationship.

Discussion

There are lots of researches focusing on relationship between glycemic control and QOL in people with diabetes. They generally suggest that better glycemic control is associated with better QOL (13). While like *Tumer* and *Trief* studies (14,15) we could not find the above association in none of the questionnaires. Some authors suggest that there may be a curvilinear relationship between HbA1C and health related QOL, implying lowest QOL in patients with the highest HbA1c levels (>8.1%), highest in those with HbA1c levels 7.1-8% and intermediate in those with the lowest HbA1c levels (<7.0%) (16). Some studies fail to reveal this relation; moreover, they do not counterbalance the instances of significant relationships (15). In this study, curvilinear hypothesis was also tested in both the questionnaires but it is not support for the questionnaires.

The comparison of Total QOL and the four domains revealed no significance difference between females and males. But in another study carried out on IRDQOL Questionnaire, Total QOL was higher in males than females and was significant (6). In WHOQOL questionnaire, analysis data showed when the patient's age increased, physical and psychological domain's score decreased. It is supported by other studies (17) while some other studies do not support it (6,18).

Calculated parameters of reliability in WHOQOL and IRDQOL questionnaires indicated that stability (test–retest reliability) present promising results in Total QOL.

In IRDQOL questionnaire physical, psychological and spiritual domains did not show a high internal consistency. In addition, the internal consistency of spiritual domain was not only low but also negative. To explain this problem, it is reminded that spiritual domain had only 3 items and it was not enough yet to evaluate spiritual condition in patients suffering from diabetes.

Table 3. Relationship between different domains of quality of life (WHOQOL and IRDQOL) and other clinical and demographic variables

	Psychological				Physical				Social				Environmental		Spiritual	
	WHOQOL		IRDQOL		WHOQOL		IRDQOL		WHOQOL		IRDQOL		WHOQOL		IRDQOL	
Variable	R	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Duration of Diabetes	0.067	0.58	0.053	0.656	0.091	0.46	0.11	0.32	0.081	0.52	0.049	0.68	0.168	0.174	0.038	0.75
BMI	0.066	0.591	0.038	0.75	0.018	0.884	0.047	0.691	0.132	0.303	0.224	0.056	0.135	0.28	0.005	0.967
HBA1c	0.138	0.311	0.066	0.611	0.074	0.589	0.146	0.261	0.042	0.763	0.199	0.125	0.199	0.144	0.016	0.905
Age	0.128	0.298	0.02	0.868	0.303	0.014	0.114	0.335	0.042	0.473	0.096	0.417	0.154	0.218	0.066	0.580

WHOQOL = World Health Organization Quality of Life.

IRDQOL = Iranian Diabetes Quality of Life.

r = Pearson's correlation coefficient.

P < 0.05 indicates statistically significant relationship.

Table 4. Relationship between Total QOL and domains in two questionnaires

			Physical	Psychological	Social	Environmental
WHOQOL	**Physical**	Pearson Correlation	1			
		Sig. (2-tailed)				
	Psychological	Pearson Correlation	0.539(**)	1		
		Sig. (2-tailed)	0.000			
	Social	Pearson Correlation	0.518(**)	0.657(**)	1	
		Sig. (2-tailed)	0.000	0.000		
	Environmental	Pearson Correlation	.553(**)	0.769(**)	.643(**)	1
		Sig. (2-tailed)	0.000	0.000	0.000	
	Total QOL	Pearson Correlation	0.762(**)	0.899(**)	0.838(**)	0.928(**)
		Sig. (2-tailed)	0.000	0.000	0.000	0.000
			Physical	Psychological	Social	spiritual
IRDQOL	**Physical**	Pearson Correlation	1			
		Sig. (2-tailed)				
	Psychological	Pearson Correlation	0.582(**)	1		
		Sig. (2-tailed)	0.000			
	Social	Pearson Correlation	0.643(**)	0.558(**)	1	
		Sig. (2-tailed)	0.000	0.000		
	Spiritual	Pearson Correlation	0.095	0.034	0.134	1
		Sig. (2-tailed)	0.421	0.774	0.255	
	Total QOL	Pearson Correlation	0.809(**)	0.768(**)	0.917(**)	0.042
		Sig. (2-tailed)	0.000	0.000	0.000	0.723

**Correlation is significant at the 0.01 level (2-tailed).   N= 76 patients

Another point focused in our study is the issue of items distribution in the questionnaires. In IRDQOL, distribution of the items in the 4 domains was not equal (44.7% social, 31.5 psychology, 18.4 physical and 7.8% spiritual domain) while WHOQOL had a better distribution (29.2% physical, 25% psychological, 33.3% environmental and 12.5% social domain).

It is concluded that there are differences between the two questionnaires for assessing QOL. IRDQOL is a specific questionnaire for evaluating QOL in diabetic patients and WHOQOL is a general instrument for evaluating QOL. In IRDQOL spiritual domain is a very unreliable domain. We recommend more questions to be added spiritual domain in IRDQOL questionnaire and also distribution of items to be some how equal in four domains. By these, it may help to find some rational relations between afore-mentioned domains and glycemic control.

Acknowledgements

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