

# Subjective Quality of Life of Outpatients with Diabetes: Comparison with Family Caregivers' Impressions and Control Group

Abdel W. Awadalla, PhD; Jude U. Ohaeri, MD, FRCPsych (UK); Adel M. Tawfiq, MB, MSc; and Shafika A. Al-Awadi, MRCP (UK)

Safat, Kuwait

**Background:** There is a paucity of studies on comparison of quality of life (QOL) of type-1 and type-2 diabetes patients, and the impact of family caregivers' impressions on the QOL of patients.

**Objectives:** To assess the subjective QOL of Sudanese diabetics using the WHOQOL-Bref, compared with a general population sample; examine caregiver-patient concordance; and assess the variables that impact on QOL.

**Method:** The responses of 105 outpatients with type-1 diabetes and 136 with type-2 diabetes were compared with their family caregivers' impressions and 139 general population subjects.

**Results:** Patients were predominantly dissatisfied with their life circumstances. Type-1 diabetics had significantly lowest QOL scores, while the control group had highest scores. Having additional medical problems; having diminished sexual desire; and being young, unemployed and single were associated with poor QOL, but illness duration was not. Type-2 diabetics had lesser concordance with caregivers. The only predictor of patients' QOL was the caregivers' impression of patients' QOL.

**Conclusions:** Caregivers' impression of patients' QOL impacted on outcome. Caregiver education is, therefore, important. The factors associated with QOL indicate a group that needs focused attention. The good QOL for type-2 and nonsignificance of illness duration encourage therapeutic optimism.

**Key words:** quality ■ life ■ diabetes ■ concordance

© 2006. From the Departments of Psychiatry (Awadalla, assistant professor) and Medicine (Al-Awadi, assistant professor), Faculty of Medicine, Kuwait University, and Psychological Medicine Hospital (Ohaeri, consultant psychiatrist; Tawfiq, psychiatrist), Safat, Kuwait. Send correspondence and reprint requests for *J Natl Med Assoc.* 2006;98:737-745 to: Dr. A.W. Awadalla, Department of Psychiatry, Faculty of Medicine, Kuwait University, P.O. Box 24923, Safat, Kuwait 13110; phone: 965-5330467; fax: 965-4986303; e-mail: awadal@yahoo.com

## INTRODUCTION

Research interest in the psychosocial aspects of diabetes mellitus is in line with its recognized psychosomatic dimensions.<sup>1,2</sup> This interest has led to the consensus that the primary goals in treatment are maintaining normal blood glucose levels and achieving a relatively normal quality of life (QOL).<sup>3</sup> This emphasis on QOL underscores the finding that clinical variables alone do not comprehensively capture patients' perceptions of their health.<sup>4</sup> The clinical value of this finding is that psychosocial therapies have been applied as adjuncts to drug treatment, to improve regimen adherence and QOL;<sup>5</sup> and diabetes-specific QOL scales have been developed.<sup>6,7</sup> Assessment of QOL is a formalized way of talking about the personal side of the illness.<sup>8</sup> The literature indicates that diabetics have a worse QOL than people with no chronic illness, and duration and type of diabetes are not consistently associated with QOL.<sup>9,10</sup> The factors associated with QOL in diabetes include depression,<sup>11</sup> sexual dysfunction,<sup>12,13</sup> existence of other health problems and complications of diabetes, and quality of family relationships.<sup>8,14</sup> These factors are attributable to the demands of the illness and the psychological reactions to the demands.<sup>15</sup> In order to understand the relative contribution of these factors, researchers articulated theoretical models of QOL.<sup>3,16</sup>

However, except in the case of children and adolescents,<sup>17</sup> there have been no attempts to assess the impression of family caregivers of diabetic patients on the QOL of the adult patients, and hence we do not know the impact of the caregivers' impressions on patients' QOL. Katschnig<sup>18</sup> has suggested that it is necessary to involve family members for additional views on aspects of QOL. In this regard, the literature on "expressed emotions" (the impact of emotional interactions in the family on clinical outcome) shows that family caregiver's positive appraisal of the patient has a positive impact on clinical outcome.<sup>19</sup> In line with this, the caregiver's impression

of the patient's subjective QOL was found to be the most important predictor of the patient's,<sup>20</sup> and caregiver's QOL.<sup>21</sup> Hence, research concerning the dynamics of family relationships in diabetes needs to look beyond the quality of marital relations<sup>8</sup> and social support.<sup>14,22</sup> Furthermore, there is a paucity of studies comparing the QOL of type-1 and type-2 diabetes, and these reports are rare from the African and Arab world.<sup>22,23</sup>

Based on the above considerations, the theoretical framework for our study was that the subjective QOL of community-living adult diabetic patients would be a function of the characteristics of the illness, characteristics of the patient and characteristics of the family caregiver.<sup>3,16</sup>

The objectives of our study were:

- to assess the subjective QOL of community-living adult Sudanese type-1 and type-2 diabetic patients using the WHO 26-item Quality of Life Instrument (WHOQOL-Bref);
- to compare their ratings with those of a general population sample;
- to examine the concordance between the ratings

of the patients and the family caregivers' impressions of the patients' QOL;

- to assess the impact on QOL, of sociodemographic variables, age at onset of illness, duration of illness, and complications of the illness and treatment (erectile dysfunction, lack of sexual desire, hypoglycemia, gastrointestinal symptoms<sup>24</sup>);
- to assess the diagnostic differences in the patient-caregiver concordance of ratings of QOL, and the association of patients' and caregivers' characteristics with caregivers' impressions of patients' QOL;
- to assess the characteristics of the patient, illness and family caregiver that can predict the patient's subjective QOL.

Based on evidence from the literature,<sup>22,23,25</sup> we hypothesized as follows: first, most patients would be satisfied with items related to family supports and general well-being but not with items related to the poor national economy. Patients with disease and treatment complications would have significantly less QOL scores. Second, QOL domain scores would not be significantly associated with duration

**Table 1. Sociodemographic and clinical characteristics of diabetic patients and general population group**

Variables	Type-1 Diabetes N=105 (%)	Type-2 Diabetes N=136 (%)	Gen Popn Group N=139 (%)	F (or $\chi^2$ )	Df	P
Age						
15-40	62 (60.8)	39 (31.7)	114 (82.0)			
41-65	40 (39.2)	84 (63.3)	25 (17.9)			
Mean (SD)	37.1 (13.6)	45.9 (12.1)	31.1 (8.2)	43.2	2/363	0.000
Gender						
Male	54 (51.4)	56 (45.6)	87 (62.6)			
Occupation						
Unemployed	53 (50.5)	99 (73.3)	59 (42.4)			
Skilled	23 (21.9)	22 (16.3)	39 (28.1)	29.9	4	0.000
Education						
None/primary	39 (37.5)	81 (60.4)	10 (7.2)			
High school/college	65 (62.5)	53 (39.5)	128 (92.8)	85.6	4	0.000
Marital						
Single	38 (36.2)	19 (14.0)	92 (66.7)			
Married	56 (53.3)	93 (68.4)	37 (26.8)	80.9	4	0.000
Age onset illness	26.5 (14.2)	35.9 (12.8)		5.2	223	0.000
Illness duration	10.9 (9.3)	11.5 (10.9)				ns
Hypoglycemia (%)	43 (41.3)	56 (41.5)				ns
GI symptoms (%)	29 (27.9)	51 (37.8)				ns
Erectile dysfunction (N=108)						
Frequent (%)	7 (13.5)	11 (19.6)				
Occasional	21 (40.4)	19 (33.9)				ns
Sexual desire						
No sexual desire	32 (30.5)	37 (27.4)				
Occasionally	36 (34.3)	46 (34.1)				ns
Caregiver's relationship to patient						
Parent	23 (21.9)	13 (9.6)				
Sibling	27 (25.7)	19 (14.0)				
Spouse/offspring	38 (36.2)	75 (55.1)		15.7	3	0.001

of illness, sociodemographic and diagnostic characteristics. Third, the general population subjects would have significantly higher QOL scores. Fourth, there would be no significant diagnostic differences in patient–caregiver concordance, and parents would rate the patients higher. Fifth, the most significant predictor of the patients’ QOL would be the caregivers’ impression of the patients’ QOL.<sup>20,21</sup>

The clinical relevance of these hypotheses is that they could delineate a subset of stable patients whom clinicians need to give focused attention and identify the patient and family characteristics that can be tapped as adjuncts to drug treatment to make for better quality of care.

**METHODS**

**Operational Definitions**

We accepted the WHO definition of QOL as individuals’ perception of life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns.<sup>26</sup> Our focus was on subjective QOL, as

distinct from objective QOL.<sup>25</sup> We defined subject’s satisfaction as the level of positive appreciation for each item. We quantified each group’s satisfaction with each item as ≥50% of respondents in the group positively appreciating the item, dissatisfaction (<50%), bare satisfaction (50–65%), moderate satisfaction (66–74%) and highest satisfaction (≥75%).<sup>25</sup>

**Subjects and Setting**

Following our theoretical framework, we controlled for the effect of severity of symptoms by choosing patients who were functioning stably at home. For the impact of disease complications, we analyzed for differences in QOL domain scores for patients who admitted having the relevant symptoms,<sup>12,13,24</sup> and compared with a general population group.

The patients were consecutive medical clinic attendees who fulfilled the study’s inclusion criteria. In order to have patients with sufficient experience of the illness, we chose those who were confirmed ill for at least one year and were regularly on treatment. Each patient was accompanied by a family member who lived in daily contact, was articulate

**Table 2. Comparative level of group satisfaction with QOL items**

<b>Highest Satisfaction</b> <b>(≥75% Subjects)</b>	<b>Moderate Satisfaction</b> <b>(66–74% Subjects)</b>	<b>Bare Satisfaction</b> <b>(50–65% Subjects)</b>	<b>Dissatisfied</b> <b>&lt;50% Subjects)</b>
	<i>A. Type-1 Diabetes Patients</i>		
		Life meaningful (56.3%), ability to get around (50.5%), personal relations (51.5%)	All other items
	<i>B. Type-2 Diabetes Patients</i>		
Personal relations (77.2%)	Life meaningful (74.3%), self-satisfaction (68.9%), condition of living place (68.1%)	Feeling safe daily life (58.1%), physical environmental health (61.5%), bodily appearance (61.9%), ability to get around (57.4%), sleep satisfaction (51.1%)	All other items
	<i>C. Caregivers’ Impression of Patients’ QOL</i>		
	Life meaningful (71.6%)	Health satisfaction (61.3%), enjoy life (56%), safety in life (53.9%), environment (56.8%), bodily appearance (58.4%), ability to get around (53.1%), sleep (53.5%), self-satisfaction (57.6%), personal relations (63.8%), friends’ support (54.3%), living place satisfaction (58.4%)	All other items
	<i>D. General Population Group (N=139)</i>		
Health satisfaction (75.0%), bodily appearance (84.9%), ability to get around (83.5%), self- satisfaction (76.6%)	Enjoyment (67.4%), life meaningful (72.8%), concentration (71.9%), energy (71.7%), sleep (69.8%), personal relations (71.9%)	OQL (63.3%), safety (62.6%), environmental health, ADL (61.1%), work capacity (62.6%), sexual satisfaction (52.7%), friends’ support, need medical treatment (64.2%), pain (55.1%)	All other items

and could complete the questionnaires in Arabic.

The patients were recruited from the medical clinics of the government hospitals and private clinics in Khartoum, the Wad Medani Teaching Hospital in Central Sudan and the Atbara Teaching Hospital in Northern Sudan. Recruiting community controls was difficult because the usual methods for doing this<sup>27</sup> were not available in Sudan. Hence, we recruited subjects in similar living conditions.

### The WHOQOL-Bref

This is a 26-item self-administered generic questionnaire, a short version of the WHOQOL-100 scale.<sup>26</sup> It emphasizes the subjective experiences rather than objective life conditions. It was developed in a wide range of cultural settings.<sup>26</sup> It is made up of domains and facets (or subdomains). Domains are broad groupings (e.g., physical/psychological) of related facets. The items on “overall rating of QOL” (OQOL) and subjective satisfaction with health are not included in the domains but are used to constitute the facet on

OQOL and general health. There are two models of the WHOQOL-Bref. One model has six domains—namely, physical health, psychological health, level of independence, social relationships, environment and spiritual.<sup>28</sup> To derive the second (four-domain) model, the domain of level of independence was merged with that of physical health, while the “spiritual” domain was added to the psychological.

**Modification of the WHOQOL-Bref for the impression of caregivers.** In order to produce the version of the WHOQOL-Bref with which the family caregivers rated their impression of the patients’ QOL, we used the method of Sainfort et al.,<sup>29</sup> by giving a new direction to each item, so that the caregiver could rate the patient as an observer. The modification of the WHOQOL-Bref was thus minimal.<sup>20,21</sup>

The internal consistency of the WHOQOL-Bref, as assessed by Cronbach’s alpha coefficient for the responses of all subjects, was very high for the patients (0.93), the caregivers’ impressions (0.92) and the general population (0.87).

**Table 3. Comparison of QOL domain scores of diabetic patients and general population group**

QOL Domains	Type 1 (N=105)	Type 2 (N=136)	General Popn (N=139)	F	Df	P	Signif Diff Groups	ANCOVA Signif Covariates
	Mean (SD)	Mean (SD)	Mean (SD)					
General facet on health & QOL	6.6 (1.9)	6.9 (1.8)	7.7 (1.6)	12.8	2/379	0.000	Gen popn > pts	Occupation: P 0.001 Diagnosis: P=0.000
Physical health	9.7 (2.3)	9.9 (2.2)	11.4 (1.9)	26.8	2/376	0.000	Gen popn > pts	Occupation: P=0.02 Diagnosis: P=0.000
Psychological	16.3 (3.4)	17.4 (3.0)	18.8 (2.9)	20.6	2/365	0.000	Gen popn > pts	Occupation: F=12.8, P=0.000 Diagnosis: F=21.4, P=0.000
Independence	12.6 (2.9)	12.6 (3.5)	15.2 (2.3)	35.1	2/376	0.000	Gen popn > pts	Occupation: P=0.001 Diagnosis: P=0.000
Social relationship	9.6 (3.1)	10.8 (2.8)	10.9 (2.6)	7.1	2/361	0.001	Gen popn/ type 2 > type 1	Occupation: P=0.017 Diagnosis: P=0.001
Environment	25.7 (6.6)	26.8 (6.4)	25.8 (4.4)	1.2	2/362	ns		
Spiritual	3.6 (1.1)	4.0 (0.9)	3.9 (0.9)	5.7	2/374	0.004	Gen popn/ type 2 > type 1	Occupation: P=0.04 Diagnosis: P=0.005

**Data Collection Procedure.** The questionnaires were translated into Arabic by the method of back-translation. Permission to carry out the study was obtained from the authorities of each hospital. The patients and their family caregivers gave consent to participate after the objectives of the study were explained to them. In a pilot exercise, the instrument was found to be suitable to the cultural setting.<sup>20,21</sup>

Field research assistants were recruited and trained by one of us in the use of the questionnaires. They were college-educated healthcare staff. No formal interrater reliability tests were done because the WHOQOL-Bref is a self-rated instrument. Patients and caregivers completed the questionnaires privately and without interference from staff, after clarification of the objectives of the study and the meaning of the items. Illiterate patients were assisted by their educated relatives to complete the questionnaire. However, such relatives were requested to complete their own questionnaires before assisting the patient. Literacy in Arabic language is very high in Sudan, as it is the language of the Holy Koran. All the subjects involved in this study were Arabic speaking.

The physician in-charge of each case assisted the research assistant to record the relevant clinical data.

## Data Analysis

Data were analyzed by the SPSS version 12. Summary scores were generated by organizing the items into the six domains and four domains. One-way analysis of variance (ANOVA), with Tukey's method of multiple comparison, was used to compare mean differences in domain scores for the two diabetes groups and the general population. In view of the significant differences in sociodemographic characteristics between the patients and the general population group, analysis of covariance (ANCOVA) was used to control for these differences. A Bonferroni correction was used for multiple tests; otherwise, the level of statistical significance was set at  $P < 0.05$ . The predictors of patients' QOL (based on patients' general facet on health and QOL as dependent variable) were assessed in logistic regression (using categorical independent variables) and in stepwise regression (using continuous variables).

**Concordance of patient-caregiver impressions.** The concordance of diabetic patients' QOL ratings and family caregivers' impressions was tested in three ways. First, Kappa statistics<sup>30</sup> were used to assess the level of agreements for each item. By convention, agreement was judged as follows: 0–0.20: slight agreement; 0.21–0.40: fair agreement, 0.41–0.60: moderate agreement,  $\geq 0.61$ : high agreement. Second, we assessed the caregiver-patient correlations for each item using Spearman's correlation.<sup>29</sup>

In view of the multiple tests, Bonferroni correction indicated that the appropriate P value level for the correlations would be 0.002. However, for comparison with previous reports,<sup>20</sup> we used the more stringent P value of 0.000. Hence, we operationally defined satisfactory correlation to consist of  $\rho \approx 0.4$ , plus  $P = 0.000$ . For each group of patients, we defined satisfactory patient-caregiver concordance for each item, as the items with Kappa at least "fair",  $\rho \approx 0.4$  and  $P = 0.000$ .

Third, we assessed the correlations between the patients and caregiver impressions for their QOL domain scores, using Pearson's correlation.

## RESULTS

### Sociodemographic Characteristics of Subjects (Table 1)

One-hundred-five subjects with type-1 diabetes (mean age 37.1 years) and 136 with type-2 diabetes (mean age 45.9 years) were compared with 139 general population subjects (mean age 33.1 years). Type-2 patients were significantly older than those with type 1, who were significantly older than the general population subjects ( $F = 43.2$ ,  $df = 2/363$ ,  $P = 0.0001$ ). Compared with the general population group, the patients were significantly more likely to be in a marital situation ( $P = 0.0001$ ), of lower education ( $P = 0.0001$ ) and unemployed ( $P = 0.0001$ ). For the family caregivers (mean age for type 1 = 36.4; and for type 2 = 35.8), type-1 patients were more likely to be cared for by their parents, while type 2 were predominantly cared for by their own nuclear family ( $\chi^2 = 15.7$ ,  $df = 3$ ,  $P = 0.001$ ). The women patients were significantly older (44.6, SD 12.3) than the men (38.4, SD 14.1;  $P = 0.00001$ ). Although those with type 1 were younger at illness onset ( $P = 0.00001$ ), there was no significant difference in duration of illness ( $P > 0.05$ ). Similarly, there were no significant diagnostic differences in the proportion of subjects with the various complications of diabetes and side effects of treatment of interest ( $P > 0.05$ ).

### Group Satisfaction with QOL Items (Table 2)

Type-1 patients as a group did not endorse QOL items at the highest and moderate levels of satisfaction. The type-2 patients had higher satisfaction ratings, endorsing personal relationships highly. The caregivers seemed to have a higher impression of the patients than type-1 patients had of themselves, while the general population group showed a fair spread in the level of satisfaction with the QOL items. The few items that the patients were satisfied with concerned general well-being and support from relatives. These items included life being meaning-

ful, self-satisfaction and personal relations. They were not satisfied with items related to the poor economic condition of the nation, such as money for needs and transport. The relatives were in agreement with the patients in endorsing similar items on behalf of the patients.

**Effect of Type of Diabetes on Satisfaction with Items of WHOQOL-Bref**

The tendency for a higher prevalence of satisfaction with the items among the patients with type-2 diabetes (compared with type-1 patients) reached significance for the following items after Bonferroni correction (P=0.05/ 26=0.002): self-satisfaction ( $\chi^2=10.2$ , df=3, P= 0.006), personal relationships (P=0.000) and condition of living place (P=0.002).

**Sociodemographic Factors Associated with QOL Scores**

For the patients, there were no significant gender and educational group differences in QOL domain scores (P>0.05). Correlations of age with QOL domain scores were low but significant for psychological domain (r=0.2, P=0.003), social relations (r=0.22, P=0.001), environment (r=0.23, P=0.001) and spiritual domain (r=0.27, P=0.00001). Correlations with duration of illness were significant for

only the independence domain (r=-0.20, P=0.002). Those in medium-/high-skill employment had significantly higher QOL domain scores than the unemployed and low-skilled in all domains of QOL, except physical health and general facet (P mostly <0.001). Also, those who were married had significantly higher QOL domain scores than those who were single, in all domains except independence (P<0.001).

For the control group, the men scored significantly higher than the women in the physical health domain (t=2.5, df=136, P=0.015).

**Diagnostic Differences in QOL Domain Scores (Table 3)**

While the general population group scored significantly higher than the type-1 patients for all the domains except the environment domain, and the type-2 patients scored significantly higher than the type-1 for the social relationship and spiritual domains, the type-2 patients had similar scores with the general population group for the social relationship and spiritual domains (F ranged 5.2–35.1, df=2/379, P ranged 0.004–0.00001). In ANCOVA, with age, level of education, occupation and marital status as covariates, the results were sustained. Although level of occupation was a significant

**Table 4. Concordance of patients' WHOQOL—Bref ratings and caregivers' impressions using Kappa\* and Spearman's correlations**

Concordance Statistics	Type-1 Diabetes Patients/ Caregiver Impression	Type-2 Diabetes Patients/ Caregiver Impression
Kappa: slight	Three items: Enjoy life, physical pain, need for medical treatment	Four items: Enjoy life, physical pain, need for medical treatment, negative feeling
Kappa: fair	Remainder 13 items after Kappa moderate items	Remainder 19 items after Kappa moderate items
Kappa: moderate	10 items: OQOL, life meaningful, environ health, energy, bodily appearance, money, ability to get around, work capacity, sex satisfaction, transport satisfaction	Three items: sex satisfaction, access to health service, transport satisfaction
Spearman's $\rho=0.4$	All items except the three with Kappa slight and information ( $\rho=0.37$ ) and P=0.000	All items except health satisfaction, enjoy life, physical pain, need for medical treatment
Items with overall concordance for both groups, i.e., Kappa at least fair and $\rho=0.4$	20 items: OQOL, life meaningful, concentration ability, safety in daily life, environmental health, energy, bodily appearance, money, leisure opportunity, ability to get around, sleep, ADL, work capacity, self-satisfaction, personal relations, sex satisfaction, friends' support, living place satisfaction, access to health service, transport satisfaction	

\* Kappa agreements: slight agreement, k=0–0.20; fair agreement, k=0.21–0.40; moderate, k=0.41–0.60; high: k>0.60; ADL: activities of daily living; OQOL: overall QOL

covariate in all domains, the diagnosis effect was far more important in accounting for the group differences in scores.

### Impact of Complications of Diabetes and Side Effects of Treatment

Patients who admitted having additional medical problems scored significantly less than those who had no such problems for the following domains: general facet on health and QOL ( $t=2.6$ ,  $df=241$ ,  $P=0.011$ ), physical health ( $P=0.001$ ) and independence ( $P=0.0001$ ). Patients with normal sexual desire had significantly higher QOL scores than those who lacked sexual desire in the physical health ( $F=3.1$ ,  $Df=2/239$ ,  $P=0.04$ ) and social relations ( $F=7.5$ ,  $Df=2/234$ ,  $P=0.05$ ) domains. The following variables had no significant impact on QOL domain scores: hypoglycemia, erectile dysfunction, and GI symptoms ( $P>0.05$ ).

### Concordance of Patients' Ratings and Caregivers' Impressions of Patients (Table 4)

1. Kappa values for type-1 diabetes: using the highlighted criteria, Kappa values for agreements between the type-1 patients and the impressions of their caregivers were slight for three items, moderate for 10 items and fair for the remaining 13 items (detailed in Table 4).
2. Kappa values for type-2 diabetes: agreements between the type-2 group and their caregivers were slight for four items, moderate for three items and fair for the remaining 19 items.

**Spearman's correlations for type-1 diabetes group.** All correlations were positive. All items had satisfactory correlations (i.e.,  $\rho$  approximately 0.4 plus  $P=0.000$ ) except the three with Kappa slight and "information."

**Correlations for type-2 diabetes group.** All items had satisfactory correlations except health satisfaction and the three items with Kappa slight.

In other words, judging by Kappa agreements, type-1 subjects had many more items in which they were concordant with their relatives, compared with type-2 subjects.

Combining the results of the Kappa statistics and Spearman's correlation analyses, we found that there were 20 items for which there was at least fair agreement (by Kappa) and satisfactory correlation (by Spearman's  $\rho$ ), as detailed in Table 4.

**Concordance of domain scores.** When the QOL domain scores of the patients as a group were compared with the domain scores derived from family caregivers' impressions using paired  $t$  tests, we found that while the scores were highly correlated

(all Pearson's  $r>0.5$ ,  $P=0.00001$ ), the tendency for the domain scores derived from the caregivers' impressions to be higher than those of the patients reached significance for psychological health ( $t=2.8$ ,  $df=225$ ,  $P=0.006$ ), spiritual domain ( $P=0.0001$ ), and general facet on health and QOL ( $P=0.001$ ). Using the QOL domain scores computed from caregivers' impressions, the tendency for type-2 diabetes caregivers to have higher impression of the patients reached significance for the following domains: psychological health ( $t=2.5$ ,  $df=230$ ,  $P=0.012$ ), social relations ( $P=0.012$ ), spiritual domain ( $P=0.009$ ) and general facet ( $P=0.028$ ). Patients' own nuclear family members (spouses and children) had highest impressions of patients in most domains, while patients' siblings had the poorest impression of patients in all the domains. This tendency reached significance for general facet ( $F=3.6$ ,  $df=3/239$ ,  $P=0.016$ ), psychological health ( $P=0.00001$ ), social relations ( $P=0.00001$ ), environment ( $P=0.011$ ) and spiritual domains ( $P=0.001$ ).

Considering the relationship between the patients' sociodemographic variables and the caregivers' impressions of patients' QOL, we found that duration of illness was not significantly correlated with caregivers' impressions, while patients' age was significantly correlated with caregivers' impressions in the domains of general facet ( $P=0.003$ ), psychological health ( $P=0.0001$ ), social relations ( $P=0.00001$ ), environment ( $P=0.02$ ) and spiritual domain ( $P=0.000$ ). In addition, female patients were rated higher by their relatives in the spiritual domain ( $P=0.01$ ), and the presence of additional illness in the patient had no significant impact on the ratings of the caregivers ( $P>0.05$ ). Caregivers' occupation, marital status and age (except physical domain,  $r=-0.16$ ,  $P=0.015$ ) had no significant association with their impression of the patients.

### Predictors of Patients' QOL

In logistic regression analysis, the only significant predictor of patients' general facet on health, and QOL was the general facet derived from the caregivers' impression of the patient (the model correctly classified 92.1% of subjects and accounted for 14.1% of the variance, Wald=12.3,  $P=0.002$ , Exp(B) or exponential of odds ratio=5.0). In stepwise regression analysis, the only significant predictor of the patients' general facet was the general facet caregiver impression of the patient, which accounted for 25.8% of the variance ( $\beta=0.51$ ,  $t=8.6$ ,  $P=0.00001$ ).

### DISCUSSION

Within the limitations of a cross-sectional study in which the patients were not representative of the general population of diabetes subjects, we were able to

compare the subjective QOL of a good number of type-1 and type-2 diabetes patients from the main clinics at which such patients are treated in the country, corroborated their ratings with those of their family caregivers and compared the patients with a general population sample. Although the ANCOVA operations showed that the sociodemographic differences between the patients and the general population group were not responsible for the noted differences in QOL domain scores, there is still a possibility that the results may have been biased as a result of the sociodemographic differences. In addition, it would have been advantageous to include a control group of other patients without diabetes.

For the first hypothesis, we found that the patients were only satisfied with items related to general well-being and family supports, as in previous African studies.<sup>20,21,25</sup> This is an indication that in making decisions on subjective QOL, the patients included a realistic appraisal of their material circumstances. However, the finding could be attributed to the fact that we studied patients in stable condition who had a good level of social support in the sense that they were accompanied by family members, a factor that has been associated with QOL.<sup>8,14,22</sup> The implication is that clinical improvement needs to be linked with social support to achieve good subjective QOL. Although the symptoms of hypoglycemia had no significant impact on QOL,<sup>4,9,10</sup> patients who admitted having additional medical problems and lack of sexual desire had significantly lower QOL in several domains,<sup>3,11,15,16,31</sup> an indication of the need to assess for these problems in routine care.

For the second hypothesis, we found that older age and better occupational and marital circumstances had positive impact on QOL, while duration of illness had significant impact only on the independence domain. There are conflicting reports in the literature on the impact of these factors.<sup>17,32</sup> The similarity of QOL domain scores for type-2 patients and the general population group in two domains is an indication of the impact of disease severity and, coupled with the nonsignificant impact of duration of illness, the clinical implication is that rigorous attempts to minimize disease severity in the long term can hope to make diabetes a hidden disease with sustained subjective QOL.<sup>17,33</sup>

For the fourth hypothesis, we found that there was satisfactory concordance between the patients and family caregivers in 20 items and high correlation between the domain scores of the patients and caregivers' impressions, all of which are indications of the reliability of the patients' ratings. This level of concordance is far higher than that reported for psychiatric patients,<sup>20,34</sup> thus underscoring the impact of insight, cognitive impairment and disease severity on carer-patient concordance of ratings.<sup>20</sup>

However, the usefulness of assessing caregiver impression on patient's QOL is that it helps to assess caregiver's understanding of the patient's general well-being, the impact of family conflicts or dynamics on caregiver's appraisal and the impact of caregiver's appraisal on the patient's QOL.<sup>8,14,17,20,21</sup> It was, therefore, interesting that for our subjects, caregivers of type-2 patients had a higher impression of the patients; patients' spouse/offspring had a higher impression of them, compared with patients' siblings; and of the other factors investigated, only patients' age was consistently significantly correlated with caregivers' impressions. This is in line with our ordinary understanding of family dynamics, whereby the patient's spouse and children are expected to show more tolerance and commitment to care than one's siblings. The clinical implication is that clinicians, even in developing countries where extended family support is the norm, may not take for granted the positive appreciation of patients by relatives beyond one's own nuclear family.<sup>35</sup> The finding that, judging by Kappa agreements, patient-caregiver concordance was higher for type 1 is probably related to the fact that they were more likely to be cared for by their parents (who naturally should be more in tune with their children's feelings). However, we acknowledge the possibility that the caregiver's appraisal is affected by the patient's view of QOL. In order to avoid this interaction, we ensured that the caregiver and the patient made their ratings independently.

Our most interesting finding was that, within the confines of our theoretical framework, the only significant predictor of patients' QOL was the caregivers' impression of the patients' QOL.<sup>20,21</sup> This is in line with reports from "expressed emotions" research<sup>19</sup> and studies of the families of adolescents with diabetes mellitus.<sup>8,14,17</sup> The clinical implication is that the impact of the attitude of family caregivers on clinical outcome is important, and clinicians need to pay particular attention to the education and support of family caregivers.

## CONCLUSION

In our patients with family supports, the factors associated with good QOL were: having type-2 diabetes, being older, being in better occupational and marital circumstances, having no additional medical problems, having normal sexual desire, living with own nuclear family or parents, and—most importantly—family positive appraisal of the patient. Patients that are negative on these issues are vulnerable and require focused clinical attention. In the clinical setting, many of these issues are amenable to psychosocial therapies to enhance quality of care.<sup>5</sup> It makes for therapeutic optimism that type-2 patients in stable condition had relatively good subjective QOL and that QOL was not

diminished by duration of illness. Education and support of family caregivers in the clinical setting is important, as it has the potential to enhance outcome. The patients' realistic appraisal of their QOL implies that they will benefit from and appreciate efforts by health planners to improve their quality of care.

## ACKNOWLEDGEMENT

Dr. Hashim Yagoub of Khartoum, Sudan, played an invaluable role in data collection. We thank the research assistants for their efforts.

## REFERENCES

1. Surwit R, Feinglos M, Livingston E, et al. Behavioral manipulation of the diabetic phenotype in ob/ob mice. *Diabetes*. 1984;33: 616-618.
2. Mooy JM, de Vries H, Grootenhuys PA, et al. Major stressful life events in relation to prevalence of undetected type 2 diabetes: the Hoorn Study. *Diabetes Care* 2000;23:197-201.
3. Rose M, Fliege H, Hildebrandt M, et al. The network of psychological variables in patients with diabetes and their importance for quality of life and metabolic control. *Diabetes Care*. 2002;25:35-42.
4. Weinberger M, Kirkman S, Samsa GP, et al. The relationship between glycemic control and health-related quality of life in patients with non-insulin dependent diabetes mellitus. *Med Care*. 1994;32:1173-1181.
5. Delamater AM, Jacobson AM, Anderson B, et al. Psychosocial therapies in diabetes. *Diabetes Care*. 2001;24:1286-1292.
6. Parkerson GR Jr, Connis RT, Broadhead WE, et al. Disease-specific versus generic measurement of health-related quality of life in insulin-dependent diabetic patients. *Med Care*. 1993;31:629-639.
7. Burroughs TE, Desikan R, Waterman BM, et al. Development and validation of the diabetes quality of life brief clinical inventory. *Diabetes Spectrum*. 2004;17:41-49.
8. Trief PM, Wade MJ, Britton KD, et al. A prospective analysis of marital relationship factors and quality of life in diabetes. *Diabetes Care*. 2002;25: 1154-1158.
9. Jacobson AM. Quality of life in patients with diabetes mellitus. *Semin Clin Neuropsychiatry*. 1997;2:82-93.
10. Rubin RR, Peyrot M. Quality of life and diabetes. *Diabetes Metab Res Rev*. 1999;15:205-218.
11. Goldney RD, Phillips PJ, Fisher LJ, et al. Diabetes, depression and quality of life. *Diabetes Care* 2004;27:1066-1070.
12. De Berardis G, Franciosi M, Belfiglio M, et al. Erectile dysfunction and quality of life in type 2 diabetic patients. *Diabetes Care*. 2002;25:284-291.
13. Penson DF, Latini DM, Lubeck DP, et al. Do impotent men with diabetes have more severe erectile dysfunction and worse quality of life than the general population of impotent patients? *Diabetes Care*. 2003;26:1093-1099.
14. Grey M, Boland EA, Yu C, et al. Personal and family factors associated with quality of life in adolescents with diabetes. *Diabetes Care*. 1998;21: 909-913.
15. Adams CR. Lessons learned from urban Latinas with type 2 diabetes mellitus. *J Transcult Nurs*. 2003;14:255-265.
16. Wu S, Sainfort F, Tomar RH, et al. Development and application of a model to estimate the impact of type 1 diabetes on health-related quality of life. *Diabetes Care*. 1998;21:725-731.
17. Laffel LMB, Connell A, Vangsness L, et al. General quality of life in youth with type 1 diabetes. *Diabetes Care*. 2003; 26:3067-3073.
18. Katschnig H. Schizophrenia and quality of life. *Acta Psychiatr Scand*. 2000; Suppl(407):33-37.
19. Raune D, Kuipers E, Bebbington PE. Expressed emotion at first episode-psychosis: investigating a carer appraisal model. *Br J Psychiatry*. 2004;184: 321-326.
20. Awadalla AW, Ohaeri JU, Salih AA, et al. Subjective quality of life of community living Sudanese psychiatric patients: comparison with caregivers' impression and control group. *Qual Life Res*. 2005;14:1855-1867.
21. Awadalla AW, Ohaeri JU, Salih AA, et al. Subjective quality of life of family caregivers of community living Sudanese psychiatric patients. *Soc Psychiatry Psychiatr Epidemiol*. 2005;40:755-763.
22. Westaway MS, Seager JR, Rheeder P, et al. The effects of social support on health, well-being and management of diabetes mellitus: a Black South African perspective. *Ethn Health*. 2005;10:73-89.
23. Westaway MS, Rheeder P, Gumed T. The effect of type 2 diabetes mellitus on health related quality of life. (HRQOL). *Curationis*. 2001;24:74-78.
24. Zetina-Lopez A, Custodio-Vazquez A, Hinojosa C, et al. Impact of gastrointestinal symptoms on health-related quality of life in patients with type 2 diabetes mellitus. *Rev Invest Clin*. 2003;55:594-599.
25. Olusina AK, Ohaeri JU. Subjective quality of life of recently discharged Nigerian psychiatric patients. *Soc Psychiatry Psychiatr Epidemiol*. 2003;38: 707-714.
26. Skevington SM, Loffy M, O'Connell KA, et al. The World Health Organization's WHOQOL-Bref quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. *Qual Life Res*. 2004;13:299-310.
27. Green CA, Finn DS, Moussaoui D, et al. Quality of life in treated and never treated schizophrenic patients. *Acta Psychiatr Scand*. 2001;103:131-142.
28. The WHOQOL Group. The WHO Quality of Life Assessment (WHOQOL): development and general psychometric properties. *Soc Sci Med*. 1998;46: 1569-1585.
29. Sainfort F, Becker M, Diamond R. Judgments of quality of life of individuals with severe mental disorders: patient self-report versus provider perspectives. *Am J Psychiatry*. 1996;153:497-502.
30. Landis RJ, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159-174.
31. Wandell P, Brorsson B, Aberg H. Functioning and well-being of patients with type 2 diabetes or angina pectoris, compared with general population. *Diabetes Metab*. 2000;26:465-471.
32. Hanninen J, Takala J, Keinonen-Kiukaanniemi S. Quality of life in NIDDM patients associated with the SF-20 questionnaire. *Diabetes Res Clin Pract*. 1998;17-27.
33. UK Prospective Diabetes Study Group. Quality of life in type 2 diabetes patients is affected by complications but not by intensive policies to improve blood glucose or blood pressure control(UKPDS 37). *Diabetes Care* 1999;22:1125-1136.
34. Lobana A, Mattoo SK, Basu D, et al. Quality of life in schizophrenia in India: comparison of three approaches. *Acta Psychiatr Scand*. 2001;104: 51-54.
35. Ohaeri JU. Perception of the social support role of the extended family network by some Nigerians with schizophrenia and affective disorders. *Soc Sci Med*. 1998;47:1463-1472. ■



REUSE THIS  
CONTENT

To photocopy, e-mail, post on Internet or  
distribute this or any part of *JNMA*, please  
visit [www.copyright.com](http://www.copyright.com).

**JNMA Call for Papers**  
See page 786 for more information