Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL 13, ISSUE 11, 2022

Assessment of Quality of Life and Its Determinants in Type 2 Diabetes – A Cross-Sectional Study in India

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Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It imposes significant physical, psychological, social, and economic burdens, making quality of life (QoL) a crucial outcome in management. The World Health Organization (WHO) defines quality of life as *"an individual's perception of their position in life in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards and concerns."* The global prevalence of diabetes was estimated at 463 million adults in 2019 and is projected to reach 700 million by 2045, highlighting its major public-health impact (1).

Individuals with diabetes experience reduced health-related quality of life (HRQoL) due to treatment complexity, lifestyle restrictions, and complications. Studies consistently report that people with diabetes have significantly lower QoL compared with the general population, particularly in those with poor glycemic control and longer disease duration (2,3). Research using validated instruments such as the WHOQOL-BREF has demonstrated impairment mainly in physical, psychological, and social domains (4,5). Therefore, improving QoL is essential for comprehensive, patient-centred diabetes care.

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Methodology

A cross-sectional study was conducted in the outpatient departments of Medicine and Endocrinology at a tertiary-care centre between January and June 2014. Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC approval number: 14/405). Written informed consent was obtained from all participants prior to enrolment.

Study population

The study included adults with type 2 diabetes mellitus attending the outpatient clinic. A total of 50 patients were recruited using convenience sampling.

Inclusion criteria

Clinically diagnosed cases of type 2 diabetes mellitus for at least five years, aged between 30 and 60 years, all genders, and those who provided written informed consent.

Exclusion criteria

Patients with juvenile-onset diabetes mellitus, intellectual disability, serious medical illnesses or comorbid neurological conditions such as cerebrovascular accidents or neurodegenerative diseases, individuals experiencing acute exacerbations of chronic illness or terminal conditions such as malignancy, patients currently on psychotropic medications, and those unwilling to participate were excluded.

Data collection tool

Data were collected using a semi-structured questionnaire consisting of sociodemographic details (age, gender, marital status, education, occupation, duration of diabetes, type of treatment, and recent HbA1C level). Assessment of quality of life was done using the WHOQOL-BREF (World Health Organization Quality of Life-BREF) instrument, which consists of 26 questions across four domains: physical health, psychological health, social relationships, and environmental factors. The scale has demonstrated good reliability and validity in diabetes populations.

Study procedure

Eligible participants were interviewed individually in a private setting using the structured questionnaire. WHOQOL-BREF responses were scored according to guidelines provided by WHO, and domain scores were transformed onto a 0–100 scale, with higher scores indicating better QoL. Data were entered into Microsoft Excel and analysed using SPSS version 23. Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to summarize demographic variables and QoL domain scores.

Results

Table 1:Sample characteristics:

S.NO	Characteristics	Frequency n(%)
1	Age group in years	

	30-40 40-50 50-60	8(16%) 18(36%) 24(48%)
2	Gender Male Female	 13(26%) 37(74%)
3	Socio-economic status Upper Middle Lower	 0(0.0%) 38(76.0%) 12(24.0%)
4	Marital status Married Unmarried Separated Widowed	 47(94.0%) 3(6.0%) 0(0%) 0(0%)

Table 2: Status of the study sample:

Treatment status	**Frequency**	**Percent (%)**
Oral anti diabetic drugs	45	90%
Insulin	2	4%
Combination therapy	3	6%

Table 3: Adherence to medication and lifestyle modification of the study sample:

	Adherence	**Frequency**	**Percentage**
Medication	Adherent	48	96.0
	Non-adherent	2	4.0
Diet	Adherent	32	64.0
	Non-adherent	18	36.0
Physical activity	Adherent	28	56.0
	Non adherent	22	44.0

Table 4: Association of quality of life with fasting blood sugar

Quality of life	Fasting blood sugar	Mean ± SD	P value
Physical	Elevated	57.71 ± 5.8	0.482
	Normal	59.9 ± 8.1	
Psychological	Elevated	57.64 ± 7.9	0.377
	Normal	60.03 ± 8.7	

Social	Elevated	67.50±9.2	0.644
	Normal	68.67±7.4	
Environmental	Elevated	64.14± 7.4	0.360
	Normal	66.19± 6.8	

Table 5: Association of quality of life with post prandial blood sugar

Quality of life	Fasting blood sugar	Mean ± SD	P value
Physical	Elevated	55.0± 7.9	0.040
	Normal	61.13 ± 6.3	
Psychological	Elevated	55.61± 8.5	0.017
	Normal	61.47 ± 7.8	
Social	Elevated	65.72±10.1	0.079
	Normal	69.81±6.0	
Environmental	Elevated	63.17± 7.2	0.064
	Normal	67.00± 6.6	

Table 6: Association of quality of life with HbA1C

Quality of life	Fasting blood sugar	Mean ± SD	P value
Physical	Elevated	58.26± 8.7	0.503
	Normal	59.70 ± 5.8	
Psychological	Elevated	58.89± 8.6	

	Normal	59.91 ± 8.5	0.675
Social	Elevated	67.93±8.9	0.692
	Normal	68.83±6.6	
Environmental	Elevated	64.19± 6.6	0.119
	Normal	67.30± 7.3	

A total of 50 participants were recruited. Among them, 16% (n=8) were in the age group 30–40 years, 36% (n=18) were 40–50 years, and 48% (n=24) were 50–60 years. More than half of the participants were female (74%, n=37), and 26% were male. Regarding marital status, 94% (n=47) were married and 6% (n=3) were unmarried. Based on the Modified Kuppuswamy Scale, 76% belonged to the middle socioeconomic class and 24% to the lower class (Table 1).

Among participants, 90% were on oral anti-diabetic medications, 4% on insulin therapy, and 6% on combination therapy (Table 2). Medication adherence was high (96%), while 64% adhered to diet restrictions and 56% engaged in regular physical activity (Table 3).

Fasting blood sugar and quality of life

In the domain of physical health, fasting blood sugar was within the normal range in most subjects, with a mean score of 59.39 ± 8.1, while those with elevated levels had a mean of 59.39 ± 5.7. The p-value (0.48) was not significant. In psychological health, normal levels corresponded to a mean score of 60.03 ± 8.7 and elevated levels to a mean of 57.64 ± 7.9, with a non-significant p-value of 0.37.

The social domain showed mean scores of 68.67 ± 7.4 for normal fasting blood sugar and 67.50 ± 9.2 for elevated levels (p = 0.64). In the environmental domain, mean scores were 66.19 ± 6.8 for normal and 64.14 ± 7.4 for elevated levels (p = 0.36) (Table 4).

Post-prandial blood sugar and quality of life

In the physical health domain, participants with normal PPBS had a mean score of 61.13 ± 6.3, while those with elevated PPBS had 55.0 ± 7.9, with a significant p-value of 0.04. Psychological domain scores were 61.47 ± 7.7 for normal levels and 55.61 ± 8.5 for elevated levels (p = 0.01).

The social domain scores were 69.81 ± 6.0 vs. 65.72 ± 10.1 (p = 0.07, not significant), and environmental scores were 67.00 ± 6.6 vs. 63.17 ± 7.2 (p = 0.06, not significant) (Table 5).

HbA1C and quality of life

Mean physical health scores were 59.7 ± 5.8 for normal HbA1C and 58.26 ± 8.6 for elevated HbA1C (p = 0.50). Psychological scores were 59.91 ± 8.4 vs. 58.89 ± 8.5 (p = 0.67). Social domain scores were 68.83 ± 6.6 vs. 67.93 ± 8.9 (p = 0.69). Environmental scores were 67.30 ± 7.3 vs. 64.19 ± 6.6 (p = 0.11) (Table 6).

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Discussion

The present cross-sectional study assessed the quality of life among individuals with type 2 diabetes mellitus and examined its association with glycemic parameters, including fasting blood sugar, post-prandial blood sugar, and HbA1C. The findings demonstrate that while fasting blood sugar and HbA1C values showed no statistically significant association with any of the WHOQOL-BREF domains, post-prandial blood sugar was significantly associated with physical and psychological QoL domains.

Consistent with earlier research, participants in the current study exhibited moderate impairment across quality-of-life domains, especially in physical and psychological functioning. Prior studies have similarly shown that diabetes has a substantial negative impact on health-related quality of life due to the chronic nature of the disease, lifestyle restrictions, treatment burden and risk of long-term complications (6). Trikkalinou et al. reported that individuals with diabetes consistently experience poorer QoL when compared with the general population, particularly when glycemic control is suboptimal (7)A systematic review by Fakhri et al. (2021) also highlighted reduced QoL in domains related to psychological well-being and social interaction among diabetic patients (8).

In the present study, post-prandial blood sugar levels showed a significant association with physical health ($p=0.04$) and psychological health domains ($p=0.01$). This finding indicates that fluctuations in post-meal glucose may have a more immediate impact on fatigue, energy levels and mood, which are critical determinants of well-being. Similar results were observed in a study by Prajapati et al., who found that poor post-prandial glycemic control significantly lowered WHOQOL-BREF scores among type 2 diabetics (9). In contrast, HbA1C did not show significant association with any QOL domains in this study, which may be due to the small sample size and the relatively narrow range of HbA1C values among participants. Some studies suggest that HbA1C better reflects long-term metabolic control rather than short-term symptom burden, which might explain the weaker correlation with QoL (10).

A noteworthy finding from this study is the high rate of adherence to medication (96%) and moderate adherence to diet (64%) and physical activity (56%). Lifestyle adherence is a known determinant of glycemic control and subsequent QoL; thus, the moderate impact observed may be partly explained by behavioural differences. Wändell emphasized that education, self-care behaviour and social support strongly influence QoL outcomes in diabetes management (10).

Strengths and Limitations

This study contributes to local evidence regarding the relationship between glycemic control and quality of life in a South-Indian context, a topic less explored in Indian literature. However, the study is limited by its small sample size, convenience sampling and single-centre design, which may restrict generalizability. Self-reported measures may also introduce bias.

Conclusion

Diabetes mellitus significantly affects multiple domains of quality of life. While fasting blood sugar and HbA1C did not show meaningful relationships with QoL scores, post-prandial glucose levels were associated with poorer physical and psychological functioning. Prioritizing

ISSN: 0975-3583,0976-2833 VOL 13, ISSUE 11, 2022

interventions targeting post-prandial glucose control may improve overall quality of life in individuals living with type 2 diabetes.

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