



Quality of life and its determinants among ambulatory diabetic patients attending NCD prevention clinic: A cross sectional study from Eastern India

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ABSTRACT

Introduction: India is experiencing an upward spiral in diabetic population. With the impact of diabetes on physical, social, psychological components of individual's life, a holistic view in terms of Quality of Life (QoL) is being increasingly recognized as an essential component of diabetes care and management. The objective of this study was to evaluate the QoL in ambulatory diabetic patients and factors affecting it in a tertiary care medical institution in eastern India.

Material and methods: In this cross-sectional study, 103 adult diabetic ambulatory patients were recruited by systematic random sampling from a Non-Communicable Disease (NCD) Clinic of a tertiary care hospital of Eastern India. The QoL of patients were accessed by the validated Odia version of WHO-QoL BREF questionnaire. Bivariate analysis was performed to compare the effect of sociodemographic and clinical parameters on QoL scores.

Results: The maximum domain wise score was in social (65.98 ± 13.89) followed by environmental (61.73 ± 16.27) domain. Overall, 64% of the respondents perceived as their QoL as good. Males, urban residents, persons aged less than 60 years and overweight individuals reported a better QoL than their counterparts. Gender and residence were found to be significantly associated with QoL, across domains.

Conclusions: QoL assessment is pivotal as an outcome measure in diabetes care and management. Policy makers ought to consider quality adjusted life years while evaluating health outcomes in patients of chronic diseases like diabetes.

1. Introduction

India has been notably titled as the Diabetic capital of the world, with every sixth person with diabetes being an Indian.¹ The rising trend in diabetic population can be attributed to aging, obesity, genetic predisposition and family history, unhealthy lifestyle and increased market of trans fatty foods, physical inactivity and the growing urban migration. The prevalence of diabetes is projected to increase twofold globally from 171 million in 2000 to 366 million in 2030 with the highest increase in India, according to a report by Wild et al.² By 2030, diabetes mellitus may affect up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) may also witness marked increase in numbers.^{2,3} There is a marked lowering of the age at which

type 2 diabetes is being diagnosed, with the disease prevalence becoming more apparent in the younger age group of 25–34 years.⁴ India plays a unique role in the diabetes picture of the world. Asian Indians have a higher propensity to insulin resistance, diabetes mellitus and coronary artery disease, when compared to other ethnic groups.⁵ India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. The Indian Council of Medical Research IndiaB study in 15 states reported the overall prevalence of diabetes as 7.3% (95% CI 7.0–7.5).⁶

This huge burden makes it difficult to manage at specialist care solely, and calls upon the involvement of primary care physicians and family physicians. There is a need to provide standard care for diabetes management with aim of glycaemic control and prevention of

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complications. Further diabetes being a chronic disease, needs a continuum of care approach with frequent follow ups, for stringent blood glucose control. Diabetes significantly increases an individual's risk of developing various microvascular and macrovascular complications. This is evident in the increase in age-standardised Disability Adjusted Life years (DALY) rate for diabetes in India by 39.6% (32.1–46.7) from 1990 to 2016, markedly the highest increase among major NCDs.⁷ Apart from these physical complications, diabetes also impacts psychological and social aspects. The physical, psychological, and social burden of diabetes reflects in the Quality of Life (QoL) and affects patients' self-care behaviours, disease management, therapeutic adherence. In this context, the quality of life indeed becomes a better predictor of relevant clinical outcomes (morbidity and hospitalization). Healthcare professionals around the world are becoming increasingly aware of the importance of QoL as a measure to improve diabetes care and management. There is overwhelming literature about the need to assess and monitor the quality of life as essential outcome of diabetes care and management and integral component of therapy. It helps in realizing the perceived quality of life of diabetic patients and subsequently personalize the therapy and clinical course according to their priorities and expectations. There have been very few studies from eastern India reporting the QoL in diabetic patients. Therefore, we planned this study to assess the QoL in ambulatory diabetic patients and factors affecting it in a tertiary care medical institution in eastern India.

2. Methods

2.1. Study setting and sampling

This cross-sectional hospital-based survey was carried out in ambulatory patients attending Non-Communicable Disease (NCD) prevention clinic of a tertiary care institution for routine medical care. This clinic caters to the need of the entire state of Odisha along with some patients of adjoining states of West Bengal and Chhattisgarh. The NCD prevention clinic is managed by community medicine physicians with a daily attendance of about fifty patients. The sample size for the survey was calculated using the prevalence of good quality score on WHO QOL BREF scale as 68% by Manjunath K et al. as 87, at 95% confidence interval and 10% absolute precision.⁸ We recruited a total of 103 patients of diabetes mellitus for the evaluation of quality of life to accommodate non-response and incompletes proformas. Diabetic individuals who were ≥ 18 years, on treatment for at least six months and visiting the NCD Out Patient Department for the first time were recruited by systematic random sampling. The first patient was selected by simple random sampling and subsequently patients were taken at intervals of five. The maximum number of subjects enrolled per day was limited to five to maintain the quality of data collection. The study subjects selected were interviewed by a trained person ensuring privacy after explaining them the purpose and relevance of the study. Gestational diabetes patients, those with mental disability, and not willing to give consent were excluded from the study.

2.1.1. Study tool

Validated Odia version (vernacular language) of WHO-QoL BREF (World Health Organization) questionnaire was used to assess the quality-of-life of patients.⁹ WHO-QoL BREF comprises of 26 items in 4 domains; physical health, psychological, social relationships and environment; and two items on overall QoL and general health. Each individual item of WHOQOL-BREF is scored from 1 to 5 on a response scale. Raw scores for the domains of WHO QoL-BREF were calculated by adding scores of single items and were transformed on the scale ranging from 0 to 100, where 100 is the highest and 0 is the lowest QoL, as per WHO Manual of scoring.

2.2. Statistical analysis

Summary measures of domain scores (mean \pm SD) was compared across different socio-demographic variables. Association of QoL scores across domains with sociodemographic parameters were analysed using independent samples *t*-test and one-way MANOVA. A *p* value of less than 0.05 was considered as statistically significant. Statistical analysis was carried out using standard statistical software SPSS version 21.0 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.)

Ethical approval

The study was approved by the institutional ethic committee of All India Institute of Medical Sciences, Bhubaneswar. Written informed consent was obtained from the participants prior to the inclusion in the study.

3. Results

We included a total of 103 adult diabetic individuals in the study. Majority of the patients enrolled into the study were in the age group of 41–60 years (62.13%) followed by more than 60 years (27.18%). Males and females in the study were in 3:2 ratio. Patients were nearly equally represented from urban and rural background. 45 (43%) of the participants had more than secondary level of education. Family history of diabetes was present in 46 (44.6%) of the participants. (Table 1). Mean Body Mass Index (BMI) in case of males (25.46 kg/m²) was higher than females (24.88 kg/m²). Majority of the participants were obese in reference to waist gender specific circumference cut-off levels for Asian Indian individuals. The mean duration of diabetes was approximately five and a half years, being more in males (7.09 \pm 7.60) than females (3.39 \pm 3.07). Majority 81(78.6%) of the participants were on oral anti diabetic drugs followed by Medical Nutrition Therapy.

Overall, 64% of the respondents perceived as their QoL as good as assessed by the first general question of WHO QoL BREF questionnaire. Quality of life was analysed in four domains namely physical, psychological, social, and environmental domains as, per the WHOQOL questionnaire. The maximum domain wise score was in social (65.98 \pm 13.89) followed by environmental (61.73 \pm 16.27) domain. Least score was obtained in the physical domain (55.62 \pm 12.83). (Table 2).

The mean scores of all the domains of QoL was higher in males than females. Urban residents reported a higher individual domain scores than their rural counterparts. In terms of BMI, diabetic individuals in overweight and obese BMI category reported better QoL scores, followed by those having normal BMI. Individuals with a family history of diabetes had a lower score than those with no previous history. Higher QoL

Table 1
Demographic profile of study participants: (n = 103).

Characteristic	Group	Number	Percentage
Age group (in years)	18–40 years	11	10.69
	41–60 years	64	62.13
	>60 years	28	27.18
Gender	Male	62	60.19
	Female	41	39.80
Marital status	Married	100	97.09
	Unmarried	2	1.94
	Divorced	0	0
	Widow/Widower	1	0.97
Place of residence	Rural	53	51.45
	Urban	50	48.55
Education level	Illiterate	5	4.85
	Primary	14	13.59
	Secondary	39	37.86
	Higher secondary	13	12.62
	Graduate and above	32	31.06
Family History of Diabetes	Yes	46	44.66
	No	57	55.34

Table 2

Domain wise score of the study subjects (n = 103).

Domains	Score Mean \pm SD	Range
Physical domain	55.62 \pm 12.83	25–88
Psychological domain	56.93 \pm 14.13	13–88
Social domain	65.98 \pm 13.89	25–100
Environmental domain	61.73 \pm 16.27	19–100

scores in all domains were reported by participants who had an onset of disease of more than 5 years, though it was marginal in the physical domain (Table 3). QoL across domains was significantly associated with type of residence and gender (except for the psychological domain).

We categorised the individual scores into good and bad scores, using mean value as cut off. Majority of the participants scored good in social domain (67.96%) followed by psychological domain (55.34%) (Table 4). On bivariate analysis, gender of the study participants was significantly associated with QoL ($p = 0.043$). (Table 5).

4. Discussion

Diabetes continues to grow at a fast pace assuming proportions of a modern-day epidemic, particularly in Low- and Middle-Income countries like India. Diabetes is known to adversely affect subjective perception of quality of life.¹⁰ Improvement in QoL is one of the integral

Table 3

Domain wise QOL scores based on sociodemographic and clinical characteristics (n = 103).

Factors	Physical domain	Psychological domain	Social domain	Environmental domain
Gender				
Male	57.79 \pm 12.54	58.52 \pm 14.89	68.39 \pm 14.27	64.60 \pm 16.47
Female	52.34 \pm 12.71	54.54 \pm 12.69	62.34 \pm 12.60	57.39 \pm 15.16
p- value	0.035 ^a	0.150	0.026 ^a	0.025 ^a
Age				
<60 years	55.95 \pm 11.89	56.80 \pm 13.21	66.19 \pm 13.56	61.69 \pm 15.06
>60 years	54.75 \pm 15.27	57.29 \pm 16.61	65.43 \pm 14.97	61.82 \pm 19.45
p- value	0.710	0.890	0.816	0.975
Residence				
Rural	52.15 \pm 12.45	54.02 \pm 15.02	62.52 \pm 13.92	56.21 \pm 15.30
Urban	58.84 \pm 12.26	59.48 \pm 12.38	69.28 \pm 13.09	66.94 \pm 15.28
p-value	0.007 ^a	0.048 ^a	0.013 ^a	0.001 ^a
BMI (kg/m²)				
<18	45.67 \pm 13.05	56.23 \pm 12.50	58.33 \pm 9.71	56.33 \pm 12.50
18–22.9	54.26 \pm 12.23	50.81 \pm 16.95	62.96 \pm 14.27	55.67 \pm 17.05
23–24.9	60.10 \pm 10.59	60.25 \pm 13.20	69.70 \pm 15.18	66.65 \pm 16.40
>25	55.19 \pm 13.63	58.83 \pm 12.28	66.55 \pm 13.22	63.26 \pm 15.41
p-value	0.204	0.066	0.298	0.093
Family History of DM				
Yes	53.74 \pm 13.22	56.74 \pm 12.65	65.13 \pm 12.20	62.15 \pm 13.84
No	57.14 \pm 12.41	57.09 \pm 15.33	66.67 \pm 15.18	61.39 \pm 18.12
p-value	0.186	0.900	0.570	0.808
Onset in years				
<5 years	55.45 \pm 13.27	56.30 \pm 14.97	65.97 \pm 13.14	60.63 \pm 15.87
>5 years	55.94 \pm 12.13	58.11 \pm 12.54	66.00 \pm 15.38	63.78 \pm 17.04
p-value	0.849	0.516	0.992	0.363

^a Significant.**Table 4**

Categories based on quality-of-life scores (n = 103).

Domain	Good score (%)	Bad score (%)
Physical domain	38(36.90)	65(63.10)
Psychological domain	48(46.60)	55(53.40)
Social domain	70(67.96)	33(32.04)
Environmental domain	57(55.34)	46(44.66)

Table 5

Factors influencing quality of life of diabetic patients (n = 103).

Factor	Category	Good QOL (66)	Poor QOL (47)	p value
Age	<60 years	41	34	1.000
	>60 years	15	13	
Gender	Male	39	23	0.043*
	Female	17	24	
BMI	<25	22	26	0.117
	>25	34	21	
Duration of diabetes	<5 years	33	34	0.213
	>5 years	23	13	

components of therapeutic success in diabetes management.

Overall, 64% of the diabetics have reported a good perceived QoL. This is comparable to studies from Thiruvananthapuram and Vellore, which showed that 62% and 68% of the diabetics reported good QoL, respectively.^{8,11} Conclusions from this prevalence of good QoL should be drawn with caution. Simultaneously, comparisons need to be done between QoL among non-diabetics and among patients with other chronic illnesses for better comprehension and judgement. Also, positional objectivity due to sociodemographic factors need to be considered. Some of the widely used generic tools for diabetes are WHOQOL- BREF, SF-12, EQ-3D. They are resourceful tools to compare across different populations, however, they have limitations in their ability to assess critical aspects related to issues specific of diabetes. The factors affecting QoL vary based on the study subject, design, and methods used.¹²

Mean QoL scores were higher in males than females as reported by other studies in India and elsewhere.^{8,13–16} Possible factors can be better awareness and proper health seeking behaviour among males. In females, under reporting, delay in seeking care, social disfavours, and lack of family support in rural areas and less compliance to routine testing and follow ups, might be the contributing factors. Diabetic individuals from urban areas reported higher total QoL scores and in all the domains. This is understandable as urban residents have better means of living, socioeconomic status, and access to healthcare facilities. Surprisingly, overweight, and obese diabetic individuals had better QoL scores than those with normal weight. This is in accordance with studies by Manjunath et al. in South India.⁸ However, BMI has been reported to be negatively associated with QoL in many studies.^{17,18} This may be due to overweight and obese could still have a good QoL, as overweight/obesity is not severe enough to cause physical or psychological problems in them. This is particularly plausible when the cut offs are taken according to Asian Indian standards, which is lower than the international obesity guidelines.¹⁹

The QoL of diabetic individuals with more than 5 years of onset was surprisingly better. This is in contrast to many studies.^{20,21} The fact that most of our study participants were ambulatory, may lead to higher scores, however, duration of diabetes is expected to attenuate when complications are taken into consideration with respect to QoL measures.²² Also, with longer duration (>10 years) history QoL gets affected with the onset of micro and macrovascular complications. Individuals with family history had lower scores than those with no history. It may be attributed to earlier onset of disease, higher chances of comorbidities, psychological effects, fear, and social and financial issues.

Domain-wise 36.9% had good physical QoL, 46.6% had good psychological QoL, 67.9% had good social QoL and 55.3% had good environmental QoL (Table 4). Surprisingly, higher percentage of the study

population (67.9%) scored well in social QoL. This may be attributed to strong social support and good personal bonding and care in Indian families, and with their friends and relatives, particularly in rural areas. Social cohesion and interdependence are inherent to the Indian family system, and provide valuable support in times of need.²³ The lower QoL scores in physical domain indicate low work capacity, increased dependence on medications and fatigue and reduced mobility in daily living. Low psychological scores may be attributed to coexisting anxiety, depression and mental health issues accompanied by diabetes and other associated comorbidities.¹⁰ The aspects measured in the WHO QoL BREF instrument pertaining to environmental QoL are availability of finances, condition of living place, physical environment, access to health care and transport facilities. Studies in India have unequivocally reported that costs of diabetes care are disproportionate, with a higher economic burden, particularly on the poor.^{24,25} These scores are understandable as the individuals belonged to a community with underdeveloped public healthcare system, low education, limited resources and poor socio-economic status. Studies in Iran and West Java have also reported lower QoL scores in environmental and psychological domains.^{26,27}

5. Strengths and limitations

Our study also has some limitations. Small sample size, single centre hospital-based study and non-inclusion of Type 1 diabetes limits the generalizability of the study. Also, only ambulatory subjects were taken, so the results cannot be generalized to indoor patients and those with long standing complications and critically ill. Nevertheless, it is one of the few studies which explores the QoL among ambulatory diabetic patients in Eastern India. More community-based studies are mandated in different settings to provide more robustness and utility values to the QoL tools and deciphering a comprehensive picture.

6. Conclusion

Considering the rapid increase of diabetic individuals in India and worldwide, it becomes imperative to include QoL assessment as an outcome measure in its management. There is a need of holistic care approach in the management of diabetic patients, with increased emphasis on primary care. Primary care physicians being the first and most accessible point of contact should be sensitized on the role of health education, adequate glycemic control and treatment compliance and periodic assessment of QoL for improved treatment outcomes. Policy makers may consider quality adjusted life years while evaluating health outcomes in patients of chronic diseases like diabetes through a more comprehensive lens.

Declaration of competing interest

None.

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