ISSN 2349-7203
IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
HUMAN

Human Journals
Research Article
July 2016 Vol.:6, Issue:4

A Study on Quality of Life Assessment among Patients with Type 2 Diabetes Mellitus in a Tertiary Care Hospital in Southern Kerala

ISSN 2349-7203
IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
HUMAN

Mathew George[1], Prof. Dr. Lincy Joseph[2], Linu V. Koshy[*3]

1) *Department of Pharmacology, Pushpagiri College of Pharmacy, Thiruvalla, Kerala, India.*
2) *Department of Pharmaceutical Chemistry, Pushpagiri College of Pharmacy, Thiruvalla, Kerala, India.*
3) *Pushpagiri College of Pharmacy, Thiruvalla, Kerala, India.*

Submission: 10 July 2016
Accepted: 15 July 2016
Published: 25 July 2016

HUMAN JOURNALS

www.ijppr.humanjournals.com

Keywords: Diabetes mellitus, type 2 diabetic, Quality of life, Southern Kerala

ABSTRACT

The study showed good quality of life among the type 2 diabetic study population. The study showed statistically significant differences in quality of life depending on the body mass index, social economic status, gender, duration of diabetes, subjective problems, social history, fasting blood sugar level and types of medication. Age, co-morbidities, family history showed no statistically significant differences in the quality of life.

INTRODUCTION

Diabetes mellitus (DM) is a heterogeneous group of metabolic disorders characterized by hyperglycemia. It is associated with abnormalities in carbohydrate, fat, and protein metabolism and may result in chronic complications including microvascular, macrovascular, and neuropathic disorders[1].

Diabetes mellitus is one of the major chronic non-communicable diseases that affect millions globally. The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014. The global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014.[2]

Diabetes Epidemic in India

India is facing a twin burden of under-nutrition and over-nutrition: it figures prominently both in the hunger map of the world as well as being the diabetes capital of the world. A country experiencing rapid socioeconomic progress and urbanization, India carries the highest burden of diabetes with escalating prevalence in both urban and rural populations.[3]

India is facing an epidemic of diabetes, with high prevalence in urban areas. Over the past 30 years, the prevalence of diabetes has increased to 12-18% in urban India and 3-6% in rural India with significant regional variations.[3]

The difference in prevalence of diabetes across India could be due to dissimilar levels of urbanization and lifestyle factors such as different diets and varying obesity levels. Significant determinants of diabetes are age, body-mass index (BMI), waist-hip ratio, low physical activity, and family history of diabetes.

The driving forces behind the epidemic are urbanization (30%) and economic development with resultant increase in GDP, sedentary lifestyle, western diet, and fast food diet on a background of genetic susceptibility.[3]

The prevalence of diabetes and prediabetes increases with age, approximately 60% of Indians are having diabetes or prediabetes by the age of 60. While some genes confer increased

susceptibility to diabetes among Indians, other genes that are protective in Europeans do not appear to protect Indians.[3]

Indians develop diabetes at a younger age and those younger than 45 years accounts for 36% of all diabetics in India. Longer duration of diabetes leads to greater complications and this could threaten the national economy.[3]

The latest data (2012) shows a prevalence of diabetes in excess of 25% in most states. The major challenge is to translate current knowledge into prevention programs throughout the community and the country.[3]

Kerala ─ Diabetes Capital of India

Kerala is the diabetes capital of India with a prevalence of diabetes as high as 20% ─ double the national average of 8%. In a large multi-center study involving nearly 20,000 subjects, the prevalence of diabetes in Thiruvananthapuram was 17% compared to 15% in Hyderabad and New Delhi, 4% in Nagpur and 3% in Dibrugarh. Several studies from different parts of Kerala support the high prevalence of diabetes. One study from central Kerala reported a prevalence of diabetes at 20% and prediabetes at 11%. [3]

Another study from southern Kerala, showed a wide urban-rural gradient in age-standardized (30-64 years) prevalence of diabetes indicating an important role of lifestyle factors.

The prevalence was 17% in urban, 10% in the midland, 7% in the highland, and 4% in the coastal regions. Other studies have shown a prevalence of 11-19% in men and 15-22% in women with rural Keralites having paradoxically higher rates of diabetes than urban dwellers. This is in sharp contrast to national data that shows the prevalence of diabetes to be double in urban areas than rural areas.[3]

The high literacy rate in this state does not seem to translate to health literacy. The high prevalence of diabetes is accompanied by poor detection. In one study, 11% were newly diagnosed out of 55% of all diabetics. The control rates of diabetes are even poor, which could lead to an increase in the burden of cardiovascular disease, the foremost killer of people with

diabetes. Among those with diagnosed diabetes, 17% received no treatment, 15% were on diet alone, and 68% were on medications. Only 40% of people with diabetes had adequate control of blood sugar. The fasting blood glucose was 153 mg/dl and the mean glycosylated hemoglobin level (A1C) was 8.1%. A1C level was above the recommended target of 7% in 60% of subjects. Insulin use ranged from 2%-10%.[3]

Only one fifth of the diabetics are treated and adequately controlled. The high prevalence, poor detection and control of diabetes in Kerala with the highest standards of health care and literacy level compared to other states of India makes this disease doubly dangerous necessitating intensive education directed at doctors and the public alike. [3]

Quality of life

Quality of life can be defined as "The state of contentment in a conscious individual due to his or her satisfaction in physiological, psychological, social and spiritual aspects of life".[4]

According to WHO, " Quality of life is defined as individual's perceptions 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''. [5]

Quality of life evaluation has emerged as an important outcome measure for chronic disease management.[5] It is increasingly recognized that in diabetes psychosocial factors have an important impact on self-care, acceptance of therapeutic regimens and treatment success. Metabolic measures like glycemic control are poorly correlated with quality of life necessitating separate assessment. In turn, management models for diabetes that include strategies to identify and enhance patient's health-related quality of life issues have the potential to improve compliance and hence their metabolic status. Quality of life is an individual perception and each particular subset of patients differs in their perception of quality of life influenced by their ethnicity, culture, education, income, etc.[6]

The recognition of the patient important (versus disease-oriented) and patient reported areas of well-being led to the introduction of a technical term: health-related quality of life (HRQL). [6]

As a result of changes in the lifestyle, food habits, and levels of physical activity the prevalence has increased in the past few decades. The fact that treatment of the disease and its associated risk factors are highly complex, a considerable patient education and medical monitoring are required.

Thus, the patients required to regulate the blood sugar level by making required changes in lifestyle factors and the unpleasant medication that usually accompanies the disease in order to maintain a correct degree of metabolic control. The fact that these changes make the patients vulnerable to stress, their quality of life is highly bound to be affected.[7]

The predictors of quality of life of diabetic patients are identified as personal, medical, and lifestyle factors. The study, however, provides a basis obtaining an understanding of the factors associated with quality of life of diabetic patients in the country.[7]

The study was aimed at assessing the factors associated with quality of life among diabetic patients in the country. Particularly, the study seeks to establish how the factors related to diabetic patients in Southern Kerala.

QOLID QUESTIONNAIRE

Most of the existing quality of life questionnaires have been developed in western population, which are socially, culturally and economically different from Indian participants and work from India on the subject is scarce. One such diabetes specific instrument developed and validated in India recently restricts itself to the psychosocial aspect of quality of life. In the absence of a comprehensive and validated diabetes specific quality of life instrument in India, led to the development of a reliable and valid structured questionnaire (QOLID).[5]

QOLID is a reliable, valid and sensitive tool with 8 domains and 34 items for assessment of quality of life of Indian patients with diabetes.[5.]

LITERATURE REVIEW

1) **Ronald Nyanzi *et.al* (2013)** conducted a study on **Diabetes and Quality of Life**: A **Ugandan Perspective**: The predictors of quality of life in the dimensions of role limitation were patient's

age, education level, (P < 0.05). Similar variables were associated with quality of life in the dimension of physical endurance (P < 0.05).

The findings with regards to the influence of these variables can be summarized as follows.

(i) Quality of life was approximately 13% and18% lower for diabetic patients above 59 years of age when compared to those below 50 years in the domains of role limitation and physical endurance, respectively.

(ii) Quality of life was about 16% and 19% higher in the domain of role limitation among patients with secondary and tertiary education, respectively, when compared to those with no education. Likewise, quality of life was about 11% and 16% higher among patients with secondary and those with tertiary education in the domain of physical endurance when compared to those with no education.

(iii) Quality of life of diabetic patients did not vary significantly by gender, status of smoking and alcohol consumption, treatment therapy, and type of diabetes as well as prevalence of hypertension and retinopathy (P > 0.05).

2) **Ana Spasic *et.al* (2014)** conducted a study on **Qol in type2 diabetes patient**. The presence of diabetes mellitus leads to a decrease in life quality in all domains. The aim of the study was to evaluate the quality of life (QoL) in diabetic patients and the factors affecting it in type 2 diabetic mellitus patients.

They conducted a cross-sectional study that included 86 patients with type 2 diabetes mellitus, in the territory of the City of Nis. Health-related QOL of patients was measured using the short form survey (SF-36) that produces an 8-scale health profile.

The average duration of diabetes was 12.76±8.08 years. The best QOL in all areas was observed in patients diagnosed with diabetes less than 10 years ago p<0.05) and younger than 65 years. Male respondents perceived a better QOL compared to women, especially in the vitality and pain domains. The patients with comorbidity (93.64%) had lower QOL score in all domains. There was no significant difference in the QOL of patients with diabetes compared to the level of education. High QOL represents an ultimate goal and an important outcome of all medical interventions in diabetic patients. Factors related to lower QOL included: older age, female

gender, and existence of comorbidities. Uncontrolled diabetic patients had a lower QOL than controlled diabetics.

3) **Harsimran Singh, Clare Bradley (2006)** Conducted a study on **Quality of life in diabetes** as a key outcome of diabetes management and introduces the linguistically validated and culturally adapted, Hindi and Punjabi versions of an individualized questionnaire(the ADDQoL) to assess the impact of diabetes on the QoL of Indian people with diabetes. ADDQoL findings from research in India have helped highlight the negative impact of diabetes on various life domains of Indian people with diabetes, especially their self-confidence , their family life and their freedom to eat as they wish. It is suggested that the targets of diabetes management are more likely to be achieved if the importance of predicting and improving QoL is recognized and monitored alongside biomedical outcomes such as blood glucose levels.

4) **Manjunath K *et.al* (2014)** conducted a study on **Quality of life of a patient with Type 2 diabetes: A cross-sectional study in rural south India**. With a high prevalence of diabetes in India, there is a need to study the impact of this disease on the quality of life (QoL) of the patients. This facility based cross-sectional study assessed the QoL of patients attending the diabetic clinic using the World Health Organization (WHO) QoL BREF instrument in Tamil Nadu. The QoL was analyzed domain-wise and various socio-demographic factors affecting the QoL were studied.

The mean total score of the QoL scale was 58.05 (95% CI, 22.18–93.88). Domain-wise, 63% had good physical, 69% had good psychological, 27% had good social and 85% had good environmental QoL scores. Males, currently married and those with BMI more than 25 had a statistically significantly better QoL compared to their counterparts.

Diabetes does impair the QoL of patients but not to a great extent. There is a need to specifically target and improve the QoL of women, widowed and separated, and non-obese diabetics who are at risk of a poor QoL. QoL assessment should be routinely practiced in diabetic clinics.

AIM

To assess the QoL among patients with type 2 diabetes in a tertiary care hospital.

OBJECTIVES

- To assess the quality of life of patients having type 2 diabetes using QOLID.
- To assess the impact of diabetes on quality of life.
- To find the significant factors affecting quality of life.
- To counsel the patient in improving the quality of life.

METHODOLOGY

Study Design : Cross-sectional study for a period of 6 months

Study Population : Patients diagnosed with type 2 diabetes mellitus

Inclusion Criteria :

- Both male and female patients.
- Patients on age group 35-65years.
- OP patients.
- Duration of diabetes more than one year.

Exclusion Criteria :

- Any other chronic illness which requires the patient to be admitted in the hospital for more than two weeks in the past one year.
- Type 1 Diabetes.
- Gestational Diabetes Mellitus.
- Inability to communicate due to physical or mental disability.
- Patients not willing to participate.
- IP patients.

Study Setting: Pushpagiri Medical college hospital, General Medicine department, Thiruvalla.

Estimated Sample Size of the study: 60

Study period: From March 2016 – August 2016

Source of data: Patient data collection form.
Outpatient case files.
QOLID questionnaire.
Patient counseling session.

BRIEF PROCEDURE OF THE STUDY

The study was a hospital based cross-sectional one and was carried out after getting approval of the Human Ethical Committee of Pushpagiri Medical College Hospital. An informed consent form, approved by the Human Ethical Committee was signed by all patients who wished to participate in the study and in accordance with the inclusion and exclusion criteria this process had followed good clinical practices.

Quality of life assessment among patients with type 2 diabetes was done by using linguistically validated QOLID questionnaire. The questionnaire was translated to the native language of Kerala i.e. Malayalam using procedures developed by the Mapi Research Institute, France and back translated to English to check for consistency and linguistically validated.

All significant information required for the study were collected from the patient data collection form and case records of each individual patient and also from direct patient counseling session with the outpatients focusing on the improvement of QoL, with the support of the physician.

RESULTS

A total of 60 consecutive patients with type 2 Diabetes fulfilling the inclusion criteria were interviewed. The demographic details pertaining to age, gender, marital status, socioeconomic status were collected by using data collection forms. The mean age of the participants were 54.85 and mean duration of illness since diagnosis was 8.4yrs.

Out of this 4 patients (6.7%) had a degree education, and 25 patients (41.7 %) had an upper primary education. The average income of the sample population was Rs. 7000 and a majority of those interviewed (60%) were housewives. Gender distribution: 40 patients (66.7%) were Female and 20 (33.3%) patients were male. In this study, only 6 (10%) patients were widowed or separated from their spouses whereas the remaining 54 (90%) were living with family (nuclear). Regarding comorbidities, all the patients had existing comorbidities of which hypertension was

found in 34 (56%) patients, hyperlipidemia in 21(35%), CAD 4 (7%) neuropathy in 23(38%) retinopathy 14 (23%) and asthma in 1 (2%) of the cases.

Based on the responses to the QOLID questionnaires 34 items were scored. The mean QOLID instrument score, indicating the QoL of the patients, was 63.76%. Keeping the mean as the cut-off, the QoL scores were converted into categorical variables.

Based on the responses to the QOLID questionnaires 34 items were scored under 8 domains such as role limitation due to physical health, physical endurance, general health, treatment satisfaction, symptom botherness, financial worries, mental health and diet satisfaction. The domain wise scores obtained for the 60 patients were role limitation 21.27 mean score (70.9%), physical endurance 19.22 (64.06%), general health 7.9 (52.6%), treatment satisfaction 13.5 (67.5%), symptom botherness 10.7 (71.3%), financial worries 9.05 (45.2%), emotional /mental health 17.17 (68.6), diet satisfaction 9.6 (64%).

ANALYSIS OF DEMOGRAPHIC DATA

Table no.1: Distribution of diabetic patients based on their gender.

Sex	Number of patients	Percentage (%) of patients
Male	20	33.3
Female	40	66.7

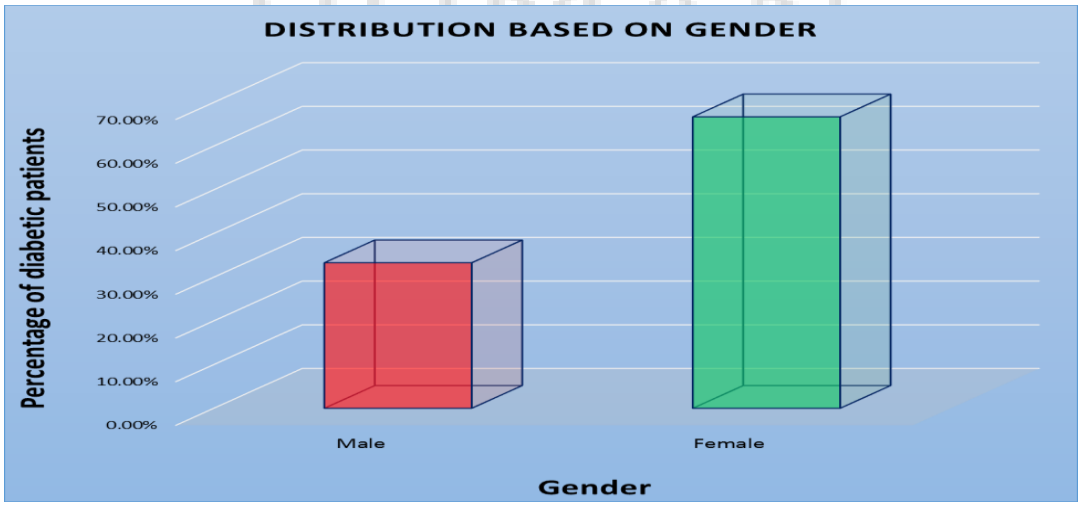


Figure no.1: Distribution of diabetic patients based on their gender.

Table no.2: Distribution of diabetic patients based on their age.

Age (years)	Number of patients	Percentage (%) of patients
35 - 44	6	10.0
45 - 54	19	31.7
55 - 65	35	58.3

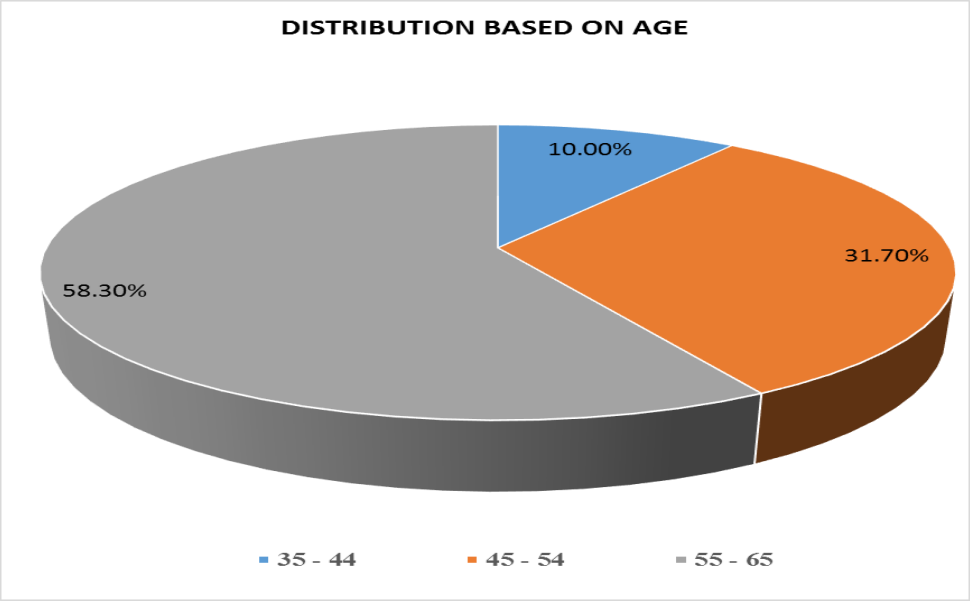


Figure no.2: Distribution of diabetic patients based on their age.

Table no.3: Distribution of diabetic patients based on their BMI.

BMI	Number of patients	Percentage (%) of patients
Under weight	0	0.0
Normal	13	21.7
Overweight	40	66.7
Obese	7	11.7

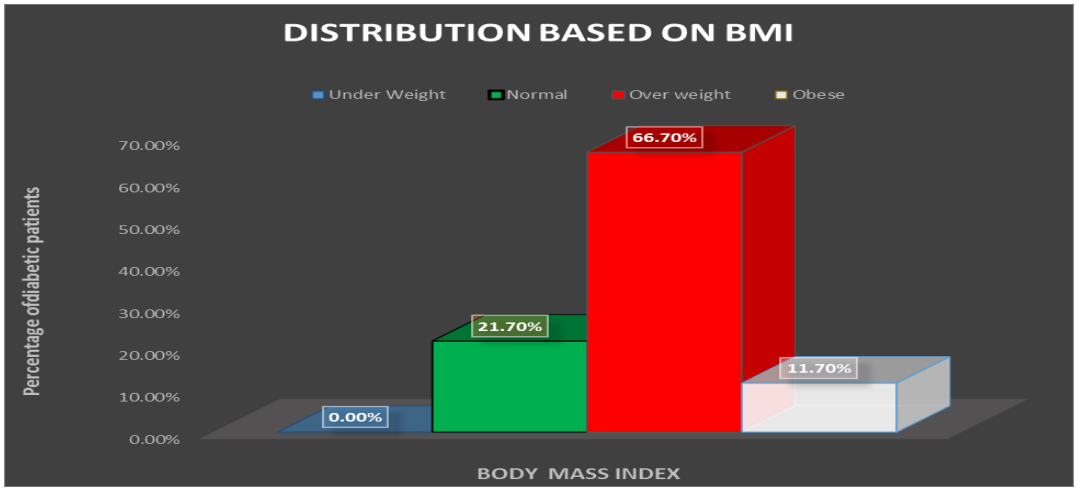


Figure no.3: Distribution of diabetic patients based on their BMI.

Table no.4: Distribution of diabetic patients based on their education.

Education	Number of patients	Percentage (%) of patients
Lower primary	13	21.7
Upper primary	25	41.7
Higher secondary	11	18.3
Diploma	7	11.7
Degree And Above	4	6.7

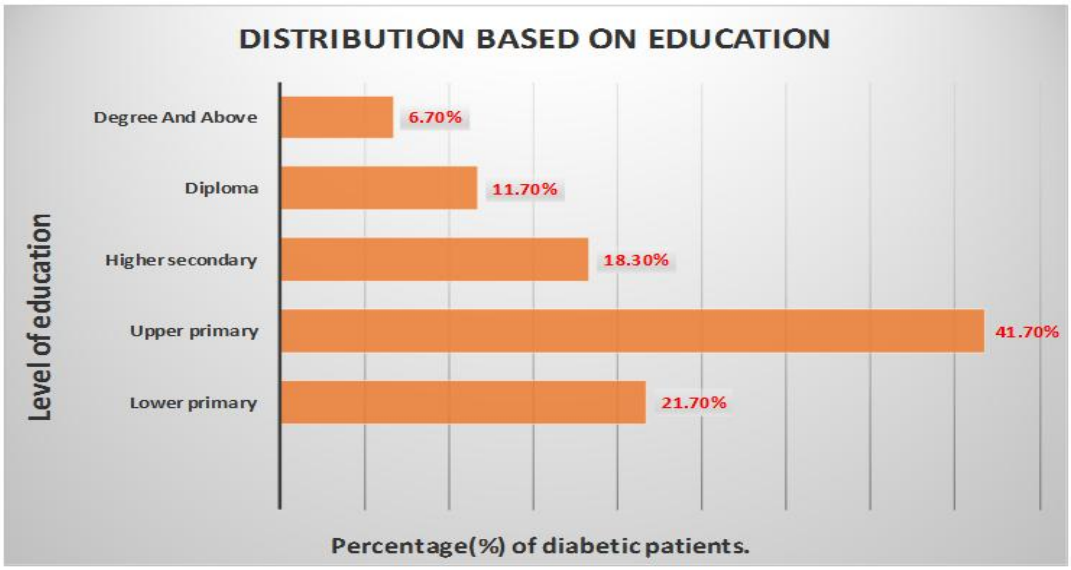


Figure no.4: Distribution of diabetic patients based on their education.

Table no.5: Distribution of diabetic patients based on their socio-economic status.

SES	Number of patients	Percentage (%) of patients
Low level	39	65.0
Average level	16	26.7
High level	5	8.3

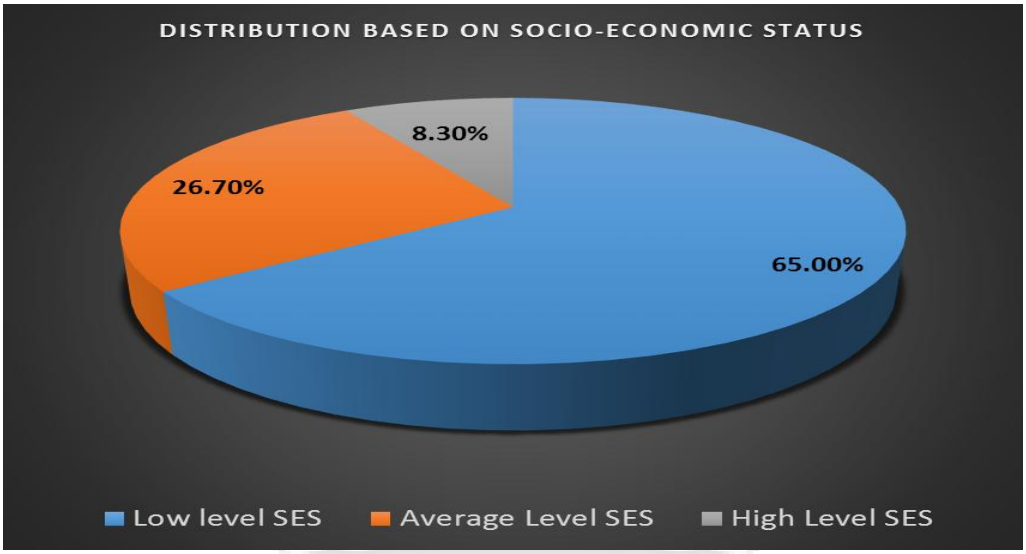


Figure no.5: Distribution of diabetic patients based on their socio-economic status.

Table no.6: Distribution of diabetic patients based on their marital status.

Marital Status	Number of patients	Percentage (%) of patients
Married /widow	6	10.0
Married	54	90.0

Table no.7: Distribution of diabetic patients based on their duration of diabetes.

Duration of diabetics	Number of patients	Percentage (%) of patients
0 to 5 years	18	30.0
5 to 10 years	24	40.0
Above 10 years	18	30.0

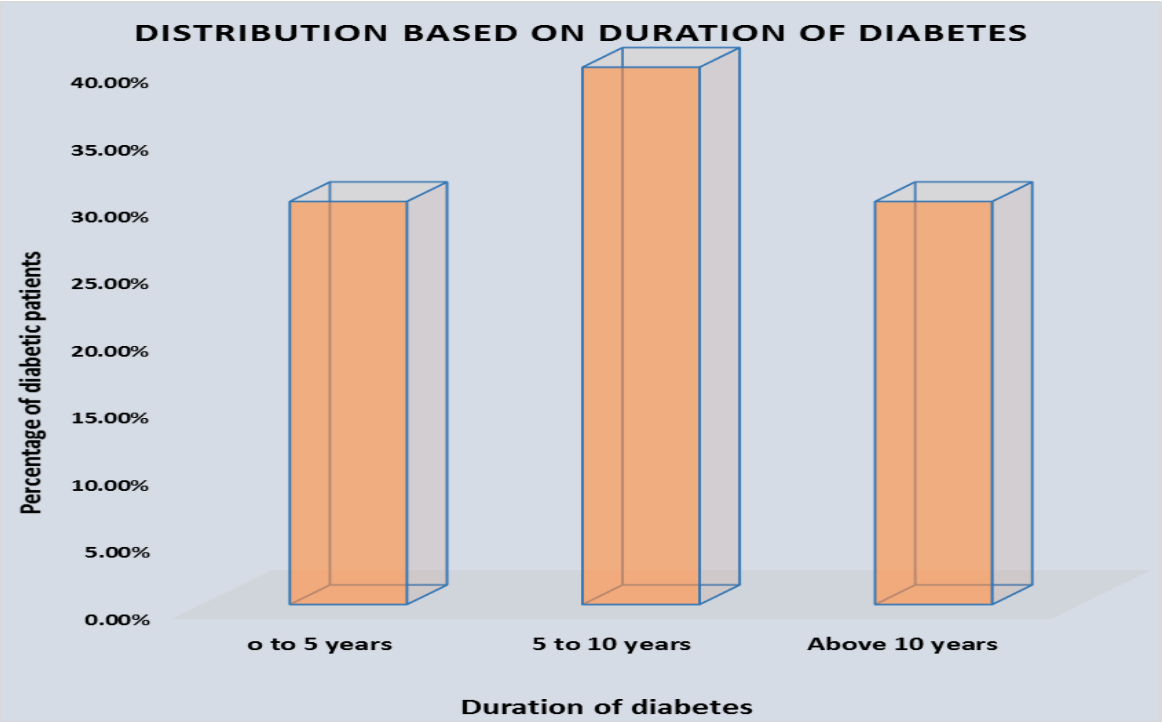


Figure no.6: Distribution of diabetic patients based on their duration of diabetes.

Table no.8: Distribution of diabetic patients based on their Living Status.

Living Status	Number of patients	Percentage (%) of patients
Lonely	2	3.3
With Family	58	96.7

Table no.9: Distribution of diabetic patients based on their co-morbidities, subjective problems, social history and family history.

Co-Morbidities	**Number of patients**	**Percentage (%) of patients**
Co-Morbidities	40	66.7
NIL	20	33.3
Subjective Problems	**Number of patients**	**Percentage (%) of patients**
Subjective Problems	36	60.0
NIL	24	40.0
Social History	**Number of patients**	**Percentage (%) of patients**
Social History	12	20
NIL	48	80.0
Family History	**Number of patients**	**Percentage (%) of patients**
YES	35	58.3
NIL	25	41.7

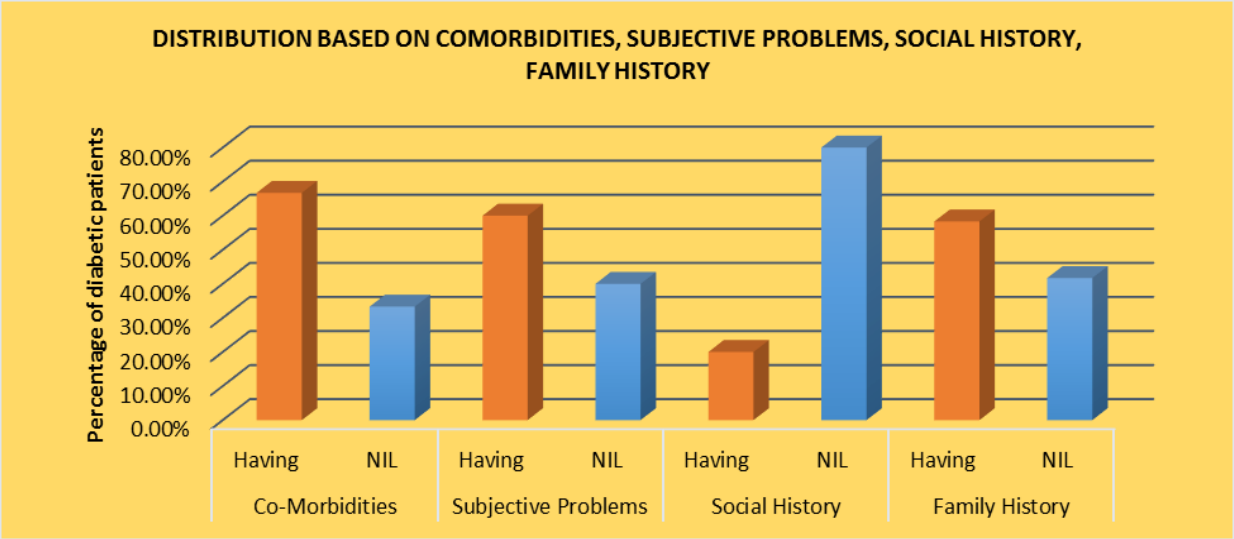


Figure no.7: Distribution of diabetic patients based on their co-morbidities, subjective problems, social history and family history.

Table No.10: Distribution of diabetic patients based on the type of medication

Type of Medication	Number of patients	Percentage (%) of patients
Life Style	3	5.0
OHA	32	53.3
INSULIN	15	25.0
OHA+INSULIN	10	16.7

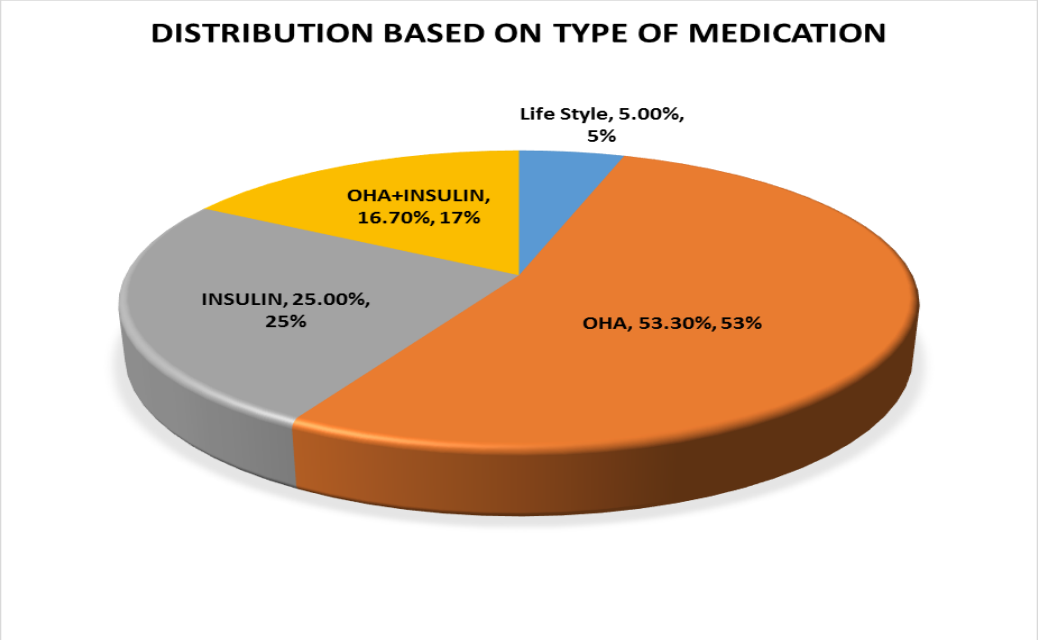


Figure No.8: Distribution of diabetic patients based on the type of medication.

Table No. 11: Descriptive statistics of Fasting Blood sugar of diabetic patients

Statistics	Values
Mean	157.74
Median	141.50
Mode	110.00
Std. Deviation	55.35
Minimum	89.00
Maximum	340.00

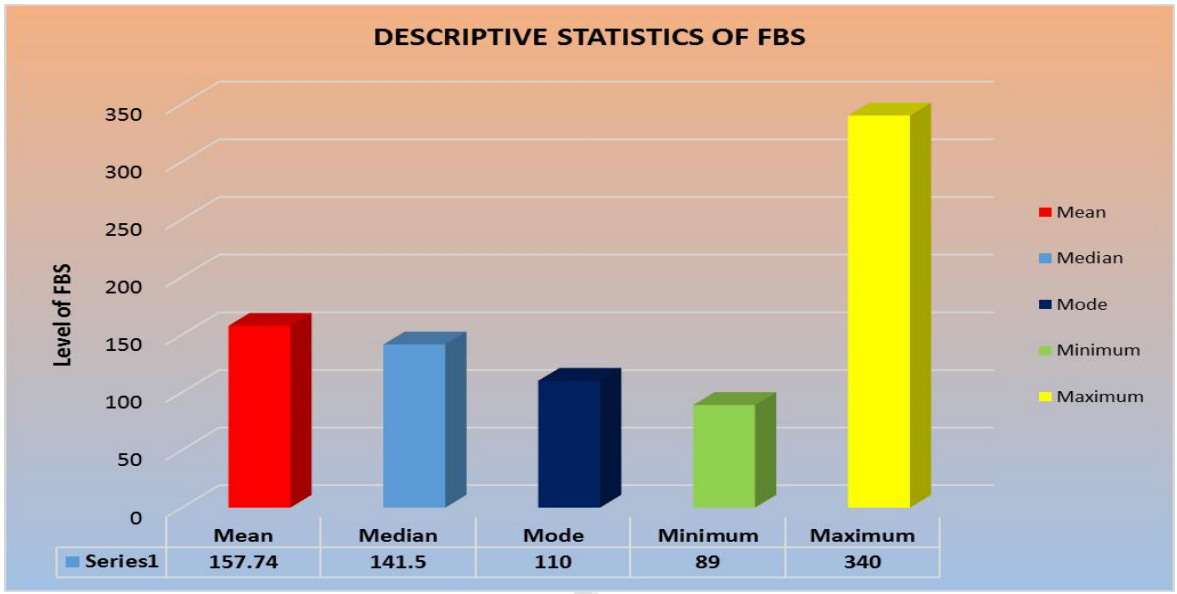


Figure No.9: Descriptive statistics of Fasting Blood sugar of diabetic patients.

Table No: 12 Descriptive statistics of quality of life and its components in diabetic patients.

	Role limitation due to physical health	Physical endurance	General health	Treatment satisfaction	Symptom botherness	Financial worries	Emotional/mental health	Diet satisfaction	TOTAL QUALITY
Mean	21.27	19.22	7.9	13.5	10.7	9.05	17.17	9.60	108.4
Std. Deviation	6.056	6.378	2.7	3.66	3.61	3.544	4.381	2.164	20.74
Minimum	8	7	3	6	3	4	8	5	64
Maximum	30	30	13	20	15	18	25	14	148

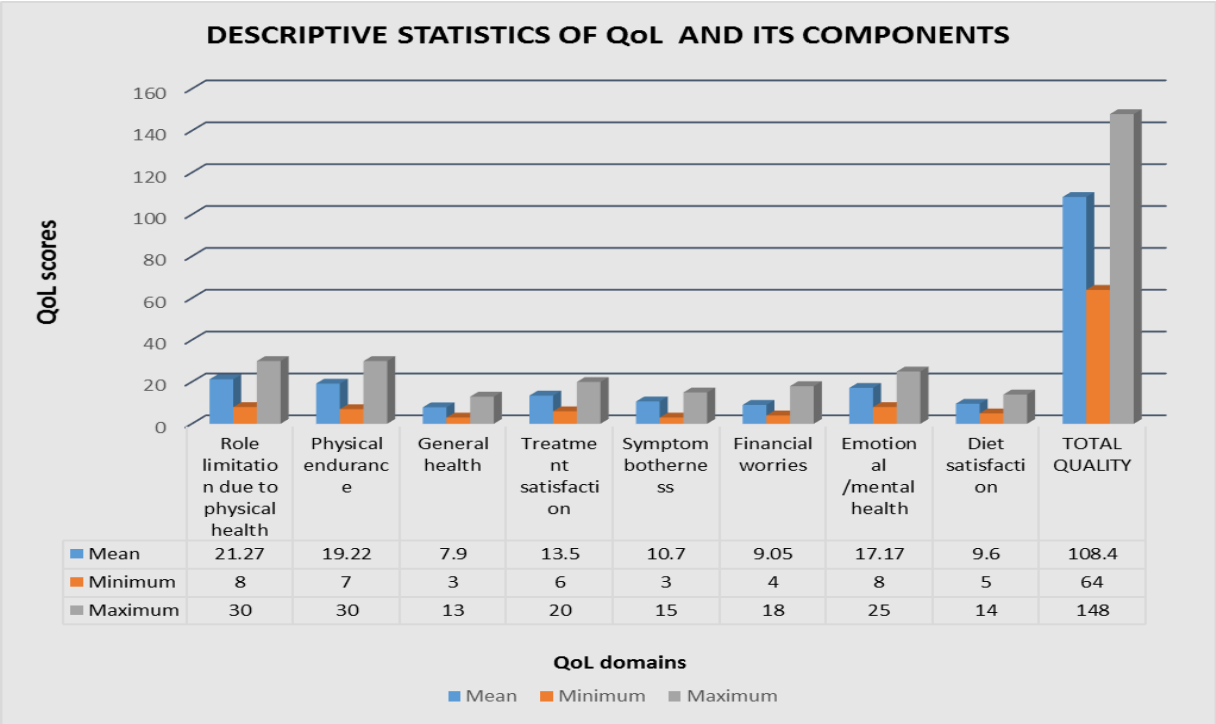


Figure No: 10 Descriptive statistics of quality of life and its components in diabetic patients.

ANALYSIS OF DEMOGRAPHIC DATA WITH QUALITY OF LIFE

1) Age and QoL

Data and result of quality of life and its domains based on the age level, using one way ANOVA.

		Sum of Squares	df	Mean Square	F	P Value
Role limitation due to physical health	Between Groups	155.856	2	77.928	2.212	0.119
	Within Groups	2007.877	57	35.226		
	Total	2163.733	59			
Physical endurance	Between Groups	153.247	2	76.623	1.944	0.153
	Within Groups	2246.936	57	39.420		
	Total	2400.183	59			
General health	Between Groups	29.503	2	14.751	1.986	0.147
	Within Groups	423.347	57	7.427		
	Total	452.850	59			
Treatment satisfaction	Between Groups	71.811	2	35.906	2.846	0.066
	Within Groups	719.189	57	12.617		
	Total	791.000	59			

Symptom botherness	Between Groups	14.419	2	7.209	.542	0.585
	Within Groups	758.181	57	13.301		
	Total	772.600	59			
Financial worries	Between Groups	11.499	2	5.750	.449	0.640
	Within Groups	729.351	57	12.796		
	Total	740.850	59			
Emotional /mental health	Between Groups	103.430	2	51.715	2.865	0.065
	Within Groups	1028.903	57	18.051		
	Total	1132.333	59			
Diet satisfaction	Between Groups	.430	2	.215	.044	0.957
	Within Groups	275.970	57	4.842		
	Total	276.400	59			
TOTAL QUALITY	Between Groups	1416.818	2	708.409	1.684	0.195
	Within Groups	23982.032	57	420.737		
	Total	25398.850	59			

2) BMI and QoL

Data and result of quality of life and its dimension based on the BMI level, using one way ANOVA, LSD method.

Sl.no:	BMI	QoL	Sig.
1	BMI of normal	QoL of normal	0.00
2	BMI of overweight	QoL of overweight	0.00
3	BMI of obese	QoL of obese	0.00

3) SES and QoL

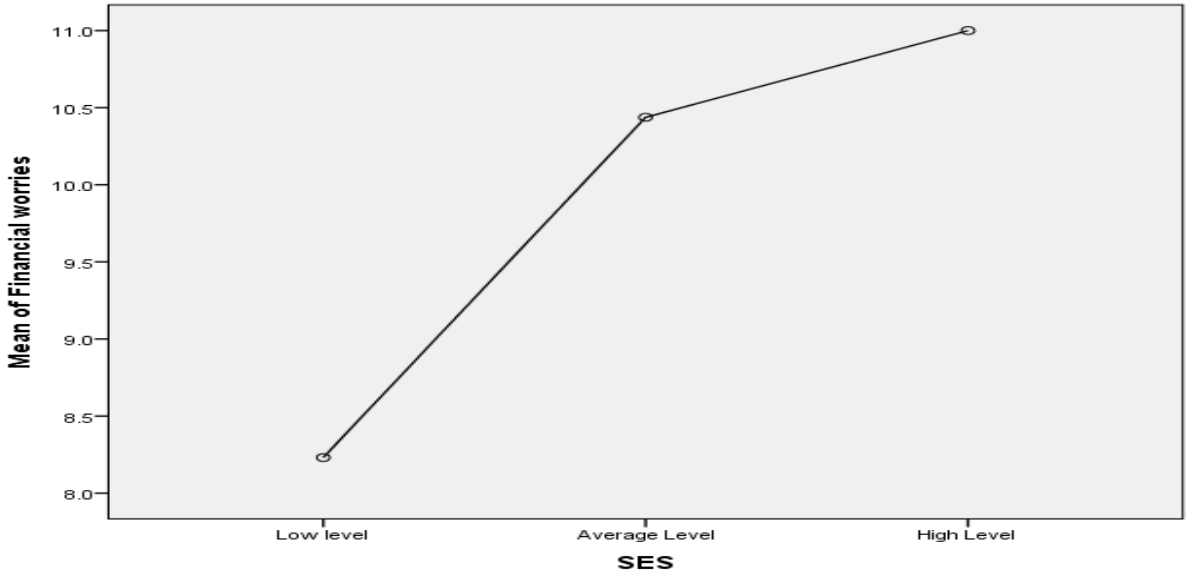
Data and result of quality of life and its dimension based on the SES using one way ANOVA.

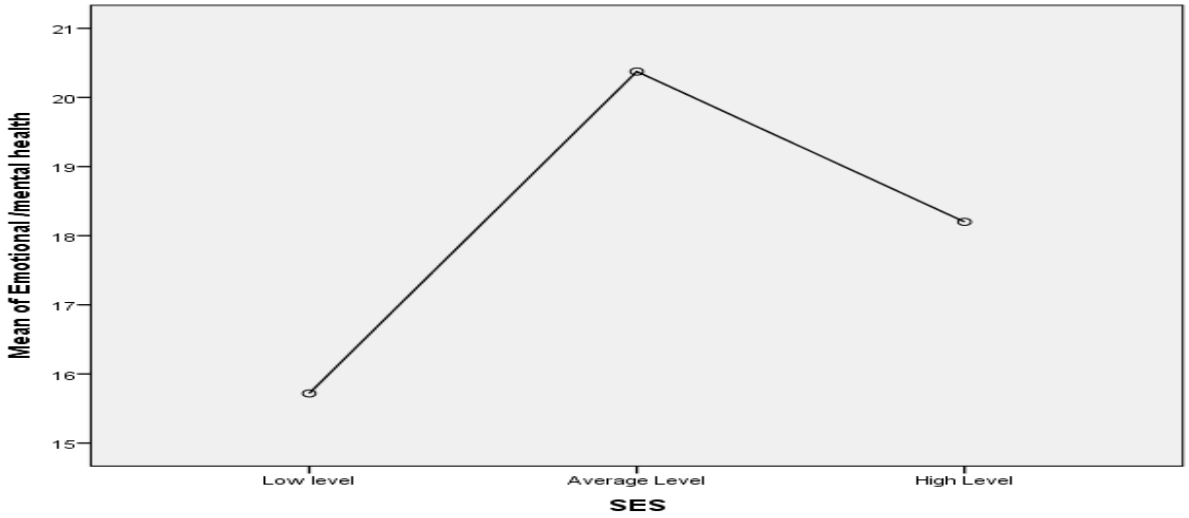
		Sum of Squares	df	Mean Square	F	P Value
Role limitation due to physical health	Between Groups	97.759	2	48.879	1.349	0.268
	Within Groups	2065.974	57	36.245		
	Total	2163.733	59			
Physical endurance	Between Groups	60.844	2	30.422	0.741	0.481
	Within Groups	2339.340	57	41.041		

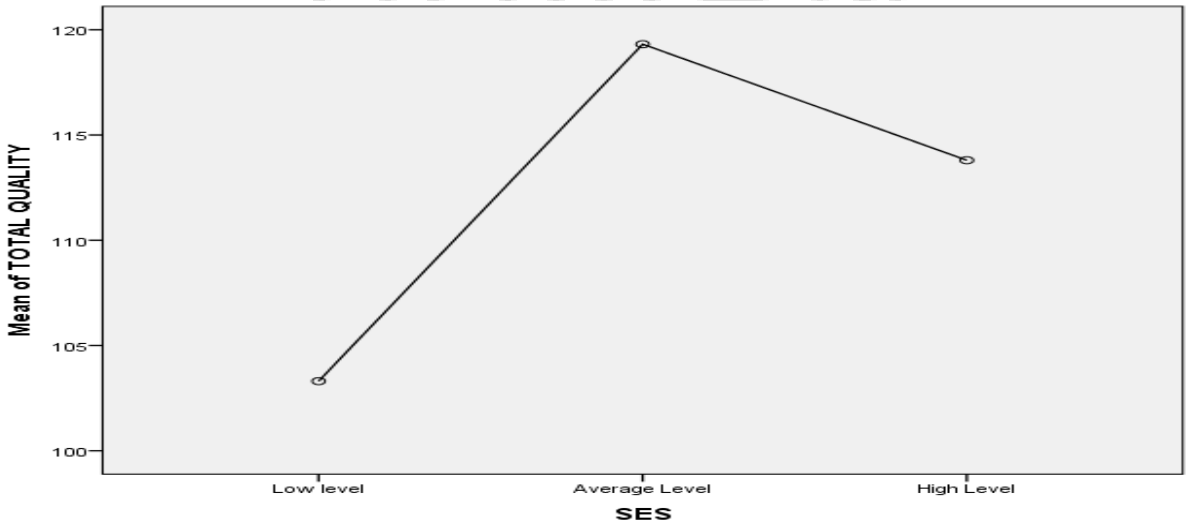
	Total	2400.183	59			
General health	Between Groups	30.060	2	15.030	2.026	0.141
	Within Groups	422.790	57	7.417		
	Total	452.850	59			
Treatment satisfaction	Between Groups	63.827	2	31.913	2.502	0.091
	Within Groups	727.173	57	12.757		
	Total	791.000	59			
Symptom botherness	Between Groups	8.306	2	4.153	0.310	0.735
	Within Groups	764.294	57	13.409		
	Total	772.600	59			
Financial worries	Between Groups	75.989	2	37.995	3.257	0.046
	Within Groups	664.861	57	11.664		
	Total	740.850	59			
Emotional /mental health	Between Groups	251.886	2	125.943	8.154	0.001
	Within Groups	880.447	57	15.446		
	Total	1132.333	59			
Diet satisfaction	Between Groups	8.339	2	4.170	0.887	0.418
	Within Groups	268.061	57	4.703		
	Total	276.400	59			
TOTAL QUALITY	Between Groups	3062.305	2	1531.152	3.907	0.026
	Within Groups	22336.545	57	391.869		
	Total	25398.850	59			

Dependent Variable	(I) SES	(J) SES	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Financial worries	Low level	Average Level	-2.207*	1.014	0.034	-4.24	-0.18
		High Level	-2.769	1.622	0.093	-6.02	0.48
	Average Level	Low level	2.207*	1.014	0.034	0.18	4.24
		High Level	-.563	1.750	0.749	-4.07	2.94
	High Level	Low level	2.769	1.622	0.093	-.48	6.02
		Average Level	.563	1.750	0.749	-2.94	4.07
Emotional /mental health	Low level	Average Level	-4.657*	1.167	0.000	-6.99	-2.32
		High Level	-2.482	1.867	0.189	-6.22	1.26
	Average Level	Low level	4.657*	1.167	0.000	2.32	6.99
		High Level	2.175	2.014	0.285	-1.86	6.21
	High Level	Low level	2.482	1.867	0.189	-1.26	6.22
		Average Level	-2.175	2.014	0.285	-6.21	1.86
TOTAL QUALITY	Low level	Average Level	-16.005*	5.877	0.009	-27.77	-4.24
		High Level	-10.492	9.403	0.269	-29.32	8.34
	Average Level	Low level	16.005*	5.877	0.009	4.24	27.77
		High Level	5.513	10.142	0.589	-14.80	25.82
	High Level	Low level	10.492	9.403	0.269	-8.34	29.32
		Average Level	-5.513	10.142	0.589	-25.82	14.80

*. The mean difference is significant at the 0.05 level.


Mean of Financial worries
11.0
10.5
10.0
9.5
9.0
8.5
8.0
Low level
Average Level
High Level
SES


Mean of Emotional /mental health
21
20
19
18
17
16
15
Low level
Average Level
High Level
SES


Mean of TOTAL QUALITY
120
115
110
105
100
Low level
Average Level
High Level
SES

4) Sex and QoL

Data and result of quality of life and its domains based on the gender, using t test.

	Sex	N	Mean	Std. Deviation	t	P value
Role limitation due to physical health	Male	20	24.20	5.944	2.80*	0.007
	Female	40	19.80	5.626		
Physical endurance	Male	20	22.00	7.041	2.49*	0.016
	Female	40	17.83	5.606		
General health	Male	20	8.85	3.117	1.81	0.075
	Female	40	7.50	2.501		
Treatment satisfaction	Male	20	15.35	2.943	2.94*	0.005
	Female	40	12.58	3.665		
Symptom botherness	Male	20	11.50	3.154	1.21	0.229
	Female	40	10.30	3.804		
Financial worries	Male	20	9.45	3.332	0.61	0.541
	Female	40	8.85	3.669		
Emotional /mental health	Male	20	19.05	4.186	2.45*	0.017
	Female	40	16.23	4.215		
Diet satisfaction	Male	20	9.35	2.277	0.62	0.532
	Female	40	9.73	2.124		
TOTAL QUALITY	Male	20	119.75	20.238	3.21*	0.002
	Female	40	102.80	18.802		

* Significant at 0.05 level

5) Marital status and QoL

Data and result of quality of life and its domains based on the marital status, using one t test.

	Marital status	N	Mean	Std. Deviation	T	P value
Role limitation due to physical health	Married /widow	6	20.50	9.333	0.324	0.747
	Married	54	21.35	5.704		
Physical endurance	Married /widow	6	16.67	7.033	1.03	0.306
	Married	54	19.50	6.309		
General health	Married /widow	6	7.17	3.061	0.727	0.470
	Married	54	8.04	2.754		
Treatment satisfaction	Married /widow	6	10.83	3.920	1.92	0.059
	Married	54	13.80	3.547		
Symptom botherness	Married /widow	6	7.67	3.670	2.23*	0.029
	Married	54	11.04	3.486		
Financial worries	Married /widow	6	7.83	2.229	0.88	0.380
	Married	54	9.19	3.650		
Emotional /mental health	Married /widow	6	14.83	5.193	1.38	0.171
	Married	54	17.43	4.259		
Diet satisfaction	Married /widow	6	8.33	2.160	1.52	0.132
	Married	54	9.74	2.138		
TOTAL QUALITY	Married /widow	6	93.83	23.147	1.85	0.068
	Married	54	110.0	20.045		

* Significant at 0.05 level

6) Duration of diabetes and QoL

Data and result of significant difference in the quality of life and its domains based on the duration of diabetes, using one way ANOVA.

		Sum of Squares	df	Mean Square	F	P Value
Role limitation due to physical health	Between Groups	152.497	2	76.249	2.161	0.125
	Within Groups	2011.236	57	35.285		
	Total	2163.733	59			
Physical endurance	Between Groups	49.906	2	24.953	0.605	0.549
	Within Groups	2350.278	57	41.233		
	Total	2400.183	59			
General health	Between Groups	39.239	2	19.619	2.704	0.076
	Within Groups	413.611	57	7.256		
	Total	452.850	59			
Treatment satisfaction	Between Groups	0.389	2	0.194	0.014	0.986
	Within Groups	790.611	57	13.870		
	Total	791.000	59			
Symptom botherness	Between Groups	13.031	2	6.515	0.489	0.616
	Within Groups	759.569	57	13.326		
	Total	772.600	59			
Financial worries	Between Groups	28.961	2	14.481	1.159	0.321
	Within Groups	711.889	57	12.489		
	Total	740.850	59			
Emotional /mental health	Between Groups	110.319	2	55.160	3.076	0.054
	Within Groups	1022.014	57	17.930		
	Total	1132.333	59			
Diet satisfaction	Between Groups	12.456	2	6.228	1.345	0.269
	Within Groups	263.944	57	4.631		
	Total	276.400	59			
TOTAL QUALITY	Between Groups	1744.447	2	872.224	2.102	0.132
	Within Groups	23654.403	57	414.990		
	Total	25398.850	59			

7) Co-morbidities and QoL

Data and result of quality of life and its domains based on the type of co-morbidities, using one t test.

	Type of Comorbidities	N	Mean	Std. Deviation	t	P value
Role limitation due to physical health	Nil	20	22.10	7.290	0.751	0.456
	Having	40	20.85	5.390		
Physical endurance	Nil	20	20.40	6.419	1.01	0.314
	Having	40	18.63	6.356		
General health	Nil	20	7.80	2.895	0.294	0.770
	Having	40	8.03	2.741		
Treatment satisfaction	Nil	20	13.65	3.990	0.223	0.825
	Having	40	13.43	3.537		
Symptom botherness	Nil	20	10.75	3.447	0.075	0.940
	Having	40	10.68	3.744		
Financial worries	Nil	20	9.15	4.320	0.153	0.879
	Having	40	9.00	3.146		
Emotional /mental health	Nil	20	17.90	5.025	0.916	0.364
	Having	40	16.80	4.040		
Diet satisfaction	Nil	20	9.75	2.489	0.377	0.708
	Having	40	9.53	2.013		
TOTAL QUALITY	Nil	20	111.5	20.462	0.803	0.425
	Having	40	106.9	20.979		

* Significant at 0.05 level

8) Subjective problems and QoL

Data and result of quality of life and its domains based on the subjective of problem, using one t test.

	Type of Comorbidities	N	Mean	Std. Deviation	t	P value
Role limitation due to physical health	Nil	24	23.00	5.649	1.84	0.070
	Having	36	20.11	6.117		
Physical endurance	Nil	24	21.63	5.962	2.49*	0.016
	Having	36	17.61	6.212		
General health	Nil	24	8.63	2.700	1.56	0.124
	Having	36	7.50	2.762		
Treatment satisfaction	Nil	24	14.92	3.599	2.56*	0.013
	Having	36	12.56	3.435		
Symptom botherness	Nil	24	11.83	3.409	2.03*	0.047
	Having	36	9.94	3.601		
Financial worries	Nil	24	10.21	3.375	2.12*	0.038
	Having	36	8.28	3.486		
Emotional /mental health	Nil	24	18.46	3.683	1.90	0.062
	Having	36	16.31	4.640		
Diet satisfaction	Nil	24	9.67	2.353	0.193	0.847
	Having	36	9.56	2.063		
TOTAL QUALITY	Nil	24	118.3	16.470	3.24*	0.002
	Having	36	101.8	20.875		

* Significant at 0.05 level

9) Social history and QoL

Data and result of quality of life and its domains based on the social history, using one t test.

	Type of Social History	N	Mean	Std. Deviation	t	P value
Role limitation due to physical health	Nil	48	20.58	5.999	1.78	0.080
	Having	12	24.00	5.721		
Physical endurance	Nil	48	18.60	6.381	1.50	0.138
	Having	12	21.67	6.005		
General health	Nil	48	7.73	2.607	1.24	0.220
	Having	12	8.83	3.326		
Treatment satisfaction	Nil	48	13.08	3.735	1.79	0.078
	Having	12	15.17	2.918		
Symptom botherness	Nil	48	10.46	3.707	1.03	0.305
	Having	12	11.67	3.200		
Financial worries	Nil	48	9.23	3.514	.781	0.438
	Having	12	8.33	3.725		
Emotional /mental health	Nil	48	16.71	4.272	1.64	0.106
	Having	12	19.00	4.513		
Diet satisfaction	Nil	48	9.50	2.203	.713	0.479
	Having	12	10.00	2.045		
TOTAL QUALITY	Nil	48	105.9	21.092	1.95	0.056
	Having	12	118.6	16.306		

10) Family history and QoL

Data and result of quality of life and its domains based on the family history, using one t test.

	Type of family History	N	Mean	Std. Deviation	t	P value
Role limitation due to physical health	Nil	25	20.80	6.311	0.501	0.618
	Having	35	21.60	5.937		
Physical endurance	Nil	25	19.40	6.384	0.187	0.853
	Having	35	19.09	6.464		
General health	Nil	25	8.24	3.099	0.682	0.498
	Having	35	7.74	2.536		
Treatment satisfaction	Nil	25	13.36	4.405	0.248	0.805
	Having	35	13.60	3.089		
Symptom botherness	Nil	25	11.44	3.042	1.34	0.183
	Having	35	10.17	3.937		
Financial worries	Nil	25	9.28	3.311	0.42	0.675
	Having	35	8.89	3.740		
Emotional /mental health	Nil	25	17.28	5.029	0.168	0.867
	Having	35	17.09	3.929		
Diet satisfaction	Nil	25	9.28	2.170	0.967	0.337
	Having	35	9.83	2.162		
TOTAL QUALITY	Nil	25	109.0	23.645	0.197	0.844
	Having	35	108.0	18.759		

11) FBS and QoL

Data and result of quality of life and its domains based on FBS, using one way ANOVA.

		Sum of Squares	df	Mean Square	F	P Value
Role limitation due to physical health	Between Groups	90.146	2	45.073	1.239	0.297
	Within Groups	2073.587	57	36.379		
	Total	2163.733	59			
Physical	Between Groups	34.346	2	17.173	0.414	0.663

endurance	Within Groups	2365.838	57	41.506		
	Total	2400.183	59			
General health	Between Groups	12.125	2	6.062	0.784	0.461
	Within Groups	440.725	57	7.732		
	Total	452.850	59			
Treatment satisfaction	Between Groups	67.400	2	33.700	2.655	0.079
	Within Groups	723.600	57	12.695		
	Total	791.000	59			
Symptom botherness	Between Groups	97.513	2	48.756	4.117	0.021
	Within Groups	675.088	57	11.844		
	Total	772.600	59			
Financial worries	Between Groups	3.725	2	1.863	0.144	0.866
	Within Groups	737.125	57	12.932		
	Total	740.850	59			
Emotional /mental health	Between Groups	41.621	2	20.810	1.088	0.344
	Within Groups	1090.712	57	19.135		
	Total	1132.333	59			
Diet satisfaction	Between Groups	1.925	2	0.962	0.200	0.819
	Within Groups	274.475	57	4.815		
	Total	276.400	59			
TOTAL QUALITY	Between Groups	1417.250	2	708.625	1.684	0.195
	Within Groups	23981.600	57	420.730		
	Total	25398.850	59			

12) Type of medication and QoL

Data and result of quality of life and its domains based on the type of medication, using one way ANOVA.

		Sum of Squares	df	Mean Square	F	P Value
Role limitation due to physical health	Between Groups	339.231	3	113.077	3.471*	0.022
	Within Groups	1824.502	56	32.580		
	Total	2163.733	59			
Physical endurance	Between Groups	228.308	3	76.103	1.962	0.130
	Within Groups	2171.875	56	38.783		
	Total	2400.183	59			
General health	Between Groups	56.550	3	18.850	2.664	0.057
	Within Groups	396.300	56	7.077		
	Total	452.850	59			
Treatment satisfaction	Between Groups	3.992	3	1.331	0.095	0.963
	Within Groups	787.008	56	14.054		
	Total	791.000	59			
Symptom botherness	Between Groups	24.867	3	8.289	0.621	0.604
	Within Groups	747.733	56	13.352		
	Total	772.600	59			
Financial worries	Between Groups	53.548	3	17.849	1.454	0.237
	Within Groups	687.302	56	12.273		
	Total	740.850	59			
Emotional /mental health	Between Groups	178.598	3	59.533	3.496*	0.021
	Within Groups	953.735	56	17.031		
	Total	1132.333	59			
Diet satisfaction	Between Groups	3.558	3	1.186	0.243	0.866
	Within Groups	272.842	56	4.872		
	Total	276.400	59			
TOTAL QUALITY	Between Groups	3423.898	3	1141.299	2.908*	0.042
	Within Groups	21974.952	56	392.410		
	Total	25398.850	59			

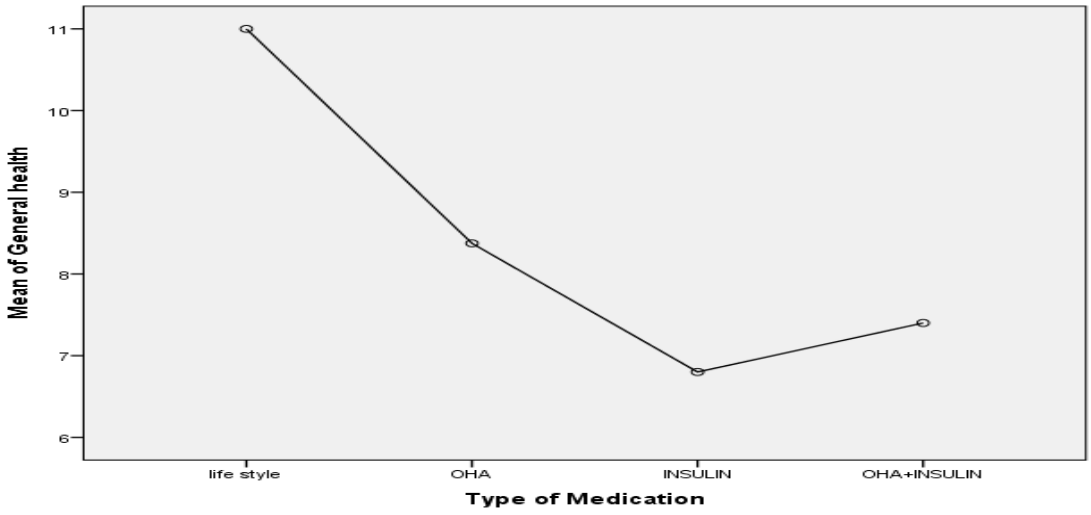
*Significant difference in the components of QoL and total QoL, in order to find out the difference among the type of medication Scheffe post hoc test is used.

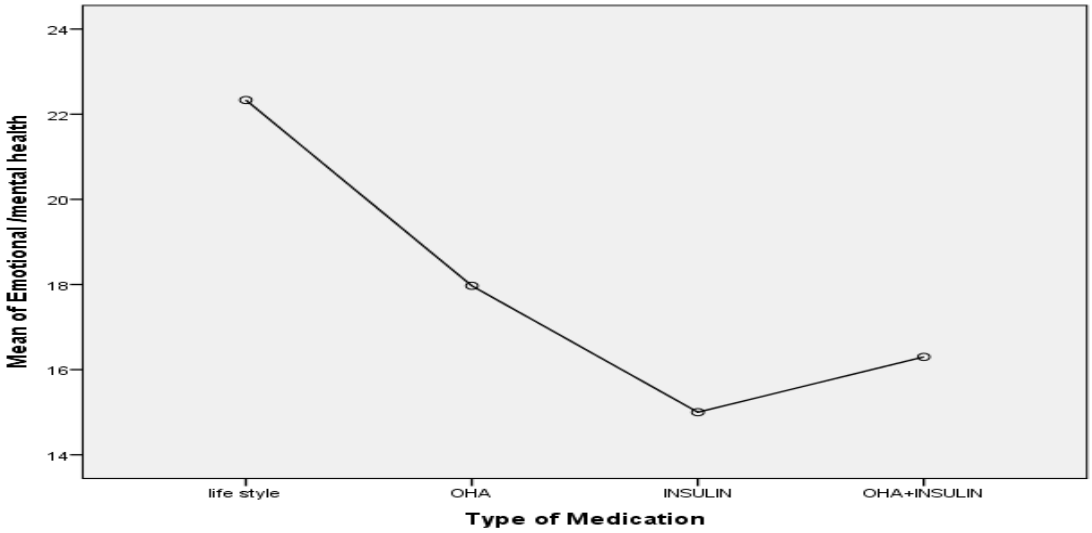
Role limitation due to physical health			
Scheffe[a,b]			
Type of Medication	N	Subset for alpha = 0.05	
		1	2
INSULIN	15	18.27	
OHA	32	21.47	21.47
OHA+INSULIN	10	22.80	22.80
lifestyle	3		29.00

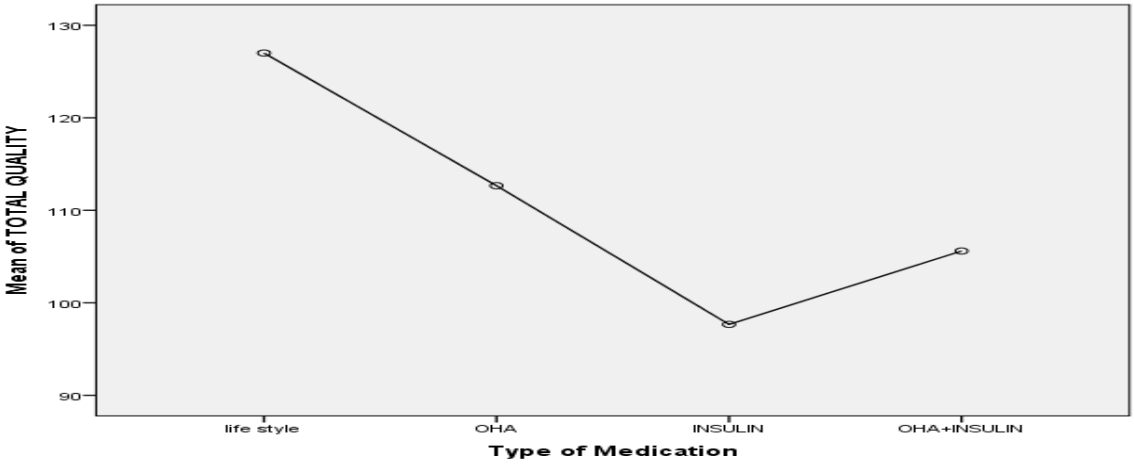
General health			
Scheffe[a,b]			
Type of Medication	N	Subset for alpha = 0.05	
		1	2
INSULIN	15	6.80	
OHA+INSULIN	10	7.40	7.40
OHA	32	8.38	8.38
lifestyle	3		11.00

Emotional /mental health			
Scheffe[a,b]			
Type of Medication	N	Subset for alpha = 0.05	
		1	2
INSULIN	15	15.00	
OHA+INSULIN	10	16.30	16.30
OHA	32	17.97	17.97
lifestyle	3		22.33

Total Quality		
Scheffe[a,b]		
Type of Medication	N	Subset for alpha = 0.05
		1
INSULIN	15	97.67
OHA+INSULIN	10	105.60
OHA	32	112.66
lifestyle	3	127.00

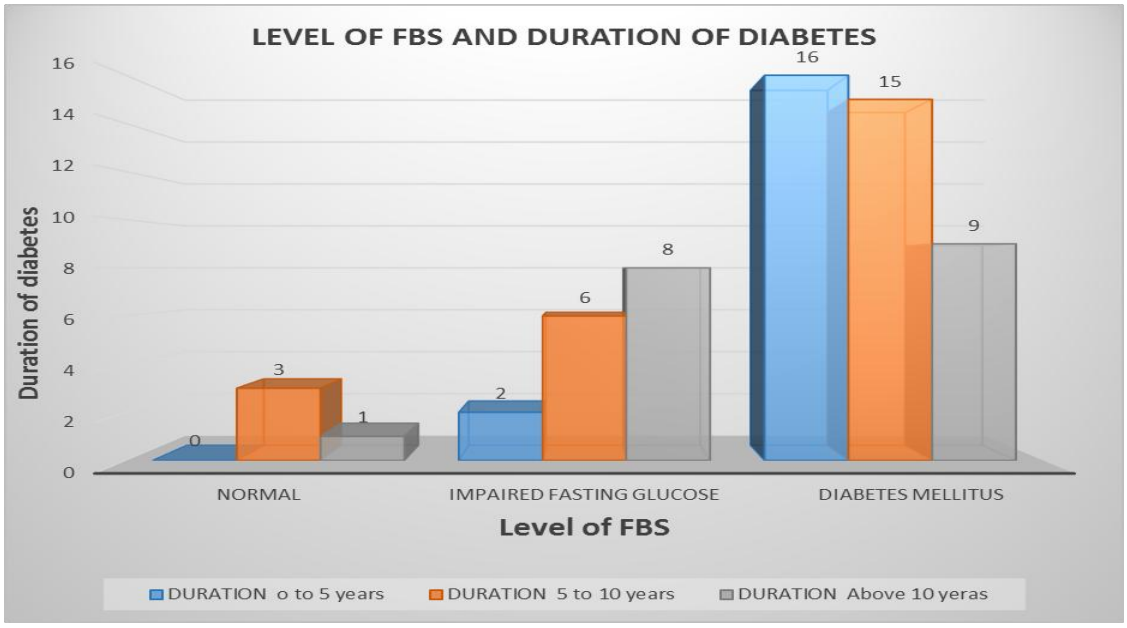






Cross tabulation of level of FBS with frequency of duration.

Level of FBS	Frequency of Duration			Total	X^2	P value
	0 to 5 years	5 to 10 years	Above10 years			
Normal	0	3	1	4	9.39	0.052
Impaired fasting glucose	2	6	8	16		
Diabetes mellitus	16	15	9	40		
Total	18	24	18	60		



DISCUSSION

In this study, age of the diabetes patients were not found as a significant factor in the quality of life.

BMI of diabetes patients were found to be significant factor in quality of life. In the study most of the patients were overweight. The quality of life of diabetes patients can be improved by reducing their weight by exercising.

In the study socio-economic status (SES) shows significance between groups in the total quality of life and in the following domains: symptom botherness, emotional or mental health. SES also shows significance between the low level SES and average level SES groups in total quality of life and the following domains like financial worries and emotional or mental health. There is a need for improving the quality of life of patients with low and average level socio-economic status. This can be done by decreasing the financial burden for diabetes care.

It was found out from the study that males show significance in the total quality of life as well as in the following domains like: Role limitation, Physical endurance, Treatment satisfaction, emotional/ mental health. There is a need to improve the quality of life of women.

The widowed population had significance between the groups in the quality of life domain emotional or mental health. It was seen from the study symptom botherness affects the quality of life.

The duration of diabetes is having significance between the groups in emotional/ mental health domain of quality of life.

The types of comorbidities were found to be statistically insignificant.

Those who are having no subjective problems shows significance in the total quality of life and following quality of life domains: Physical endurance, Treatment satisfaction, Symptom botherness, Financial worries.

Those who are not involved in social habits like drinking alcohol and smoking tobacco shows significance in total quality of life.

Family history is not a significant factor in the quality of life study.

The quality of life domain symptom botherness is significant between groups (i.e. normal, impaired fasting glucose level, diabetes mellitus) of fasting blood sugar level. There is an association found between the level of FBS and frequency of duration of diabetes.

In the study, types of medication have significance in total quality of life within the groups and also significant between the groups in the QoL domains like: role limitation, general health, emotional/ mental health. There is a need for improving the quality of life of patients using insulin.

CONCLUSION

Diabetes is a non-curable disease but can be controlled if effective steps were taken at right time thus preventing its progression and hence improves the quality of life. It is essential to assess the impact of diabetes on quality of life for improving diabetic care. High quality of life represents the ultimate goal and an important outcome of all medical interventions in diabetic patients.

The study showed good quality of life among the type2 diabetic study population.

The study showed statistically significant differences in quality of life depending on the body mass index, social economic status, gender, duration of diabetes, subjective problems, social history, fasting blood sugar level and types of medication.

Age, co-morbidities, family history showed no statistically significant differences in the quality of life.

The study concludes by giving emphasis on the fact that, quality of life assessment should be made into practice in clinics for improving diabetes care.

ACKNOWLEDGEMENT

It is a pleasant task to express my heartfelt thanks to an army of people who has contributed in many ways to ensure the success of this study and make it an unforgettable experience for me.

At the onset, I thank **Almighty GOD** whose grace and countless blessings have been with me at each step of my project work.

I extend my sincere gratitude and immense respect to my esteemed **Guide, Prof. Dr. Mathew George**, who is also the **Principal** of our institution, for his vision, patience, guidance,

motivation, encouragement, tireless support and commendable spirit during the progress of my thesis work.

I also express my sincere gratitude and immense respect to my esteemed **Co-Guide, Prof. Dr.P. Visvanathan, MD, DM, Department of General Medicine, Pushpagiri Medical College Hospital, Thiruvalla.** His guidance has helped me at all the times of my thesis work. I couldn't have imagined having a better advisor and mentor for my thesis work.

I sincerely extend my heartfelt gratitude to our PG in-charge **Prof. Dr. Lincy Joseph, Department of Pharmaceutical Chemistry** for the guidance, encouragement and kind support throughout our course.

I also thank our **Director Rev.Fr. Mathew Vadakkekuttu,** for his prayers and inspiration throughout our course.

I would like to express our sincere thanks to **Mrs.Emily James and Mrs. Rani Manju,** Assistant Professors of the Department of Pharmacy Practice for their insightful ideas and valuable help during the project.

I thank our entire **teaching faculty**, **all the Office staff, Non-teaching faculty and librarians** for their generous help and cooperation throughout our course.

I thank the entire **staff of Pushpagiri Medical College Hospital** especially **the Medical Records Department** for their sincere cooperation and guidance throughout our Thesis work.

I gratefully acknowledge our **juniors** for the facilities and help that I have received from them.

I thank my batchmates **Beril Sweety Mathews, Priya Joseph, Reethu P Mammen, Sangeeth Johns** for keeping harmony and providing me with a stimulating and fun filled environment throughout our course.

Last but not the least; I would like to pay high regards to My Parents, Brothers and Sisters for their love, prayer and constant support.

My thesis is a reflection of the network of supporters and the passionate crusaders mentioned above and **even those who could not come in mention due to our unintentional negligence**.

It's our privilege that so many have come forward and worked with us to accomplish this venture.

With warm regards,

Linu V.Koshy

REFERENCES

1) DiPiro J. Pharmacotherapy : a pathophysiologic approach. New York; Madrid: McGraw-Hill Education. 9ed. 2014; 2294.
2) Mathers C Loncar D. Projections of Global Mortality and Burden of Disease from 2002 to 2030. PLoS Med. 2006; 3(11):e442.
3) Diabetes Epidemic in Indians Cadi [Internet]. Cadiresearch.org. Available from: http://www.cadiresearch.org/topic/diabetes-indians.
4) Sithara S. P. Validation of the diabetic foot ulcer scale short form (DFS-SF) and the measurement of health related quality of life (HRQL) among patients with type 2 diabetes in southern Kerala. Available from: http://dspace.sctimst.ac.in/jspui/bitstream/123456789/2133/1/MPH_6150.pdf.
5) PubMed Nagpal J *et.al*. The development of 'Quality of Life Instrument for Indian Diabetes patients (QOLID): a validation and reliability study in middle and higher income. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21117348.
6) Strom B. Pharmacoepidemiology. 4ed.2005; 653-4.
7) Nyanzi R, Wamala R, Atuhaire L. Diabetes and Quality of Life: A Ugandan Perspective. Journal of Diabetes Research. 2014; 2014:1-9.
8) Singh H, Bradley C. Quality of life in diabetes. International Journal of Diabetes in Developing Countries. 2006; 26(1): 7.
9) Spasic A, Radovanovic R, Dordevic A, Stefanovic N *et.al*. Quality of Life in Type 2 Diabetic Patients. Acta Facultatis Medicae Naissensis. 2014; 31(3).
10) Manjunath K, Christopher P, Gopichandran V.*et.al*. Quality of life of patient with type 2 diabetes: A cross-sectional study in Rural South India. J. Fam. Med. Primary Care. 2014; 3(4):397.

ABBREVIATION

ADDQoL : Audit of Diabetes Dependent Quality of Life

ANOVA : Analysis of Variance

BMI : Body Mass Index

CAD : Coronary Artery Disease

CVD : Cardio Vascular Disorder

GDP : Gross Domestic Product

LSD : Least Significant Difference

OHA : Oral Hypoglycemic Agents

QoL : Quality of Life

QOLID : Quality of Life Instrument for Indian Diabetes Patients

SF-36 : Short Form- 36

WHO : World Health Organization

WHOQOL-BREF: An abbreviated version of the WHOQOL-100