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Assessment of Quality of Life of Patients with Type-II Diabetes Mellitus

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ABSTRACT

Background: Diabetes is a chronic metabolic disorder that negatively affects the quality of life in context of physical, psychological and social health or well-being. **Objective:** Current study aimed to assess the quality of life with type 2 diabetes and determine its association with demographic variations of study participants. **Study Design:** A descriptive cross-sectional study design was used to assess the quality of life of Diabetes patient type 2 with the structured questionnaire of the World Health Organization Quality of Life (WHOQoL-BREF) was adopted. **Settings:** The study was conducted in the outpatient department (OPD) of Allied Hospital, Faisalabad Pakistan. **Duration:** Data was collected from April 2022 to June 2022. **Methods:** Total of 450 patients with type 2 diabetes were recruited according to inclusion criteria. **Results:** A total of 450 patients with DM-2, and mean age of 53.8 ± 10.2 years and 50.7%were males and 49.3% were females. Overall, 44.2% of participants rated moderate and 40% were found satisfactory in terms of good Quality of Life. Mean stress score of QoL domains: physical (51 ± 10.8), psychological (48.04 ± 12.6), social relationship (53.3 ± 19.6), and environmental health (46.1 ± 13.9). To determine the association multiple linear regression model was used. Significant association were seen between age, marital status, Body Mass Index (BMI), and monthly income with QoL four domains($p<0.05$). Fasting Glucose Sugar (FBS) was negatively associated with QoL domains, except environmental health. **Conclusion:** Overall, the present study has clearly shown that DM2 alters the QoL of patients and patients reported moderate level QoL, and its significant association with demographic parameters of study participants such as age, gender, and household income.

Keywords: *Diabetes mellitus, Quality of life, Diabetes complications, Patients.*

INTRODUCTION

Diabetes is a chronic illness. Diabetes mellitus type 2 (DM2) is a chronic, non-communicable and metabolic disorder that occurs due to insufficiency of insulin production by the pancreas or ineffective utilization of insulin by human cells resulting in an increased level of blood glucose or hyperglycemia. DM2 causes numerous serious short-term and long-term results that influence both well-being and quality of life (QoL).[1,2]

Globally, 440 million people are affected with Diabetes Mellitus type-2, and drastic change has been noted in its prevalence among the Asia Pacific regions in the last few years.[3] It has been propagated that diabetic people will be increased to 693 million by 2045 from 451 million in 2017.[4] According to the report by The International Diabetes Federation (IDF) diabetes atlas 2017, Pakistan ranked 10, out of 221 countries around the globe; containing 7.5 million cases of diabetes at age of 20–79 years.[5]

Diabetes Mellitus could tremendously affect the quality of life of people due to its long-term nature, compliance with drugs or insulin, and lifestyle changes. Among these factors, one of the major indicators alarming a patient's life is drug compliance either oral diabetic pills or insulin injections. The acquiescence of taking oral antidiabetic pills, subcutaneous infusion of insulin, and an episode of hypoglycemia might depress diabetic patients and influence QoL.[6] The World Health Organization (WHO) stated the QoL as an individual's way of perception about his current position in terms of socio-cultural values, norms and belief system in pursuing his aims and goals of life.[7]

DM2 is related to increased morbidity and mortality worldwide. It also impacts functional health status and

wellness which is still not well addressed, especially in a developing country where the number of patients is rising swiftly.[8] Patients often feel challenged by their illness and its everyday management.[9] DM2 patients have extraordinary strain to treat themselves, and they have lower QOL when contrasted to people without diabetes.[1-10] Poor QoL is related to adverse outcomes in people with DM2, poor response to treatment, disease course, and cardiovascular mortality.[11]

Among various instruments and questionnaires to assess the QoL of health and non-health populations, WHO has developed (WHO QoL-BREF) with its four domains of physical, psychological, social and environment health domain. The World Health Organization QoL-BREF (WHOQoL-BREF) questionnaire is one of the instruments that is used to measure QoL in healthy and non-health populations.[12] The study aimed to assess the quality of life of the diabetic patient with type 2, many studies have been conducted in developed countries to analyze diabetic patients' QoL, and very few comprehensive studies have been conducted in developing countries, where socio-cultural parameters can modify the factors regarding the QoL of diabetic patients.[13] With a given challenge, the current study objectives are to assess the QoL of diabetic patients and its association with the socio-demographic attributes of participants that can prevail in the improvement of the QoL of the respective population.[14]

METHODS

Current cross-sectional study was conducted among 450 patients with type 2 diabetes from April to June 2022. Ethical approval was taken from the Institutional Review Board of Allied hospital (vide letter no.16719/AHF/22). A non-probability purposive sampling technique was used to recruit participants according to the inclusion criteria of the study. Before conducting the study, the purpose of the study was explained and written informed consent was taken and confidentiality of data was ensured. The questionnaire comprises two sections: First; demographic data, and second; the standardized questionnaire of WHO-QoL-BREF was adopted and its Urdu version was administered concerning the native language of the study population. The pilot tested (Cronbach's alpha= .70) among 10 participants for reliability of questionnaire.

Patients received diagnosed with diabetes mellitus type-2 for 6 months, with any type of treatment therapies (diet only, oral therapy, and insulin therapy), agree to participate in the study. Patients with microvascular (neuropathy, retinopathy, diabetic foot) and macrovascular (hypertension, ischemic heart disease, and stroke) diabetic complications were included in the study. Patients with previous mental illnesses and taking anti-psychotic drugs were excluded.

The demographic and socioeconomic data of patients were obtained through a questionnaire that includes gender, age, marital status, qualification, employment and monthly income.

The second part of the questionnaire contained questions related to the disease which were the time duration of the disease, fasting glucose level, type of treatment taken (diet only, oral drugs, insulin therapy), body mass index (BMI), and history of hypertension. The complications inquired about were nephropathy, retinopathy, neuropathy, ischemic heart disease, diabetic foot, and stroke.

The World Health Organization Quality of Life-BREF (WHO QoL BREF) standardized questionnaire was utilized and its Urdu version in context of Pakistan validated by Fahaed *et al*., administered to collect the data.[12] The questionnaire comprises of four domains and total 26 items; Physical health domain, psychological health domain, social relationship domain, and environmental health domain. Patients' response was recorded on Likert scale from 1 to 5, very dissatisfied to very satisfied respectively.[15] Raw scoring was calculated and transfigured in each domain from 4-20 score as per guidelines and interpretation of scale. The higher score indicated higher quality of life of study participants. Cronbach's alpha was applied to check the internal consist any of items (0.80) and four domains' domains of physical, psychological, social relationship and environmental health = 0.84, 0.742, 0.76, and 0.685 respectively.

The data were analyzed by SPSS version 23.0. Descriptive statistics was presented in range, frequency, mean and stand deviation (SD). Pearson correlation and independent-t test, and multiple linear correlation was used to determine the association of all four domains with demographic characteristics of participants. P value ≤ 0.05 and confidence interval 95% at 5% margin of error were considered as statistically significant.

RESULTS

Total of 450 patients with type 2 diabetes mellitus participated in the study and response rate was 100%. Mean age of 52.3 ± 16.7 years (± SD), 50.7%were males, and 49.3% were females. According to marital status of the participants, 435 (96.7 %) were married, and (3.3%) were unmarried.

In regard to educational status of study participants, (28.4%) are illiterate, (26.4%) a primary level of education. The employment status was ((56.2%) employed and monthly household income (range:5000-25,000 PKR), and

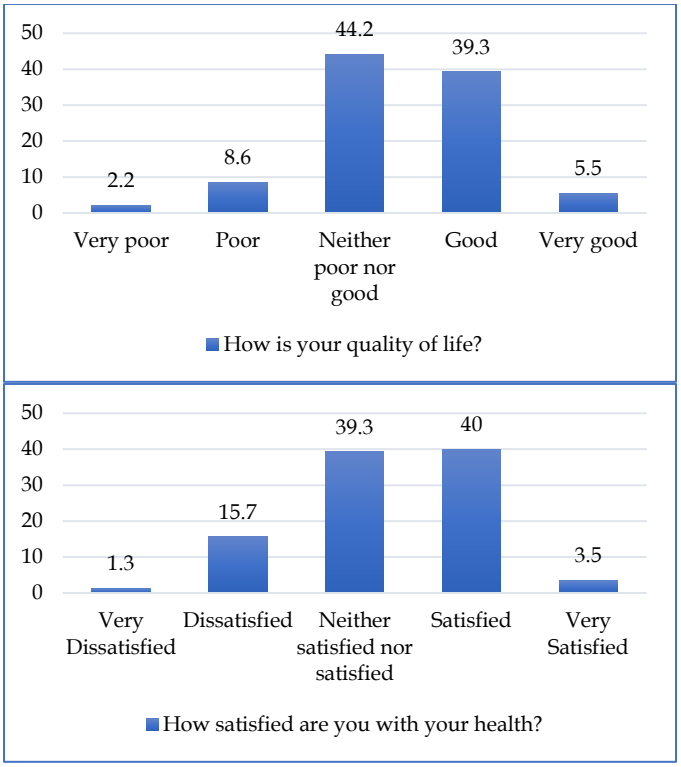
(57.3%) were unemployed. The mean duration of disease was 10.3 ± 7.9 years. Majority of patients were on oral therapy (46.2%). Comorbid conditions such as Hypertension (76.4%), neuropathy (34%), ischemic heart disease (8.9%) was noted among study participants. 46% of participants reported with at least one complication of diabetes mellitus (Table 1). First, two questions; How would you rate your QoL? and how satisfied are you with your health? of the WHO-BREF questionnaire explores patients' general awareness and understanding regarding their QoL and satisfaction level of own health, correspondingly.

Table 1: Socio-demographic characteristics of Study Participants (n=450)

Variables		N	Frequency (%)
Gender	Male	228	50.7%
	Female	222	49.3%
Marital status	Married	435	96.7%
	Unmarried	15	3.3%
Employment	Yes	192	42.7%
	No	258	57.3%
Household Income	<20k	253	56.2%
	20k-30k	99	22.0%
	30k-40k	55	12.2%
	40k-50k	27	6.0%
	>50k	16	3.6%
Education Level	Illiterate	128	28.4%
	Primary	119	26.4%
	Secondary	79	17.6%
	High	58	12.9%
	Intermediate or above	66	14.7%
Type of Treatment	Diet Only	57	12.7%
	Oral Therapy	208	46.2%
	Insulin Therapy	185	41.1%
Complication	None	239	53.1%
	Diabetic Foot	58	12.9%
	Neuropathy	153	34.0%
Any Comorbidity	Hyper Tension	343	76.4%
	Ischemic Heart disease	40	8.9%
	Stroke	30	6.7%

Of the study participants, 39.3% believed that they had moderate QoL and 40% general satisfaction about their overall health respectively (Figure 1).

Figure 1: The study participant's response rate (%) questions 1 and 2 (WHOQOL-BREF scale)



The mean score was 3.3+0.8 for the first question and 3.2+0.8 for the second question. The significant correlation among the four domains of WHOQoL ($p<0.01$) (Table 2).

Table 2: Correlation coefficients in four domains of WHOQoL-BREF

Correlations					
		PH	PSH	SR	EH
PH	Pearson Correlation	1	.455**	.386**	.492**
	Sig. (2-tailed)		.000	.000	.000
PSH	Pearson Correlation		1	.537**	.618**
	Sig. (2-tailed)			.000	.000
SR	Pearson Correlation			1	.675**
	Sig. (2-tailed)				.000
EH	Pearson Correlation				1
	Sig. (2-tailed)				

**PH=Physical Health, PSH= Psychological Health, SR= Social Relationship, EH= Environmental Health*

Comparison was made among four domains scores (0-100) and patients' demographic characteristics. Standard deviation of QoL were 46.13+ 13.9 and 53.30+19.6 in and social relationship domain respectively.

The mean score in all domains of WHOQoL of males is higher than females. A similar dispensation of the score was recorded between levels of education. The mean physical health domain score was notably lower in illiterate patients who had a secondary level of education ($p=0.007$). Significant association was seen between

higher income and domains of quality of life ($p < 0.002$). It was also observed that by applying the univariate and multivariate tests that there was a significant association between and among the different independent variables in all domains of Quality of life ($p< 0.01$) (Table 3).

Table 3: Comparison between four domains of WHOQoL and participant's variables (Mean ± SD)

Variables		Domains				
		PH	PSH	SR	EH	Total
Total		51 ± 10.88	48.04 ± 12.66	53.30 ± 19.60	46.13 ± 13.900	49.62 ± 14.88
Gender	Male	52.38 ± 10.52	49.27 ± 12.92	55.74 ± 19.10	47.92 ± 13.08	51.33 ± 14.58
	Female	49.58 ± 11.09	46.77 ± 12.30	50.79 ± 19.84	44.30 ± 14.5	47.87 ± 15.42
	P-value	0.006	0.036	0.007	0.006	
Employment	Yes	51.72 ± 10.73	48.74 ± 12.74	56.21 ± 19.41	48.08 ± 13.23	51.18 ± 14.75
	No	50.46 ± 10.98	47.51 ± 12.61	51.13 ± 19.51	44.68 ± 14.22	48.44 ± 15.15
	P-value	0.22	0.309	0.006	0.01*	
Household Income (Rs)	<20k	49.89 ± 11.18	51.00 ± 10.88	50.26 ± 19.09	44.10 ± 12.81	48.81 ± 14.16
	20k-30k	51.98 ± 10.62	46.29 ± 11.71	55.81 ± 19.97	47.41 ± 13.86	50.37 ± 14.99
	30k-40k	49.35 ± 9.70	50.04 ± 13.50	54.85 ± 19.09	45.63 ± 14.16	49.97 ± 14.87
	40k-50k	57.14 ± 12.54	53.70 ± 13.54	60.49 ± 16.76	55.09 ± 12.14	56.61 ± 14.09
	>50k	57.81 ± 9.24	54.43 ± 17.04	68.23 ± 21.13	57.03 ± 20.96	59.3 ± 18.52
	P-value	0.001**	0.002*	0.000***	0.000***	
Complication	None	51.43 ± 10.28	48.27 ± 11.88	52.96 ± 19.51	46.39 ± 14.05	49.76 ± 14.59
	Diabetic Foot	45.57 ± 14.42	42.53 ± 14.22	49.57 ± 21.20	41.49 ± 15.25	44.79 ± 16.82
	Neuropathy	52.38 ± 9.63	49.75 ± 12.74	55.23 ± 19.02	47.49 ± 12.82	51.21 ± 14.27
	P-value	0.000***	0.001**	0.161	0.018	

P=0.01, P=0.001**, P=0.000****

Similarly, by applying multiple linear regression; age, marital status, BMI and income was significantly associated with four domains of QoL ($P< 0.05$). The current findings revealed the moderate (49.62) level of quality of life among diabetic patients (Table 4).

Table 4: Multiple linear regression analyses of factors significantly associated with QoL

QoL Domains	Variables Included	Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	S. E	B		
PH	Age	.118	.031	.125	3.841	.000
	Marital Status	13.804	2.579	.278	5.352	.000
	Employment	2.529	1.142	.080	2.215	.027
	Household Income	1.631	.568	.066	2.875	.004
	Education Level	1.013	.443	.057	2.289	.023
	Treatment Type	2.157	.795	.099	2.711	.007
	Fasting Plasma Glucose	-.016	.007	-.068	-2.264	.024
	BMI	.833	.152	.370	5.493	.000
PSH	Age	.146	.035	.162	4.209	.000
	Marital Status	9.441	2.889	.199	3.268	.001
	Employment	2.302	1.267	.076	1.816	.070
	Household Income	2.560	.580	.108	4.417	.000
	Fasting Plasma Glucose	-.021	.008	-.096	-2.825	.005
	BMI	.944	.166	.440	5.686	.000
SR	Age	.132	.053	.128	2.515	.012
	Marital Status	10.933	4.421	.202	2.473	.014
	Household Income	3.925	.843	.145	4.654	.000
	Treatment Type	2.318	1.371	.097	1.691	.092
	Fasting Plasma Glucose	-.033	.012	-.130	-2.757	.006
	Comorbidity	4.287	1.632	.101	2.627	.009
	BMI	1.052	.240	.429	4.389	.000
EH	Age	.131	.036	.150	3.604	.000
	Marital Status	6.549	3.166	.143	2.069	.039
	Household Income	3.249	.599	.141	5.422	.000
	Complication	1.176	.702	.049	1.675	.095
	BMI	1.057	.156	.508	6.799	.000

DISCUSSION

Diabetes mellitus is a lifelong metabolic disorder that affects the quality of life of patients. According to WHO, quality of life comprises of following domains; physical health, psychological, social relationship, and environmental domains.

On top of that, the current study findings showed that the overall QoL of DM2 patients was moderately maintained (mean score=49.6) of the score range (0 – 100 for WHOQOL-BREF).[16] In addition to this; study findings reported that patients' perception of their QoL and health was pre-dominantly average (i.e., 50). Only one-quarter of study participants rated their QoL as poor, and one-quarter were unsatisfied with their physical health. Furthermore, the patient's age, marital status, BMI, and monthly household income revealed a positive and significant association with quality of life (QoL). Simultaneously, the occurrence of disorder complications was found as a paramount negative indicator of QoL scores of diabetic patients. Similar to current study findings; a survey conducted in Nepal by Mishra *et al*.[17] and concluded that (mean ± SD) of scores on the QoL scale was physical health (50.7 ± 11.8), psychological (53.3 ± 10.3), social relationship (57.3 ± 8.9), and environmental (54.7 ± 7.7) domains among diabetic patients (DM-2). In favor of this, a descriptive study conducted in Iran by West Java, *et al*., and reported that most DM2 patients had moderate and low scoring of QoL in four domains.[18,19]

These findings suggested that DM2 not only affects patient's physical health, but also their mental health, social relations, and environmental factors as well. Another survey conducted in India reported that scores of four domains were remarkably higher (mean= 77.8) in patients with DM in contrast to the non-diabetic patient (mean=75).[20]

Moreover, another study performed by, Sarir *et al*., Peshawar, Pakistan showed that the Urdu version of WHOQOL BREF to access the QoL in DM2 patients, consequently overall good QoL in participants.[21]

Enormous literature depicted that sociodemographic variations of participants also affect the Quality of life, such as currents study results revealed the significant difference noted among various sociodemographic backgrounds of patients with DM-2 and age is a significant predictor that affects all four QoL domains of patients. In favor of our study findings, Gebremedhin *et al*., concluded that age is positively associated in maintain the quality of life among patients.[22]

Diabetes mellitus type 2 is equally prevalent in both gender and present study results revealed that 50.7 % were male, and 49.3 % were female and it played important role in determining their quality of life and well-being. In addition to this, Sarir *et al*., Manjunath *et al*., and Jain *et al*. reported that females had poor quality of life as compared to males.[21,23,24] Literature reported the various factor that affects the quality of life of female are; depression, anxiety, pregnancy, childbirth, and breastfeeding needs to be explored. In addition, marital status also considers a proclaiming factor in affecting the QoL of patients and current study findings revealed that diabetic patients who are single reported poor QoL status.[19] Moreover, given the study results, no significant association were found in domains of QoL with employment status except physical health and these finding are contradictory with the study conducted in Ethiopia.[8] On the other hand, significant and positive associations were found between the domains of QoL and monthly household income. In favor of this, another study conducted by Esin *et al*[19] and Pandey *et al*,[20] reported that patients' physical, psychological, social relationship, and environmental domain scores were significantly higher in the high-income groups. Moreover, DM2 is a chronic disease, a lifelong condition requiring lifelong compliance with medicines with a fixed budget and high healthcare costs consequently poor adherence to quality of Life.

Furthermore, only the physical health domain was significantly associated (p=0.007) with the level of education, and study results revealed that microvascular complications (diabetic foot and Neuropathy) were associated with a higher decline in QoL scores in physical (p=0.00), psychological (p=0.001) and environmental health (0.01) which agrees with Gebremedhin *et al*.[22] Similarly, macrovascular complications (Hypertension, Stroke, Ischemic heart disease) were associated with the psychological health domain only. Previous literature assessed the QoL using the WHOQOL-BREF questionnaire and highlighted the effect of micro- and macro-vascular complications of DM in the QoL of patients. Another study performed by Meher *et al* observed the complications of DM2, only foot complications, and depression remained significant predictor of poor QoL.[25]

CONCLUSION

The current study findings highlighted the health-related Quality of Life of patients with Type 2 Diabetes Mellitus; a chronic metabolic condition that affects the patients' various functional health patterns such as health perception and health management, nutritional and metabolic, activity- exercise and elimination pattern.

Overall patients reported moderate QoL and showed significant association with some sociodemographic factors, especially gender, age, marital status, monthly household income. Moreover, to given its chronic and economic impact, along with progressive complications

needs attention to improve quality of life of affected population and reducing the financial burden of existing debilitating health care system.

LIMITATIONS

Firstly, it was conducted in the outpatient department of one hospital and was a cross-sectional survey which cannot asses the good diabetic care on the QoL of patients. Second, the results cannot be generalized to other populations.

SUGGESTIONS / RECOMMENDATIONS

This study serves as basis for further exploration of developing complications associated with poor quality of life among diabetic patients in prospective cohort study design. Health professional i-e doctors and nurses, need to be informed about preservation of quality of life and prevention from complication, while maintaining the glycemic control of diabetic patients.

CONFLICT OF INTEREST / DISCLOSURE

None to disclose.

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