



A Study to Evaluate the Quality of Life of Patients with Diabetes Mellitus

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: The aim of the study was to evaluate the QOL of patients with Diabetes Mellitus.

Study Design: This was a prospective, observational study.

Duration of Study: The study was conducted from August 2019 to January 2021 in Yashoda Hospital, Hyderabad.

Methodology: Patients of either sex with ≥ 1 year history of diabetes willing to give the consent were included in the study. Patients of either sex with < 1 year history of DM, Pregnant/lactating women and patients not willing to give the consent were excluded from the study. Data on Blood glucose levels (FBS, PPBS) and HbA1C was also obtained and assessed. QOLID questionnaire was administered to the patients and assessed which consisted of a set of 34 items representing 8 domains such as Role limitation due to the physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, Financial worries, Mental health, and Diet satisfaction).

Results: A total of 200 patients were analysed in the study, 108(54%) were males and 92(46%) were females. The average age of the patients was 58.5 years with majority being 51-70 years

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(73.5%) of age. Patients with higher age and females had poor QOL compared to others. The correlation between various categorical variables with that of scores of QOL in various domains was assessed, Age of the patients influenced QOL score in various domains like RLPH (p value-0.038), PE (p value-0.0183), and SB (p value-0.0002), Gender has influenced QOL score in domains like RLPH (p value-0.0008), PE (p value-0.0106), TS (p value-0.0005) and Educational Qualification has influenced QOL score in RLPH (p value-0.0008), GH (p value-<0.0001), TS (p value-<0.0001), E/MH (p value-<0.0001).

Conclusion: The results concluded that overall QOL was noticeably low in Diabetic patients especially in Women and elderly thus indicating that Diabetes management is not restricted to treatment but also requires attention on QOL of patients.

Keywords: Diabetes, complications; diabetes management; QOL

1. INTRODUCTION

Diabetes mellitus is a metabolic disorder with an increasing global prevalence and incidence. It presents with episodes of hyperglycaemia and glucose intolerance, as a result of lack of insulin, defective insulin action, or both. There are four types or classes of diabetes mellitus like type 1 diabetes, type 2 diabetes, gestational diabetes, and other specific types based on the aetiology.

There are more than 387 million people with Diabetes Mellitus (DM) and the number is likely to reach 592 million by 2035. The prevalence of DM is 9.1% in India [1].

Life style management is the basis of management of diabetes mellitus and is recognized as being an essential part of diabetes and cardiovascular disease prevention [2].

Uncontrolled blood glucose in the long term will lead to micro vascular and macro vascular complications with increased morbidity and mortality and negatively affects the quality of life. In order to minimise the complications of Diabetes there is a requirement for comprehensive diabetes care which is a complex task that takes the entire team of healthcare professionals including the pharmacist to work together to provide multidisciplinary care for patients [3]. This can be achieved by assessing and closely monitoring the QOL in Diabetes patients. Now, this again cannot be done by interpreting their health status measures as to their measure of QOL which can be deceptive as the patients may compromise on achieving good diabetic control to safeguard their QOL if the treatment regimen doesn't go in good terms with their way of living [4]. Most health care providers focus on medically related outcomes only when assessing the efficacy of their intervention, thus for a better outcome it is important to extend the

assessment of the effect on physical, emotional, social and economic wellbeing that is, the quality of life [5] Numerous studies indicated that QOL for patients with DM is lower than that of the healthy individuals, and the factors involved in this regard are not precisely determined. It is significant that some variables such as age, DM related complications, social status, psychological factors, ethnicity, educational level, knowledge about the disease, type of assistance which they received from others may interfere in the QOL for these patients [6]. Thus, there is a requirement of a proper tool to measure the QOL, in particular to Diabetic patients. Although there are several QOL questionnaires available, we have chosen to utilise QOLID (Quality of life instrument for Indian Diabetic Patients) since most of the existing QOL questionnaires were developed in the western countries which might differ and cannot be considered in all aspects for the Indian population. The aim of the study was to evaluate the QOL of patients with Diabetes Mellitus.

2. MATERIALS AND METHODS

Prior approval from Independent ethics committee was taken. All the patients were thoroughly explained about the study in native language through informed consent form.

2.1 Study Design and Data Collection

This was a prospective observational study conducted from August 2019 to January 2021 in Yashoda Hospital, Hyderabad. Patients of either sex with ≥ 1 -year history of diabetes and who were willing to give the consent were included in the study. Patients of either sex with <1 year history of DM, Pregnant/lactating women and patients who are not willing to give the consent were excluded from the study. A Patient data collection form was designed to collect the

demographic and laboratory details. An informed consent form consisting of the study information was prepared in the regional language.

2.2 Data Analysis

After obtaining the consent from the patients through the informed consent form, information was gathered into Patient data collection form that contained the socio demographic details of the patient like age, sex, educational qualification, occupation, family annual income, social and family history and also data on comorbid diseases. Data on Blood glucose levels (FBS, PPBS) and HbA1C was also obtained and assessed. QOLID questionnaire consisted of a set of 34 items representing 8 domains such as Role limitation due to the physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, Financial worries, Mental health, and Diet satisfaction). This questionnaire was administered to the patients and the QOL was assessed. A score for each domain was calculated by adding items' scores. Each individual domain score was then divided by maximum possible domain score and multiplied by 100. All individual domain scores were then added and divided by 8 (total number of domains) to obtain an overall score.

2.3 Statistical Analysis

Descriptive and inferential statistical analysis was carried out in this study. Data was represented in mean and standard deviation(SD) values and categorical variables were presented in percentage. Microsoft word and excel were used to generate graphs and tables. The differences among the variables was analysed by ANOVA.

3. RESULTS AND DISCUSSION

3.1 Socio Demographic Characteristics of the Patients

A total of 200 patients were analysed in the study where 108(54%) were males and 92(46%) were females. The average age of the patients was 58.5 years with majority being 51-70years (73.5%) of age. Out of 200 patients, 59 (29.5%) completed their Intermediate. Patients qualified with Primary and Graduation were approximately equal in the study i.e., 47(23.5%) and 46 (23%) respectively. About 79(39.5%) patients were private employees, 68(34%) were House wives and 25(12.5%) were illiterates.

173(86.5%) had a family income of more than INR.200000 per annum and 27(13.5%) had less than INR.200000 per annum. 178(89%) patients were non-smokers and rest 22(11%) smoked at least 05 cigarettes a day. 149(74.5%) were non-alcoholic in the study and 51 (25.5%) had a history of alcohol consumption.

182 (91%) patients didn't have any family history whereas 18(9%) had either history of DM, HTN or both. 108 (54%) patients had history of Diabetes since last 6-10 years and 78(39%)patients had 1-5 years' history of Diabetes. A very few patients had 11-20 years' history of Diabetes, i.e.,14 (7%) (Table 1).

The mean FBS was 135.09±28.15 mg/dL, with majority (20.5%) of the patients having it between 131-140 mg/dL, followed by 12.5% of patients having it between 91-100 mg/dL and 161-170 mg/dL (Fig 1).

Table 1. Socio demographic characteristics of the patients

Age	N	%
31-40	2	1
41-50	42	21
51-60	74	37
61-70	73	36.5
71-80	9	4.5
Gender	N	%
F	92	46
M	108	54
Qualification	N	%
Graduate	46	23
High School	23	11.5
Illiterate	25	12.5
Intermediate	59	29.5
Primary	47	23.5

Occupation	N	%
Farmer	16	8
Govt. employee	11	5.5
House Wife	68	34
Private employee	79	39.5
Retired	26	13
Family annual income	N	%
<200000/annum INR	27	13.5
>200000/annum INR	173	86.5
H/o Smoking	N	%
1 pack/day	1	0.5
1-2 packs/day	13	6.5
3-4 packs/day	1	0.5
5 packs/day	2	1
5-6 cigarettes /day	5	2.5
Non smokers	178	89
H/o Alcohol consumption	N	%
Daily More Than Once	1	0.5
Daily Once	3	1.5
Occasionally	30	15
Weekly Once	17	8.5
Non Alcoholic	149	74.5
Family history	N	%
DM	5	2.5
DM and HTN	8	4
HTN	5	2.5
No Family history	182	91
H/o DM	N	%
1-5	78	39
6-10	108	54
11-15	9	4.5
16-20	5	2.5

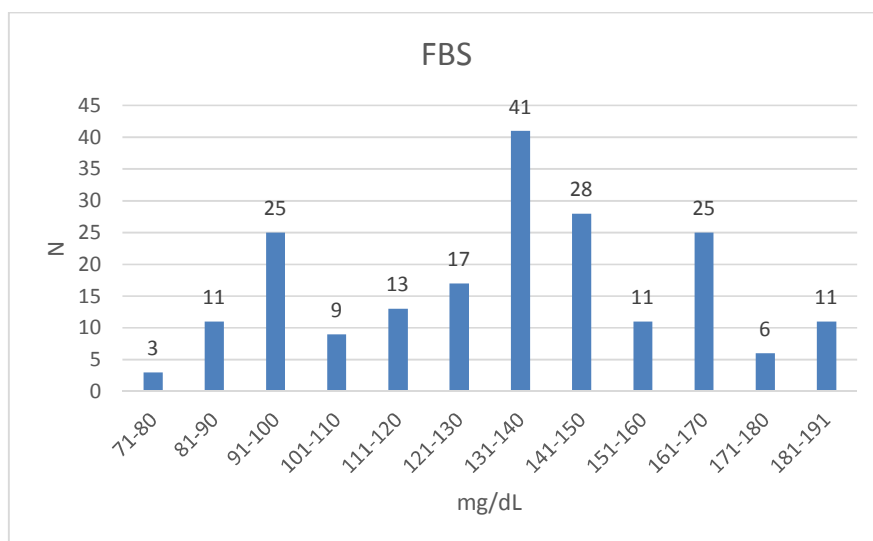


Fig. 1. Fasting blood glucose levels (mg/dL)

The mean PPBS was 184.92±17.23 mg/dL, with majority (52%) of the patients having it between 181-200 mg/dL, followed by 28.5% of patients having it between 161-180 mg/dL (Fig. 2).

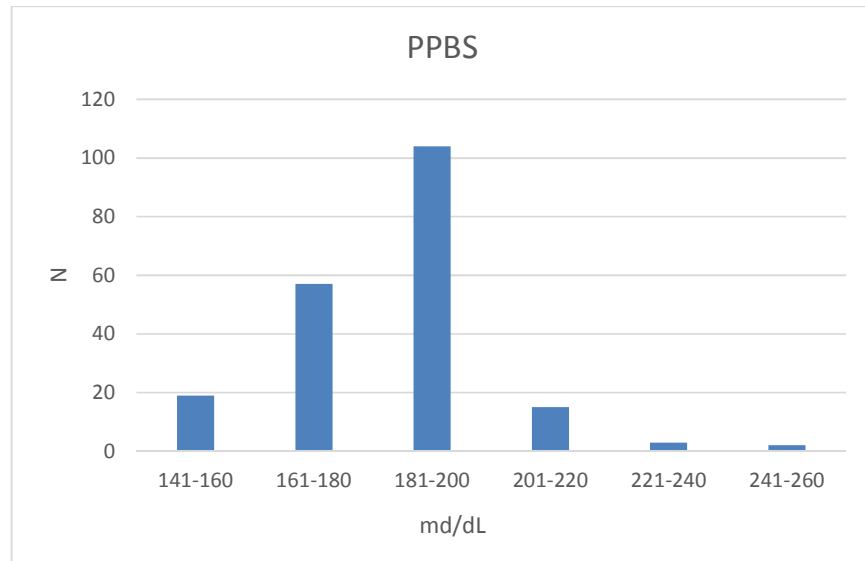


Fig. 2. Post prandial blood glucose levels (mg/dL)

The mean HbA_{1c} was 8.29±0.85% with majority (27.5%) of the patients having it between 8.6-9%, followed by 20.5% having it between 7.6-8% (Fig. 3).

3.2 Assessment of QOL

The highest QOL (61.18±4.99%) was found to be in the age group of 30-40 years followed by (58.35±4.09%) 41-50 years. Males had a better overall QOL (58.26±3.51%) compared to females (56.2±3.01%). Graduates had the highest QOL

(58.18±3.63%) compared to other. Patients with 1-5 years' history of Diabetes had the highest QOL (57.5±3.82%) than others followed by 6-10 years' history (57.35±3.25%) of Diabetes. Patients with a family history of Diabetes had slightly lesser overall QOL (57.1±2.09%) than the patients with no family history (57.33±3.52%).

Statistical significance was observed in three categories, namely Age, Gender and Educational qualification (Table 2).

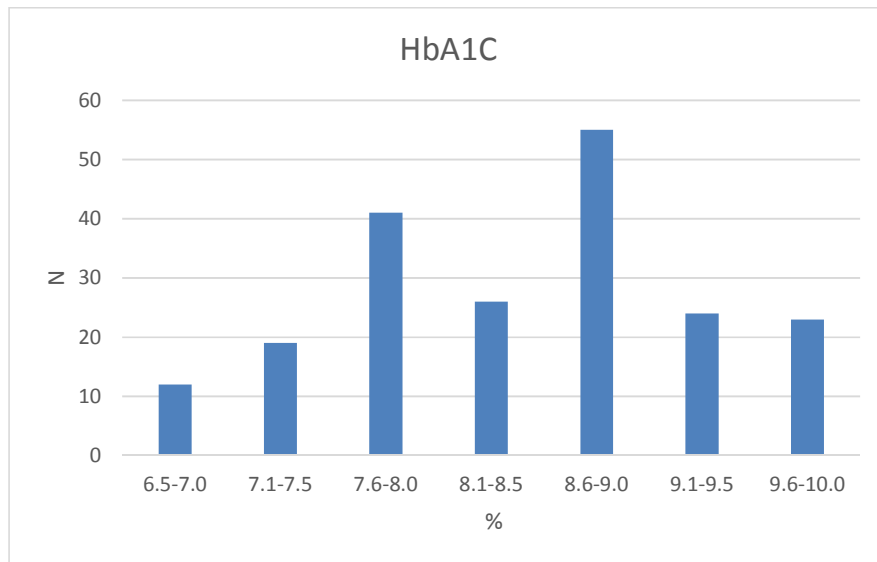


Fig. 3. HbA_{1c} levels (%)

Table 2. Assessment of overall QOL score

Category	Total QOL (%) [mean±SD]
Age (years)	
30-40	61.18±4.99
41-50	58.35±4.09
51-60	57.4±3.13
61-70	56.83±3.22
71-80	54.77±1.78
<i>p value</i>	0.0115
Gender	
F	56.2±3.01
M	58.26±3.51
<i>p value</i>	<.0001
Educational qualification	
Graduate	58.18±3.63
High School	58.01±3.57
Illiterate	57.6±3.63
Intermediate	57.11±3.04
Primary	56.22±3.36
<i>p value</i>	0.0589
History of Diabetes (years)	
1-5	57.5±3.82
6-10	57.35±3.25
11-15	55.95±2.5
16-20	56±2.14
<i>p value</i>	0.4993
Family History of Diabetes	
No	57.33±3.52
Yes	57.1±2.09
<i>P value</i>	0.8224

3.3 Comparison of QOL Scores in Various Domains of QOL among Several Categorical Variables

Role limitation due to Physical health: (Maximum score=30, minimum score=6) (RLPH).

Of 200 patients, the highest score (19±2.4) was found to be in the age group of 41-50 years. Females had a better score (18.79±2.35) compared to males (17.79±1.69). Patients with a qualification of High school scored highest (20.04±1.89) among others. Patients with a Diabetes history of 1-5 years scored highest (18.69±2.47). Patients with no family history of Diabetes scored better (18.36±2.14) than the patients with family history of Diabetes (17.85±1.63).

Physical Endurance: (Maximum score=30, minimum score=6) (PE).

The highest score (19±4.24) was found to be in the age group of 31-40 years followed by 41-50

years (18.33±4.17). Again, females had a better (17.52±3.53) score than males (16.38±2.52). Here, Illiterates had higher score (17.84±3.83) followed by Graduates (17.39±2.85). Patients with 6-10 years' Diabetes history had better score (17.09±2.82) than others. Here, patients with a family history of Diabetes scored better (18.38±3.23) than the ones who did not have family history of Diabetes.

General Health: (Maximum score=15, minimum score=3) (GH).

The highest score (9.5±0.71) was found to be in the age group of 31-40 years followed by 41-50 years (8.71±1.04). Females had a better (8.49±1.16) score than males (8.29±1.02). Here, patients with a qualification of Intermediate had higher score (8.85±0.87) followed by illiterates (8.72±1.14). Here, patients with 16-2 years' history of Diabetes had better score (8.6±1.14) than others. Also, patients with family history had slightly better score (8.46±1.13) than who did not have family history.

Treatment Satisfaction: (Maximum score=20, minimum score=4) (TS).

The highest score (10.23±1) was found to be in the age group of 51-60 years followed by 61-70 years (10.18±1.13). Females again had a better (10.32±1.07) score than males (9.79±1.04). Here, Graduate patients had higher score (10.67±1.03) followed by patients who qualified Intermediate (10.19±1.01). Patients with a 16-20 years' history of Diabetes had highest score (10.6±0.55) amongst others and patients with no Family history had better score (10.11±1.09) than the ones who did have a history (9.69±1.03).

Symptom Botherness: (Maximum score=15, minimum score=3) (SB).

The highest score (9.57±1.17) was found to be in the age group of 41-50 years followed by 51-60 years (9.22±0.93). Even here, females had a better (9.23±1.06) score than males (9.02±1.03). Here, again graduate patients had higher score (9.37±1.08) followed by patients who qualified Intermediate (9.22±1.13). Patients with a 1-5 years' history of Diabetes had better score (9.23±0.92) and patients with a family history had higher score (9.31±1.03) than the ones who did not have family history (9.12±1.05).

Financial Worries: (Maximum score=20, minimum score=4) (FW).

The highest score (13.5±0.71) was found to be in the age group of 31-40 years followed by 51-60 years (12.39±1.57). Even here, females had a better (12.42±1.58) score than males (12.22±1.57). Here, patients with high school qualification had higher score (12.7±0.82) followed by Graduate patients (12.61±1.53). The highest score (12.56±1.26) was seen in patients with 1-5 years' history of Diabetes and patients with no family history had better score (12.34±1.57) than patients who had a history (12.08±1.66).

Emotional/Mental Health: (Maximum score=25, minimum score=5) (E/MH)

The highest score (16±4.24) was found to be in the age group of 31-40 years followed by 41-50 years (15.02±2.24). Even here, females had a better (15.1±2.14) score than males

(14.82±2.03). Here, patients with high school qualification had higher score (17.04±1.66) followed by illiterate patients (15.6±2.29). Patients with a 6-10 years' history of Diabetes had better score (15.17±2.01) than others and patients with family history had lesser score (14.08±2.22) than those who had no family history (15.03±2.07).

Diet Satisfaction: (Maximum score=15, minimum score=3) (DS)

The highest score (8±0) was found to be in the age group of 31-40 years followed by 51-60 years (7.34±1.26). This was the only domain where males had a slightly higher score (7.22±1.43) than females (7.18±1.32). Graduate patients had higher score (7.59±1.59) followed by patients who qualified Intermediate (7.22±1.72). Patients with 16-20 years' history of Diabetes had better score (7.6±1.52) than others and patients with a family history had better score (7.23±1.59) than the ones with no family history (7.19±1.35) (Table 3).

In this study, patients with higher age and females had poor QOL compared to others which correlated with the findings in many such studies that evaluated the QOL of Diabetes patients. [7,8,9,10]. These results also correspond with the findings of Thiruvananthapuram study [8]. There was statistically significant correlation found in few variables such as Age in this study. Patients with longer history of Diabetes had poor QOL compared to those who had shorter history of Diabetes, which again was in line with the findings of one of few such studies that evaluated QOL of Diabetic patients [11].

In this study, we have also assessed the correlation between various categorical variables with that of scores of QOL in various domains and found that Age of the patients influenced QOL score in various domains like RLPH (p value-0.038), PE (p value-0.0183), and SB (p value-0.0002), Gender has influenced QOL score in domains like RLPH (p value-0.0008), PE (p value-0.0106), TS (p value-0.0005) and Educational Qualification has influenced QOL score in domains like RLPH (p value-0.0008), GH (p value-<0.0001), TS (p value-<0.0001), E/MH (p value-<0.0001).

Table 3. Comparison of QOL scores in various domains with several categorical variables

Variables	Score in various domains of QOL [mean±SD]							
	RLPH	PE	GH	TS	SB	FW	E/MH	DS
Age (years)								
31-40	19± 1.41	19± 4.24	9.5± 0.71	10± 1.41	9± 0	13.5± 0.71	16± 4.24	8± 0
41-50	19± 2.4	18.33± 4.17	8.71± 1.04	9.64± 1.1	9.57± 1.17	12.24± 1.27	15.02± 2.24	6.67± 1.56
51-60	18.47± 2.2	16.51± 2.63	8.43± 1.06	10.23± 1	9.22± 0.93	12.39± 1.57	14.99± 2	7.34± 1.26
61-70	17.92± 1.75	16.81± 2.86	8.18± 1.12	10.18± 1.13	8.95± 0.97	12.27± 1.77	14.99± 2.04	7.33± 1.29
71-80	17.22± 1.99	15.78± 2.22	8.22± 1.3	10.11± 0.93	8± 1	12.33± 1.5	14.22± 2.39	7.22± 1.56
<i>P value</i>	0.038	0.0183	0.0686	0.0639	0.0002	0.8372	0.7988	0.0736
Gender								
Male	17.79± 1.65	16.38± 2.52	8.29± 1.02	9.79± 1.04	9.02± 1.03	12.22± 1.57	14.82± 2.03	7.22± 1.43
Female	18.79± 2.35	17.52± 3.53	8.49± 1.16	10.32± 1.07	9.23± 1.06	12.42± 1.58	15.1± 2.14	7.18± 1.32
<i>P value</i>	0.0008	0.0106	0.2082	0.0005	0.1577	0.373	0.3351	0.8312
Educational qualification								
Graduate	18.11± 1.65	17.39± 2.85	8.67± 1.08	10.67± 1.03	9.37± 1.08	12.61± 1.53	14.5± 1.83	7.59± 1.59
High School	20.04± 1.89	15.3± 3.97	7.91± 1.04	9.65± 1.11	8.96± 1.52	12.7± 0.82	17.04± 1.66	7± 1.04
Illiterate	18.2± 2.71	17.84± 3.83	8.72± 1.14	9.84± 0.75	8.88± 0.6	11.64± 2.61	15.6± 2.29	7.2± 0.71
Intermediate	18.29± 1.53	16.98± 2.97	8.85± 0.87	10.19± 1.01	9.22± 1.13	12.15± 1.32	14.19± 1.68	7.22± 1.72
Primary	17.83± 2.51	17± 2.6	7.64± 0.94	9.7± 1.12	9.02± 0.74	12.45± 1.36	15.06± 2.15	6.87± 0.9
<i>P value</i>	0.0008	0.0561	<0.0001	<0.0001	0.247	0.0728	<0.0001	0.1405
History of diabetes (years)								
1-5	18.69±2.47	16.94±3.67	8.45±0.98	9.95±1.08	9.23±0.92	12.56±1.26	14.76±2.18	7.17±1.23
6-10	18.19±1.82	17.09±2.82	8.37±1.16	10.15±1.12	9.16±1.1	12.19±1.74	15.17±2.01	7.19±1.45
11-15	17.44±1.74	16.44±3.24	8.22±1.48	10.11±0.93	8.44±1.13	12.22±2.05	14.89±2.42	7.33±1.5
16-20	17.2±1.92	16.8±0.84	8.6±1.14	10.6±0.55	8.4±0.89	11.8±1.1	14.2±1.92	7.6±1.52
<i>p value</i>	0.1231	0.9362	0.8915	0.4397	0.0674	0.3561	0.4852	0.9045
Family history								

Variables	Score in various domains of QOL [mean±SD]							
	RLPH	PE	GH	TS	SB	FW	E/MH	DS
of diabetes								
No	18.36±2.14	16.9±3.13	8.4±1.1	10.11±1.09	9.12±1.05	12.34±1.57	15.03±2.07	7.19±1.35
Yes	17.85±1.63	18.38±3.23	8.46±1.13	9.69±1.03	9.31±1.03	12.08±1.66	14.08±2.22	7.23±1.59
<i>p</i>	0.3939	0.1005	0.8358	0.1838	0.5391	0.5576	0.1114	0.9225

RLPH: Role limitation due to Physical Health, PE: Physical Endurance, GH: General Health, TS: treatment satisfaction, SB: Symptom Botherness, FW: Financial Worries, E/ML: Emotional/Mental Health, DS: Diet Satisfaction

4. CONCLUSION

The study clearly shows that overall QOL was noticeably low in Diabetic patients especially in Women and elderly thus indicating that Diabetes management is not restricted to treatment but also requires attention on QOL of patients.

Limitations: The research was performed in only a single centre and the sample size was small (200). The study was dependent on the answers given by the patients and so there is no complete assurance of the responses of patients to be correct.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

All the patients were thoroughly explained about the study in native language through informed consent form.

ETHICAL APPROVAL

Prior approval from Independent ethics committee was taken.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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