RESEARCH ARTICLE

QUALITY OF LIFE ASSESSMENT BY USING WHOQOL-BREF SCORE AMONG TYPE 2 DIABETIC POPULATION COMING TO ATERTIARY HEALTH CARE CENTER OF WESTERN UTTAR PRADESH REGION: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Quality of Life assessment is considered to be as an important parameter for assessment of disease related outcome especially in context with chronic diseases like diabetes, which might have a negative impact on general wellbeing. In this study we have measured the QOL of patients suffering from type 2 diabetes by using WHOQOL-BREF score and also tried to assess the correlation of QOL with various demographic and laboratory parameters. **Materials and Methods:** This cross-sectional study was conducted after the approval from IECby the department of internal medicine of Nayati Healthcare and Research center, Mathura, India. A total of 100 type 2 diabetic participants fulfilling the inclusion criteria were enrolled in the study. For this study purpose we have used WHOQOL – BREF Questionnaire available in English and was being translated into Hindi by linguistic experts. This questionnaire was validated by conducting a pilot study over 30 patients. The cronbach-alpha for determining the internal consistency of the questionnaire was 0.89 suggesting high level of reliability. **Results:** Out of 100 type 2 diabetics, 71% were males. The mean age was 52.7 ±10.6. 97% participants were married. 68% were from urban area and 61% had the family income of Rs<50,000 per month. Total 66% were coming in either obese or overweight category. The average transformed scores calculated by the equation for computing domains scores was found to be 65.33; 63.58; 70; 67.69 for domain 1,2,3,4 respectively. Age is found to have statistically significant correlation (p value<.028)) with domain 4 and income status showed statistically significant correlation (p value <0.05) with Domain 2. **Conclusion:** QOL is an important parameter and should always be taken into consideration while managing type 2 diabetics. There are various demographic, laboratory, disease related and life-style related parameters which can affect QOL. Comprehensive care of diabetics including assessment of QOL and modifying treatments accordingly may improve the overall quality care of these patients.

INTRODUCTION

Type II Diabetes is a chronic lifestyle disease which is the significant cause of morbidity and mortality world-wide. As this is a long term and incurable disease, the focus of management of this disease should not only remain on blood sugar management but also on preventing the complications and improving the quality of life. Quality of Life is defined by WHO as an individual perception of their position in life in context of their culture and value system; in which they live and in relation to their goals, expectations, standards and concerns [World Health Organization, 1996]. Currently Quality of Life assessment is considered to be as an important parameter for assessment of disease related outcome especially in context with chronic diseases like diabetes which might have a negative impact on their Quality of Life or in general wellbeing.

However some studies quoted that diabetics have slightly higher QOL in comparison to patients suffering from other major chronic illnesses [Polonsky, 2000]. Every diabetic individual has unique requirement and various socio demographic factors also need to be taken into consideration before deciding their medical management. As both short term and long term care planning is necessary for diabetes management, it takes in to account of many patient related factors apart from his diabetes related clinical parameters. The anthropometric measurements such as body mass index and socio-demographic factors such as age, gender, marital status, income status and educational status and adherence to advised diet and exercise routine may have significant positive and negative correlation with QOL. Long term consequences of diabetes which includes both microvascular and macrovascular complications and longer duration of the illness are also important factors that affect the QOL of the diabetic person but we have not included these parameters in our study. Continuously deteriorating QOL and disease related depression also can influence patients compliance and adherence to life

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style modification therapy. In this study we have attempted to measure the QOL of patients suffering from type 2 diabetes by using WHOQOL-BREF score and assessed the correlation of QOL with various socio demographic and laboratory parameters parameters. Unique diabetes related scales are available for measurement of QOL in diabetics like appraisal diabetic scale (ADS); problem areas in diabetes (PAID), Diabetes Treatment satisfaction Questionnaire (DTSQ), Medical Outcomes Study (MOS) and EQ-5D [3, 4] however we chose to use WHOQOL- BREF questionnaire in our study, Awareness and education among Diabetics is poor inspite of its high prevalence in developing countries like India is 8.8%[5].Though there are studies being done for assessment of Quality of Life in Diabetic Patients in various states of India but as per our knowledge there is no study available from western U.P region of India, soto generate a data against this background we have conducted this study.

MATERIALS AND METHODS

This cross-sectional study was conducted after approval from IEC by the department of internal medicine, Nayati Healthcare and Research, Mathura, India. An informed consent was taken from all the participants after explaining them the purpose of the study and providing them with patient information sheet (PIS) in both languages (Hindi & English) as per their choice. A total of 100 diabetic patients, who gave valid informed consent were enrolled in the study.A pretested and structured Questionnaire was use to collect the data on demographic characteristics and diabetes related parameters. QOL was assessed by using WHOQOL-BREF Score which is a validated tool to assess QOL in diabetics. Questionnaire was translated in to Hindi and back translated to English to check validity of translation. A pilot study was done on 30 participants using Cronbach's alpha to check the internal consistency of the questionnaire which was found to be 0.89 reflecting good level of reliability. WHOQOL-BREF contains 4 domains which includes Physical health, psychological, Social relationships and environmental and a total of 26 questions. The 2 questions are for the assessment of overall QOL and 24 questions were distributed in all the 4 domains. Table 1 describes all the domains of the WHOQOL-BREF score.

During this study the privacy was given to every participant to complete the questionnaire and a trained assistant was provided to them in case of any query. According to WHO user manual, raw score and transformed scores were calculated. Information on gender, residential status, family history, marital status, educational status, financial status, occupation, alcohol abuse, physical activity, age, BMI, HbA1C, total cholesterol were collected on a predesigned form by examining and interviewing the patient. Mean and standard deviation of various demographic characteristics and laboratory parameters were calculated for descriptive analysis.The relationship between the four domains of WHOQOLBREF with independent qualitative variables like gender, residential status, family history, alcohol intake, physical activity and quantitative variables like age, monthly income, BMI, Hba1C and total cholesterol, were analyzed by the use of Pearson correlation coefficient.The differences among groups were analyzed by Mann–Whitney U-test, Kruskal–Walis test and chi square test. For statistical analysis P value <.05 is taken as a statistically significant value. Statistical analysis was carried out using IBM SPSS 21.0 (Armonk, NY, USA).

Inclusion criteria

- Type 2 diabetics >30 years who give consent for the study

Exclusion criteria

- People who cannot write or read Hindi
- Type 1 diabetics
- Severely ill
- H/o Psychiatric illness
- Gestational diabetes
- Who refuses to give consent

RESULTS

Socio- Economic, Demographic and Clinical characteristics of the study subjects: Out of 100 type 2 diabetics, 71% were males and 29% were females. The maximum no. of patients (45%) were in age group category between 50-60 years of age with the mean age of 52.7 ±10.6. 31% of them were having educational qualification till graduation and 22% were post graduates; only 12% study subjects were illiterate. Most of them (97%) were married. 68% were from urban area while 32% were from rural area. 24 % of participants were in Job while 25% and 24% were house maker and unemployed respectively. 56% of them had the family members between 5-10. 61% had the family income <50,000 per month. 18% were having the income between 50,000 to 1000000 and 21% were having income >1000000. Only 6% were consuming Alcohol. 29% were continuously engaged in some physical activity, while 71% were not doing any physical activity. 49% of them were having positive family history of Diabetes. 42% of study subjects were in overweight category while 24% were obese. 31% individuals had normal weight and only 3% were in underweight category.

Mean and standard deviation of demographic and laboratory characteristics: The mean age ± standard deviation of the study population was 52.7 ± 10.27. Mean height and mean weight± standard deviation were163.17 ± 8.06 and 71.094 ± 13.57 respectively. Mean BMI ± standard deviation was 26.8 ± 5.08. Mean and standard deviation of cholesterol level was 181.56 ± 85.39; LDL levels was 110.97 ± 46.98; Triglyceride level was 209.24 ± 230.51; HbA1C level was 9.0473 ± 2.01; RBS was 174.439 ± 79.51 and creatinine level was 0.9222 ± 0.39.

Association of Independent variables with various domains: The association of various independent variables with all the domains is shown in table 3. These independent variables are gender, residential status, and family history of diabetes, alcohol consumption and physical activity. There was no statistically significant association was found between the various independent variables described above and any of the domains of QOL. Mean score for male and female for domain 1 was 65.96 and 64.04 respectively. Similarly mean score for urban and rural population for domain 3 was 71.69 and 64.61 respectively. Patient having family history of diabetes had mean QOL score of 72.62 in domain 3 and patients who do not have family history of diabetes had QOL score of 67.28 in domain 4. Patient who were having physical activity had maximum QOL score in domain 3 while patients who were not having physical activity had minimum QOL score in domain 2 i.e. 65.73.

Table 1 - WHOQOL-BREF domains

Domain	Facets incorporated within domains
1. Physical health	Activities of daily living Dependence on medicinal substances and medical aids Energy and fatigue Mobility Pain and discomfort Sleep and rest Work Capacity
2. Psychological	Bodily image and appearance Negative feelings Positive feelings Self-esteem Spirituality / Religion / Personal beliefs Thinking, learning, memory and concentration
3. Social relationships	Personal relationships Social support Sexual activity
4. Environment	Financial resources Freedom, physical safety and security Health and social care: accessibility and quality Home environment Opportunities for acquiring new information and skills Participation in and opportunities for recreation / leisure activities Physical environment (pollution / noise / traffic / climate) Transport

Item No. and Response category of various domains

Domains	Item Numbers	Response Category & Score
Domain 1	Q3,Q4,Q10,Q15,Q16,Q17,Q18	1=3,2=10,3=30,4=38,5=19
Domain 2	Q5,Q6,Q7,Q11,Q19,Q26	1=5,2=10,3=27,4=21,5=36
Domain 3	Q20,Q21,Q22	1=4,2=7,3=21,4=44,5=24
Domain 4	Q8,Q9,Q12,Q13,Q14,Q23,Q24,Q25	1=3,2=8,3=23,4=44,5=23

Table 1. Socio-Economic, Demographic and Clinical characteristics of the study subjects

Characteristics (N = 100)	Numbers	Percentage
Gender		
Male	71	71.00
Female	29	29.00
Age (years)		
< 50	30	30.00
50-60	45	45.00
> 60	25	25.00
BMI		
Underweight (< 18.5)	3	3.00
Normal (18.5-24.9)	31	31.00
Overweight (25-29.9)	42	42.00
Obese (30-39.9)	24	24.00
Educational status		
Illiterate	12	12.00
Primary education	7	7.00
High School	11	11.00
Intermediate	17	17.00
Graduation	31	31.00
Post-Graduation	22	22.00
Marital status		
Unmarried	3	3.00
Married	97	97.00
Residential status		
Urban	68	68.00
Rural	32	32.00
Occupation		
Advocate	2	2.00
Business	14	14.00
Farmer	4	4.00
House maker	25	25.00
Unemployed	24	24.00
Service	24	24.00
Student	1	1.00
Teacher	6	6.00
Family Members		
< 5	40	40.00
5-10	56	56.00
> 10	4	4.00
Family Income		
< 50000	61	61.00
50000-100000	18	18.00
> 100000	21	21.00
Alcohol intake		
Yes	6	6.00
No	94	94.00
Physical activity		
Yes	29	29.00
No	71	71.00
Family history of DM		
Yes	49	49.00
No	51	51.00

Table 2. Mean and standard deviation of demographic and laboratory characteristics

Characteristics	Mean	SD
Age	52.7	10.60
Height	163.17	8.06
Weight	71.094	13.57
BMI	26.854	5.08
Total Cholesterol	181.56	85.39
LDL	110.97	46.98
HDL	38.97	13.07
TG	209.24	230.51
FBS/RBS	174.439	79.51
Creatinine	0.9222	0.39
HbA1c	9.0473	2.01

QOL Score status of various domains: QOL score was divided into 3 categories for the ease of comparison. Those patients who had QOL score <50 had poor QOL; in between 50-70 had average QOL and >70 had good QOL. According to table (A) 41% had average QOL; 46% had good QOL and 16 % patients had bad QOL in domain 1. Similarly in domain 2, 3 and 4 19%; 10% and 9% had poor QOL respectively; while 44%, 52% and 43% had good QOL.

Equation for computing domain scores: The average transformed scores calculated by the equation for computing domains scores was found to be 65.33; 63.58; 70; 67.69 for domain 1,2,3,4 respectively. The correlation of various domains with age, monthly income, BMI was calculated and shown in table B. Correlation of age was found to be positive in all the domains i.e. 1,2,3,4 and correlation of monthly income was positive for domain 4. Correlation of BMI for domain 1 & 2 was negative and domain 3 & 4 was positive.

Correlation of independent variables with various domains: In this table correlation of independent variables with all the 4 domains was assessed. Age is found to have positive correlation with all the 4 domains; monthly Income has positive correlation with domain 1 and 4 and negative correlation with domain 2 and 3. BMI has negative correlation with domain 1 and 2 and positive correlation with domain 3 and 4. Total cholesterol has negative correlation with all the 4 domains. HbA1C has positive correlation with domain 1, 2 and 4 and negative correlation with domain 3.

Table 3. Association of Independent variables with various domains

Independent variables	Scores	Domain 1 (QOL Score)	Domain 2 (QOL Score)	Domain 3 (QOL Score)	Domain 4 (QOL Score)
Gender					
Male (71)	z	−0.939	−0.493	−0.471	−0.046
Female (29)	P-value	0.348	0.622	0.638	0.964
Residential status					
Urban (68)	z	-0.138	-0.498	-1.528	-0.423
Rural (32)	P-value	0.890	0.618	0.126	0.673
Family history of DM					
Yes (49)	z	-0.341	-1.669	-1.475	-0.059
No (51)	P-value	0.733	0.095	0.140	0.953
Alcohol intake					
Yes (6)	z	-0.205	-0.555	-0.206	-0.277
No (94)	P-value	0.838	0.579	0.836	0.782
Physical activity					
Yes (29)	z	-1.268	-0.891	-0.371	-1.501
No (71)	P-value	0.205	0.373	0.711	0.133

Table 3 (a). Mean and standard deviation of transformed QOL score in various domains Gender Wise

QOL Score	Gender	N	Mean	Std. Deviation
Domain 1	Male	71	65.95	15.57
	Female	29	64.04	16.25
Domain 2	Male	71	62.85	17.49
	Female	29	65.37	21.25
Domain 3	Male	71	69.13	18.92
	Female	29	72.13	13.23
Domain 4	Male	71	67.30	16.01
	Female	29	68.64	17.90

Table 3 (b). Mean and standard deviation of transformed QOL score in various domains Residence wise

QOL Score	Residential status	N	Mean	Std. Deviation
Domain 1	Urban	68	64.92	15.89
	Rural	32	66.41	15.52
Domain 2	Urban	68	62.68	19.58
	Rural	32	65.49	16.40
Domain 3	Urban	68	71.69	17.23
	Rural	32	66.41	17.64
Domain 4	Urban	68	68.43	16.20
	Rural	32	66.11	17.28

Table 3 (c). Mean and standard deviation of transformed QOL score in various domains Family History wise

QOL Score	FamilyhistoryofDM	N	Mean	Std. Deviation
Domain 1	Yes	49	65.31	14.94
	No	51	65.48	16.56
Domain 2	Yes	49	66.58	18.97
	No	51	60.70	17.92
Domain 3	Yes	49	72.62	15.50
	No	51	67.48	18.95
Domain 4	Yes	49	68.11	16.19
	No	51	67.28	16.95

Table 3 (d). Mean and standard deviation of transformed QOL score in various domains Physical activity wise

QOL Score	Physical activity	N	Mean	Std. Deviation
Domain 1	Yes	29	63.79	17.38
	No	71	66.05	15.05
Domain 2	Yes	29	58.33	20.11
	No	71	65.73	17.62
Domain 3	Yes	29	68.68	18.59
	No	71	70.54	17.07
Domain 4	Yes	29	62.39	19.52
	No	71	69.85	14.71

Table 4 a. QOL Score status of various domains

Transformed Score	QOL Score Status		
	Poor (Score < 50)	Moderate (Score (50-70))	Better (Score > 70)
Domain 1	16	41	43
Domain 2	19	37	44
Domain 3	10	38	52
Domain 4	9	48	43

Table 4 b. Equation for computing domain scores

Calculation	Equations for computing domain scores	Raw score (Avg.)	Transformed scores (0-100) (Avg.)
Domain 1	(6-Q3)+(6-Q4)+Q10+Q15+Q16+Q17+Q18	23.89	65.33
Domain 2	Q5+Q6+Q7+Q11+Q19+(6-Q26)	20.32	63.58
Domain 3	Q20+Q21+Q22	11.4	70
Domain 4	Q8+Q9+Q12+Q13+Q14+Q23+Q24+Q25	29.66	67.69

Table 5 a. Correlation of independent variables with various domains

Correlation	Age	Monthly Income	BMI	Total Cholesterol	HbA1c
Domain 1	0.176	0.068	-0.076	-0.054	0.026
Domain 2	0.080	-0.011	-0.068	-0.078	0.136
Domain 3	0.110	-0.032	0.162	-0.129	-0.050
Domain 4	0.219	0.029	0.047	-0.097	0.148

Table 5 b. Statistical significance of correlation of independent variables with various domains

Correlations		Domain 1	Domain 2	Domain 3	Domain 4
Age	Pearson Correlation	0.176	0.080	0.110	0.219
	P Value	0.080	0.430	0.275	0.028
Monthly Income	Pearson Correlation	0.068	-0.011	-0.032	0.029
	P Value	0.502	0.911	0.754	0.777
BMI	Pearson Correlation	-0.076	-0.068	0.162	0.047
	P Value	0.453	0.500	0.108	0.643
Total Cholesterol	Pearson Correlation	-0.054	-0.078	-0.129	-0.097
	P Value	0.597	0.441	0.202	0.339
LDL	Pearson Correlation	0.114	0.086	0.050	-0.022
	P Value	0.257	0.397	0.625	0.829
HDL	Pearson Correlation	-0.154	-0.082	-0.114	0.013
	P Value	0.126	0.416	0.257	0.900
HbA1c	Pearson Correlation	0.026	0.136	-0.050	0.148
	P Value	0.797	0.177	0.618	0.141
*. Correlation is significant at the 0.05 level					

Statistical significance of correlation of independent variables with various domains: Age is found to have statistically significant correlation (p value <0.05) with domain 4. Although no statistically significant correlation of age was found with domain 1, 2 and 3. Monthly Income, BMI, Total cholesterol, LDL, HDL and HbA1C did not show any statically significant correlation with all the 4 domains.

Comparison of independent variables with various domains (average rank):** In this table comparison of different variables like age groups, BMI, marital status, educational status had shown no statistically significant association with any of the domains of QOL including domain 1, 2, 3 & 4.

Income status showed statistically significant correlation with Domain 2; but no statistical significant correlation with rest of the domains including 1, 3 and 4. P value is calculated by using kruskal-walis test and value of <0.05 is considered as significant.

DISCUSSION

In this study we have analyzed QOL in 100 diabetics based on 4 domains (Physical, Psychological, Social and Environmental). When we analyzed the mean QOL score for different domains it was found that the females in domain 3 had the highest mean QOL score (72.13), while the males in domain 3 had mean QOL score of 69.13, which is the highest mean QOL score of males in comparison to all other domains.

Table 6. Comparison of independent variables with various domains (average rank**)

Independent variables	n	Domain 1	Domain 2	Domain 3	Domain 4
Age (years)					
<50	30	50.55	50.63	51.48	46.73
50-60	45	48.57	46.67	50.41	48.71
>60	25	53.92	57.24	49.48	58.24
χ^2		0.56	2.16	0.07	2.47
P-value		0.76	0.34	0.97	0.29
BMI (kg/m^2)					
Underweight (<18.5)	3	35.17	33.83	36.50	30.83
Normal (18.5-24.9)	31	54.18	54.27	44.18	51.45
Overweight (25-29.9)	42	47.36	50.89	55.94	51.17
Obese (30-39.9)	24	53.17	47.02	50.90	50.56
χ^2		2.07	1.89	3.77	1.44
P-value		0.56	0.60	0.29	0.70
Education status					
Illiterate	12	40.67	48.67	56.50	42.67
Primary education	7	39.71	37.21	51.07	40.43
High School	11	49.00	51.41	53.23	52.95
Intermediate	17	52.12	49.79	47.50	52.82
Graduation	31	53.65	45.56	43.40	44.19
Post-Graduation	22	54.36	62.77	58.00	63.84
χ^2		3.24	6.45	4.26	8.08
P-value		0.66	0.26	0.51	0.15
Marital status					
Married	97	50.80	50.79	50.82	51.21
Unmarried	3	40.83	41.17	40.00	27.67
χ^2		0.35	0.32	0.42	1.93
P-value		0.55	0.57	0.52	0.16
Income status					
<3000	1	23.50	70.50	37.50	43.00
3001-10,000	12	35.71	31.04	44.58	34.88
10,001-30,000	41	54.76	50.93	46.76	50.18
30,001-50,000	20	53.93	62.60	62.55	59.03
>50,000	26	49.02	48.73	50.37	51.94
χ^2		5.31	9.58	4.99	5.38
P-value		0.26	0.05	0.29	0.25

** Average rank is the quotient of rank sum by no. of observation in the group.

Overall in all 4 domains, for both males and females the average mean QOL score were above 60, qualifying as moderate QOL score. There was no statistically significant correlation of gender with various domains of QOL was found with gender in study. However in some studies by Varghese RT;Undén AL; Eljedi A and Rubin RR [6, 7, 8, 9] it was observed that the male have better quality of life in comparison to females. However in a study from Karnataka, females had shown better Quality of life score in comparison to males in all the four domains [Somappa, 2014]. Age is found to have statistically significant correlation with domain 4 of QOL i.e. Environmental, though in different categories of age i.e., <50, 50-60 and >60 this correlation was insignificant. A study done by Mathew George from Kerala showed that age has a positive correlation with physical domain [George, 2016] and in an another study done by Yogesh gautam from Delhi showed that age has positive correlation with physical, psychological and social domain. In our study its correlation with environmental domain was significant [Gautam, 2009]. The mean QOL score of people living in urban as well as rural area was more than 60 in all four domains, though the highest mean QOL score (71.69) was found in domain 3 of people living in urban area, and there was no statistically significant correlation of QOL with this parameter. In a study conducted in Thailand, it was found that people living in semi-urban area had a higher QOL score in most of the domains in comparison to people living in rural area [Apidechkul, 2011]. There was no statistical significant correlation of family history with mean QOL score with all the four domains; however a study from Bangladesh revealed a statistically significant correlation of family history with QOL score [Saleh, 2015].

Correlation between physical activity and mean QOL was also not found to be statistically significant. The highest score (70.54) was found in domain 3 in people doing no physical activity. Though, in various studies from South East Asia, a significant association of physical activity and mobility had been found impacting QOL in diabetics [Saleh, 2015; Shim et al., 2012]. The correlation of alcohol intake with QOL in diabetics was also found to be statistically insignificant. When QOL score was assessed with BMI, it was found that underweight Individuals had low mean QOL in all the domains. Normal, Over-weight and obese individuals have mean QOL score of approx. 50. This finding was corroborated with the findings of a study done in Maharashtra, where under-weight patients had low mean QOL score in comparison to patients who are in normal weight category [John, 2019]. Increased BMI was not associated with statistically significant association with QOL in contrast to various studies, where Increased BMI was associated with poor QOL in specially physical and environmental domain [Fal et al., 2011; Redekop, 2002; Akinci, 2008].

No statistically significant correlation was found between marital status and QOL in our study. However the number of unmarried people was only 3 in this study. This gross variability in number between both the groups may impact the results and outcomes and that is why it may not be statistically relevant. In various other studies it was observed that married and single people have higher QOL in comparison to divorced and widowed ones [Rwegerera, 2018; Jacobson, 1994]. While looking at the impact of monthly income, people with more than 50,000 per month income had mean QOL score of 50 in

all the 4 domains.Statistically significant correlation was found between income status and domain 2 of QOL. (p value <0.05). The distribution of patient here also was widely varied in different income groups and only one person was present in less than 3000 per month income group. Various other studies have described the importance of income status in contributing to financial worries and hence impacting the QOL [Wubben, 2005; Manjunath, 2014]. There was no statistically significant correlation was found between various education status staring from Illiterate to post graduation with QOL. Patient who were Illiterate and have received only primary education, there QOL scores were low in especially domain 1,2 and 4. All the study participants having qualification till Post graduation have higher QOL value in comparison to people who are less qualified then them. Though, this difference was not statistically significant [de Brito, 2016; Ghanbari, 2005]. There was no significant association of all the domains of QOL score with various qualitative variables including gender, residential status, family history, physical activity and alcohol consumption.

Conclusion

This study showed the statistically significant correlation of age with domain 4 of QOL (p value 0.028) i.e. environmental domain consisting of home, environment, leisure, recreational activities, physical environment, transport and financial resources, etc.; signifying the importance of impact of these above mentioned factors on QOL in aging population. Hence, while managing elderly diabetics these needs should also be addressed. Income status also showed the statistically significant correlation with domain 2 of QOL (p value 0.05) i.e. psychological domain, consisting of bodily image, negative and positive feelings, self-esteem, thinking, memory and spirituality, etc. and this finding also has to be taken into consideration while managing type 2 diabetics. Overall, it is advisable to assess the QOL by some objective parameters in all type 2 diabetics so as to ensure the holistic clinical care to every diabetic.

Limitations of the study: In this study we have not taken the data on complications of diabetes, treatment with Insulin therapy and duration of disease which may significantly affect QOL negatively or positively. The impact of these variables on

QOL has been described in many studies.

- In our study total no. of participants was 100 only. Number of participants in different demographic characteristics was significantly variable and may have the impact on data analyses for e.g. in our study97 participants were married and only three participants were unmarried.
- As WHOQOL-BREF score is an exhaustive questionnaire, it might be better to fill this questionnaire in presence of an interviewer rather than handing it over to participants to fill on their own.
- We would like to continue this study further to collect more data with an Interviewer based study.

Conflict of interest: The author(s) declared no conflicts of interests with respect to the research and publication of   this article.

REFERENCES

Acharya LD, KK AF, Mallayasamy S. Development and validation of quality of life assessment instrument for diabetic patients. Asian Journal of Pharmaceutical and Health Sciences. 2014;4(4).

Akinci F, Yildirim A, Gözü H, Sargın H, Orbay E, Sargın M. Assessment of health-related quality of life (HRQoL) of patients with type 2 diabetes in Turkey. Diabetes research and clinical practice. 2008 Jan 1;79(1):117-23.

Apidechkul T. Comparison of quality of life and mental health among elderly people in rural and suburban areas, Thailand. Southeast Asian Journal of Tropical Medicine and Public Health. 2011 Sep 1;42(5):1282.

de Brito GM, Gois CF, Zanetti ML, Resende GG, Silva JR. Quality of life, knowledge and attitude after educational program for Diabetes. ActaPaulista de Enfermagem. 2016;29(3):298-306.

Eljedi A, Mikolajczyk RT, Kraemer A, Laaser U. Health-related quality of life in diabetic patients and controls without diabetes in refugee camps in the Gaza strip: a cross-sectional study. BMC public health. 2006 Dec;6(1):268.

Fal AM, Jankowska B, Uchmanowicz I, Sen M, Panaszek B, Polanski J. Type 2 diabetes quality of life patients treated with insulin and oral hypoglycemic medication. Actadiabetologica. 2011 Sep 1;48(3):237-42.

Gautam Y, Sharma AK, Agarwal AK, Bhatnagar MK, Trehan RR. A cross-sectional study of QOL of diabetic patients at tertiary care hospitals in Delhi. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2009 Oct; 34(4):346.

George M, Joseph L, Koshy LV. A Review on Quality of Life Assessment among Patients with Type 2 Diabetes Mellitus. Int.J.Curr.Res.Aca.Rev. 2016 July; 4(7):103-6.

Ghanbari A, Yekta ZP, Roushan ZA, Lakeh NM. Assessment of factors affecting quality of life in diabetic patients in Iran. Public Health Nursing. 2005 Jul;22(4):311-22.

Jacobson AM, De Groot M, Samson JA. The evaluation of two measures of quality of life in patients with type I and type II diabetes. Diabetes care. 1994 Apr 1;17(4):267-74.

John R, Pise S, Chaudhari L, Deshpande PR. Evaluation of quality of life in type 2 diabetes mellitus patients using quality of life instrument for indian diabetic patients: A cross-sectional study. Journal of Mid-life Health. 2019 Apr;10(2):81.

Manjunath K, Christopher P, Gopichandran V, Rakesh PS, George K, Prasad JH. Quality of life of a patient with type 2 diabetes: A cross-sectional study in Rural South India. Journal of family medicine and primary care. 2014 Oct;3(4):396.

Polonsky WH. Understanding and assessing diabetes-specific quality of life. Diabetes spectrum. 2000;13(1):36.

Redekop WK, Koopmanschap MA, Stolk RP, Rutten GE, Wolffenbuttel BH, Niessen LW. Health-related quality of

life and treatment satisfaction in Dutch patients with type 2 diabetes. Diabetes care. 2002 Mar 1;25(3):458-63.

Rubin RR, Peyrot M. Quality of life and diabetes. Diabetes/metabolism research and reviews. 1999 May;15(3):205-18.

Rwegerera GM, Moshomo T, Gaenamong M, Oyewo TA, Gollakota S, Rivera YP, Masaka A, Godman B, Shimwela M, Habte D. Health-related quality of life and associated factors among patients with diabetes mellitus in Botswana. Alexandria journal of medicine. 2018 Jun 1;54(2):111-8.

Saleh F, Ara F, Mumu SJ, Hafez MA. Assessment of health-related quality of life of Bangladeshi patients with type 2 diabetes using the EQ-5D: a cross-sectional study. BMC research notes. 2015 Dec 1;8(1):497.

Shim YT, Lee J, Toh MP, Tang WE, Ko Y. Health-related quality of life and glycaemic control in patients with Type 2 diabetes mellitus in Singapore. Diabetic Medicine. 2012 Aug;29(8):e241-8.

Somappa HK, Venkatesha M, Prasad R. Quality of life assessment among type 2 diabetic patients in rural tertiary centre. Int J Med Sci Public Health. 2014 Apr 1;3(4):415-7.

Undén AL, Elofsson S, Andréasson A, Hillered E, Eriksson I, Brismar K. Gender differences in self-rated health, quality of life, quality of care, and metabolic control in patients with diabetes. Gender medicine. 2008 Jun 1;5(2):162-80.

Varghese RT, Salini R, Abraham P, Reeshma KK, Vijayakumar K. Determinants of the quality of life among diabetic subjects in Kerala, India. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2007 Sep 1;1(3):173-9.

World Health Organization. WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996. Geneva: World Health Organization; 1996.

Wubben DP, Porterfield D. Health-related quality of life among North Carolina adults with diabetes mellitus. NC Med J. 2005 May; 66(3):179-85.

WWW.diabetesatlas.org; Diabetes in India in 2017.

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