

Quality of life of type 2 diabetes mellitus patients attending a tertiary care hospital of Northern India: A cross sectional study

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ABSTRACT

Introduction: Diabetes mellitus is a chronic and progressive metabolic disorder. According to the World Health Organization (WHO) there is “an apparent epidemic of diabetes, which is strongly related to lifestyle and economic change.” Objective of the study was to assess the quality of life of people living with type 2 diabetes mellitus and factors associated with quality of life. **Methods:** A hospital-based cross-sectional study was conducted on 215 patients with diabetes mellitus. Quality of life was assessed using a generic instrument SF 36. The data was analyzed using SPSS, version 24.0. An independent t test and analysis of variance (ANOVA) were used to compare the means of each domain of quality of life within groups of various independent variables. **Results:** The mean age of respondents was 52.5 ± 11.0 years. The majority (87.4%) of the patients were married, Hindu by religion (88.8%), and belonged to upper socio economic class (28.8%). The mean duration since diagnosis of diabetes was 7.82 ± 6.0 years, and 80.4 percent of patients were on oral hypoglycemic agents. Hypertension was found to be the most common (24.6%) comorbidity. Age, education, socioeconomic status, duration of diabetes, type of treatment, complication of diabetes, comorbidities, and body mass index (BMI) were found to be significantly associated with various domains of SF-36. **Conclusions:** Diabetes has an adverse effect on quality of life of patients with diabetes. The most affected domain in male and female patients was vitality domain followed by general health domain of quality of life.

Keywords: Diabetes mellitus, quality of life, SF 36

Introduction

Diabetes is a common chronic metabolic disorder affecting lives and well-being of individuals, families, and societies worldwide. Once “a disease of the affluent,” now has become increasingly

common among the poor.^[1] Globally, an estimated 463 million adults (20–79 years) were living with diabetes mellitus in the year 2019, and by 2045 this is expected to rise to 700 million.^[2]

India is the second largest country with number of adults living with diabetes worldwide after China.^[2] In 2019, India had 77 million people living with diabetes and was the largest contributor to the regional mortality, with nearly one million estimated deaths attributable to diabetes.^[2] Prevalence of high (>140 mg/dL) and very high (>160 mg/dL) blood sugar among

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females was 5.1 and 2.6 percent, while in men it was 6.6 percent and 2.5 percent, respectively in Lucknow.^[3]

Diabetes is a common threat that occurs irrespective of areas or social class.^[2] The dynamics of diabetes epidemic are changing rapidly.^[4] The progression of disease, especially poor glycemic control, leads to numerous potentially life threatening complications.^[5] The World Health Organization has defined 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 and in relation to their goals, expectations, standards, and concerns.”^[6]

Quality of life (QOL) is an important health outcome,^[7] and considerations of QOL are gaining increasing importance in evaluation of health policy and medical intervention.^[8] With advances in health care technology, we have been successful in prolonging the lives of people living with chronic noncommunicable diseases. However, considering the debilitating complications, nothing much is being done to improve the quality of the prolonged life of diabetes patients.^[9]

There is very limited literature and research material available pertaining to the present study. Very few studies have been conducted in India to assess the QOL in type 2 diabetes mellitus patients, with most of the studies conducted in Southern India, while the Northern region remained largely understudied. With this background in view, the present study was undertaken with an objective to assess the QOL of people living with type 2 diabetes mellitus and factors associated with quality of life.

Materials and Method

The present study was a cross-sectional study conducted on patients with type 2 diabetes mellitus attending a tertiary care center in Lucknow. The patients were enrolled from the Medicine OPD, which has a Diabetes Clinic that is attended by more than 100 patients every week. The sample size was calculated using the following formula: $n = (Z_{1-\alpha/2})^2 \times (SD)^2 / d^2$ where $Z_{1-\alpha/2}$ is value of two tailed alpha error at 95% confidence interval, SD is the standard deviation, and d is the acceptable deviation which was taken to be 2.5. Taking the SD to be 18.70 from a previous study^[10] where the mean value of QOL score was observed to be 59.47 ± 18.70 , the minimum sample size was calculated to be 215.

A total of 215 patients were enrolled in the study, and a systematic random sampling method was used to select the patients for the study. A target of 8 to 10 patients was set per day and every tenth patient registered at Diabetes Clinic was included in the study. If the selected patient did not fulfil the inclusion criteria, then next registered patient was included. Patients with type 2 diabetes mellitus who were on treatment for 6 months and aged ≥ 18 years were included while other type of diabetes, pregnant patients, and uncooperative patients were excluded from the study.

A predesigned and pretested semi-structured interviewer administered schedule was used for data collection after taking

informed consent from the participants. The ethical clearance was obtained from the Institutional Ethics Committee of King Georges Medical University before commencing the study.

Information on socio demographic characteristics, clinical history of disease, and QOL was collected. QOL was assessed using a Short Form (SF-36) scale. It is a generic instrument that assesses the health-related quality of life outcomes. The survey form consists of 36 items that measures 8 health domains namely physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). A separate question about health transition (rating their health in general) is also included in this questionnaire.

The eight domains were scored on a scale of 0–100, “0” indicating the worst and “100” the best possible status. Ware *et al.*^[11] scoring manual was used for calculating scores. After data entry, items and scales were scored in three steps:

1. Item recoding, for the 10 items that require recoding.
2. Computing scale scores by summing across items in the raw scale.
3. Raw scale scores were transformed to a 0–100 scale (transformed scale scores).

Data were analyzed using the IBM SPSS, version 24.0. Descriptive statistics such as mean (SD) for continuous variables and frequency along with their percentage for categorical variables were determined. An independent t test and an analysis of variance (ANOVA) were used to compare the means of each domain of quality of life within groups of various independent variables. The level of significance was considered at *P* value less than 0.05.

Results

The mean age of all patients was observed to be 52.5 ± 11.0 years. The majority (87.4%) of the patients were married and Hindu by religion (88.8%). More than one third (37.2%) of the total patients were graduate and above followed by illiterates (17.2%). Half (50.2%) of the study patients were employed and more than two third (71.6%) belonged to an urban area [Table 1].

About 73.1 percent of patients were obese followed by 17.2 percent patients who were overweight. Normal range of body mass index (BMI) was observed in 8.8 percent of patients. A maximum of the males (68.5%) and females (79.1%) were obese followed by overweight [Figure 1].

The mean duration since diagnosis of diabetes was 7.82 ± 6.0 years. Out of the total study patients, 80.5 percent of patients were on oral hypoglycemic agents and along with lifestyle modification. Most (91.6%) of the patients did not have any complication. Among patients, hypertension was found to be the most common (24.6%) co-morbidity [Table 2].

Table 1: Distribution of type 2 diabetes mellitus patients by their socio-demographic characteristics

Socio-demographic variables	Males (n=124)		Females (n=91)		Total (n=215)	
	n	(%)	n	(%)	n	(%)
Age of participants (years)						
30 - <40	12	(9.7)	14	(15.4)	26	(12.1)
40- <50	20	(16.1)	28	(30.7)	48	(22.4)
50- <60	46	(37.1)	30	(33.0)	76	(35.3)
≥60	46	(37.1)	19	(20.9)	65	(30.2)
Mean Age±SD	54.9±10.7		49.3±10.7		52.5±11.0	
Marital Status						
Married	108	(87.1)	80	(87.9)	188	(87.4)
Widowed/Widower	16	(12.9)	11	(12.1)	27	(12.6)
Religion						
Hindu	112	(90.3)	79	(86.8)	191	(88.8)
Muslim	12	(9.7)	12	(13.2)	24	(11.2)
Category						
SC/ST	12	(9.7)	12	(13.2)	24	(11.2)
Other Backward Class	46	(37.1)	12	(13.2)	58	(27.0)
Unreserved	66	(53.2)	67	(73.6)	133	(61.8)
Education						
Upto Primary	24	(19.4)	45	(49.5)	69	(32.1)
Upto Senior Secondary	44	(35.5)	22	(24.2)	66	(30.7)
Graduate and above	56	(45.2)	24	(26.4)	80	(37.2)
Employment Status						
Employed	91	(73.4)	17	(18.7)	108	(50.2)
Homemaker	0	(0)	67	(73.6)	67	(31.2)
Unemployed/Retired	33	(26.6)	7	(7.7)	40	(18.6)
Place of residence						
Rural	34	(27.4)	27	(29.7)	61	(28.4)
Urban	90	(72.6)	64	(70.3)	154	(71.6)
Socioeconomic Status*						
Class I	44	(35.5)	18	(19.8)	62	(28.8)
Class II and III	50	(40.3)	32	(35.2)	82	(38.1)
Class IV and V	30	(24.2)	41	(45.1)	71	(33.0)

*Modified BG Prasad Scale

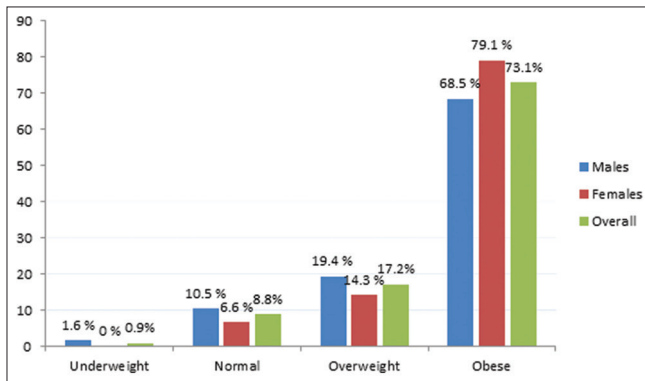


Figure 1: Body Mass Index of Type 2 Diabetes Mellitus Patients

The mean score of QOL of the patients was lowest in vitality domain (47.46 ± 15.63), whereas highest score was attained for social functioning domain (86.04 ± 22.28), followed by bodily pain (78.54 ± 18.01), physical functioning domain (74.39 ± 21.35), mental health domain (66.77 ± 12.99), role physical domain (62.67 ± 21.46), role emotional domain (59.84 ± 24.4), and general health domain (50.27 ± 17.08) of QOL. Most

commonly affected domain in both male and female patients was vitality domain while social functioning domain was least affected among both male and female patients. About 64.7 percent of patients in the study perceived that their health is fair, followed by 19.4 percent who thought their health to be good, while only 15.8 percent of the patients perceived their health to be poor.

Age was significantly associated with all the domains of QOL except for role limitation and role emotion domain of QOL. Male patients perceived a better QOL as compared to females, and there was a statistically significant difference in the mean scores of males and females for the bodily pain, role emotion, and mental health domains of quality of life. Married patients had better scores as compared to widowed patients in the physical functioning, vitality, and social functioning domain of quality of life, and this was found to be statistically significant. Patients with more years of schooling had better scores in general health, vitality, role emotional, and mental health domains of quality of life except in role physical domain where patients up to primary education had better scores than patients with higher education. The association between employment status and QOL revealed

Table 2: Distribution of type 2 diabetes mellitus patients based on their disease history

Clinical Profile	Males (n=124)		Females (n=91)		Total (n=215)	
	n	(%)	n	(%)	n	(%)
Duration since diagnosis of diabetes (years)						
≤1	36	(29.0)	22	(37.9)	58	(27.0)
>1-5	13	(10.5)	16	(17.6)	29	(13.5)
>5-10	75	(57.7)	53	(58.2)	128	(59.5)
Mean duration±SD	8.48±6.7		6.92±4.8		7.82±6.0	
Type of medication						
OHA + lifestyle modification	96	(77.4)	77	(84.6)	173	(80.5)
Insulin + OHA + lifestyle modification	28	(22.6)	14	(15.4)	42	(19.5)
Complications						
No diagnosed complications	114	(91.9)	83	(91.2)	197	(91.6)
Neuropathy	10	(8.1)	3	(3.3)	13	(6.1)
Coronary artery disease	0	(0)	5	(5.5)	5	(2.3)
Comorbidities*						
No diagnosed comorbidities	88	(71.0)	48	(52.7)	136	(63.3)
Hypertension	24	(19.4)	29	(31.8)	53	(24.6)
Arthritis	4	(3.2)	11	(12.1)	15	(6.9)
Thyroid dysfunction	0	(0)	12	(13.2)	12	(5.6)
Dyslipidemia	6	(4.8)	1	(1.1)	7	(3.3)
Tuberculosis	1	(0.8)	2	(2.2)	3	(1.4)

*Multiple responses

that there were significant differences in physical functioning, role physical, vitality, and mental health domains of quality of life. QOL was better in all domains in patients who belonged to upper class, and this was significant for general health, vitality, and mental health domains of quality of life [Table 3].

Physical functioning and social functioning domain of QOL was significantly associated with duration since diagnosis. The mean scores of all the domains of QOL was better in patients who were on oral hypoglycemic agents in comparison to those who were on insulin only or oral hypoglycemic agents and insulin both. This was found to be statistically significant for all domains of QOL except for role physical and role emotional domains of QOL. Patients with diabetic complications had lower scores in general health, role emotional, and mental health domains of QOL compared to those who did not report any complications, and this was found to be statistically significant. Moreover, patients with comorbidities showed significantly lower scores in the role physical and vitality domains of quality of life. The mean scores of different domains of quality of life of patients within normal range of BMI was better than those who were overweight and obese. This was found to be significantly associated with physical functioning and bodily pain domains of quality of life of diabetes patients [Table 4].

Discussion

In this study, the association of socio demographic and diabetes-related variables with quality of life of patients with type 2 diabetes attending a tertiary care hospital was investigated. Among all the eight domains of QOL, the least affected domain was social functioning domain (86.04 ± 22.28) while the most affected domain was vitality domain (47.46 ± 15.63). The highest mean score in social domain was also reported

in a study conducted among type 2 diabetes mellitus cases in West Ethiopia by Reba K *et al.* (2018).^[12] Similarly, in a study by Svedbo Engström M *et al.* (2019),^[13] vitality domain was found to be highly affected.

Socio-demographic status plays an important role in the QOL outcome. In the present study, age was significantly associated with all the domains of QOL except for role physical and role emotional domains of QOL. These findings are consistent with the results of the study performed by Zurita-Cruz JN (2018)^[14] in which a significant association between age and domains of QOL was observed.

In view of gender, male patients perceived a better quality of life as compared to females and there was a statistically significant difference in the bodily pain, role emotion, and mental health domains of quality of life. Shaheen F *et al.* (2013)^[15] in their study observed that there was a statistically significant difference in the physical functioning, vitality, bodily pain, mental health, and general health domains of QOL, and this result is in accordance with the result of present study.

Patients with more years of schooling had better scores of QOL in general health, vitality, role emotion, and mental health domains except in role physical domain where patients up to primary education had better scores than patients with higher education. Similar findings were observed by Altinok A *et al.* (2016)^[16] in their study that patients with more years of schooling had statistically significantly better QOL of life in all domains except for social functioning domain of SF 36.

When the QOL scores according to the occupation of the patients enrolled in our study were examined, it was observed

Table 3: Association of all the domains of Quality of Life of Type 2 Diabetes Mellitus patients with Socio-Demographic Variables

Socio - demographic variables	Mean±SD							
	PF	RP	BP	GH	VT	SF	RE	MH
Age								
30-39	80.7±11.1	61.5±24.7	86.7±15.5	54.8±14.0	50.3±15.0	95.1±9.4	62.8±21.7	71.7±9.6
40-49	83.5±13.7	66.6±13.9	83.9±17.1	54.6±13.6	53.3±12.6	92.1±17.0	54.1±27.1	69.5±11.3
50-59	72.7±26.0	61.1±23.9	73.4±18.6	48.1±18.8	45.0±17.4	83.2±24.0	60.9±22.6	64.6±15.1
≥60	67.0±20.0	61.9±21.6	77.2±16.8	47.6±17.6	44.8±14.5	81.1±25.3	61.5±25.1	65.2±11.9
p-value	<0.001	0.53	0.001	0.049	0.009	0.006	0.32	0.032
Gender								
Males	75.4±22.9	60.4±23.0	81.4±18.1	51.7±17.3	48.8±14.3	85.2±22.9	62.9±23.7	68.8±11.5
Females	73.0±18.9	65.6±18.2	76.3±17.6	48.3±16.6	45.5±17.0	87.1±21.4	55.6±24.8	63.9±14.2
p-value	0.42	0.06	0.040	0.14	0.12	0.55	0.032	0.008
Marital Status								
Married	75.5±21.4	62.1±21.8	78.8±18.2	50.8±17.1	48.2±15.9	89.0±19.4	60.1±24.3	67.3±13.1
Widowed	66.4±19.5	66.6±18.3	77.0±16.6	46.4±16.4	42.0±11.6	64.8±29.2	58.0±25.4	62.7±11.4
p-value	0.032	0.30	0.64	0.20	0.018	<0.001	0.68	0.008
Education status								
Upto V	75.0±18.3	69.2±19.2	82.8±17.4	48.1±16.2	46.1±13.9	84.8±24.3	52.6±23.1	63.5±13.7
VI to XII	76.3±17.2	52.2±23.9	76.4±18.9	47.3±16.3	41.8±14.3	82.1±20.8	58.1±25.0	64.2±13.3
Above XII	72.2±26.3	65.6±17.9	76.5±17.3	54.6±17.7	53.2±16.2	90.3±21.1	67.5±23.1	71.6±10.6
p-value	0.49	<0.001	0.05	0.015	<0.001	0.07	0.001	<0.001
Employment status								
Employed	78.3±22.8	64.9±20.2	78.7±17.8	52.4±16.9	50.6±13.4	86.5±22.8	61.7±24.8	69.3±10.8
Homemaker	73.2±17.1	64.9±18.9	81.3±17.8	46.4±16.5	43.3±17.1	85.4±20.9	57.7±21.3	63.1±14.5
Unemployed/Retired	65.7±21.9	53.7±26.8	73.3±17.9	50.9±17.5	45.7±17.1	85.6±23.4	58.3±27.9	65.9±14.2
p-value	0.005	0.014	0.08	0.07	0.008	0.94	0.52	0.007
Socio economic status								
Class I	77.2±20.3	64.1±18.4	81.3±16.5	54.3±17.1	50.8±13.5	65.1±22.9	87.1±20.3	71.2±12.0
Class II & III	72.1±23.4	60.9±22.2	76.8±18.6	49.9±17.3	48.9±6.9	59.3±25.7	88.4±21.9	68.1±11.9
Class IV& V	74.4±19.5	63.4±23.0	78.1±18.5	47.1±16.2	42.8±14.8	55.9±23.7	82.4±25.0	61.3±13.3
p-value	0.37	0.65	0.33	0.048	<0.001	0.09	0.22	0.001

PF=Physical functioning, RP=Role Physical, BP=bodily pain, GH=General Health, VT=Vitality, SF=Social functioning, RE=Role emotional, MH=Mental Health

that being unemployed or retired had significant adverse effect on physical functioning, role physical, vitality, and mental health domains of quality of life as compared to employed patients; however, housewives scored lower in vitality and mental health domains of QOL in comparison to employed and unemployed patients. Haslinda IN *et al.* (2016)^[17] in their study revealed that the retired or unemployed respondents had significantly lower mean score in physical functioning, bodily pain, and vitality, while Altinok A *et al.* (2016)^[16] in their study observed that the QOL of homemakers was significantly lower in all subscales of SF 36 quality of life compared to other professional groups. The results of these studies are consistent with the results of the present study.

QOL was better in all domains in patients who belonged to upper class, and this was significant for general health, vitality, and mental health domains of QOL. This observation was consistent with the findings of Gautam Y *et al.* (2009) [10], in which it was observed that scores of all the domains had statistically significant association with socioeconomic status of patients.

In the present study, patients with less than 2 years of diabetes had better scores in physical functioning domain than those

of patients with more years of duration of diabetes, and this difference was found to be statistically significant. Previous studies conducted by Kumar SA *et al.* (2016)^[18] and Javanbakht M *et al.* (2012)^[19] in their study showed that there was a statistically significant association between age and physical functioning and vitality domain of SF 36, which is in accordance with the result of the present study.

Patients who were on oral hypoglycemic agents had better QOL and this was found to be significant in all domains except for role physical and role emotional domains of QOL. This result was in accordance with results of Haslinda IN *et al.* (2016)^[17] study in which a significant association between type of treatment and all domains of SF 36 scale was observed except for bodily pain, however, contrast results were reported by Gautam Y *et al.* (2009)^[10] in which there was no significant relation between treatment types and different domains of QOL.

With respect to complications, patients with complications had lower scores in general health, role emotional, and mental health domains of QOL in comparison to those without any complications, and this was found to be statistically significant.

Table 4: Association of all the domains of quality of life of type 2 diabetes mellitus patients with diabetes related variables

Diabetes Related Variables	Mean±SD							
	PF	RP	BP	GH	VT	SF	RE	MH
Duration since diagnosis								
<2 years	81.2±15.5	57.3±28.1	78.6±18.2	48.8±15.1	44.4±14.1	78.4±28.4	60.9±18.8	65.6±12.3
2-5 years	77.7±19.1	61.2±19.5	80.8±21.3	53.5±17.7	50.0±13.3	92.6±13.9	65.5±18.8	71.4±12.4
>5 years	70.5±23.2	65.4±17.7	77.9±17.2	50.1±17.7	48.0±16.6	87.9±19.7	58.0±27.5	66.2±13.2
<i>p</i> -value	0.004	0.05	0.74	0.47	0.27	0.005	0.31	0.11
Treatment undertaken								
OHA only	76.2±21.5	63.8±20.2	79.9±17.5	52.5±16.1	49.5±16.2	87.5±22.4	61.0±24.3	68.6±12.7
OHA&/Insulin	66.9±19.0	57.7±25.5	72.6±19.0	41.1±17.9	39.0±9.3	79.7±20.8	54.7±24.2	59.0±11.0
<i>p</i> -value	0.011	0.09	0.017	<0.001	<0.001	0.041	0.13	<0.001
Complications								
Absent	74.7±21.6	62.9±21.0	78.5±17.7	51.2±17.0	47.8±15.8	86.8±22.2	61.4±22.8	67.3±13.0
Present	70.5±18.4	59.7±25.9	78.0±21.3	40.0±14.1	43.3±13.0	77.7±21.4	42.6±33.9	60.2±10.6
<i>p</i> -value	0.42	0.54	0.89	0.007	0.24	0.10	0.033	0.025
Co-morbidities								
Absent	76.2±21.9	61.2±23.9	77.9±18.4	49.7±17.5	48.9±14.8	87.2±12.8	59.8±23.6	67.3±12.8
Present	58.3±6.8	45.8±21.4	76.3±18.7	46.7±12.9	28.3±5.1	83.3±12.9	61.1±13.6	60.0±9.4
<i>p</i> -value	0.76	0.03	0.71	0.62	0.004	0.59	0.99	0.36
BMI								
≤22.9 kg/m ²	84.2±14.6	59.5±20.1	79.5±18.2	52.0±12.6	47.4±15.6	86.6±22.5	60.4±24.6	64.1±14.6
≥23.0 kg/m ²	73.3±21.7	63.0±21.6	69.6±12.5	50.0±17.5	47.3±16.1	80.3±19.5	53.9±22.3	67.0±12.8
<i>p</i> -value	0.025	0.48	0.016	0.61	0.97	0.21	0.24	0.33

PF=Physical functioning, RP=Role Physical, BP bodily pain, GH=General Health, VT=Vitality, SF=Social functioning, RE=Role emotional, MH=Mental Health

Haslinda IN *et al.* (2016)^[17] in their study observed that patients with diabetic complication had lower SF-36 scores in all domains compared to patients who had no diabetic complication. Gautam Y *et al.* (2009)^[10] in their study observed that physical functioning, role physical, and role emotional domains were affected in patients with complications, and the differences were statistically significant, which is in accordance with the results of the present study.

In the present study, scores in role physical and vitality domains of QOL were poor in those who had multiple comorbidities, and this was found to be statistically significant. This is consistent with previous studies showing that the presence of comorbidities was associated with a significant decline in SF36 scores. Papadopoulos AA *et al.* (2007)^[20] in their study showed that the coexistence of nondiabetic comorbidities resulted in lower scale scores, and these differences were significant for physical functioning, bodily pain, general health, and social functioning domains of QOL.

BMI of patients was significantly associated with physical functioning and bodily pain domains of QOL. Papadopoulos AA *et al.* (2007)^[20] in their study showed that the patients in the normal range reported higher scores than those in the overweight and obese ranges, however, this difference was statistically significant only for physical functioning domain, which is in accordance with the result of the present study.

Conclusion

To conclude, this study has shown that diabetes mellitus has an adverse effect on QOL. Most affected domain in male and female

patients was vitality domain followed by general health domain of QOL. It was observed that socio-demographic factors were significantly associated with QOL in patients with type 2 diabetes mellitus such as age, gender, education level, marital status, and employment status in various SF-36 domains. Clinical variables such as duration of illness and type of treatment were significantly associated with QOL of type 2 diabetes mellitus patients. The presence of diabetes complications and comorbidities had an adverse effect on QOL of the type 2 diabetes patients.

Diabetes mellitus being a chronic disease with lifelong implications, the QOL of the patients is bound to get affected. It is of utmost importance to understand the effect of diabetes on QOL for clinical management and also for health policy makers in order to improve the QOL and health outcomes of those with diabetes. Physicians starting from primary to tertiary levels should always take into account the QOL of the patients while initiating or modifying the treatment to get a better adherence and compliance to the prescribed therapy.

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Conflicts of interest

There are no conflicts of interest.

References

1. Hu FB. Globalization of diabetes: The role of diet, lifestyle, and genes. *Diabetes Care* 2011;34:1249-57.

2. IDF Diabetes Atlas, 9th ed.. Brussels, Belgium: International Diabetes Federation; 2019.
3. International Institute for Population Sciences. State Fact Sheet. Uttar Pradesh. National Family Health Survey-4. 2016. Available from: http://rchiips.org/nfhs/FCTS/UP/UP_Factsheet_157_Lucknow.pdf
4. Hawal NP, Shivaswamy MS, Kambar S, Patil S, Hiremath MB. Knowledge, attitude and behaviour regarding self-care practices among type 2 diabetes mellitus patients residing in an urban area of South India. *Int Multidiscip Res J* 2012;2:31-5.
5. Trikkalinou A, Papazafiropoulou AK, Melidonis A. Type 2 diabetes and quality of life. *World J Diab* 2017;8:120-9.
6. World Health Organization. WHO-BREF: Introduction, Administration, Scoring and Generic Version of the Assessment. Geneva: WHO; 1996. Available from: http://www.who.int/mental_health/media/en/76.pdf.
7. Richard RR, Mark P. Quality of life and diabetes. *Diabetes Metab Res Rev* 1999;15:205-18.
8. Li L, Young D, Xiao S, Zhou X, Zhou L. Psychometric properties of the WHO Quality of Life questionnaire (WHOQOL-100) in patients with chronic diseases and their caregivers in China. *Bull World Health Organ* 2004;82:493-502.
9. Kumar P, Krishna M. Quality of life in diabetes mellitus. *Sci J Public Health* 2015;3:310-3.
10. Gautam Y, Sharma A, Agarwal A, Bhatnagar M, Trehan RR. A cross-sectional study of QOL of diabetic patients at tertiary care hospitals in Delhi. *Indian J Community Med* 2009;34:346-50.
11. Ware JE, Snow KK, Kosinski M, Gandek B. SF-36 Health Survey: Manual and Interpretation Guide. Boston, Massachusetts: The Health Institute, New England Medical Center; 1993.
12. Reba K, Argaw Z, Walle B, Gutema H. Health-related quality of life of patients with diagnosed type 2 diabetes in Felege Hiwot Referral Hospital, North West Ethiopia: A cross-sectional study. *BMC Res Notes* 2018;11:544.
13. Svedbo Engström M, Leksell J, Johansson UB, Borg S, Palaszewski B, Franzén S, *et al.* Health-related quality of life and glycaemic control among adults with type 1 and type 2 diabetes-a nationwide cross-sectional study. *Health Qual Life Outcomes*. 2019;17:141.
14. Zurita-Cruz JN, Manuel-Apolinar L, Arellano-Flores ML, Gutierrez-Gonzalez A, Najera-Ahumada AG, Cisneros-González N. Health and quality of life outcomes impairment of quality of life in type 2 diabetes mellitus: A cross-sectional study. *Health Qual Life Outcomes* 2018;16:94.
15. Shaheen F, Basit KA, Riaz M, Fawwa A, Hakeem R, Basit A. Assessing health related quality of life in diabetic subjects by SF 36 questionnaire in a tertiary care diabetes unit of Karachi, Pakistan. *Int J Adv Res* 2014;2:13-7.
16. Altınok A, Marakoğlu K, Kargin NÇ. Evaluation of quality of life and depression levels in individuals with Type 2 diabetes. *J Family Med Prim Care* 2016;5:302-8.
17. Haslinda IN, Juni MH, Minhat HS, Lasa I. Factors associated with quality of life among adult patients with Type 2 diabetes mellitus. *Int J Public Health Clin Sci* 2016;3:132-45.
18. Kumar SA, Raghavendraswamy K, Chandrashekar SV. Quality of life of type 2 diabetes patients in a tertiary care hospital in southern part of India, Shimoga, Karnataka: A cross-sectional study. *Int J Community Med Public Heal* 2016;3:1723-8.
19. Javanbakht M, Abolhasani F, Mashayekhi A, Baradaran HR. Health related quality of life in patients with type 2 diabetes mellitus in Iran: A national survey. *PLoS One* 2012;7:e44526.
20. Papadopoulos AA, Kontodimopoulos N, Frydas A, Ikonomakis E, Niakas D. Predictors of health-related quality of life in type II diabetic patients in Greece. *BMC Public Health* 2007;7:186.