ORIGINAL RESEARCH ARTICLE

Quality of Life and Its Determinants Among Diabetic Patients in A Rural Area of Gautam Buddha Nagar, Uttar Pradesh, India

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ABSTRACT

Context: Diabetes has become the largest health emergencies of 21st century. The burden of diabetes is increasing globally especially in developing economies like India. In the recent years, Physician's interest has turned to the concept of quality of life (QOL) as an important treatment goal and an important component of therapy in the management of diabetes. The study was aimed to compare the quality of life of adult diabetic subjects with healthy subjects and to assess the factors affecting the quality of life among diabetic subjects.

Methodology: A Community based cross sectional study was conducted among 250 diabetic subjects and 50 healthy subjects more than 18 years of age, based on WHO-Quality of Life-BREF (WHO-QOL-BREF) questionnaire manual in the rural area of District Gautam Buddha Nagar from Jan 2021-June 2022. Data collected were entered and statistically analyzed using statistical software (SPSS-22)

Results: Overall quality of life and general health score was significantly poor among diabetic subjects as compared to healthy subjects. Quality of life was significantly lower in diabetic subjects ≥ 60 years of age, illiterate subjects and in diabetic subjects with presence of comorbidity.

Conclusions: Overall QOL was poor among diabetic subjects as compared to healthy subjects

Key-words: Quality of life, Diabetes Mellitus, WHO-QOL-BREF

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INTRODUCTION

The burden of diabetes is high and increasing globally. The Global Prevalence of Diabetes in 20-79 years old in 2021 was estimated to be 10.5% (536.6 million people) which will rise to 12.2% (783.2 million) in 2045.[1]

In SEAR (South East Asian Region), 1 in 11 adults (90 million) are living with diabetes and over 1 in 2 adults living with diabetes are undiagnosed and 747,000 deaths were caused by diabetes in SEAR in 2021.[2]

In India, 16.8% of adult male population and 14.6% of adult female population on an average are diabetic. According to NFHS-5 survey, among 22 states/ UTs in India around 16.8% of adult male population and 14.6% of adult female population on an average are estimated to be diabetic.[3]

WHO defines Quality of Life as an "Individual's perception of their position in life in context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." [4]

Low quality of life in diabetics persists as a major public health challenge globally. Factors such as marital status, gender, body mass Index, depression, socioeconomic status, attitudes and awareness of selfcare practices have been shown to influence the quality of life of diabetic patients. [5-8]

Currently, there is dearth of literature regarding quality of life among diabetics in India particularly in rural areas of North India. Hence, the study was conducted to assess the quality of life among diabetics in rural population of District Gautam Buddha Nagar, Uttar Pradesh, to compare the quality of life of diabetic's patients with normal subjects and to determine the factors associated with poor quality of life among the diabetic subjects.

METHODOLOGY

Study Design: A Community based cross-sectional study was conducted in the rural area of District Gautam Buddha Nagar situated in the western Uttar Pradesh, India.

Study Period: The study was conducted throughout one and a half years from January 2021 to June 2022.

Study Population: Adult diabetic patients more than 18 years of age residing in the selected study area for the past six months have been included in the study. Those who were not willing to participate in the study, pregnant women and people with severe mental disability were excluded from the study.

Sample size and Sampling Technique: The study was carried out among 250 diabetic patients and 50 healthy persons which is based on WHO-QOL-BREF methodology manual.[4] The details of the diabetic patients in the study were obtained through the previous surveys conducted in the area and the OPD register of Rural Health Training Centre (RHTC), Panchayat an which is under the Department of Community Medicine of the Institute.

All the 250 diabetic patients and 50 healthy persons were asked to fast overnight after which the next morning fasting blood sugar sample of all the participants was taken using ACCU-CHEK glucometer.[9] The cases included diabetic patients who were either on treatment of diabetes or whose fasting blood glucose levels were ≥ 126 mg/dl.[10] Out of the total 250 diabetic patients, 187 patients had current fasting blood glucose levels were ≥ 126 mg/dl. Whereas, 50 healthy persons with no history of any medical disease and fasting blood glucose levels < 126 mg/dl were taken as controls. These controls were matched to the cases with regards to various socio-demographic variables such as age, gender, caste, educational status, occupation, family type and socioeconomic status.

The diabetic patients and the healthy subjects were visited and interviewed by the principal investigator and his team. The questionnaire was in Hindi language and included the basic socio-demographic details i.e., age, gender, religion, caste, education, occupation, income, family type etc. The questionnaire also contained general information about study subjects regarding duration of disease, presence of comorbidity etc. The quality of life was also assessed using WHO-QOL-BREF questionnaire.[4] The questionnaire consisted of 26 items, 2 general items and 24 items related to the domains of Quality of life. These 24 items are divided into 4 domains, Physical health with 7 items (DOM1), Psychological health with 6 items (DOM2), Social relationships with 3 items (DOM3) and Environmental health with 8 items (DOM4). The four domain scores denote an individual's perception of quality of life in each particular domain. Domain scores are scaled in a positive direction (i.e., higher scores denote higher quality of life). The domain scores range from minimum 0 to maximum 100 score. The mean score of items within each domain is used to calculate the domain score. Mean scores were then multiplied by four in order to make the domain scores comparable with scores used in the WHOQOL.

Statistical analysis: The data was entered and analysed using SPSS version 22. Descriptive statistics was used to determine the mean scores of different domains of quality of life. The association of various socio-demographic variables with patient's quality of life was assessed using independent t-test and ANOVA test.

Ethical Considerations: The study was conducted after approval from Institutional ethics Committee (Ref. No. SU/SMS&R/76-A/2020/69) obtained on 28/12/2020.

RESULTS

A total of 300 subjects were enrolled in the present study. Out of these, 250 were Diabetic Subjects and 50 were healthy subjects. There was almost equal proportion of male and female study subjects in the present study (49.0% and 51.0% respectively). Nearly half of the participants (52.7%) belonged to the age group of ≥ 60 years and most of them were Hindus (97%). Majority of them belonged to OBC category (55.0%) and majority of the study subjects (45.3%) were just literate or educated up to primary school. Majority of them were either unemployed or were homemakers (51.0%). Majority of them lived in joint/three generation family (81.3%). Most of them belonged to middle class (37.7%) and lower middle class (38.7%) of socioeconomic status according to modified B.G. Prasad classification.[11] (Table 1)

Table 2 illustrates the comparison of mean quality of life scores between diabetic and healthy subjects. Overall quality of life and general health score was significantly poor among diabetic subjects compared to healthy subjects (p value:<0.001). Mean quality of life scores was significantly lower in diabetic subjects in domain of physical health (p value:<0.001), psychological domain (p value:<0.001) and domain of social relationships (p value:0.005).

Table 3 depicts the effect of gender on mean quality of life scores among diabetic subjects. Overall quality of life and general health score was lower in male diabetic subjects (p value:0.154) compared to female diabetic subjects. Domain scores of physical health (p value:0.443), psychological domain (p value:0.703), domain of social relationships (p value:0.801) were lower in male subjects. However, the mean domain score of environments was significantly lower in female subjects as compared to the male subjects (p value: 0.015).

Table 1: Sociodemographic characteristics of the study subjects

Sociodemographic Variable	Diabetic Subjects (n=250) (%)	Healthy Subjects (n=50) (%)	Total (n=300) (%)	χ^2, df, p-value
Gender				
Male	118(47.2)	29(58.0)	147(49.0)	1.945,1,0.163
Female	132(52.80)	21(42.0)	153(51.0)	
Age group (in years)				
<60	117(46.8)	25(50.0)	142(47.3)	0.171,1,0.679
≥60	133(53.2)	25(50.0)	158(52.7)	
Religion				
Hindu	241(96.4)	50(100)	291(97.0)	1.856,1,0.173
Muslim/Others	9(3.6)	0(0.0)	9(3.0)	
Caste				
General	47(18.8)	8(16.0)	55(18.3)	3.952,2,0.139
OBC	142(56.8)	23(46.0)	165(55.0)	
SC/ST	61(24.4)	19(38.0)	80(26.7)	
Educational status				
Illiterate	76(30.4)	15(30.0)	91(30.3)	0.231,2,0.891
Just Literate/Primary school	112(44.8)	24(48.0)	136(45.3)	
Middle school and above	62(24.8)	11(22.0)	73(24.3)	
Occupation				
Unemployed/Homemaker	131(52.4)	22(44.0)	153(51.0)	3.570,4,0.467
Unskilled	14(5.6)	5(10.0)	19(6.3)	
Semiskilled/Skilled	13(5.2)	2(4)	15(5.0)	
Clerical/Shop owner/farmer	87(34.8)	21(42.0)	108(36.0)	
Semiprofessional/Professional	5(2.0)	0(0.0)	5(1.7)	
Family Type				
Nuclear	47(18.8)	9(18.4)	56(18.7)	0.005,1,0.943
Joint/Three generation	203(81.2)	40(81.6)	243(81.3)	
Socioeconomic status				
Upper	11(4.4)	3(6.0)	14(4.7)	2.065,4,0.724
Upper Middle	33(13.2)	7(14)	40(13.3)	
Middle	91(36.4)	22(44.0)	113(37.7)	
Lower Middle	101(40.4)	15(30.0)	116(38.7)	
Lower	14(5.6)	3(6.0)	17(5.7)	

Table 2: Comparison of mean Quality of life (QOL) scores between Diabetic and Healthy subjects

Domain	Diabetic Subjects (n=250) Mean ± SD	Healthy Subjects (n=50) Mean ± SD	t value, p value
Overall QOL and General health	34.55±23.46	67.75±17.32	-9.497, **<0.001**
D1-Physical Health	47.48±19.12	76.62±11.46	-10.398, **<0.001**
D2-Psychological	35.64±18.87	47.62±17.61	-4.140, **<0.001**
D3-Social Relationships	53.74±16.92	60.96±15.07	-2.804, **0.005**
D4-Environment	46.99±16.10	48.44±17.23	-0.575, 0.566

Table 3: Effect of Gender on mean Quality of life (QOL) scores of Diabetic Subjects(N=250)

Domain	Males (n=118) Mean ± SD	Females (n=132) Mean ± SD	t value, p value
Overall QOL and General Health	32.30±22.89	36.55±23.85	-1.431, 0.154
D1-Physical Health	46.49±18.58	48.36±19.62	-0.769, 0.443
D2-Psychological	35.16±19.13	36.08±18.69	-0.382, 0.703
D3-Social Relationships	53.45±17.37	53.99±16.56	-0.253, 0.801
D4-Environment	49.61±16.98	44.64±14.95	2.458, **0.015**

Table 4: Effect of Age on mean Quality of life scores (QOL) of Diabetic Subjects (N=250)

Domain	<60 years (n=117) Mean ± SD	≥60 years (n=133) Mean ± SD	t value, p value
Overall QOL and General Health	46.26±24.46	24.24±16.83	8.365, **< 0.001**
D1-Physical Health	57.73±17.62	38.46±15.56	9.180, **<0.001**
D2-Psychological	42.40±18.25	29.70±17.40	5.628, **<0.001**
D3-Social Relationships	58.32±16.03	49.71±16.71	4.142, **<0.001**
D4 Environment	54.33±14.39	40.53±14.74	7.471, **<0.001**

Table 5: Effect of Educational status on mean Quality of life (QOL) scores among Diabetics (N=250)

Domain	Illiterate (n=76) Mean ± SD	Just literate /Primary School (n=112) Mean ± SD	Middle school and above (n=62) Mean ± SD	F value, p value
Overall QOL & General Health	26.97±16.33	39.28±25.76	35.28±24.43	6.555, **0.002**
D1-Physical Health	41.12±16.82	50.74±20.49	49.37±17.53	6.400, **0.002**
D2-Psychological	28.72±16.65	38.27±18.31	39.39±20.38	7.818, **0.001**
D3-Social Relationships	49.03±15.93	55.81±17.31	55.76±16.48	4.343**, 0.014**
D4-Environment	39.20±11.49	47.26±15.12	56.05±17.91	21.854**, <0.001**

Table 6: Effect of Socioeconomic status on mean Quality of life (QOL) scores of Diabetics (N=250)

Domain	Upper-I (n=11) Mean ± SD	Upper Middle-II (n=33) Mean ± SD	Middle-III (n=91) Mean ± SD	Lower Middle-IV (n=101) Mean ± SD	Lower-V (n=14) Mean ± SD	F value, p value
Overall QOL & General Health	46.59±32.15	38.25±29.47	33.10±23.15	32.30±20.55	41.96±19.36	1.614, 0.171
D1-Physical Health	54.64±20.07	48.94±17.94	46.73±19.71	45.28±18.48	59.14±18.77	2.143, 0.076
D2-Psychological	50.09±30.85	34.97±18.33	34.68±17.55	34.98±18.37	36.93±18.50	1.750, 0.140
D3-Social Relationships	58.00±12.18	54.33±18.74	53.23±17.91	53.37±15.97	54.93±17.35	0.232, 0.920
D4-Environment	73.00±14.48	54.85±13.75	47.55±13.72	41.83±15.09	41.57±17.73	14.85, **<0.001**

Table 7: Effect of Duration of Disease on mean Quality of life (QOL) scores of Diabetic Subjects (N=180)

Domain	<2 years(n=37) Mean ± SD	≥2 years(n=143) Mean ± SD	t value, p value
Overall QOL and General Health	37.16±19.42	30.59±22.57	1.620, 0.107
D1-Physical Health	47.54±19.73	43.31±18.96	1.198, 0.232
D2-Psychological	34.65±17.03	34.36±20.29	0.080, 0.936
D3-Social Relationships	54.78±14.57	51.43±17.26	1.086, 0.279
D4-Environment	46.14±13.45	46.18±17.29	-0.015, 0.988

Table 8: Effect of presence of comorbidity on Quality of life (QOL) scores among Diabetics (N=250)

Domain	Comorbidity present(n=217) Mean ± SD	Comorbidity absent(n=33) Mean ± SD	t value, p value
Overall QOL and General Health	33.35±23.57	42.42±21.41	-2.083**, 0.038**
D1-Physical Health	45.93±19.10	57.67±16.10	-3.352**, 0.001**
D2-Psychological	34.76±19.27	41.45±14.97	-1.909, 0.057
D3-Social Relationships	53.40±17.03	55.94±16.24	-0.802, 0.423
D4-Environment	46.50±16.42	50.18±13.58	-1.224, 0.222

Table 4 shows the influence of age on mean quality of life scores of diabetic subjects. The overall quality of life and general health score was significantly lower in diabetic subjects ≥ 60 years (p value:<0.001). Mean quality of life score was significantly lower in diabetic subjects ≥60 years in all the four domains i.e., domain of physical health (p value:<0.001), psychological domain (p value:<0.001), domain of social relationships (p value:<0.001) and environmental domain (p value:<0.001).

Table 5 illustrates the effect of educational status on mean quality of life scores of diabetic subjects. Overall quality of life and general health score was significantly lower in illiterate subjects than literate subjects (p value: 0.002). Mean Quality of life scores of all the domains were also significantly lower among illiterate subjects compared to literate subjects (p value<0.05).

Table 6 illustrates the influence of socio-economic status on mean quality of life scores of diabetic subjects. Overall quality of life and general health score was highest in diabetic subjects belonging to upper class of B.G. Prasad socio-economic scale (p value:0.171). Along with that, domain scores of psychological health (p value:0.140) and social relationships (p value:0.920) were also found to be higher in diabetic subjects belonging to upper class of socio- economic scale. The environmental domain score was significantly higher in diabetic subjects of upper class (p value:<0.001).

Table 7 illustrates the effect of duration of disease and mean Quality of life scores of diabetic subjects. Overall quality of life and general health score was higher in diabetic subjects with duration of disease < 2 years as compared to diabetic subjects with duration of disease ≥2 years (p value:0.107). Domain scores of physical health (p value:0.232), psychological domain (p value:0.936), and domain of social relationships (p-value:0.279) were higher in diabetic subjects with duration of disease <2 years.

Table 8 describes the effect of presence of comorbidity on mean quality of life scores among diabetic subjects. Overall quality of life and general health score as well as mean physical health domain score was significantly lower in diabetic subjects with comorbidity (p value:0.038). Along with it, domain score of physical health was significantly lower in diabetic subjects with comorbidity (p value:0.001). Scores of psychological domains (p value:0.057), domain of social relationships (p value: 0.423) as well as environmental domain were also lower in diabetic subjects with comorbidity (p value:0.222), however the differences in scores were not significant.

Discussion

The present study revealed that overall quality of life and general health score was significantly lower (34.55) among diabetic subjects compared to healthy subjects (67.75) (p value: <0.001). Similar findings were observed in a study conducted by Amin MF et al in Bangladesh in the year 2022 among a total of 500 patients with type 2 diabetes mellitus. Among these, 22.2% of the participants rated their quality of life as poor and 25% were dissatisfied with their health.[12] Similarly, in a study conducted by Natrajan J et al in Chennai Tamil Nadu in the year 2022, overall health related quality of life was poor among around 90% of the diabetic subjects.[13] Gupta J et al conducted a cross-sectional study among 217 diabetic subjects in the year 2014-2018 in Bilaspur, Himachal Pradesh and it was observed that approximately 50% of the participants did not have a very good quality of life.[14]

In the current study, mean quality of life scores was significantly lower in diabetic subjects in the domain of physical health (47.48), psychological domain (35.64) and domain of social relationships (53.74). However environmental domain score was nearly equal in both diabetic and healthy subjects (46.99 and 48.44 respectively). The findings of a study conducted by MF Amin et al in Bangladesh in the year 2022 among 500 diabetic subjects, were in resemblance to current study, where the domain scores in domains of physical health, psychological domain, domain of social relationships and environmental domain were37.2±20.5, 44.2±21.0, 39.6±23 and 41.6±19.5 respectively, indicating a poor quality of life.[12] Similarly, in a study conducted by Sreedevi A et al in Kerala, India in 2016 among 200 diabetic subjects, quality of life was found to be low in the physical, psychological and social domains.[15] On the contrary, in a study conducted by N Sarir et al in Pakistan in 2022 among 99 diabetic subjects, the scores of physical domain, psychological domain, social relationships and environmental domain indicated overall good quality of life.[16]

In the present study, overall quality of life and general health score was lower in male diabetic subjects compared to female diabetic subjects. Domain scores of physical health, psychological domain and domain of social relationships were lower in male subjects. However, mean domain score of environments was significantly lower in female subjects (p value: 0.015) as compared to male subjects. Contrary to the present study, in a study conducted by N Sarir et al in Pakistan in the year 2022, male diabetics were found to have a better quality of life as compared to female diabetics.[16] Similarly, a study conducted by Aarthy R et al in the year 2022 in India, reported that women with diabetes had a poorer quality of life than men.[17] However, in a study conducted by MF Amin et al in Bangladesh in 2022, no association was noticed between quality of life and gender of the patients .[12]

In the present study, overall quality of life and general health score was significantly lower in diabetic subjects ≥60 years (p value:<0.001). Similarly, in a study conducted by Meher D et al in Bhubaneswar among 400 diabetic subjects, in the year 2020, it was found that the patients with age over 50 years had poor quality of life.[18] However, in a study conducted by Timar R et al in 2016 in Romania, no significant association was found between quality of life and age of diabetic subjects.[19]

Overall quality of life and general health score was significantly lower in illiterate subjects (26.97) than literate subjects in the present study. The findings of the present study were in resemblance with a study conducted by John R et al in Poona, Maharashtra in

the year 2019, where it was found that mean quality of life score was comparatively lower in primary educated and illiterates as compared to those diabetic patients who had received higher education.[20]

In the present study, overall quality of life and general health score was highest in diabetic subjects belonging to upper class of BG Prasad socio-economic scale and the domain scores of physical health, psychological and social relationships were also higher in diabetic subjects belonging to upper class of socioeconomic scale. Environmental domain score was significantly higher in diabetic subjects of upper class (p value:<0.001). In resemblance to the present study, in a study conducted by Esin et al in 2016 in Kazan Russia, a positive association was found between quality of life of diabetic subjects and monthly family income.[21] Similarly, a significant positive association was found between quality of life and monthly family income in a study conducted by Amin et al in 2022 in Bangladesh, in which the domain scores of psychological, social relationships and environmental domain were significantly higher in high income group.[12] Similarly, in a study conducted by Gupta J et al in Bilaspur, Himachal Pradesh in the year 2018 it was found thar lower family income predicted poor health related quality of life among diabetic subjects .[14] Similar to the present study, in a study conducted by Alsuwayt S et al in Riyadh, Saudi Arabia in 2019 it was found that the diabetic subjects belonging to low socioeconomic status had a poor quality of life compared to those belonging to the higher socioeconomic status.[22]

In the present study, overall quality of life and general health score was higher in diabetic subjects with duration of disease <2 years as compared to diabetic subjects with duration ≥2 years. Domain scores of physical health, psychological domain and domain of social relationships were higher in diabetic subjects with duration of disease <2 years. However, mean score of environmental domains was almost equal in diabetic subjects with duration of disease ≥2 years and <2years. In resemblance to the present study, in a study conducted by de Lima et al in the 2018, it was found that longer duration of diabetes was significantly associated with poorer quality of life among elderly diabetics.[23] On the contrary, in a study conducted by Sarir N et al in Pakistan in 2022 no association was found between duration of diabetes and quality of life.[16] Similarly, in a study conducted by Timar R et al in Romania in the year 2016 it was found that there was no significant association between quality of life of diabetic subjects and duration of disease.[19]

In the present study overall quality of life and general health score was significantly lower in diabetic subjects with comorbidity (p value:0.038). Along with it, domain score of physical health (p value:0.001) was significantly lower. Moreover, scores of psychological domain, social relationships and environmental domain were also lower in diabetic subjects with comorbidity. In a study conducted by Nuguyen HV in Vietnam in the year 2016 on 194 participants who were 60 years old or older and were diagnosed with type 2 diabetes, it was observed that digestive and neuropsychiatric diseases had the strongest negative association with physical quality of life of the diabetic subjects and the subjects struggled to perform physical functions. In addition, in resemblance to the present study, comorbidities significantly reduced the quality of life of diabetic patients.[24]

Conclusion & Recommendations

Overall QOL was poor among diabetic subjects as compared to healthy subjects. The quality-of-life scores were also lower among diabetic subjects in terms of physical, psychological and social domains. “Increase in awareness of diabetic patients through health education can improve compliance of patients, which improves overall quality of life and general health of the patients. Daily exercise should be promoted as it improves the physical domain score of quality of life, by reducing pain, discomfort and improving glycemic control which further prevents the other complications. mHealth techniques can be used for promoting, adherence to treatment and detection of complications among diabetic patients. Policymakers should also give impetus to continuing diabetes surveillance at all levels of health care delivery system”.

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