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Assessment of Health-Related Quality of Life of Patients with Type 1 and Type 2 Diabetes Using ADDQoL Questionnaire in a Tertiary Care Hospital: A Cross-Sectional Study

ABSTRACT

Objective: This study aimed to determine the health-related quality of life (HRQoL) of patients with diabetes (PwD) using the Audit of Diabetes-Dependent Quality of Life (ADDQoL) questionnaire.

Material and methods: A cross-sectional, observational study was conducted among 300 PwD to evaluate their HRQoL by using ADDQoL questionnaire. The association between impact, importance, and weighted impact scores were assessed by applying various tests. Chi-square test was used to find the association between condition-specific domains and weighted impact scores. Kruskal-Wallis test was used to determine the association between patient-related demographic variables and average weighted impact scores (AWIS). All analysis was done at significance level $p \leq 0.05$.

Results: The mean age of the participants was 55.49 years. Out of 300 patients, the majority were male ($n = 153$), married (96.7%) and urban residents

(57.7%). The most affected domain was family life (-5.18) followed by financial situation (-4.52) and physical health (-4), and the least affected domain was people's reactions (-1.27) followed by local or long-distance journeys (-1.38) and holidays (-1.39). The mean AWI score (-3.31) indicated most of the patient's QoL was impacted by diabetes. Kruskal-Wallis test identified that gender, residence, marital status, education, and family income were confounding factors associated with HRQoL of patients.

Conclusions: Diabetes was found to have a greater negative impact on HRQoL. Most of the patients rated their present QoL to be bad and thought that QoL would be slightly better if they did not have diabetes. (Clin Diabetol 2024; 13, 2: 86-92)

Keywords: audit of diabetes-dependent quality of life, average weighted impact score, health-related quality of life, type 1 diabetes, type 2 diabetes, weighted impact score

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Clinical Diabetology 2024, 13; 2: 86-92

DOI: 10.5603/cd.98812

Received: 6.01.2024

Accepted: 11.03.2024

Early publication date: 22.04.2024

Introduction

Diabetes mellitus (DM) is a combination of various metabolic conditions with symptoms such as hyperglycemia (high blood glucose levels), polyphagia, polydipsia, and polyuria [1, 2]. It contributes to approximately 6% of the total worldwide mortality, leading to an

international healthcare catastrophe requiring novel approaches for its prevention and treatment [3]. The level of mortality and morbidity because of diabetes and related complications are alarming, resulting in increased health challenges and medical expenditures on individuals as well as the community [4]. Quality of life (QoL) refers to an individual's opinion of how good or bad their daily life is [5–7]. In comparison to QoL, the term health-related quality of life (HRQoL) entails a more comprehensive viewpoint that incorporates several facets of an individual's well-being, such as psychological, physical and social aspects of life [6]. Numerous tools have been created, authenticated, and employed to estimate the HRQoL in individuals with DM. One such instrument is the Audit of Diabetes-Dependent Quality of Life (ADDQoL) [7]. It is a tool for evaluating HRQoL in people with DM because of its individualized and reliable nature that allows respondents to examine life domains that are specific to them and describe how important these aspects are in terms of their HRQoL as well as how diabetes impacts those domains [8]. Considering the enormous growth in the diabetic population, there are only a few research studies that could assess and evaluate the accurate status of the condition, and so there is urgent demand for studies that can estimate the potential catastrophic increase in the diabetes population. Moreover, we want to conduct this study to provide insight into how the HRQoL is affected because of diabetes. Furthermore, we intend to investigate how certain demographic aspects influence patient's QoL in connection to diabetes, so the rationale of the study is to examine diabetes patients HRQoL by utilizing the ADDQoL questionnaire [9, 10].

Materials and methods

Study design

A cross-sectional, single-centered study was done among patients with diabetes (PwD) as participants for a duration of 6 months (based on time capsule frame). Demographic parameters including gender, age, place of residence, education, marital status, smoking and alcoholic status, monthly income, diabetes duration along with laboratory investigations including random blood glucose levels, fasting blood glucose, glycated hemoglobin (HbA1c) levels, and complications (if present) were obtained from the diabetic patients. The questionnaire and methodology for this study was approved by the Human Research Ethics Committee of Jaipur National University Institute of Medical Science and Research Centre (No. JNUIMSRC/IEC/2022/97).

Study population

Patients with type 1 diabetes (T1D) and type 2 diabetes (T2D) who have been diagnosed with the disease at least 3 months before enrollment in the study and visited the outpatient and inpatient Department of Internal Medicine of Jaipur National University Hospital, Jaipur were recruited for the study purpose. In addition, prior to inclusion in the study, all subjects supplied written informed consent. The following were the inclusion criteria: (1) patients with diabetes aged ≥ 18 years; (2) both genders; (3) patients with comorbid conditions (DM-related complications); (4) patients wanting to engage in the study and providing written consent. Patients less than 18 years with gestational diabetes and patients with learning disabilities were excluded from the study.

Study tools

For the better comprehension of the diabetes patients in the area, all the study tools including the consent form, demographic form, and ADDQoL questionnaire were prepared in both Hindi and English language (wherever needed).

ADDQoL questionnaire

The ADDQoL is an individualized questionnaire designed to examine the HRQoL of patients with diabetes. The questionnaire is composed of two sections, the first of which has two overview items (Statement I and Statement II), while the second one contains 19 condition-specific life domains (Statements 1 to 19), each of which reveals the general and overall HRQoL. The impact and importance of a specific condition are assessed for each domain in statements (a) and (b) [11]. The maximum score for the negative and positive impact of diabetes is -9 and $+3$, respectively. Higher negative score values indicate poorer HRQoL, whereas lower negative values (in the positive direction) indicate better HRQoL [12, 13].

Statistical analysis

The Raosoft sample size calculator was used to compute the sample size at 95% confidence interval (CI), 5% margin of error, and 50% response distribution. The overall sample size was determined to be 300 T1D and T2D patients after which Statistical Package for Social Sciences (SPSS 29.0, Chicago, USA) was used to conduct the statistical analysis [14]. The Shapiro-Wilk test was used to identify the pattern of data distribution, and it revealed that the data was not normally distributed. The significance of the differences between the Impact, Importance, and Weighted Impact ratings

was assessed using the Chi-Square test. The association that exists between the patient's demographic variables and average weighted impact score (AWIS) was determined using the Kruskal-Wallis test. All the analysis was done at a significance level $p < 0.05$.

Results

Baseline characteristics of the patients with diabetes

The study found mean age (in years \pm SD) of the participants to be 55.49 ± 11.49 and approximately half of the population were male ($n = 153$, 51%). Most of the participants were married (96.7%). More than half of the study participants (57.7%) were urban residents. In terms of lifestyle factors, 25.7% of the participants were smokers, 12% were alcohol drinkers. It is noteworthy that a significant proportion of the participants were non-smokers (64.3%) and non-drinkers (78%). The mean duration of diabetes since diagnosis was 6.31 ± 5.58 . According to family history, 16.3% of patient's parents had a previous history of diabetes. Other baseline characteristics are indicated in Table 1. The average value for HbA1c was found to be 9.879 ± 2.33 and the mean fasting and random glucose values (mg/dL) were found to be 220.72 ± 84.43 and 299.38 ± 94.67 , respectively. With regard to diabetes complications, most patients had cardiovascular disease (25.3%), followed by nephropathy (5.3%), retinopathy (4.6%), neuropathy (3.6%) and about 3.2% patients had combined complications.

General quality of life in patients with diabetes

Table 2 depicts the overall QoL scores of diabetic patients. The data was analyzed using descriptive statistics.

Impact, importance and weighted impact scores of condition-specific domains of patients with diabetes

The HRQoL scores for the patients were assessed according to 19 condition-specific domains as shown in Supplementary Table 1. It was observed that diabetes demonstrated the greatest negative impact on "family life" (mean -2.12 ± 0.66) followed by "financial situation" (mean -1.95 ± 0.67) and least negative impact on "people's reaction" (mean -1.27 ± 0.50), "local or long-distance journeys" (mean -1.38 ± 0.77) and "holidays" (mean -1.39 ± 0.77). The most important domain was found to be "family life" (mean 2.33 ± 0.50) whereas the least important was "people's reaction" (mean 1.34 ± 0.56). After calculation of the weighted impact scores, family life (mean -5.18 ± 2.52), financial situation (mean -4.52 ± 2.43) and physical health

Table 1. Baseline Characteristics of Patients with Diabetes (N = 300)

Baseline characteristics		Frequency n (%)
Gender	Male	153 (51)
Residence	Urban	173 (57.7)
	Rural	127 (42.3)
Smoking	Smoker	77 (25.7)
	Non-Smoker	193 (64.3)
	Ex-Smoker	30 (10)
Alcohol	Alcohol drinkers	36 (12)
	Non-drinkers	234 (78)
	Ex-drinkers	30 (10)
Marital status	Married	290 (96.7)
	Unmarried	4 (1.3)
	Divorced	1 (0.3)
	Widow	5 (1.7)
Education	Primary	218 (72.7)
	Secondary	35 (11.7)
	Tertiary	47 (15.7)
Family history	Father	13 (4.3)
	Mother	26 (8.7)
	Mother and Father	49 (16.3)
	Brother	11 (3.7)
	Sister	7 (2.3)
Family income (Rs)	≤ 5000	141 (47)
	5000–10 000	80 (26.7)
	$> 10 000$	79 (26.3)
Diabetes duration [years]	0–10	252 (84)
	11–20	42 (14)
	21–30	4 (2)

Table 2. Mean Scores of General Quality of Life for Patients with Diabetes Mellitus (N = 300)

General quality of life scores		
Statement I: My present quality of life is		Score range*
Mean \pm SD	-1.13 ± 1.16	-3 to +3
Statement II: Quality of life without diabetes		
Mean \pm SD	-1.66 ± 0.73	-3 to +1

*Better quality of life is indicated by lower negative ratings -3 (extremely bad) to +3 (excellent); +2 (very good); +1 (good); 0 (neither good nor bad); -1 (bad); -2 (very bad) -3 (very much better) to +1 (worst); -2 (much better); -1 (a little better) 1 and 0 (the same)
SD — standard deviation

(mean -4 ± 2.56) were found to be the most affected QoL domains, whereas the least affected QoL domain was reported to be people's reaction (mean -1.94 ± 1.62) as depicted in Figure 1.

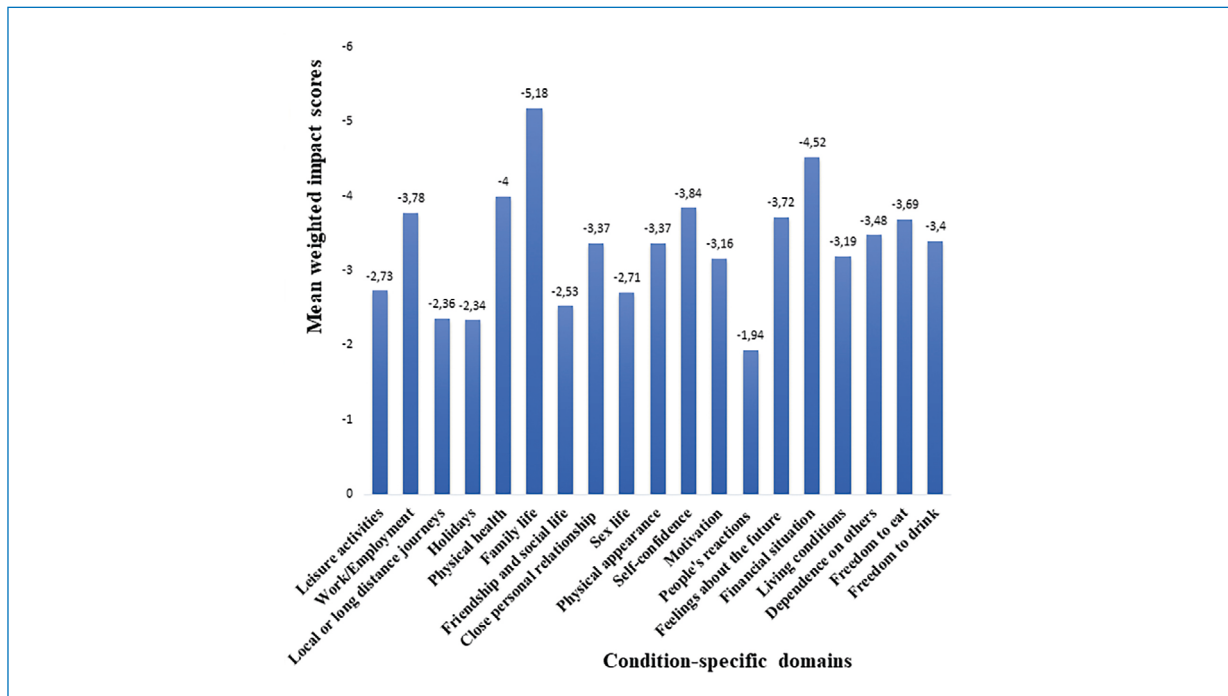


Figure 1. Overall Mean Weighted Impact Scores of Diabetes on the Individual Condition-Specific Life Domains

Association between patient demographic variables and average weighted impact scores

The link between patient demographic factors and average weighted impact scores demonstrated noteworthy significance for gender, residence, alcohol, marital status, education and family income which was analyzed by using the Kruskal-Wallis test at $p < 0.05$, as shown in Table 3.

Discussion

The present study determined that diabetes had a more detrimental impact on the present HRQoL, which was analogous to various other studies which revealed an identical negative influence of diabetes on the patient's HRQoL [15–23]. The mean AWI score of the total group of participants was -3.31 , which was on the negative side of the QoL impact for diabetes. Also, majority of the patients rated their present QoL to be "bad" and thoughts that their QoL would be "a little better" if they did not have diabetes.

Diabetes had the greatest negative impact on the domain family life (-2.12) which was also found to be the most important domain which may be due to the fact that the Asian population including Indian people value family over self. These findings from the current study are consistent with the findings from the studies

conducted in different countries [15–16]. The most affected domains with respect to WIS in the present study were family life (-5.18), financial situation (-4.52) and physical health (-4). These findings are in line with the studies conducted by Upadhyay et al. [12], Levterova et al. [16] and Jannoo et al. [17], respectively. However, a study by Kontoteza et al. [18] found the financial situation to be one of the least impacted domain.

On the other hand, the least impacted domain in the present study was found to be people's reactions (-1.27) followed by local or long-distance journeys (-1.38) and holidays (-1.39). The likely cause for this may stem from the elevated prevalence and frequency of diabetes, resulting in widespread awareness of the condition and a general absence of unfavorable attitudes towards individuals living with diabetes [19].

Interestingly, in this research, the domains that were most and least affected were identified to be family life and people's reaction, respectively, both before as well as after weighing. This information can aid in designing patient education materials by targeting the specific QoL areas that were most affected by diabetes for each person. In summary, the results of the present study rated the domain family life as the most impacted and important whereas people's reactions were rated as the least impacted and important, which is consist-

Table 3. Association between Patient Demographic Variables and Average Weighted Impact (AWI) Scores (N = 300)

Demographic variables		Frequency n (%)	AWI (mean ± SD)	Significance*
Gender	Male	153 (51)	-3.63 ± 1.54	0.000**
	Female	147 (49)	-2.98 ± 1.41	
Residence	Urban	173 (57.7)	-3.10 ± 1.48	0.006**
	Rural	127 (42.3)	-3.61 ± 1.51	
Smoking	Smoker	77 (25.7)	-3.54 ± 1.60	0.312
	Non-smoker	193 (64.3)	-3.25 ± 1.45	
	Ex-smoker	30 (10)	-3.14 ± 1.51	
Alcohol	Alcohol drinkers	36 (12)	-3.82 ± 1.49	0.019**
	Non-drinkers	234 (78)	-3.19 ± 1.52	
	Ex-drinkers	30 (10)	-3.68 ± 1.30	
Marital status	Married	290 (96.7)	-3.29 ± 1.47	0.000**
	Unmarried	4 (1.3)	-6.05 ± 0.67	
	Divorced	1 (0.3)	-6.21 ± 0	
	Widow	5 (1.7)	-1.77 ± 0.97	
Education	Primary	218 (72.7)	-3.03 ± 1.39	0.000**
	Secondary	35 (11.7)	-3.90 ± 1.58	
	Tertiary	47 (15.7)	-4.20 ± 1.53	
Family income (Rs)	≤ 5000	141 (47)	-3.05 ± 1.36	0.008**
	5000–10 000	80 (26.7)	-3.33 ± 1.56	
	> 10 000	79 (26.3)	-3.78 ± 1.60	

*Kruskal-Wallis test; **Significance at $p < 0.05$ (2-tailed test); SD — standard deviation

ent with various other studies conducted in different regions [16, 17, 19].

Major demographic variables associated with lower QoL were gender, residence, marital status, education and family income. These suggested that some socio-demographic and disease-specific predictors were likely to affect certain domains more than others which need to be considered in responding to patient's individual needs [15].

In our study, it was observed that male patients with diabetes had poorer HRQoL than female patients with respect to average weighted impact scores, which is identical to another study done by Komal et al. [20]; however, a study done by Gautam et al. found that female patients with diabetes had a comparatively poor QoL as male patients [21]. In the present study, it was found that rural population had a poorer effect on their HRQoL compared to urban population, which can be explained by the fact that urban living provides better access to healthcare facilities, thus helps in better disease management. These results were found to be similar to those from studies done by Naous et al. and Gvozdanovic et al. [22, 23].

The results of the present research demonstrated that measuring the HRQoL of diabetes patients using the ADDQoL questionnaire offered insightful information about the influence of diabetes on different

facets of their day-to-day lives and highlighted the significance of addressing particular domains affected by diabetes to tailor patient education and improve overall well-being [18]. Like other studies, the current study is also not free from the study limitations. As the data collection was done only from one hospital (single center); therefore, the outcomes cannot be generalized to the entire population of the country. The cross-sectional approach of the study limits the development of causal links between variables by providing an overview of QoL at a certain point in time and fails to recognize variations in QoL over the course of time. Additionally, certain self-reported information such as diagnosis time frame and duration of diabetes may be subject to information bias because they depend upon the participant's thoughts.

Conclusions

DM stands as a prominent chronic ailment worldwide, carrying significant economic and social consequences. HRQoL offers a comprehensive outlook on a patient's physical, emotional, and social well-being. As per the results of our study, it was found that diabetes had a greater negative impact on present HRQoL. Also, the major demographic variables associated with lower HRQoL were found to be gender, residence, marital status, education and family income. Interestingly, in

our study, both before and after weighting, the most affected domain was found to be family life and the least affected domain was found to be people's reaction. Also, the majority of the patients rated their present QoL to be bad and thought that QoL would be a little better if they did not had diabetes. As we conclude this study, we acknowledge the invaluable contributions of every participant who shared their experiences, granting us profound insights into the complex tapestry of HRQoL in the face of diabetes.

Article information

Supplementary materials

The Supplementary materials for this article can be found at https://journals.viamedica.pl/clinical_diabetology/article/view/98812

Data availability statement

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

Ethics approval

The questionnaire and methodology for this study was approved by the Human Research Ethics Committee of Jaipur National University Institute of Medical Science and Research Centre (No. JNUIMSRC/IEC/2022/97).

Consent to participate

Written informed consent was obtained from all individual participants included in the study.

Consent for publication

Consent for publication was obtained from all the patients.

Funding

No funding was received for conducting this study.

Author contributions

Material preparation, data collection and analysis were performed by Gurusha Bahl and Tekchand Narang. The first draft of the manuscript was written by Gurusha Bahl and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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