ORIGINAL ARTICLE

Quality of Life Assessment in Urban Diabetics of Meerut: A Physical and Mental Health Perspective

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ABSTRACT

Background: Diabetes is linked to lifestyle and economic changes and has a significant impact on the quality of life across physical, mental, and social domains. **Aims & Objective:** The objective of this study was to assess the quality of life of adults with type 2 diabetes in urban Meerut. **Settings and Design:** Community-based cross-sectional study. It was conducted over a one-year period among adults aged above 18 years with Type 2 Diabetes Mellitus residing in the urban areas of Meerut City. **Methods and Material:** A total of 350 adults with Type 2 Diabetes mellitus were selected using systematic random sampling from a line list of known cases. Data on socio-demographics and quality of life were collected using a pre-designed questionnaire and the SF-36 tool. **Statistical analysis used:** The data were analysed using Epi Info and Jamovi **Results:** The study found that increasing age, lower socioeconomic status, and lower educational attainment were significantly associated with poorer Quality of Life (QoL) scores among Type 2 diabetic patients in all domains. **Conclusions:** Quality of Life (QoL) in diabetics is deeply influenced by age, education, and socioeconomic status, with 57.4% of participants reporting good QoL. The study recommends a holistic approach to improve QoL in diabetics, combining medical care with lifestyle changes, stress management, and mental health support.

KEYWORDS

Quality of Life, Type-2 Diabetes Mellitus, Community-based Study, Mental Health

INTRODUCTION

According to World Health Organisation (WHO), there is *'an apparent epidemic of diabetes, which is strongly related to lifestyle and economic change*.(1) The International Diabetes Federation projected that the number of patients of diabetes in India doubled from 1995 to 2005, and is expected to reach approximately 70 million by 2025. (2,3)

The World Health Organization describes Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live which is in relation to their goals, expectations, standards, and concerns.(4) Quality of life (QOL) is a multidimensional concept that reflects a person's subjective evaluation of the various aspects of their life, including physical health, mental well-being, emotional well-being (happiness with work and personal relationships, social relationships, cognitive component (sense of satisfaction and fulfilment) and environmental conditions.(5) Those having diabetes are predisposed to complications that impact psychosocial life and everyday functioning, and thus contribute to poor quality of life [QoL]. (6, 7)

Assessing the quality of life among individuals with Type-2 diabetes can help healthcare professionals identify areas that require attention in diabetes management and develop targeted medical interventions and health policies to improve overall patient outcomes.(8)Most studies on QoL assessment among diabetic patients have been conducted in Southern India and largely reported from tertiary care hospitals. With this background in view, the present community-based study was done to assess the quality of life among type 2 diabetic adults in urban Meerut.

Objectives:

- To assess the Quality of life among adults with type 2 diabetes mellitus in an urban area of Meerut.
- To find out the proportion of individuals with good and poor QoL.
- To find out the sociodemographic variables influencing QoL among diabetic adults.

Material & Methods

Study type: The current cross-sectional study was carried out in the urban population of Meerut City among Type 2 Diabetes Mellitus patients who were more than 18 years for a period of one year.

Sample Size calculation: The sample size calculation was done using the formula: $\mathbf{n = (Z_{1-\alpha/2})^2 \times (SD)^2/d^2}$, where $Z_{1-\alpha/2}$ at 95% confidence interval, d (acceptable deviation) is 2.5, the SD was taken to be 23.17 from a previous study (9)and after accounting for a 5% nonresponse rate, the final sample size for the study was rounded off to **350.**

Inclusion and Exclusion criteria: Those >18 years and all those who reported or who revealed their reports and prescriptions as diagnosed diabetics were included in the study. Severely ill or bedridden patients, those who did not give consent to be part of the study and non-diagnosed cases of Diabetes Mellitus were excluded.

Data collection: Meerut District is having 90 wards (10) and selection of one ward was done randomly using tables of random numbers. A line list of diabetic patients was obtained from the Urban Health Centre and based on this list, a systematic random sampling technique was used with a sampling interval (k) of 6, to select the required number of study participants. The starting point was chosen randomly using the lottery method, and then every 6th individual was selected until the desired sample size of 350 was reached.

Detailed information on Socio-demographic characteristics was collected using a pre-designed questionnaire. The Survey Form-36 was used to assess Quality of life, consisting of 36 items categorized into two components: physical and mental health. The physical health domains include Physical Functioning (10 items), Role Limitations due to Physical Health (4 items), Bodily Pain (2 items), and General Health Perceptions (5 items). The mental health domains comprise Vitality (4 items), Social Functioning (2 items), Role Limitations due to Emotional Problems (3 items), and Mental Health (5 items). When scores for all eight domains are available, two composite scores derived are: Physical Component Summary (PCS) and Mental Component Summary (MCS). All domain and summary scores are positively scaled, meaning that higher scores imply better health-related quality of life.

Statistical analysis: The data collected was analyzed using the Centres for Disease Control (CDC), Epi Info TM 7.2.5.0 and Jamovi 2.3.28. Categorical data were summarised as numbers and percentages. Mean (SD) or Median (IQR) were used to summarise the continuous type of data. For the continuous variables Mann-Whitney U test and Kruskal-Wallis test ANOVA test were used. p-value < 0.05 was considered significant. The statistically significant values were evaluated as 95% confidence interval level.

Ethical clearance was obtained for this study by the ethical committee of LLRM Medical College.

Results

The present study was done in an urban Meerut among 350 participants with a mean age of participants being 54.6 ± 13.3 years; most were aged 38–58 years (48.8%) and were female (57.4%). The majority were Hindus (86.6%). Over half lived in joint families (59.1%), and most were married (76%). Socioeconomically, the largest group belonged to the upper middle class (40%). In terms of education, 25.4% were graduates, while 23.1% were illiterate. Most participants were unemployed/housewives (40.9%) or skilled workers (30.3%).

Figure 1: Physical component scoring (PCS) of QoL with its various key domains.

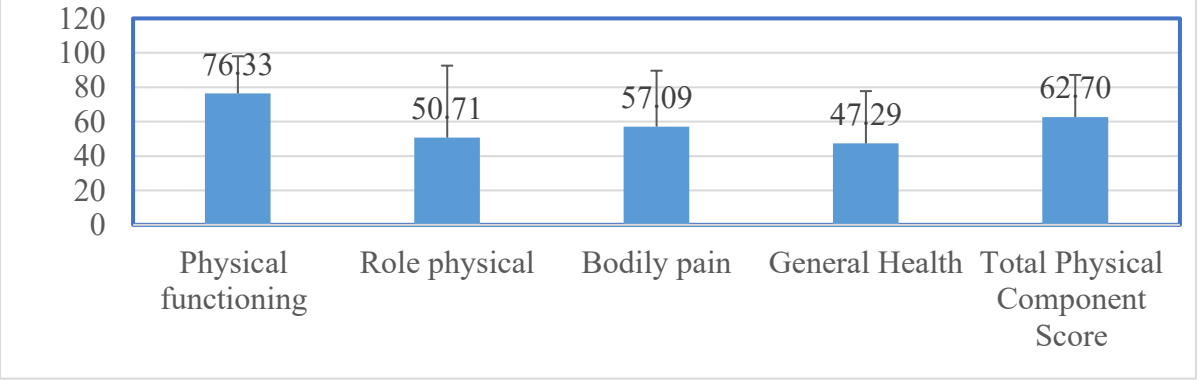

Figure 1 illustrates the mean scores and standard deviations for the domains that contribute to the Physical Component of Quality of Life. The Physical Component Score (PCS) encompasses four key domains: Physical Functioning, Role Physical, Bodily Pain, and General Health. Among these, Physical Functioning recorded the highest mean score (76.33 ± 21.68), followed by the Bodily Pain domain with a mean of 57.09 ± 32.52 and Role Physical having a mean score of 50.71 ± 41.84. The General Health domain showed the lowest score (47.29 ± 30.46). The combined Physical Component Score was 62.70 ± 24.44.

Figure 2: Mental component scoring (MCS) of QoL with its various key domains.

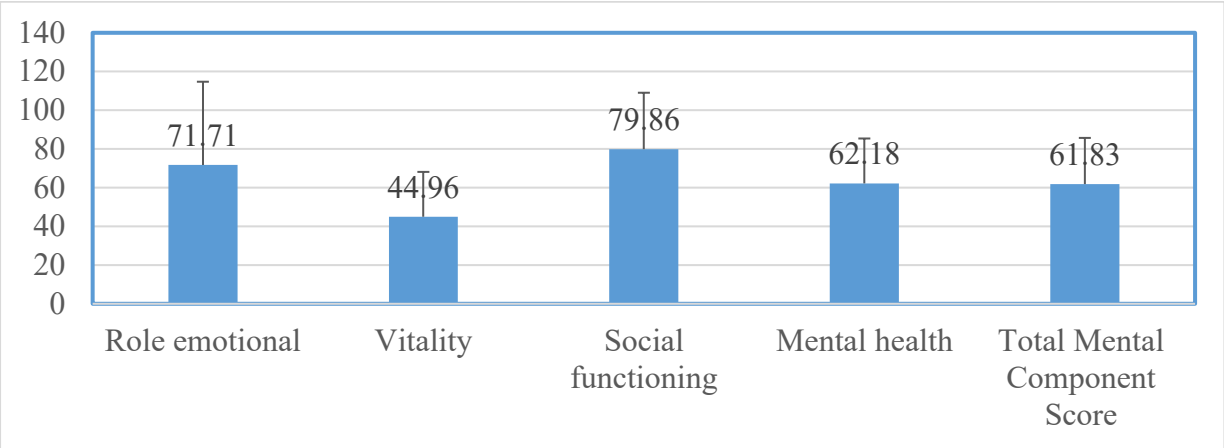

Figure 2 depicts the mental health-related Quality of life dimensions. Mental Component Score (MCS) includes four domains: Role emotional, Vitality, Social functioning and Mental health. The highest mean score in the mental domain was observed in Social Functioning (79.86 ± 29.17), followed by the Role Emotional domain, which scored 71.71 ± 43.01 and the Mental Health domain with a mean score of 62.18 ± 23.21. The lowest mean scores were found in the Vitality domain (44.96 ± 23.17). The Total Mental Component Score (MCS) was 61.83 ± 23.87.

Figure 3: Distribution of diabetic study participants based on QoL Assessment (n=350)

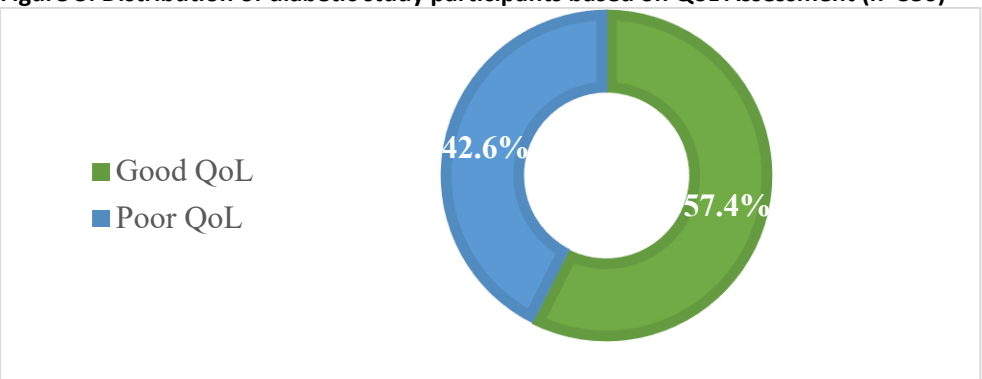

Figure 3 show the overall distribution of participants based on their overall quality of life (QoL) scores. The QoL scores were categorised using the mean score as the cut-off point, classifying participants into those with good QoL (scores above the mean) and poor QoL (scores below the mean). Out of the total sample, 201 participants (57.4%) were categorised as having good QoL, while 149 participants (42.6%) were categorised as having poor QoL.

Table 1 presents the association of Quality of Life domains with Socio-Demographic Variables. The Quality of Life (QoL) scores had a statistically significant decrease in Physical Component Summary (PCS), Mental Component Summary (MCS), and Overall QoL scores with increasing age ($p < 0.001$ for PCS and Overall QoL; $p = 0.005$ for MCS). Younger participants (18–38 years) reported the highest median scores across all domains, while the oldest age group (>78 years) exhibited the lowest values. No statistically significant differences were observed in QoL scores based on gender, family structure, marital status, or occupation ($p > 0.05$). Although females and participants from nuclear families, unmarried individuals, and employed participants had slightly higher median scores in some domains, these differences were not statistically significant. In contrast, socioeconomic

status and educational attainment demonstrated a significant association with QoL outcomes. Participants from higher socioeconomic classes ($p < 0.001$ for all domains) and those with higher educational qualifications ($p < 0.001$ for PCS and Overall QoL; $p = 0.007$ for MCS) reported better scores across all three QoL domains. The lowest scores were recorded among individuals from lower socioeconomic backgrounds and those with no formal education.

Table 1: Association of domains of Quality of Life among Type 2 Diabetes Mellitus patients with Socio-Demographic Variables (n=350)

Socio-demographic variables	Frequency (%)	Physical component summary score			Mental component summary score			Overall		
		Median (IQR)	Q1-Q3	Min - Max	Median (IQR)	Q1-Q3	Min - Max	Median (IQR)	Q1-Q3	Min - Max
Age (in years)										
18-38	45(12.9)	100 (25)	75-100	0-100	80 (30)	60-90	0-100	100 (22.5)	77.50-100	0-100
38-58	171(48.8)	75(50)	50-100	0-100	70 (50)	40-90	0-100	77.5(60)	40-100	0-100
58-78	114(32.6)	50 (75)	25-100	0-100	67.5 (50)	40-90	0-100	67.50 (75)	25-100	0-100
>78	20(5.7)	50 (60)	15-75	0-100	52.5(27.5)	35-62.5	0-100	50 (41.87)	21.88-63.75	0-100
p-value*		**<0.001**			**0.005**			**<0.001**		
SES										
Upper	53(15.2)	100(50)	50-100	0-100	70(20)	60-80	0-100	80 (50)	50-100	0-100
Upper middle	140(40)	100(50)	50-100	0-100	80(30)	60-90	0-100	77.5 (50)	50-100	0-100
Middle	67(19.1)	75(77.5)	22.5-100	0-100	60(52.50)	27.5-80	0-100	67.5(77.5)	22.5-100	0-100
Lower Middle	57(16.3)	75(50)	50-100	0-100	80(50)	40-90	0-100	75(60)	40-100	0-100
Lower	33(9.4)	50(75)	0-75	0-100	40(50)	20-70	0-100	40 (57.5)	20-77.5	0-100
p-value*		**<0.001**			**<0.001**			**<0.001**		
Education										
Professional degree	12(3.4)	100 (31.25)	68.75-100	0-100	80(27.5)	62.5-90	30-100	85 (42.50)	57.5-100	0-100
Graduate	89(25.4)	100(50)	50-100	0-100	80(30)	60-90	0-100	80 (50)	50-100	0-100
Intermediate or diploma	72(20.6)	75(50)	50-100	0-100	78.75(30)	60-90	0-100	80 (50)	50-100	0-100
High school certificate	44(12.6)	75(75)	25-100	0-100	60(48.13)	31.88-80	0-100	67.5 (75.63)	50-100	0-100
Middle school certificate	29(8.3)	50(100)	0-100	0-100	60(60)	20-80	0-100	55 (80)	24.38-100	0-100
Primary school certificate	23(6.6)	50(60)	0-100	0-100	60(40)	40-80	0-100	50(50)	20-100	0-100
Illiterate	81(23.1)	50(75)	40-100	0-100	60 (57.50)	22.5-80	10-100	50 (67.5)	40-90	0-100
			25-100	0-100			0-100		20-87.5	0-100
p-value*		**<0.001**			**0.007**			**<0.001**		

*Kruskal–Wallis test; # Mann–Whitney U test

DISCUSSION

This study highlights the diverse impact of diabetes on patients' lives, showing significant variation in quality of life across different health domains. Among the domains, the highest mean score were in the Social Functioning (SF) domain, indicating retained ability to engage in social interactions and maintain interpersonal roles, despite illness. The lowest scores were observed in the Vitality (VT) domain and General Health (GH), indicating compromised energy levels, fatigue, and general health perceptions among participants. These scores might indicate. Low vitality scores likely reflect constant tiredness due to workload pressure, urban congestion, and limited time for self-care in urban Meerut, which could contribute to reduced perceived energy levels among participants. The findings align with the study done by Rajput M et al (2020) which recorded the domain of social functioning as having the highest mean scores (76.47 ± 26.10), while vitality (43.46 ± 19.35) and general health (47.17 ± 19.21) were the most affected domains.(9) Similarly, Sharma S et al (2021) in the study also reported Social Functioning as the best-preserved domain (86.04 ± 22.28) and Vitality as the most compromised domain (47.46 ± 15.63). (11)

The current study showed that 57.4% of participants (n=201) were identified as having good QoL, while 42.6% (n=149) fell into the poor QoL category. Jose SD et al (2022) noted that 38% of the study participants were having poor quality of life, (12)while Amin MF et al (2022) (Bangladesh) found that only 25% of participants reported having a poor overall quality of life.(13)

It was noted that there was a significant decrease in Quality of Life (QoL) with increasing age across all measured domains of QoL. The youngest participants (18–38 years) reported the highest QoL scores, which progressively decreased in individuals of the older age group with the oldest group (>78 years). The findings align with the study conducted by Singh RK et al (2016), and by Sharma S et al (2021) which observed a statistically significant decline in QoL with increasing age (11,14). The decrease in QoL with increasing age can be attributed to the compounding effects of physical issues like chronic illness, reduced mobility, and fatigue with ageing and psychological stressors linked to cognitive decline, depression, and social isolation, highlighting that more care is needed in older age groups.

Lower socioeconomic status (SES) were associated with poor QoL for both physical and mental dimensions. The findings were supported by Gautam Y et al (2009), where individuals from lower socioeconomic backgrounds had significantly poorer QoL scores and were found to have significant associations between SES and all eight SF-36 domains. (15) In study by Jose SD et al (2022), individuals in the low (OR: 4.59, CI: 2.43-8.66) and medium (OR: 4.70, 95% CI: 2.61-8.46) SES categories had significantly poorer QoL compared to those in high SES. (12)

In the present study, higher education was linked to better Quality of Life outcomes across all domains. This finding was supported by Sharma S et al (2021) who reported significantly better QoL in both physical component domain and mental component domains among participants with higher education levels. (11)Thomas Z et al (2022) also found that participants with secondary education or higher were significantly more likely to report good QoL (*OR* = 2.70, *p* = 0.02) as compared to those with no formal education. (16)Improved education is associated with enhanced health literacy, treatment adherence, healthcare access, and coping strategies, which collectively contribute to better disease management and QoL outcomes.

In present study, there were no significant differences between QoL and sex, marital status, type of family and occupation of the participants.

CONCLUSION

Quality of life (QoL) significantly influences human existence and is shaped by cultural contexts, value systems, personal goals, and expectations. It has been observed that the healthcare systems often focus on acute complications and the psychological weight of living with diabetes is frequently underrecognized. Of the total 350 study participants, 57.4% reported good QoL, with an overall mean QoL score of 62.35 ± 22.93. The highest mean domain scores were in Social (79.86) and Physical Functioning (76.33), while Vitality (44.96) and General Health (47.29) scored lowest. The present study highlighted that age, education, and socioeconomic status have a significant impact on QoL in diabetics. This suggests that there is need for targeted interventions by healthcare sector to improve health outcomes among older, less-educated, and economically disadvantaged groups.

RECOMMENDATION

The study highlights that diabetes mellitus significantly affects the quality of life, especially in domains such as general health, vitality, role limitations, and mental well-being. To address this, the study recommends a comprehensive approach

combining medical treatment with lifestyle interventions. Key strategies include educating patients on managing insulin resistance through diet and exercise, incorporating pain and stress management into routine care, and promoting yoga, pranayama, and mental health support. Community-based interventions like self-help groups at health centres, regular screening camps, IEC/BCC activities, and Mohalla clinics can facilitate early detection and awareness. Financial aid, subsidized treatment, and tailored education for low-income and low-literacy patients are advocated. Trained community health workers and workplace diabetes management programs, along with meaningful engagement for the unemployed, are essential to enhance QoL and self-worth among diabetics.

LIMITATION OF THE STUDY

Due to logistical, time and manpower constraints it was feasible to conduct detailed data collection in only ward. However, inclusion of multiple wards would have improved the external validity.

RELEVANCE OF THE STUDY

This study is relevant as it highlights that quality of life in Type 2 diabetes is strongly influenced by age, education, and socioeconomic status in an urban Indian setting.It emphasizes the need for holistic, socially responsive diabetes care beyond mere glycaemic control.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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Nil

CONFLICT OF INTEREST

There are no conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generator AI/AI assisted technology in the writing process.

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