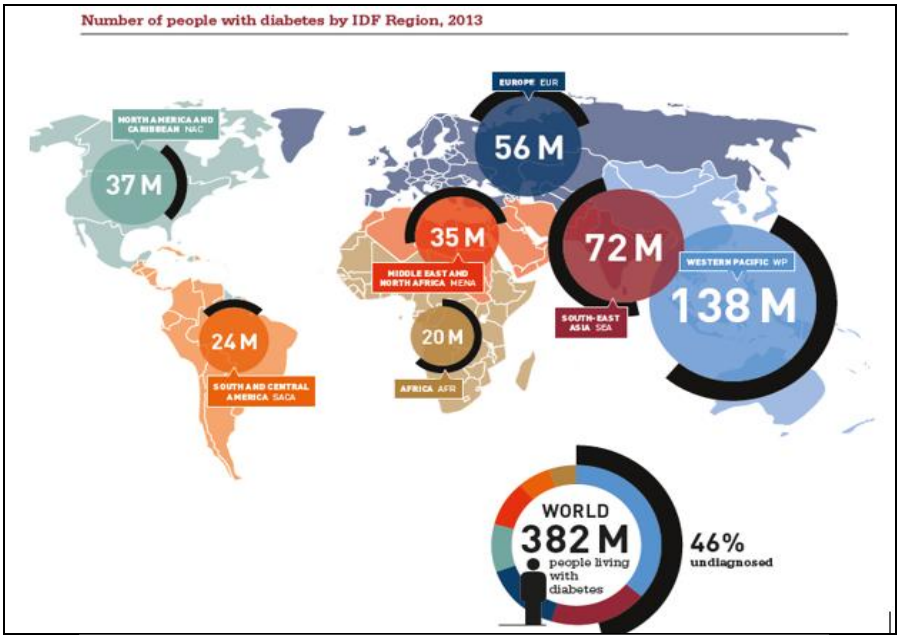
INTRODUCTION

Diabetes is one of the most common non communicable disease (NCD). It is the fourth leading cause of death in the high income countries and there is substantial evidence, that there may be an epidemic in economically developing and newly industrialized countries. Diabetes is undoubtedly the most challenging health problem of the 21st century. (1)

An astounding 382 million people are estimated to have diabetes, with dramatic increase seen in countries all over the world. Socially and economically disadvantaged people in every country carry the greatest burden of diabetes. The new estimate shows an increasing trend in younger and younger people developing diabetes, which is worrisome for future generations. (2)

In 2015, India had around 69.1 million people with Type 2 Diabetes, which is predicted to reach about 100 million in 2030 as estimated by the International Diabetes Federation (IDF), Belgium.(3) (Fig. 1)



Source: IDF atlas, 6th edition. 2013

The upward trend in the number of diabetic patients points to the need for improved treatment and care for the disease. People with diabetes require not only adequate drug therapy and blood glucose control but also a healthy life style.

Quality of life is now being recognized as an independent and achievable outcome in terms of diabetes management. WHO has defined Quality of Life as **"**Condition of the effects of the complete range of factors such as those determining health, happiness (including occupation), education, social and intellectual attainment, freedom of action, justice and freedom of expression.[4]

Detrimental effect of diabetes has been noted on the quality of life of patients. Recent multinational studies have indicated that Diabetes has had a notable impact on the Quality of life of patients. Patients are at an increased risk of micro and macro vascular complications. At the same time, large proportions of patients continue to have poor glycemic control (20%), high blood pressure (33%), and high cholesterol levels (40%).[5]

Such situation have a deep psychological impact on affected individuals and increase their perception of a poor quality of life.

Generic instruments like World Health Organization Quality of Life questionnaire (WHO – QOL – BREF) and disease specific Appraisal of Diabetes Scale (ADS) are designed to measure aspects of health that are of universal importance and are therefore suitable for comparison between different group of patients or healthy population. [6, 7]

In this part of North Karnataka such studies are rare, hence the need for such a study arises. This study will help in assessing the Quality of life, their wellbeing, attitude and outcome towards life. This study will also play a very important role in addressing the psycho-social atmosphere of the patients.

OBJECTIVES

- To assess quality of life in Type 2 Diabetes Mellitus patients using World Health Organization Quality of Life Bref questionnaire and disease specific Appraisal of Diabetes Scale.

REVIEW OF LITERATURE

HISTORY OF DIABETES MELLITUS:

- The term "diabetes" was first coined by Araetus of Cappodocia (81-133AD). Later, the word mellitus (honey sweet) was added by Thomas Willis (Britain) in 1675 after rediscovering the sweetness of urine and blood of patients (first noticed by the ancient Indians). It was only in 1776 that Dobson (Britain) firstly confirmed the presence of excess sugar in urine and blood as a cause of their sweetness. The role of the pancreas in pathogenesis of diabetes was discovered by Mering and Minkowski (Austria) 1889. Later, this discovery constituted the basis of insulin isolation and clinical use by Banting and Best (Canada) in 1921. [(8)]

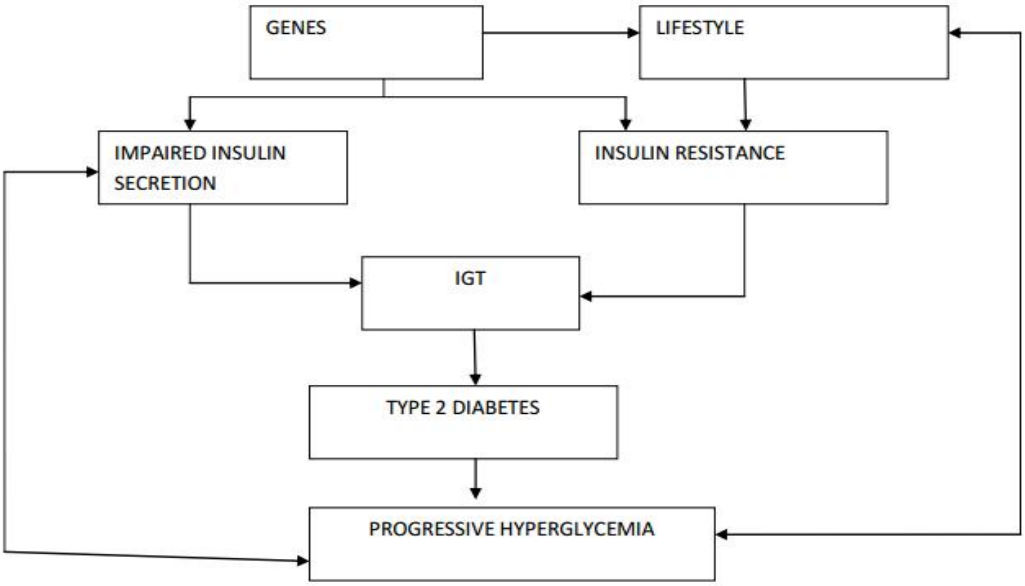
PREDISPOSING FACTORS FOR DIABETES:

- Age
- Family History of Diabetes Mellitus.
- Sedentary Life style.
- Drugs like: β blockers, Steroids, Hydrochlorothiazide's, Oral Contraceptive Pills.
- Habits like: Tobacco consumption, Alcohol Consumption.
- Obesity/overweight (especially excess visceral adiposity).
- Excess growth hormone (acromegaly).
- Pregnancy, gestational diabetes.
- Polycystic ovary disease.

- Lipodystrophy/ Dyslipidemia (acquired or genetic, associated with lipid accumulation in liver).[9]

PATHOGENESIS OF DIABETES:

- Under normal physiological conditions, plasma glucose concentrations are maintained within a narrow range, despite wide fluctuations in supply and demand, through a tightly regulated and dynamic interaction between tissue sensitivity to insulin (especially in liver) and insulin secretion. In Type 2 Diabetes these mechanisms break down, with the consequence that the two main pathological defects in Type 2 Diabetes are impaired insulin secretion through a dysfunction of the pancreatic β-cell, and impaired insulin action through insulin resistance. Type 2 Diabetes Mellitus has a greater genetic association than Type 1 DM, the pathogenesis of Type 2 Diabetes Mellitus is characterized by impaired insulin secretion and insulin resistance as shown in the figure below. [10]



COMPLICATIONS OF DIABETES:

- Cardiovascular disease.
- Nerve problems (neuropathy)
- Kidney problems (nephropathy)
- Eye problems (retinopathy)
- Foot problems (Ulcer, gangrene)
- Skin conditions (repeated fungal infections)
- Hearing impairment.
- Central Nervous System impairments like Alzheimer's disease etc**.** [(1)]

HISTORY OF QUALITY OF LIFE:

- Since Plato writers have speculated on the aspect of "good life" and how public policy can help to nurture it. Resources and the science to measure the "good life" have started only recently. The last 30 years have seen a great many attempts to measure Quality of Life (QOL) in many parts of the world. The efforts to collect and organize such data have become more systematic from around the 1960s. [(11)]

WHY IS QUALITY OF LIFE IMPORTANT IN DIABETES?

- Quality of life has importance for people with diabetes and their health care providers for several reasons. First, many people say that when they suffer from diabetes overwhelms (i.e., poor quality of life), they often take to a very careless attitude toward their self-care, doing less than what they should be actually doing to manage their diabetes. Unfortunately, when people take such attitude toward diabetes, invariably most of them land in complications.

Diabetes overwhelms leads to diminished self-care, which in turn leads to worsened glycemic control, increased risks for complications, and exacerbation of diabetes overwhelms in both the short run and the long run. Thus, quality-of-life issues are crucially important, because they may powerfully predict an individual's capacity to manage his disease and maintain long-term health and well-being.[12]

- Now a days there is good evidence that, among people with diabetes, psychosocial factors such as depression are stronger predictors of medical outcomes such as hospitalization and death than are physical and metabolic factors such as presence of complications, body mass index, or glycemic status (HbA_1C) level.[13]
- Most studies report worse quality of life for people with diabetes compared to the general population, especially regarding physical functioning and well-being. Some psychosocial factors, including health-related beliefs, social support, coping style, and personality type may have a potent effect on quality of life. These effects may be direct, or they may be indirect, buffering the negative impact of diabetes or its demands. In fact, these psychosocial factors may be the most powerful predictors of quality of life, often outweighing the effects of important disease-related factors such as complications. [14]
- A cross sectional community based study was carried out in Gujarat, Western India in Department of Medicine of a tertiary care hospital in January 2013, on 114 patients for duration of 8 weeks, to assess the Quality of life among diabetics using WHO-QOL-BREF questionnaire. Study showed that the mean age and duration of diabetes (± SD) was around 56.8 ± 10.5 and 8.3 ± 9.4 years respectively. Mean ADS and total WHO-QOL-BREF scores for

uncontrolled and controlled diabetics were significantly different ($p < 0.001$ and 0.042 for ADS and WHO-QOL-BREF respectively). Age, duration of diabetes, number of symptoms, number of co-morbidities and number of non-pharmacological measures were significantly correlated with Quality of Life. (15)

- A cross sectional hospital based study was conducted in a tertiary care hospital of Kolar, in December 2013, to assess quality of life in Type 2 Diabetes patients using WHO-QOL-BREF questionnaire. It was noted that the mean age of male diabetics was 59.56 ± 9.64 and that of females was 60.90 ± 7.51 years. Females had higher mean scores of physical, psychological, social and environmental domains compared to that of males and the difference was statistically significant ($p < 0.01$). Correlation between Quality of life domains and other continuous variables showed that there is significant positive correlation with age for physical, psychological, social and environmental domains ($r = 0.864, 0.396, 0.549, 0.420$ respectively and $p < 0.001$). Overall it was observed that males generally reported better quality of life as compared to that of females and younger patients reported better quality of life than older patients. (16)
- A cross-sectional study based in the secondary care facility of the Community Health Department of Christian Medical College Vellore, was carried on 100 patients using the WHO –QOL – BREF questionnaire. Overall, 68% of the diabetics have reported a good QOL. 63% had good physical QOL, 69% had good psychological QOL, 27% had good social QOL and 85% had good environmental QOL. An 80% agreement between the total QOL score and the

perceived QOL score was observed. The κ value was 52.5%. This indicates good agreement. [17]

- A cross-sectional study was conducted on 75 diabetes patients having End Stage Renal Disease to evaluate the quality of life (QOL) in hemodialysis patients of J.S.S Medical College Hospital and Basappa Memorial Hospital, Mysore. In this study comparison was done among the QOL of hemodialysis patients with the QOL of the general population (n=300), renal transplant patients (n= 39), and patients with a chronic disease (n= 35). Data was collected using WHO-QOL-BREF questionnaire. The quality of life of hemodialysis patients was found to be significantly impaired ($p < 0.05$) in comparison to healthy individuals of the general population, particularly with respect to the physical, psychological, and social relationship domains. In comparison to the quality of life of renal transplant patients, the quality of life of hemodialysis patients was significantly ($p < 0.05$) lower in all the four WHO- QOL-BREF domains. Only in the environmental dimension was the quality of life of hemodialysis patients found to be significantly lower than that of the asthma patients. Female hemodialysis patients showed significantly ($p < 0.05$) lower quality of life than did male patients in the psychological and environmental dimensions of WHO- QOL-BREF. A positive association was seen between higher education and the psychological functioning and the environmental dimensions of WHO- QOL-BREF. [18]
- A cross-sectional study that was carried out over a period of two months in a tertiary care hospital in Mandya, Southern India on 52 Type 2 Diabetes patients using WHO-QOL-BREF questionnaire. 40% of the patients belonged to the age group of 40-49 years. Males constituted 69% of the study subjects.

The mean duration of the illness in diabetics and the hypertensive was 7.8 years and 4.2 years, respectively. The quality of life was average for 24 (46.2%) subjects and poor for 15 (28.8%) patients. Out of the 17 patients who were in a state of therapeutic control, eight (47.1%) patients had a good quality of life, while only two (11.7%) had a poor quality of life. Out of the 25 patients whose diabetes was not controlled, only two (8%) patients had a good quality of life; while 12 (48%) patients had a poor quality of life. The state of therapeutic control was found to be statistically associated (chi square = 11.14, p-value < 0.05).[19]

- A cross sectional study was conducted on 200 patients with Type 2 Diabetes Mellitus in Kerala using WHO – QOL- BREF questionnaire which was translated in malayam for the local residents to understand. The mean age of the sample size was about 54.96 ± 10.61 years. The physical domain of QOL with increasing education a highly significant increase in good quality of life was observed (p <0.001). 40% of unmarried people enjoyed a better quality of life when compared with the 6.3% married ones (p < 0.05). Patients with no comorbidities had a better QOL when compared to those with co- morbidities (p <0.05). The psychological and the social domain were significantly related to the education status. 24% of men had a better QOL score as compared with 13.1 % women (p <0.01). [20]
- A cross sectional study was carried out on 60 patients who were grouped into three groups (group 1 = Type 2 Diabetic patients without diabetic nephropathy, group 2 = Type 2 diabetic nephropathy patients (30- 300mg/d of albumin excretion) and group 3 = Type 2 diabetic nephropathy patients (> 300mg/d of albumin excretion and serum creatinine >1.4mg/dL) attending an

endocrine clinic of tertiary care hospital in Patiala, India. The data was collected by using Generic HRQOL questionnaires (SF-36) and disease specific Appraisal of Diabetes Scale questionnaire. 71.7% patients were between 51-65 years, 16.6 % had the age less than 50 years and 11.7% of the patients were more than 65 years. There was no significant difference in age (p =0.801), Body Mass Index (p =0.331), hemoglobin levels (Hb) (p =0.199), systolic (p =0.331) and diastolic blood pressure (p =0.998) of patients amongst group 1, group 2 and group 3. Factors that differed significantly among the three groups were duration of diabetes (p =0.006), HbA1c (p=0.000) and fasting glucose levels (p =0.001). Renal parameters i.e. Serum creatinine (p=0.01) and Blood urea nitrogen (p =0.01) levels differed significantly in different Quality of life differed significantly between groups as the values of SF-36 showed significant difference (p = 0.000). Similarly, significant difference was observed in D-39 scores (p =0.000) which illustrated that quality of life differed amongst various groups significant difference was prominent in ADS scores (p =0.000) between the groups. [(21)]

- A clinic based observational study carried out in the primary care mobile clinics in ten villages of Devanahalli Taluk, Bangalore from April 14 to May 31, 2014. Patients above 18 years of age, who were diagnosed to have diabetes, hypertension or both, coming to the primary care clinics, were recruited for the study. 100 patients were recruited for the study; data was collected using World Health Organization Quality of life Questionnaire (BREF). 25% of the population reported a good quality of life, whereas 48% rated their quality of life as poor. About one third (34%) of the patients were satisfied with their health status and almost the same proportion (29%) were

dissatisfied. The quality of life and the overall health perception improved significantly with higher income (r = -0.28 for QOL, r = 0.32 for health satisfaction) and worsened with age (r = -0.22 for QOL, r =0.40 for health satisfaction). [22]

- A cross-sectional study was performed on 352 eligible females with diabetes referring to Diabetes Clinic of Khoy, North Western Iran. The study data were collected using a questionnaire to assess patients' knowledge on diabetes and the world health organization's quality of life (WHO-QOL-BREF) questionnaire. The total mean score of QOL was 58.02 ± 17.63. The lowest and the highest mean scores were observed in physical health and social relationship domains (53.84 ± 17.09) and (65.08 ± 14.87) respectively. The regression models revealed that age, education, duration of disease, and family income were significantly associated with all areas of quality of life ($p < 0.05$). The results also revealed that comorbidity was significantly correlated with the overall quality of life and the physical health domain ($p < 0.01$). [23]
- A cross sectional study carried out in Neyshabur, Iran from April to July 2012. A total of 1847 patients with Type 2 Diabetes were interviewed by using Iranian version of the WHO-QOL-BREF questionnaire. The mean age of the study population was 59.65 ± 12.3 yrs. (Range: 30-97 yrs.). The majority of participants were female (69.8%). The overall observed Cronbach's alpha coefficient for WHO-QOL-BREF was 0.93 and for each domain of it ranged from 0.69 to 0.86. The total mean score of WHO-QOL-BREF was 12.18. The lowest and the highest mean scores were observed in Psychological health domain (11.73) and Social relationship domain (12.66), respectively. Backward multiple linear regression model revealed that Education levels,

Marital Status and Household Income were significantly associated with all domains of WHO- QOL-BREF ($p < 0.05$). [24]

- A cross-sectional study was conducted on patients attending the Diabetic clinic at Kenyatta National Hospital to assess the Health-related quality of life of diabetic patients not on insulin therapy using the WHO-QOL-BREF (World Health Organization Quality of Life – BREF). 139 patients with Type 2 Diabetes not on insulin therapy were recruited for the study. The study population was predominantly female (61%) , majority were 40-60yrs, having had diabetes for less than 5yrs, 75% having more than one complication. Most (75%) of the study participants were poorly controlled with HbA1C mean score of 8.04%. Majority of the study participants (84%) achieved a good score on the HRQOL scale using the WHO-QOL-BREF tool. The determinants of HRQOL in our study were: age of study participants, duration of diabetes, presence of complications and income related factors. Age of the study subjects had significant association only in the social domain of HRQOL with a p-value 0.037. Level of income had a significant association with overall HRQOL score (p-value 0.029), psychological domain (p-value 0.023) and in the social domain (p-value 0.029). Health care financing was significantly associated with psychological domain (p-value 0.006) and environmental domain (p-value 0.04) and overall score (p-value 0.011). There was an association between employment status and HRQOL. Having a job improved the scores in physical domain (p value 0.013) and social domain (p value 0.020). Duration with diabetes had significant association with physical domain where the p value was 0.007. The HRQOL of the study subjects was associated significantly with the number of complications. Indeed the

association of complications with the HRQOL involved physical domain (p-value < 0.001) and psychological domain (p value 0.041) which directly impacted on the overall total score (p value 0.041).[25]

- A cross-sectional study was conducted on 86 patients with Type 2 Diabetes Mellitus, in the territory of the City of Nis. Health-related QOL of patients was measured using the WHO – QOL – BREF Questionnaire. 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. The patients with comorbidity had lower quality of life score in all domains compared to the group without comorbidity. There was a statistically significant correlation between the level of HbA1c and the occurrence of comorbidity ($p < 0.05$). [26]
- A cross-sectional hospital based study design was conducted in rural area of Uganda to assess quality of life in Type 2 Diabetes patients using WHO-QOL- questionnaire. Mean age of diabetics was around 50.0 ± 9 years. Quality of life in diabetes in Uganda was mainly dependent upon age, education level and status of the blood glucose level of the patient. The consensus in this study is that the quality of life is higher among patients in the lower age group, higher education and life style factors (smoking and alcohol consumption) were not significant predictors of quality of life. P value was found to be < 0.01 which was significant. [27]
- In a cross sectional study conducted on 251 Type 2 Diabetes patients attending the University of Ilorin teaching Hospital in Nigeria. The World Health

Organization Quality of Life Bref questionnaire and socio demographic questionnaire was used to assess the quality of life. The quality of life in this study was found out to be fairly good, approximately 1 out of 7 patient rated poor for overall QOL, while more than 6 out of 10 and 1 out of 5 rated fair and good respectively. For health satisfaction approximately 3 out of 10 patients rated poor, compared with 1 out of 10 and 3 out of 5 who rated good and fair respectively. For the physical domain 3 out of 20 patients rated poor. For the psychological domain 1 out of 5 patients rated poor. For social relationships only 1 out of 15 patients rated poor and all patients rated fair for environment domain.[28]

- A cross-sectional study of household inquiry type and developed with 296 elderly patients with DM was carried out in Community Health Research Group in Uberaba-MG. Data were collected at the residences of the elderly at the end of 2012 and early 2013 by using WHO-QOL-BREF questionnaire. The highest score of QOL measured by WHO-QOL-BREF was in social relationships domain (70.86) while the lowest was in the physical (55.92). QOL assessed by the WHO-QOL-OLD had higher scores on the facet in death and dying (73.73) and lowest in social participation (63.98).[29]
- A case control study was conducted in rural medical college in Wardha, Maharashtra in May 2012 on a total of 70 Type 2 Diabetes patients attending the out-patient diabetic clinic. Quality of Life among these patients was assessed by using WHO-QOL-BREF questionnaire. The mean age of diabetics was 48.63 ± 10.6 years for cases and 49.21 ± 10.45 years for controls and the mean duration of diabetes among cases was 3.14 ± 2.94 years. The crude domain score was a near significant in physical health, suggesting that male

diabetics physical health was marginally better than female diabetics (p = 0.06). The overall Quality of life of the total study population (cases and controls) was poor. [30]

- A cross sectional study was done on 100 patients in Yenepoya Medical College Mangalore, using Demographic Performa and The Quality of Life Instrument for Indian Diabetes Patients (QOLID). Majority of the subjects (57%) had moderate quality of life, 38% had good quality of life, 4% had very good quality of life, and only 1% subjects had poor quality of life. The mean percentage of quality of life was 54.8%. The data showed a significant association between the quality of life and demographic variables like type of family ($\chi2(1) = 6.57$, $\chi2(1) = 3.84$), occupation ($\chi2(1) = 7.95$, $\chi2(1) = 3.84$), monthly income ($\chi2(1) = 4.77$, $\chi2(1) = 3.84$) and duration of illness ($\chi2(1) = 6.27$, $\chi2(1) = 3.84$) and no significant association with other demographic variables. [31]
- In a case control study, conducted on 200 diabetes patients living in refugee camp in Gaza strip from November 2003 to December 2004, were interviewed with the help of World Health Organization BREF questionnaire. It was observed that the quality of life was significantly reduced in which physical health scored 36.7 points out of 0 -100 score, psychological domains 34.8, weaker effects in social relationships 52.4 and environmental domain 23.4 in a scoring of 0-100. In joint analysis of all the domains several interactions including group status of diabetic patient's vs. controls and age were found to be significant ($p < 0.05$). [32]
- A cross-sectional hospital based study was conducted in a tertiary care hospital in Riyadh, Saudi Arabia in June 2011. Totally 283 Type 2 Diabetes

Mellitus patients were selected and interviewed using Arabic version of the Short-Form 36 items survey (SF-36) to assess the Health Related Quality of Life (HRQOL). The mean age of the participants was 56.4 ± 13.2 years and the mean duration of diabetes was about 11.8 ± 8.4 years. Health Related Quality of Life (HRQOL) was found to be better in males as compared to that of female patients. Respondents who were more than 50 years of age had poor HRQOL than those who were less than 50 years of age. Poor economic status, reported diabetic complications and longer duration of diabetes were significantly associated with poor HRQOL. Multi-dimensional analysis indicated that gender, economic status and complications of diabetes as independent risk factor for HRQOL. P value < 0.05 was considered to be statistically significant. [33]

- In a cross sectional study design conducted in at the "University Diabetes Center" in Riyadh, on 400 diabetic patients. Patients were interviewed using the "Audit of Diabetes Dependent Quality Of Life (ADDQOL)" questionnaire. Study showed that the majority of Saudi diabetic patients had non-favorable ADDQOL scores. More than one fifth of patients scored less than −4.0 (*i.e.*, worst QOL). Female patients had significantly worse QOL, patients with type 2 diabetes had significantly worse QOL than those with Type-1 Diabetes. The degree of control of disease among diabetics was significantly and directly associated with their QOL ($p < 0.001$). The worst QOL was expressed among poorly controlled diabetes while the best was among patients with excellent control. QOL of diabetics was less among those who had diabetes complications. [34]

METHODOLOGY

STUDY SETTING

The study was conducted in Ashok Nagar Urban Health Centre (UHC), which is the urban field practice area of Dept. of Community Medicine, Jawaharlal Nehru Medical College (JNMC), KLE University, Belagavi. Data was collected from Type 2 Diabetes Mellitus patients residing in the area of Ashok Nagar UHC.

STUDY DESIGN

A community based cross-sectional study.

STUDY PERIOD

The study was conducted over a period of one year from 1st January to 31st December 2015.

SELECTION CRITERIA

INCLUSION CRITERIA:

All adults diagnosed to have Type 2 Diabetes Mellitus were included in the study.

EXCLUSION CRITERIA:

i) Type 1 Diabetes Mellitus patients.

ii) Gestational Diabetes Mellitus patients.

SAMPLE SIZE

By taking the prevalence of poor quality of life in Type 2 Diabetes Mellitus to be around 39% [15], sample size was calculated using the formula –

$n = Z_{\alpha}^{2} \times p\ q / d^2$

$1.96 \times 1.96 \times p\ q / d^2$

Where: p = prevalence of poor quality of life = 39%

q = 100 – p = 100 – 39 = 61%

d = relative error 10% of p, = 3.9 ≈ 4.

So, $n = 1.96 \times 1.96 \times 31 \times 69 / 4 \times 4$ = 513.57 ≈ 520.

Hence, 520 Type 2 Diabetes Mellitus patients were chosen for the study.

SOURCE OF DATA

Adult Type 2 Diabetes Mellitus patients residing in the area of Urban Health Centre Ashok Nagar (including areas of Shivbasav Nagar, Markandeya Nagar, Karnataka State Reserve Police Force Lines (KSRP), Nehru Nagar, Ashok Nagar, Azam Nagar, JNMC college area) coming under field practice area of Department of Community Medicine, JNMC, KLE University, Belagavi, 590010.

SAMPLING METHOD

The population coming under the Urban Health Centre of Ashok Nagar (including areas of Shivbasav Nagar (population = 6995), Markandeya Nagar, KSRP (population = 4848), Nehru Nagar (population = 4852), Ashok Nagar (population = 9337), Azam Nagar (population = 4268), JNMC college area (population = 2400) is around 32,700.[35] Population proportion to size method was used to select the patients suffering from Type 2 Diabetes Mellitus. Thus 117 cases from Shivbasav Nagar, 154

from Ashok Nagar, 81 from Markandeya Nagar and KSRP, 70 from Azam Nagar, 81 from Nehru Nagar and 40 cases were selected from the JNMC College surrounding area.

METHOD OF DATA COLLECTION

Type 2 Diabetes patients residing in the area of Urban Health Centre, Ashok Nagar were informed about the nature of study by house to house visit. After obtaining written informed consent, a pretested questionnaire was used to collect information regarding socio-demographic details, educational status, occupational status, income and habits. Quality of life data was collected by using World Health Organisation Quality of Life BREF (WHO- QOL- BREF) and Appraisal of Diabetes Scale (ADS) questionnaire. Further they were clinically examined and anthropometry measurements such as height, weight, BMI and Waist hip ratio were collected.

Following were the domains which were included in the WHO- QOL- BREF and ADS questionnaire to assess the quality of life in Type 2 Diabetes patients.

- Overall General Health
- Physical Domain
- Psychological Domain
- Social Domain
- Environment Domain

  APPRAISAL of DIABETES SCALE consists of seven questions related to diabetes.

  The scoring in both these questionnaires was done on Likert Scale as shown in the questionnaire. The number of responses were graded from 1 – 5 (1 = very poor and 5 = very good).

STATISTICAL ANALYSIS

Data was entered in Excel sheet after coding. Analysis of numerical variables outcome were summarized by computing the mean and standard deviations (SD). Categorical data including socio – economic status, family history of diabetes, symptoms of diabetes, were summarized using rates (percentages). Unpaired't' test was used to test the difference between mean of two groups. Whereas Chi- square test was used to compare rates of categorical variables in different groups. Significance level was kept at 0.05 level of probability. Statistical Package for Social Sciences (SPSS) version 20.0 and Microsoft data excel sheet was used to analyze the data.

ETHICAL CLEARANCE

Ethical clearance was obtained from the Institutional Review Board of JNMC, KLE University, Belagavi. Informed written consent was obtained from all the participants. (Annexure I)

DEFINITION OF STUDY VARIABLES

1. **Age**

Age was recorded to the nearest completed year as per information provided by the study participants.

2. **Education status**

   a. **Illiterate** – Never attended school.

   b. **Primary school** –Studied up to 7^{th} standard.

   c. **High school** –Studied at least until 8^{th} standard but not beyond 10^{th} standard.

   d. **PUC** –Studied at least until 10^{th} standard but not beyond 12^{th} standard.

   e. **Graduation** – Having studied beyond 12^{th} standard.

3. Occupation

a. **Housewife**: main occupation is caring for her family, managing household affairs, and doing housework.

b. **Government Job**: one who is employed with the state or the central government.

c. **Private Job**: one who is employed with the private sector

d. **Business**: An activity of buying and selling commodities thereby making profit for living.

e. **Others:** Others included retired and pensioners.

4. Type of Family [36]

a. **Joint family**: It consists of number of married couples and their children who live in the same household.

b. **Nuclear family**: The family consisting of married couple along with their dependent children.

5. Socio-economic status:

Per capita income was classified using Modified B. G. Prasad's classification [37]

Social class	Prasad's classification 1961 (per capita income in Rupees/month)	Modified Prasad's classification in study period 2015 (per capita income in Rupees/month)
I	100 and above	5965 and above
II	50 – 99	2983 – 5905
III	30 – 49	1789– 2923
IV	15 – 29	895– 1730
V	<15	Below 895

Modification was done with the aid of multiplication factor (MF), which was obtained as below:

$$MF = \frac{\text{Value of consumer price index average for the study period (2015)}}{100} \times 4.93$$

$$= 1210 /100 \times 4.93 = 59.65$$

As our study period was from 1st January to 31st December 2015, the mean consumer price index for the period was considered. Average consumer price index for year 2015 was 1210.

6. Diet [38]

Vegetarian: A vegetarian diet is a meal plan made up of foods that come mostly from plants, which include vegetables, fruits, whole grains, legumes, seeds, nuts.

Non Vegetarian: Is a meal that contains animal proteins

7. Physical Exercise [39]

Physical activity was assessed by three domains: regular, irregular and not doing

Regular: minimum 30 minutes of exercise per day for a minimum 4-5 days per week.

Irregular: minimum 30 minutes of exercise per day at least 2 or 3 days in a week.

Not doing: No physical activity for a single day.

8. Blood pressure measurement [40]

During the course of interview, three measurements of blood pressure of each study participant were measured using mercury sphygmomanometer at an interval of 5 minutes in sitting position. The reading of BP was obtained after the subject had rested for at least five minutes in the seated position. The first BP measurement was recorded after obtaining socio-demographic information

from study subject, while second was recorded during clinical examination and the third was examined after the questionnaire was completed.

All BP measurements were made on left arm of patient, using an adult cuff covering approximate of 80% of the arm. The sphygmomanometer was kept at the level of the heart. The average of last two Systolic Blood Pressure and Diastolic Blood Pressure reading in mm Hg were noted to describe the blood pressure of the participant.

9. Height [41]

The subject was asked to stand straight without footwear, with heels, buttocks and back straight touching the wall and arms hanging by side. The height was measured from head to heal. The coinciding reading was measured to the nearest cms using a measuring tape.

10. Weight [41]

Body weight was measured without any foot wear and with minimal clothing to the nearest 0.1 kilogram using a standard portable adult weighing machine, which was standardized periodically during the study. The scale was adjusted to zero before each session and weight was recorded in kilograms (kgs).

11. Body Mass Index[42]

The body mass index for the individuals was calculated using the formula:

BMI: Weight (in kgs)/ (Height in meters) ^{2}

Classification of BMI was done as

BMI	Status
Less than 18.4	Underweight
Greater than or equal to 18.5 but less than 22.9	Healthy
Greater than or equal to 23 but less than 24.9	Overweight
Greater than or equal to 25	Obese

12. Cardinal symptoms of Diabetes Mellitus [43]

Polyuria: The excessive passage of urine (at least 2.5 liters OR 10 -12 times per day for an adult) resulting in profuse urination and urinary frequency (the need to urinate frequently).

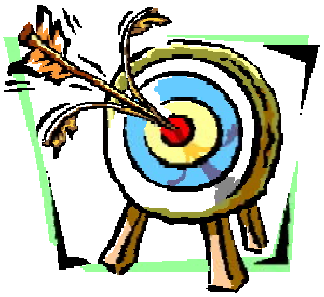
Polydipsia: Constant, excessive drinking as a result of thirst.

Polyphagia: Excessive hunger or increased appetite.

13. HbA1C [44]

HbA1C will tell what the diabetic's blood sugar levels have been running for the past 2 to 3 month. If the blood sugars have generally been running high during the previous few months, the level of HbA1c will be high. If blood glucose concentrations have been running close to normal during this time, the HbA1C level will be close to values seen in normal persons. It is an important value to monitor periodically. Studies have shown that HbA1C values in the "better ranges" correlate with less incidence of diabetic complications later in life. In our study documented HbA1c levels were noted down and a level of 7% was considered as cut off value for good control in diabetes patients.

Introduction



Objectives

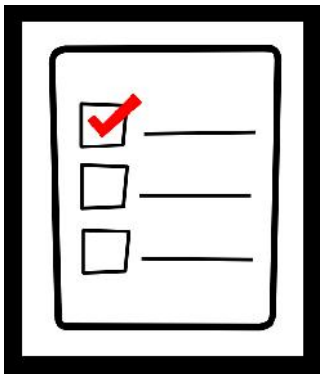
Review of Literature

Methodology

Results

Discussion

Conclusion

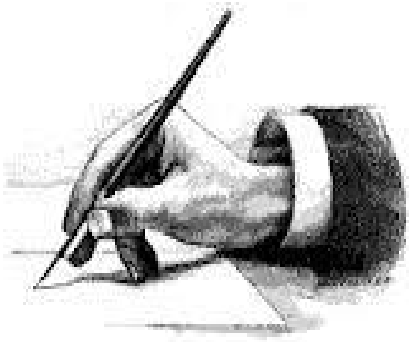


Limitations

Recommendations

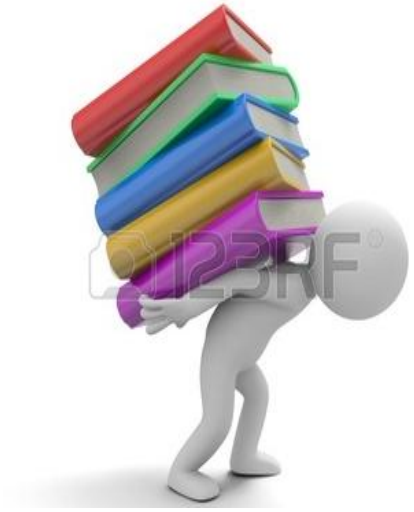
Summary

Bibliography



Annexure-I

Annexure-II



Annexure-III

Annexure-IV

Annexure-V

RESULTS

The present study was conducted in Urban Health Centre, Ashoknagar, Belagavi which is the field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College Belagavi.

The data obtained was tabulated and analyzed under the following headings:

1. **SOCIO DEMOGARPHIC PROFILE OF STUDY PARTICIPANTS**.
2. **PREVALENCE OF CARDINAL SYMPTOMS OF DIABETES MELLITUS.**
3. **PREVALENCE OF ASSOCIATED CO MORBIDITIES.**
4. **DURATION AND TREATMENT OF DIABETES MELLITUS.**
5. **BLOOD GLUCOSE LEVELS.**
6. **WORLDHEALTH ORGANIZATION – QUALITY OF LIFE - BREF PARAMETERS.**
7. **APPRAISAL OF DIABETES SCALE PARAMETERS.**
8. **COMPARISON OF SCORES IN PATIENTS WITH UNCONTROLLED AND CONTROLLED DIABETES MELLITUS.**
9. **ASSOCIATION OF QUALITY OF LIFE WITH VARIOUS VARIABLES.**

1. SOCIO-DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

Table 1: Distribution of study participants according to sex

SEX	Participants	Percentage
MALE	**264**	**50.76%**
FEMALE	**256**	**49.24%**
TOTAL	**520**	**100%**

Out of the total 520 participants who participated in the study, 264 (50.76%) were males and 256 (49.24%) were females.

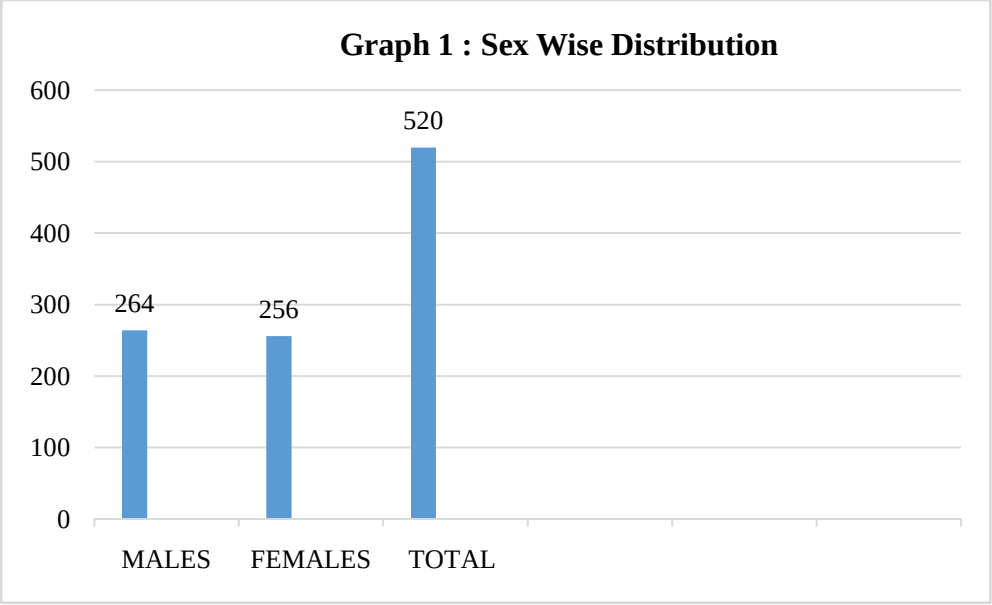


TABLE 2: Distribution of Study Participants According to Age Groups.

AGE CATEGORY	MALE	FEMALE	TOTAL
31 – 40 years	6 (2.3%)	6 (2.3%)	12 (2.3%)
41 – 50 years	50 (18.9%)	29 (11.3%)	79 (15.2%)
51 – 60 years	95 (36.0%)	103 (40.2%)	198 (38.1%)
61 – 70 years	84 (31.8%)	104 (40.6%)	188 (36.2%)
71 – 80 years	25 (9.5%)	12 (4.7%)	37 (7.1%)
81 – 90 years	4 (1.5%)	2 (0.8%)	6 (1.2%)
TOTAL	264 (100%)	256 (100%)	520 (100%)

Of the 520 study participants, 12 (2.3%) belonged to the age group of 31 – 40 years (6 males and 6 females). 79 (15.2%) were in the age group of 41 – 50 years (50 males and 29 females). 51 – 60 year age group had 198 (38.1%) participants of which 95 (36.0%) were males and 103 (40.2%) females. 188 (36.2%) participants belonged to the age group of 61 – 70 years (males 84 and females 104). 37 (7.1%) study participants were in the age group of 71 – 80 years (males 25 and females 12). Remaining 6 (1.2%) participants were in the age group of 81 – 90 years (4 males and 2 females). Mean age of the male participants was 58.86± 9.95 with a minimum age of 35 years and a maximum age of 85 years, similarly in female participants the mean of age and standard deviation was 59.82± 8.263 with a minimum age of 39 years and maximum age of 85 years. The combined mean and standard deviation of the age was 59.34± 9.16.

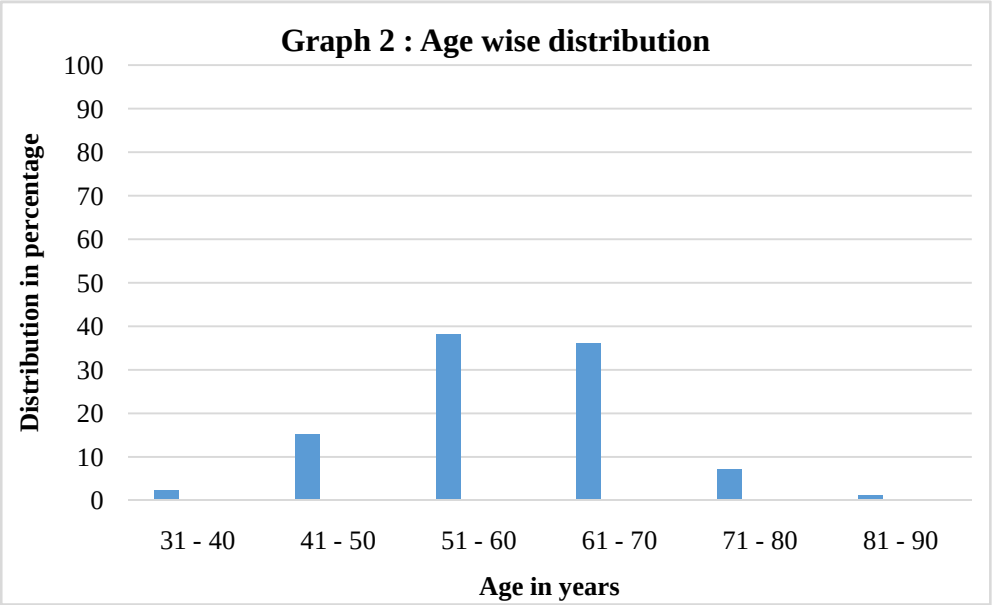

Graph 2 : Age wise distribution
Distribution in percentage
100
90
80
70
60
50
40
30
20
10
0
31 - 40
41 - 50
51 - 60
61 - 70
71 - 80
81 - 90
Age in years

Table 3: Distribution of the study participants according to their religion.

Religion	Participants	Percentage
Hindu	**343**	**65.96%**
Muslim	**94**	**18.07%**
Christian	**64**	**12.3%**
Others	**19**	**3.65%**
Total	**520**	**100%**

Hindu study participants were 343 (65.96%), Muslims, Christians and other religions constituted 94 (18.07%), 64 (12.3%) and 19 (3.65%) respectively**.**

Table 4: Distribution of study participants according to education status:

Education	Male	Female	Percentage
Illiterate	**29 (11.0%)**	**79 (30.9%)**	**108 (20.8%)**
Primary	**67 (25.4%)**	**88 (34.4%)**	**155 (29.8%)**
Secondary	**84 (31.8%)**	**70 (27.3%)**	**154 (29.6%)**
PUC	**60 (22.7%)**	**11 (4.3%)**	**71 (13.7%)**
Graduation	**24 (9.1%)**	**8 (3.1%)**	**32 (6.2%)**
Total	**264 (100%)**	**256 (100%)**	**520 (100%)**

108 participants (20.8 %), 29 (11%) males and 79 (30.9%)females were illiterate in our study, 67 (25.4%) males and 88 (34.4%)females completed primary level of schooling which was 155 (29.8%), 154 participants males 84 (31.8%) and females 70 (27.3%) had completed their secondary level of education which constituted to 29.6%, PUC completed were 71 (13.7%) among whom males were 60 (22.7%) and females 11 (4.3%). A total of 32 participants were those who had completed their graduation among those 24 (9.1%) were males and females were 8 (3.1%) which contributed to 6.2% of the study participants.

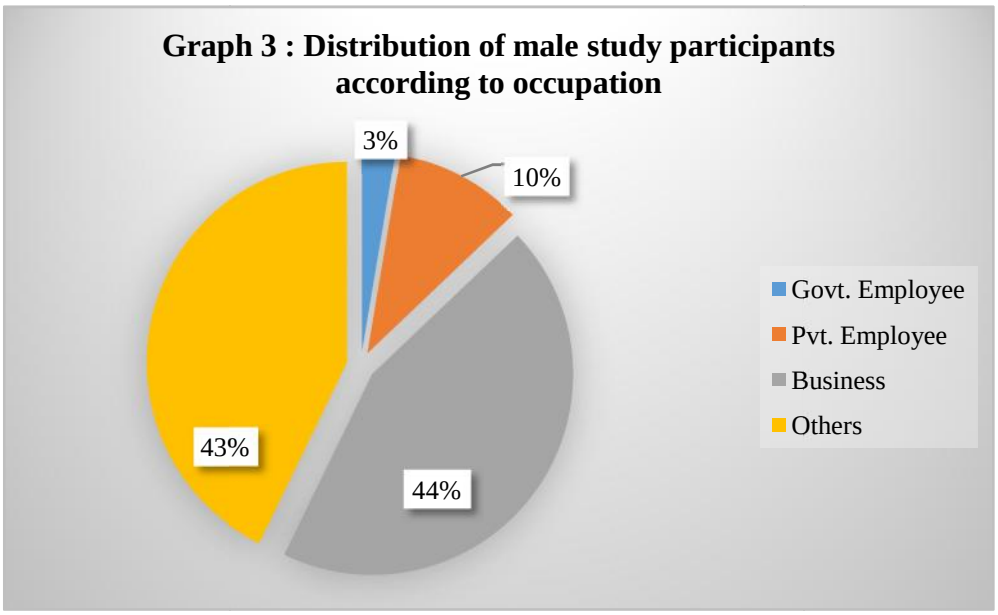
OCCUPATION WISE DISTRIBUTION:

Table 5: Distribution of the study participants according to their occupation:

Occupation	Male	Female	Percentage
Housewife	**--**	**235 (91.8%)**	**235 (45.2%)**
Govt. employee	**7 (2.7%)**	**2 (0.8%)**	**9 (1.7%)**
Private employee	**27 (10.2%)**	**12 (4.7%)**	**39 (7.5%)**
Business	**117 (44.3%)**	**2 (0.8%)**	**119 (22.7%)**
Others	**113 (42.8%)**	**5 (2.0%)**	**118 (22.7%)**
Total	**264 (100%)**	**256 (100%)**	**520 (100%)**

Out of 520 study participants, 256 females among them 235 (91.8%) were housewives, those employed in Government sector were 2 (0.8%), Employed in private sector were 12 (4.7%), those involved in business were 2 (0.8%) and other sector involved 5 (2.0%) females.

Among males 7 (2.7%) were employed in the government sector, 27 (10.2%) employed in the private sector, those involved in family and other business were 117 (44.3%), and others were 113 (42.8%) which constituted those who were pensioners and not involved in any work.


Graph 3 : Distribution of male study participants according to occupation
3%
10%
43%
44%
Govt. Employee
Pvt. Employee
Business
Others

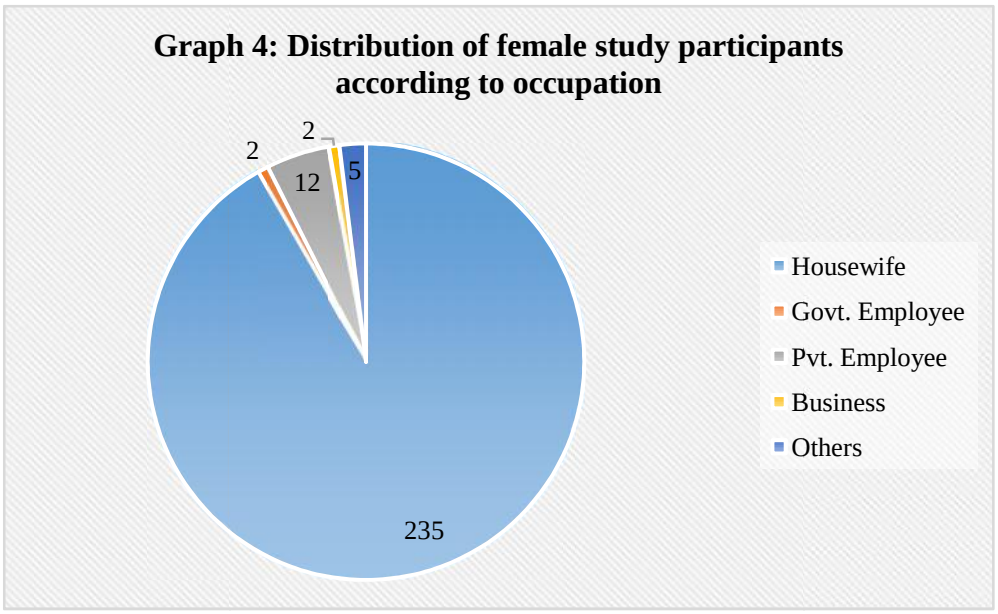

Graph 4: Distribution of female study participants according to occupation
2
2
12
5
235
Housewife
Govt. Employee
Pvt. Employee
Business
Others

Table 6: Distribution ofStudy participants according to their marital status:

Marital status	Number	Percentage
Married	**389**	**74.8%**
Widowed/ widower	**123**	**23.7%**
Unmarried/Seperated	**8**	**1.5%**
Total	**520**	**100%**

In our study 389 (74.8%) of the particpants were married, 123 (23.7%) widowed/widower and 8 (1.5%) participants were those who were unmarried or seperated**.**

Table 7: Distribution of Study participantsaccording to the type of family:

Type of Family	Number	Percentage
Nuclear	**172**	**34.23%**
Joint	**348**	**66.92%**
Total	**520**	**100%**

Out of 520 participants, 172 belonged to nuclear family comprising 34.23% and majority were settled in joint family 348 (66.92%).

Table 8:Distribution of study participants according to socio economic status (Modified B. G. Prasad classification):

B.G Prasad Class Status	Number	Percentage
Class I	**20**	**3.8%**
Class II	**114**	**21.9%**
Class III	**226**	**43.5%**
Class IV	**136**	**26.2%**
Class V	**24**	**4.6%**
Total	**520**	**100%**

In our study, 20 (3.8%) participants belonged to class I, 114 (21.9%) to class II, 226 (43.5%) to class III, 136 (26.2%) to class IV and 24 (4.6%) belonged to class V.

Graph 5: Distribution of study participants according to Socio Economic Status (Modified B.G. Prasad Classification)

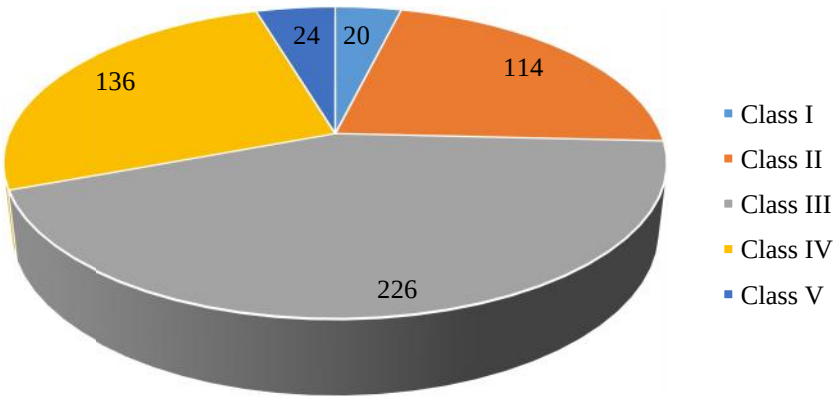


Table No 9: Distribution of study participants according to their Family History of Diabetes:

Family History	Number	Percentage
Yes	**186**	**35.76%**
No	**113**	**21.73%**
Don't Know	**221**	**42.50%**
Total	**520**	**100%**

In our study, 186 (35.76%) of the study participants reported with positive family history for diabetes mellitus, 113 (21.73%) responded by saying that their parents did not have the disease and 221 (42.5%) of the participants reported saying that they did not know their parents having history of diabetes.

Table 10: Distribution of the study participants according to their diet patterns:

Diet Pattern	Number	Percentage
Vegetarian	**280**	**53.8%**
Non Vegetarian	**59**	**11.3%**
Both Veg and Non Veg	**181**	**34.8%**
Total	**520**	**100%**

In our study it was noted that majority of the study participants were vegetarian 280 (53.8%), participants practicing exclusively non vegetarian diet were 59 (11.3%) and participants practicing both veg and non-veg diet were 181 (34.8%).

Table 11: Distribution of study participants according to exercise regimen

Frequency of exercise	Number	Percentage
Regular	**347**	**66.7%**
Occasional	**65**	**12.5%**
No exercise	**108**	**20.8%**
Total	**520**	**100%**

In our study we found out that 347 (66.7%) people were doing regular exercise, 65 (12.5%) participants were involved in doing exercise occasionally while 108 (20.8%) participants did not do any form of exercise.

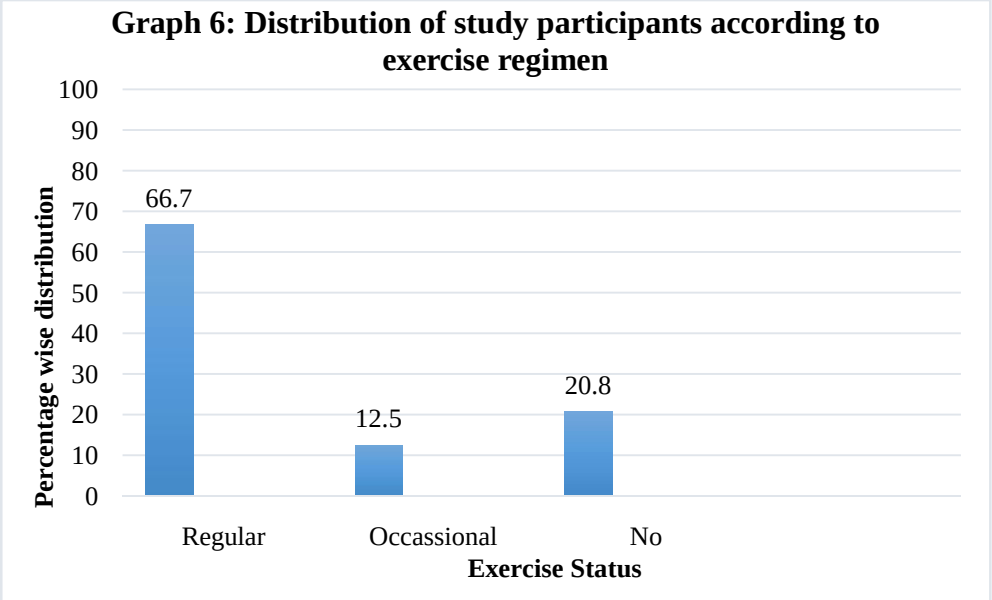


Table No: 12 Distribution of study participants according to their BMI:

BMI	Male participants	Percentage	Female participants	Percentage	Total
< 18.4	**4**	**1.51%**	**7**	**2.73%**	**11 (2.11%)**
18.5 – 22.9	**107**	**40.53%**	**106**	**41.41%**	**213 (40.96%)**
23 – 24.9	**76**	**28.78%**	**67**	**26.17%**	**143 (27.5%)**
≥ 25	**77**	**29.16%**	**76**	**29.68%**	**153 (29.42%)**
TOTAL	**264**	**100%**	**256**	**100%**	**520 (100%)**

In our study it was observed that 4/264 (1.51%) male participants had their BMI levels below 18.4 kg/m^2, 107/264 (40.53%) of the participants had their BMI levels in the range of 18.5 – 22.9 kg/m^2 and 76/264 (28.78%) of the male participants had their BMI levels between 23 – 24.9 kg/m^2 and 77 (29.16%) had their BMI more than 25 kg/m^2.

In the female participants it was seen that 7/256 (2.73%) had their BMI levels below 18.4 kg/m^2, 106/256 (41.41%) of the participants had their BMI in the range of 18.5 – 22.9 kg/m^2, 67/256 (26.17%) had their BMI between 23 – 24.9 kg/m^2 and the remaining females 76/256 (29.68%) had BMI more than 25 kg/m^2.

Table No 13: Distribution of study participants according to the presence of symptoms:

Symptoms	Number	Percentage
Yes	**442**	**85%**
No	**78**	**15%**
Total	**520**	**100%**

During our study we found that 442 (85%) of the study participants presented with symptoms in any forms and 78 (15%) did not have any symptoms.

Table No 14: Distribution of the study participants according to history of cardinal symptoms of diabetes mellitus:

Symptoms	Number	Percentage
Polyuria	**172**	**33.1%**
Polydipsia	**49**	**9.4%**
Polyphagia	**56**	**10.8%**
>1 Symptoms	**150**	**28.8%**
All three	**15**	**2.9%**
Asymptomatic	**78**	**15%**
Total	**520**	**100%**

In our study we observed that 172(33.1%) of the participants presented with polyuria as a symptom, 49 (9.4%) of the participants presented with polydipsia, polyphagia was observed in 56(10.8%) of the subjects, while 150 (28.8%) of the participants were such who presented with more than one symptoms, 15(2.9%) of the subjects had all the three symptoms while 78 (15%) individuals were those who were asymptomatic during the time of interview**.**

Graph 7: Distribution of participants having history of cardinal symptoms of diabetes

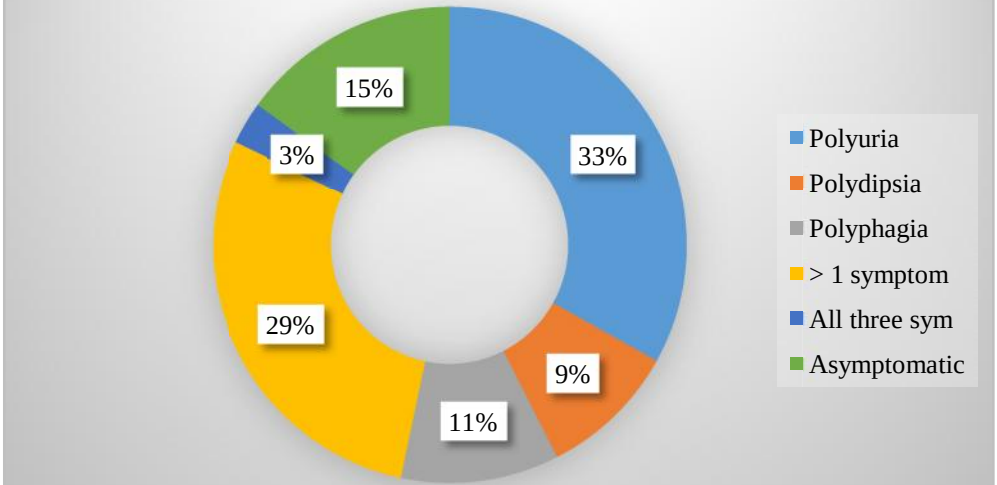


Table No 15: Distribution of the study participants according to the associated Co- morbidities

SingleCo - Morbidity	Number	Percentage
HTN	**115**	**22.1%**
IHD	**05**	**0.96%**
CVA	**00**	**0%**
Retinopathy	**23**	**4.42%**
Neuropathy	**28**	**5.38%**
Nephropathy	**01**	**0.19%**
Others	**26**	**5%**
Multiple Co Morbidities	**262**	**50.38%**
None	**60**	**11.53%**
Total	**520**	**100%**

During our study process we found that Hypertension was the single most common co – morbidity associated with Type 2 Diabetes, 115 patients had hypertension which was around 22.1%, 28 patients were found having neuropathy which was 5.38%, retinopathy was associated with 23 (4.42%) patients, only 1 (0.19%) was diagnosed to have nephropathy, 26 (5%) of the study subjects had other symptoms.

A large number of patients were having multiple co – morbidities, their number was 262 (50.38%) and the patients who did not have any kind of co – morbidities were 60 (11.53%).

Graph 8: Distribution of the study participants according to the associated Co- morbidities

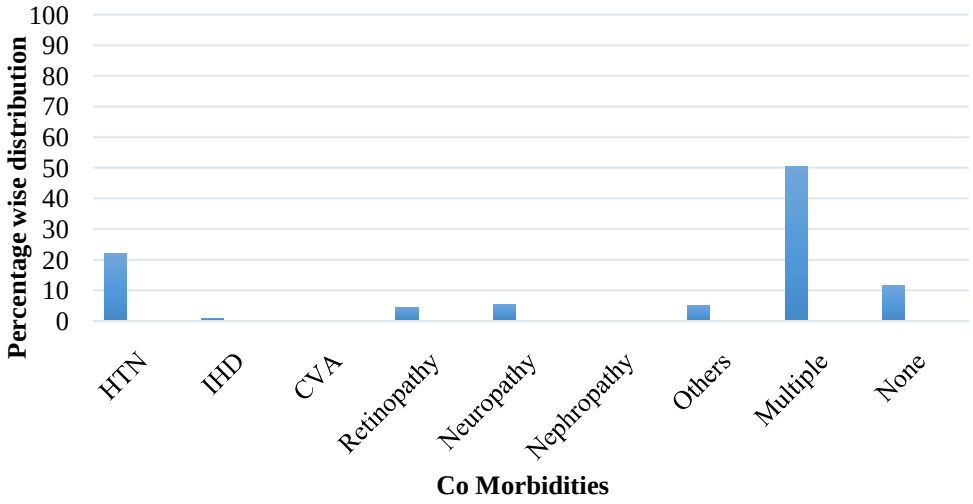


Table No 16: Distribution of study participants according to the duration of diabetes mellitus

Duration of Diabetes	Number	Percentage
0 – 5 years	**162**	**31.2%**
6 – 10 years	**165**	**31.7%**
11 – 15 years	**101**	**19.4%**
>15 years	**92**	**17.7%**
Total	**520**	**100%**

In our study we found that 162 (31.2%) participants were found to have duration of diabetes between 0 – 5 years, whereas those having diabetes from past 6 – 10 years were 165 (31.7%), 101 (19.4%) participants were having diabetes from past 11 – 15 years and 92 (17.7%) participants were those who had the duration of diabetes for than 15 years.

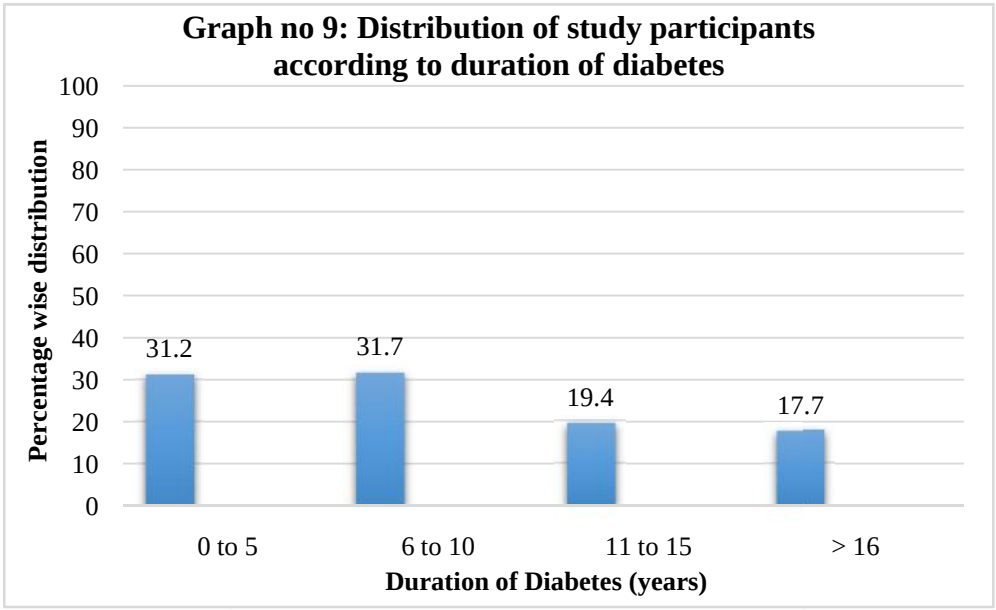


Table No 17: Distribution of study participants according to treatment:

Treatment	Number	Percentage
Oral HypoglycemicAgents	**225**	**43.3%**
Insulin	**18**	**3.5%**
Both	**195**	**37.5%**
NoTreatment	**82**	**15.8%**
Total	**520**	**100%**

Treatment wise distribution in our study we found that 225 (43.3%) patients were only on oral hypoglycemic agents, patients only on insulin regimen were 18 (3.5%), 195 (37.5%) patients were those who were both on oral hypoglycemic agents and insulin and 82 (15.8%) patients were such who were not on any treatment or practiced non pharmacological methods.

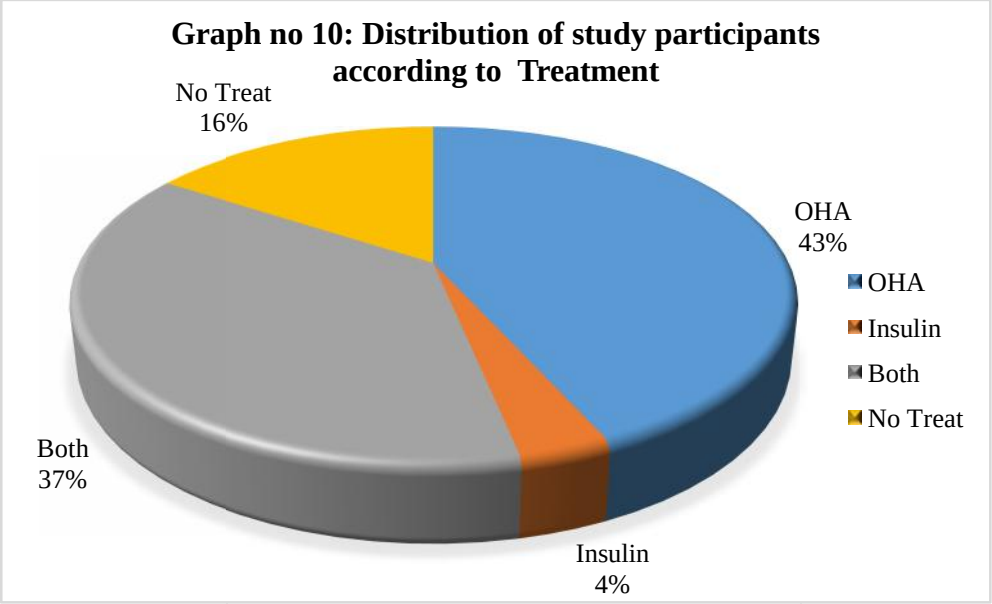


Table NO 18: Distribution of study participants according to their blood glucose levels.

a) Distribution according to Fasting Blood Glucose (FBG) levels:

FBG Level	NUMBER	PERCENTAGE
<126 mg/dl	293	56.3%
>126 mg/dl	227	43.7%
Total	520	100%

b) Distribution according to Post Prandial Blood Glucose (PPBG) levels:

PPBG Level	Number	Percentage
<180mg/dl	337	64.8%
>180mg/dl	183	35.2%
Total	520	100%

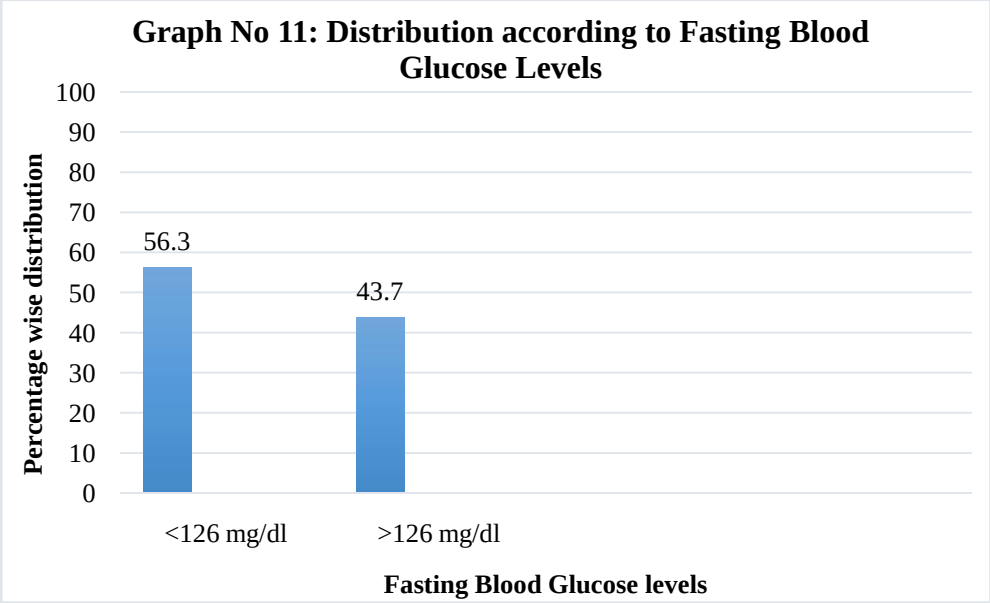
c) Distribution of participants according to their HbA1C levels:

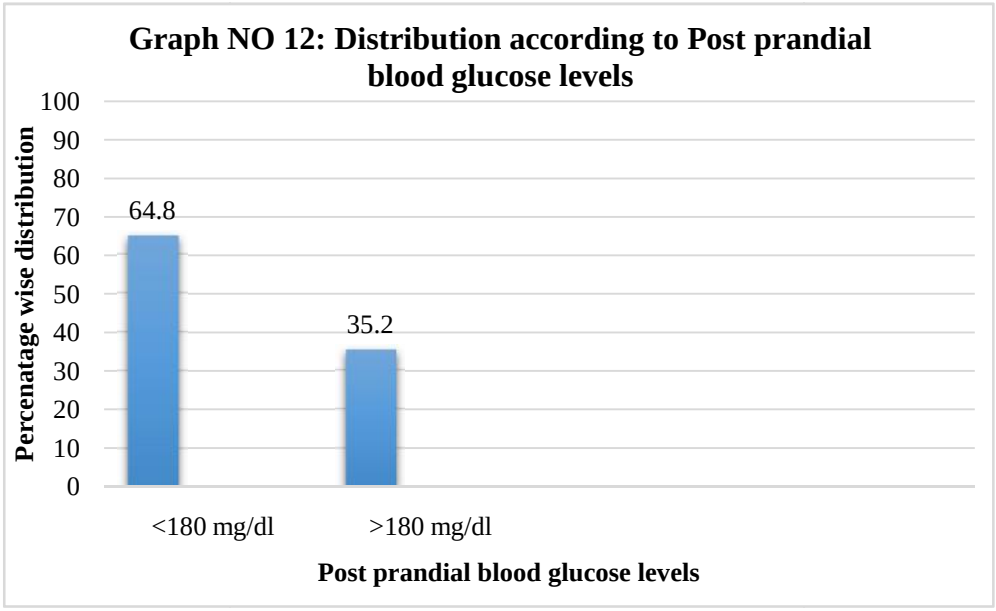
HbA1C Level	Number	Percentage
<7%	169	32.5%
>7%	351	67.5%
Total	520	100%

In our study we found that 293 (56.3%) participants had their fasting blood glucose level under 126 mg/dl, while 227 participants were those whose fasting blood glucose levels were above 126 mg/dl.

It was found that 337 (64.8%) participants had their post prandial glucose levels below 180 mg/dl and 183 (35.2%) were those participants whose post prandial blood glucose levels were above 180 mg/dl.

It was observed that 169 (32.5%) participants had their HbA1C levels <7% and 351 (67.5%) participants had their HbA1C levels >7%.




Graph NO 12: Distribution according to Post prandial blood glucose levels
Percenatage wise distribution
100
90
80
70
60
50
40
30
20
10
0
64.8
35.2
<180 mg/dl
>180 mg/dl
Post prandial blood glucose levels

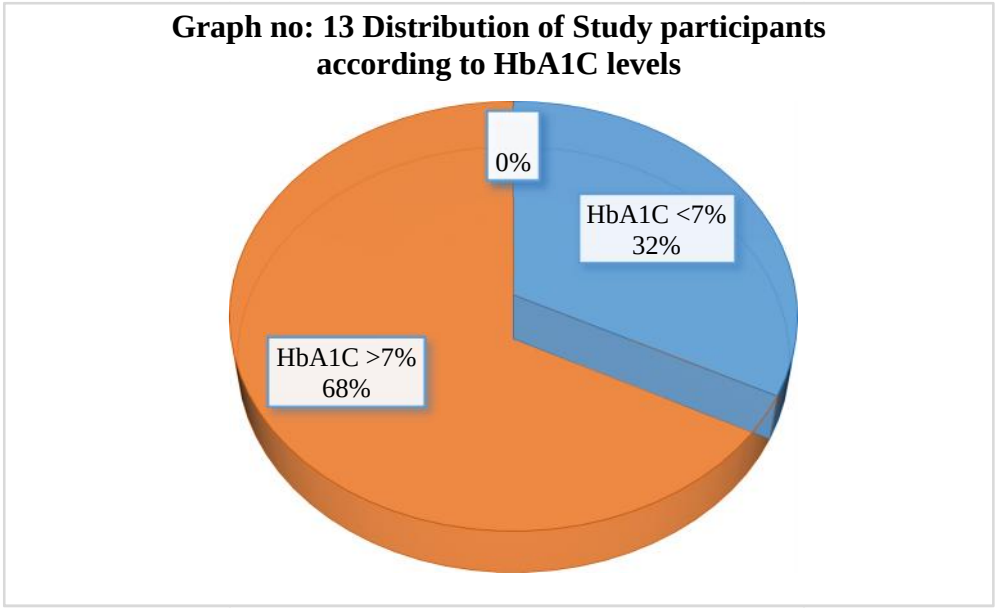

Graph no: 13 Distribution of Study participants according to HbA1C levels
0%
HbA1C <7%
32%
HbA1C >7%
68%

Table NO 19: Distribution of responses in WHO-QOL-BREF questionnaire.

WHO – QOL- BREF	1 (very poor)	2 (poor)	3 (average)	4 (good)	5 (very good)	Mean ± SD
OG: Gen QOL	86(16.5%)	112(21.5%)	271(52.1%)	51(9.8%)	0	2.55± 0.88
Gen Health	2(0.4%)	112(21.5%)	364(70.0%)	42(8.1%)	0	2.86± 0.54
D1: Pain& Discomfort	66(12.7%)	216(42.5%)	216(41.5%)	22(4.2%)	0	2.37± 0.75
Dependence medication	27(5.2%)	140(26.9%)	206(39.6%)	143(27.5%)	4(0.8%)	2.92± 0.88
Energy & Fatigue	47(9%)	188(36.2%)	209(40.2%)	76(14.6%)	0	2.60± 0.84
Mobility	48(9.2%)	168(32.3%)	220(42.3%)	84(16.2%)	0	2.65± 0.85
Sleep & Rest	91(17.5%)	234(45%)	129(24.8%)	65(12.5%)	1(0.2%)	2.33± 0.91
Activities of daily living	51(9.8%)	222(42.7%)	165(31.7%)	81(15.6%)	1(0.2%)	2.54± 0.87
Work Capacity	66(12.7%)	211(40.6%)	191(36.7%)	48(9.2%)	4(0.8%)	2.45± 0.85
D2: Positive feelings	2(0.4%)	116(22.3%)	340(65.4%)	62(11.9%)	0	2.89± 0.58
Spiritual, religion	0	48(9.2%)	392(75.4%)	80(15.4%)	0	3.06± 0.49
Thinking, learning	23(4.4%)	248 (47.7%)	184(35.4%)	61(11.7%)	4(0.8%)	2.57± 0.78
Body Image	14(2.7%)	172(33.1%)	234(45%)	100(19.2%)	0	2.81± 0.77
Self Esteem	15(2.9%)	195(37.5%)	235(45.2%)	72(13.8%)	3(0.6%)	2.72± 0.75
Negative Feelings	61(11.7%)	235(45.2%)	200(38.5%)	24(4.6%)	0	2.36± 0.74
D3: Personal Relation	3(0.6%)	27(5.2%)	320(61.5%)	170(32.7%)	0	3.26± 0.57
Sex Life	450(86.5%)	57(11%)	12(2.3%)	1(0.2%)	0	1.16± 0.44
Practical and social support	1(0.2%)	96 (18.5%)	332(63.8%)	90(17.3%)	1(0.2%)	2.99± 0.61

WHO – QOL- BREF	1 (very poor)	2 (poor)	3 (average)	4 (good)	5 (very good)	Mean ± SD
D4: Safety	1(0.2%)	55(10.6%)	416(80%)	48(9.2%)	0	2.98± 0.45
Home Environment	0	64(12.3%)	275(52.9%)	180(34.6%)	1(0.2%)	3.23± 0.65
Finance resources	78(15%)	212(40.8%)	114(21.9%)	113(21.7%)	3(0.6%)	2.80± 4.02
Information	104(20%)	111(21.3%)	183(35.2%)	114(21.9%)	8(1.5%)	2.64± 1.07
Recreation and leisure	32(6.2%)	157(30.2%)	273(52.5%)	55(10.6%)	3(0.6%)	2.69± 0.76
Physical Environment	0	118(22.7%)	294(56.5%)	108(20.8%)	0	2.98± 0.66
Access Health care	0	74(14.2%)	353(67.9%)	93(17.9%)	0	3.04± 0.56
Transport	1 (0.2%)	91 (17.5%)	305 (58.7%)	120 (23.1%)	3 (0.6%)	3.06 ± 0.65

In our study for WHO – QOL –BREF questionnaire, about 60 – 80 % of the patients responded as “poor to average” except for the domain 4 i.e. environment domain where we have received good and very good responses as well.

Maximum poor response was received in sex life of Domain 3 where 450 (86.5%) participants responded with affected sex life.

Overall General Health: In our study most of the patients had poor to average general quality of life and general health. 112 (21.5%) had responded as poor and 271 (52%) had an average general quality of life.

112 (21.5%) had a poor general health and 364 (70%) of the patients had responded with an average general health overall.

Domain 1: **Physical Domain**: In this it was noted that maximum number of participants i.e. 216 (41.5%) each under poor and average response to pain and discomfort.

It was noted that 140 (26.9%) had poor dependence medication whereas 206 (39.6%) and 143 (27.5%) had average and good responses to dependence medication.

Under energy and fatigue category it was noted that 188 (36.2%) participants reported that they felt fatigue easily which was a poor response, 209 (40.2%) participants reported average response to energy and fatigue and good response was noted from 76 (14.6%) of the participants.

48 (9.2%) of the participants reported to have very poor response to mobility, 168 (32.3%) and 220 (42.3%) participants responded in poor and average variables.

Sleep and rest was disturbed in 91 (17.5%) of the participants who had responded as very poor, whereas 234 (45%) participants were having a poor response towards sleep, 129 (24.8%) participants reported to have average response to sleep and good response was noted in 65 (12.5%) of the participants.

Activities of daily living was hampered in 51 (9.8%) of the individuals who had a very poor response while 81 (15%) of the participants had a good response towards this domain.

Working capacity was found decreased in 211 (40.6%) of the participants who gave a poor response and 191 (36.7%) of the participants had an average response towards this domain.

Domain 2: PSYCHOLOGICAL

In this domain the best response was notedin spirituality and religionbeliefs category where almost 392 (75.4%) and 80 (15.4%) responses were under average to good category.

Worst reported domain was the negative feelings domain where almost 61 (11.7%) and 235 (45.2%) of the participants response was in very poor and poor category.

340 (65.4%) of the participants were such who reported an average sense of positive feeling.

Thinking was adversely affected in the participants with 248 (47.7%) of the participants reported a poor thinking ability and 184 (35.4%) of the participants reported with average thinking capacity.

A 234 (45%) of the individuals were those who reported an average self-esteem while only 72 (13.8%) participants were those who reported with a good self-esteem**.**

Domain 3: SOCIAL ENVIRONMENT

In this the best reported domain was the personal relationships with 320 (61.5%) of the individuals reported with an average score and 170 (32.7%) of the individuals reported with a good response towards personal relationships.

The worst affected domain was the sex life which recorded the highest number of very poor responses 450 (86.5%), only 1 individual reported with a good response towards sex life.

Maximum average response were noted under the practical and social support with 332 (63.8%) responses.

Domain 4: ENVIRONMENT

The most very poor responses were noted in information domain with 104 (20%) of the individuals responded with very poor outlook.

The best response was noted in home environment where around 180 (34.6%) of the individuals reported with good response.

Maximum average response was noted in the safety domain with 416 (80%) of the individuals reported in this sector.

Access to health care was rated average with 353 (67.9%)of the participants reporting it as average.

Access to transport facility had a response of 91 (17.5%) in poor, 305 (58.7%) in average and 120 (23.1%) in good category of response.

Table No 20: Distribution of responses under Appraisal of Diabetes Scale(ADS)

Items	1	2	3	4	5	Mean± SD
How Upsetting is having diabetes for you	Not at all 20 (3.8%)	Slightly upsetting 90(17.3%)	Moderately upsetting 193(37.1%)	Very upsetting 202(38.8%)	Extremely upsetting 15(2.9%)	3.20± 0.89
How much control over your diabetes do you have	Not at all 8(1.5%)	Slightamount 161(31%)	Moderateamount 314(60.4%)	Largeamount 33(6.3%)	Total amount 4(0.8%)	2.74± 0.63
How much uncertainty do you experience in life	Not at all 18(3.5%)	Slightamount 143(27.5%)	Moderateamount 292(56.2%)	Largeamount 61(11.7%)	Very large amount 6(1.2%)	2.80± 0.73
How likely is your diabetes to worsen in next few years	Not at all 44(8.5%)	Slightly likely 212(40.8%)	Moderately likely 205(39.4%)	Very likely 59(11.3%)	Extremely likely 0	2.54± 0.80
Do you believe that achieving good diabetic control is due to your efforts?	Totally because of me 48(9.2%)	Mostly because of me 167(32.1%)	Partly because of me 260 (50%)	Mostly because of other factors 44(8.5%)	Total because of other factors 1(0.2%)	2.58± 0.78
How effective are you in coping with your diabetes?	Not at all 10(1.9%)	Slightly Effective 161(31%)	Moderately effective 320(61.5%)	Very effective 29(5.6%)	Extremely effective 0	2.71± 0.59
To what degree does diabetes get in your way of developing life goals?	None at all 58(11.2%)	Slightamount 188(36.2%)	Moderateamount 240(46.2%)	Largeamount 34(6.5%)	Extremely large amount 0	2.48± 0.78

In the ADS scale almost 40 % to 60 % responses were recorded in the moderate category.

202 (38.8%) of the participants reported that they were very upset of having diabetes, whereas only 20 (3.8%) of the participants were not at all affected by diabetes status in their life. 314 (60.4%) of the participants reported that they had moderate amount of control over their diabetes while 161 (31%) of the participants had slight amount of control and 8 (1.5%) of the participants did not have any control over their diabetes status.

292 (56.2%) participants reported to have experienced moderate amount of uncertainty in their lives because of diabetes, 61 (11.7%) of the participants were such who experienced large amount of uncertainty in their lives, 6 (1.2%) experienced large amount of uncertainty in their lives due to diabetes mellitus.

44 (8.5%) of the participants said that their diabetes will not worsen in the coming years while a good amount of participants 212 (40.8%) of the participants were those who said that their diabetes status is likely to slightly worsen over the coming years, 205 (39.4%) participants reported that there is moderate chance of their diabetes worsening in the coming years.

260 (50%) of the participants stated that achieving good diabetes control is partly because of them and partly because of other factors, whereas 167 (32.1%) of the participants were those who said that achieving diabetes control is mostly because of them, 48 (8.5%) of the participants reported that achieving good diabetes control istotally because of them alone, 44 (8.5%) of the participants were those who reported that achieving good diabetes control is mostly because of other factors.

29 (5.6%) of the participants were those who said that they were very effective in coping with their diabetes status, 320 (61.5%) participants reported that they were moderately effective in this matter while 161 (31%) of the participants said that they were slightly effective in coping with their diabetes status.

58 (11.2%) of the study participants said that diabetes does not get in their way of achieving life goals, 240 (46.2%) had a moderate response to this query and 188 (36.2%) of the participants diabetes affected in a small amount in achieving their life goals and 34 (6.5%) of the participants responded by saying that diabetes gets in their way of achieving life goals in a large way.

Table NO 21: Comparison of HRQOL scores in patients with controlled and uncontrolled diabetes

Domain	All score (mean ± SD)	Controlled Diabetes (<7% HbA1C) = 169 (mean ± SD)	Uncontrolled Diabetes(>7% HbA1C) = 351 (mean ± SD)	p value
ADS	**19.03± 2.87**	**18.50± 3.08**	**19.29± 2.73**	**= 0.003**
WHO – QOL-BREF				
Overall General Health	**5.4± 1.23**	**6.0± 1.13**	**5.1± 1.18**	**<0.001**
Physical	**17.8± 4.64**	**19.35± 5.08**	**17.14± 4.23**	**<0.001**
Psychological	**16.4± 2.88**	**17.3± 3.31**	**15.9± 2.53**	**<0.001**
Social	**7.4± 1.17**	**7.91± 1.22**	**7.17± 1.07**	**<0.001**
Environmental	**23.4± 5.8**	**24.6± 4.52**	**22.83± 6.26**	**= 0.001**

From the above table we can see that ADS score was significantly higher in uncontrolled diabetes participants with a mean and SD of 19.29± 2.73 (p value = 0.003). Overall general health, physical, psychological, social and environmental domain all were significant higher in controlled diabetes as compared to with uncontrolled diabetes. Among the domains overall general health, physical, psychological, social domains were the ones who showed that they were significant with a p- value <0.001.

Table NO 22: Association between Quality of life and Age of the study participants

Quality of Life	Age Category		Total
	≤ 60 years	≥ 60 years	
Very poor	42 (17.2%)	44 (15.9%)	88 (16.5%)
Poor	20 (8.2%)	92 (33.3%)	112 (21.4%)
Average	144 (59%)	127 (46%)	271 (52.1%)
Good	38 (15.6%)	13 (4.7%)	51 (9.8%)
Very Good	Nil	Nil	Nil
Total	244	276	520
$\chi 2$: 57.904	df: 3	p value < 0.001	

In our study we found that Quality of Life had a positive association with age (p value <0.001). In participants less than 60 years reported to have average quality of life by 144 (59%) and good quality of life was reported by 38 (15.6%) of the participants which was higher when compared to participants more than 60 years of age, in whom 92 (33.3%) of the participants reported to have poor quality, average quality of life was reported by 127 (46%) whereas only 13 (4.7%) of the participants reported to have good quality of life. It was observed that quality of life was directly proportional to the age. The association was significant with a p value <0.001.

Table No 23: Association between the Quality of life and duration of diabetes

	0 – 5 years	6 – 10 years	11 – 15 years	>15 years	Total
Very Poor	**29 (17.9%)**	**31 (18.8%)**	**15 (14.9%)**	**11 (12%)**	**86 (16.53%)**
Poor	**14 (8.6%)**	**24 (14.5%)**	**16 (15.8%)**	**58 (63%)**	**112 (21.53%)**
Average	**90 (55.6%)**	**92 (55.8%)**	**66 (65.3%)**	**23 (25%)**	**271 (52.11%)**
Good	**29 (17.9%)**	**18 (10.9%)**	**4 (3.96%)**	**0 (0%)**	**51 (9.8%)**
Very Good	**Nil**	**Nil**	**Nil**	**Nil**	**Nil**
Total	**162**	**165**	**101**	**92**	**520**
$\chi 2$: 134.117		**df: 9**			**p – value: <0.001**

In our study we found that 31 (18.8%) of the patients reported with very poor quality of life in 6 – 10 years of duration of diabetes which was the highest response in this category, 58 (63%) of the patients reported with poor quality of life making it the highest response in patients having duration of diabetes for more than 15 years of duration. Average quality of life was reported in more than half of the patients under all the duration but maximum response was observed in patients with duration of diabetes between 11 – 15 years. 29 (17.9%) of the participants who had duration of diabetes less than 5 years reported to have a good quality of life which was highest under this category. The association was significant with a p value <0.001.

Table No 24: Association between Quality of life with associated Co- morbidities

	Single co-morbidity	Multiple co-morbidity	None	Total
Very Poor	**33 (16.3%)**	**45 (17.4%)**	**8 (13.3%)**	**86 (16.53%)**
Poor	**35 (17.3%)**	**71 (29.5%)**	**6 (10%)**	**112 (21.53%)**
Average	**100 (49.5%)**	**132 (51.2%)**	**39 (65%)**	**271 (52.11%)**
Good	**34 (16.8%)**	**10 (3%)**	**7 (11.7%)**	**51 (9.8%)**
Very Good	**Nil**	**Nil**	**Nil**	**Nil**
Total	**202**	**258**	**60**	**520**
$\chi 2$: 32.011 df: 6 p value <0.001				

In our study we noted that patients with multiple co morbidities reported to have very poor 45 (17.4%) and poor 71 (29.5%) quality of life, whereas good quality of life was noted in 34 (16.8%) of the patients who had single co morbidity associated with diabetes. This table indicated that less the number of co morbidities better was the Quality of Life of the participants. The association was significant with a p value <0.001.

Table No 25: Association between Quality of life and treatment of diabetes mellitus

	OHA	Insulin	Both	None	Total
Very Poor	**31 (13.8%)**	**2 (11.1%)**	**39 (20%)**	**14 (17.1%)**	**86 (16.53%)**
Poor	**68 (30.2%)**	**4 (22.2%)**	**23 (11.8%)**	**17 (20.7%)**	**112 (21.53%)**
Average	**97 (43.1%)**	**11 (66.1%)**	**116 (59.5%)**	**47 (57.3%)**	**271 (52.11%)**
Good	**29 (12.9%)**	**1 (5.6%)**	**17 (8.7%)**	**4 (4.9%)**	**51 (9.80%)**
Very Good	**Nil**	**Nil**	**Nil**	**Nil**	**Nil**
Total	**225**	**18**	**195**	**82**	**520**
$\chi 2$: 30.302		**df: 9**			**p value <0.001**

In the above results we noted that patients both on OHA and insulin reported very poor quality of life 39 (20%) which was the highest response in this category. Whereas those only on OHA reported the highest response for poor quality of life 68 (30.2%), participants only on insulin reported the highest response for average quality of life 11 (66.1%). The association was found to be significant with p- value <0.001.

Table NO 26: Association between Quality of life and HbA1C levels.

	HbA1C <7	HbA1C >7	Total
Very Poor	**0 (0%)**	**86 (24.5%)**	**86 (16.5%)**
Poor	**27 (16.1%)**	**85 (24.2%)**	**112 (21.53%)**
Average	**114 (67.5%)**	**157 (44.7%)**	**271 (52.1%)**
Good	**28 (16.6%)**	**23 (6.6%)**	**51 (9.80%)**
Very Good	**Nil**	**Nil**	**Nil**
Total	**169**	**351**	**520**
$\chi 2$: 67.97	**df : 3**		**p value <0.001**

In our study findings we noticed that participants with poor control of HbA1C 86 (24.5%) had a very poor quality of life whereas participants whose HbA1C was under control reported with average 114 (67.5%) and good 28 (16.6%) quality of life. This table indicates the fact that better the HbA1C status of the participant better was their Quality of Life. The association was found to be significant with p- value <0.001.

Table No 27: Association between Quality of Life with BMI of the study participants

	< 18.49	18.5 – 22.9	23 – 24.9	>25	Total
Very Poor	**2 (18.2%)**	**40 (18.77%)**	**16 (11.18%)**	**28 (18.3%)**	**86 (16.53%)**
Poor	**1 (9.1%)**	**43 (20.18%)**	**39 (27.27%)**	**29 (18.95%)**	**112 (21.53%)**
Average	**6 (54.5%)**	**108(50.70%)**	**70 (48.95%)**	**87 (56.86%)**	**271 (52.1%)**
Good	**2 (18.2%)**	**22 (10.32%)**	**18 (12.58%)**	**9 (5.88%)**	**51 (9.80%)**
Very Good	**Nil**	**Nil**	**Nil**	**Nil**	**Nil**
Total	**11**	**213**	**143**	**153**	**520**
$\chi 2$: 12.46			**df: 9**		**p value = 0.189**

In our study we observed that that persons whose BMI was in the range of 23 – 24.9 had maximum responses in poor quality of life 39 (27.27%), whereas persons whose BMI was in the range of 18.5 – 22.9 had maximum responses in very poor quality of life 40 (18.77%). This association was not reported to be significant with a p value 0.189.

Table No 28: Association between Quality of Life with Education status.

	Illiterate	Primary school	High school	PUC	Graduation	Total
Very Poor	**16 (14.81%)**	**20 (12.90%)**	**33 (21.42%)**	**13 (18.31%)**	**4(12.5%)**	**86 (16.54%)**
Poor	**48 (44.44%)**	**45 (29.03%)**	**13 (8.44%)**	**6 (8.45%)**	**0 (0%)**	**112 (21.54%)**
Average	**41 (37.96%)**	**83 (53.54%)**	**91 (59.09%)**	**41 (57.74%)**	**15 (46.87%)**	**271 (52.11%)**
Good	**3 (2.77%)**	**7 (4.51%)**	**17 (11.03%)**	**11 (15.49%)**	**13 (40.61%)**	**51 (9.81%)**
Total	**108**	**155**	**154**	**71**	**32**	**520 (100%)**
χ^2: 108.94			**df: 12**			**p < 0.001**

In our study we observed that the status of education was positively correlated with the quality of life. As the quality of education increased improvement in quality of life was noted. Those participants whose educational status was high had a better quality of life which is evident from the above table. The association was significant with a p value = 0.001.

DISCUSSION

The present study is an attempt to assess the quality of life in Type 2 Diabetes patients using WHO- QOL- BREF questionnaire and ADS scale .A cross sectional study was conducted at urban health center Ashok Nagar which is the urban field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, KLE University, Belagavi, between the period of January 2015 to December 2015 on 520 Type 2 Diabetes Mellitus patients. The advances which have taken place with today's medical sciences in the treatment of diabetes has resulted in the longer lifespan of patients with diabetes. Further the goal of treatment involves a new holistic approach to improve the Quality of life.

1. Socio-demographic profile of study participants

In the present study the mean age group of the male study participants was 58.86 ± 9.95 years and that of the female participants was 59.82 ± 8.26, the combined mean and standard deviation for the age was 59.34 ± 9.16 years. Of the 520 participants who participated in the study, 2.3% were in the age group of 31 - 40 years, 15.2% were in the age group of 41 – 50 years, 38.1% were in 51- 60 years age group, 36.2% in the age group of 61- 70 years, 7.1% participants were in the age group 71 – 80 years and 1.2% of the participants belonged to the age group of 81 – 90 years. The total male participants in our study were 264 (50.76%) and female participants were 256 (49.24%). In a study conducted in Kolar, Karnataka[16] there were totally 180 participants out of which 90 were males and 90 were females which is on par with our studies, the mean age of males was 59.56 ± 9.64 and females was 60.90 ± 7.51. Another study done in Neyshabur, Iran[24] the mean age of study

population was 35.1 ± 7.7 years (Range: 21-65 years) out of which females were 318 (60.9%) with a mean age of 33.38 ± 6.67, male participants were 204 (39.1%) with a mean of 37.76 ± 8.29. In another study conducted in Gujarat[15] the mean and standard deviation for the age were 56.8 ± 10.5 and male participants were 42.1% and female participants 57.9% which is slightly higher in comparison to our study **(Table No 1, 2)**.

In the present study 65.96% were Hindus, 18.07% were Muslims, 12.3% were Christians and participants belonging to other religion were 3.65%, whereas a study conducted in Gujarat[15], showed that 50.9% of study participants were Hindus and 49.1% were Muslims **(Table 3)**.

In our study, 20.8% were found to be illiterate, 29.8% had primary school education, 29.6% had secondary education, 13.7% had PUC education and 6.2% were graduated. A study conducted in Vellore, Tamil Nadu[17] showed that, only 9% of the study participants were educated more than 12th standard and 30% of the study participants did not receive any kind of formal education which is lower than our study. This difference may be because our study was conducted in an urban area as compared to the study conducted in Vellore which was in rural area **(Table No 4)**.

In the present study, majority of the females were housewives 91.8% and only 8.2% were working women whereas 0% of the males were unemployed, retired, pensioners were 42.8%, 2.7% were government employees, 10.2% were employed in private sector and those involved in business were 44.3%. Similarly a study done in Central India[30] showed that the unskilled workers were 35.71%, professional workers were 14.29% and those involved in business were 28.57% which was higher than our study. The difference is comparable as our study was carried in a community set up as

compared to the study done in Central India which was carried out in a tertiary care hospital set up **(Table 5)**.

In the present study 74.8% of the study participants were married, 23.7% were widowed/widower, unmarried or separated were 1.5%. Whereas in study conducted in Gujarat[15], 73.7% of the participants were married, 7% were single and 19.3% were widowed the results are comparable to our study. In our study, participants who belonged to nuclear family were 34.23%, those residing in joint family were 66.92%. In another study done in New Delhi[45], it was observed that 63.8% belonged to nuclear families, and 36.1% belonged to joint families which was a bit higher when compared to our study. In another study carried out in Mangalore[31] it was observed that 78% of the participants resided in a nuclear family and 22% resided with a joint family which was exactly opposite as compared to our study, the difference may be because of the fact that our study involved a larger sample size and study area was a community setup, as compared to a smaller sample size and hospital based setup of the study done in Mangalore **(Table No: 6 and 7)**.

In the present study, only 3.8% belonged to class I socio economic status, 21.9% to class II, 43.5% to class III, 26.2% to class IV and 4.6% belonged to class V. A study conducted in Vellore, Tamil Nadu[17] showed that 4% of the study participants belonged to class II, 9% of the study participants belonged to class III, 63% of the study population to lower middle class (class IV) and about 24% of the study participants belonged to lower class (class V), participants belonging to class IV and V is high in comparison to our study the reason may be because of the fact that the study was carried out in a secondary care based facility which mainly caters for rural population **(Table No: 8)**.

In our study 35.76% of the participants reported to have family history of diabetes mellitus, 21.73% of the participants responded by saying that they did not have any family history of diabetes mellitus whereas 42.50% of the participants said that they did not know about the history of disease in their parents. In a similar study done in Mangalore[31], it was observed that 33% had family history of diabetes which is almost about similar to our study. In another study done in Saudi Arabia[33], showed that 56.9% of the participants had family history of diabetes and 43.1% of the participants did not have any history of diabetes **(Table No: 9)**.

In the present study 66.7% of study participants did exercise regularly, 12.5% claimed that they did exercise occasionally and 20.8% of the participants responded by saying that they did not do any form of exercise, whereas a study conducted in Patiala, Punjab[22] showed that 55 % of the diabetes patients indulged themselves in physical exercise which was less as compared to our study. In another study carried out in Mangalore[31] it was observed that regular physical activity was undertaken by less than 46.5% of the study participants which is again less as compared to our study. **(Table No: 11)**.

In the present study 2.11% of the participants were underweight with a BMI less than 18.4kg/m^2, 69.23% of the participants were found to have BMI within the normal range of 18.5 – 22.9kg/m^2, 28.65% of the participants were overweight with BMI in the range of 23 – 24.9kg/m^2 and 29.42% of the study participants were obese with BMI more than 25kg/m^2, whereas in a study done in Vellore, Tamil Nadu[17] 15% of the study participants were underweight which is comparatively higher to our study, 26% of the participants had their BMI in the normal range which is lower in comparison to our study and 30% of the participants were overweight which is

slightly higher to our study and 29% of the study participants were obese which is comparable to our study. In another study conducted in Gujarat[15] 36.8% of the participants were in the normal/underweight category, which was comparatively less to our study. In another study done in Southern India[19] it was noticed that 78.8% of the study participants had their BMI in the normal range which is comparatively high to our study and 17% had BMI >25 kg/m^2 **(Table No: 12).**

2. Diabetes Profile of the Study Participants:

In the present study, 172 (33.1%) complained of polyuria, 49 (9.4%) complained of polydipsia, 56 (10.8%) of polyphagia, 150 (28.8%) of the participants reported with more than one symptom, 15 (2.9%) reported with all the three cardinal symptoms while 78 (15%) of the participants did not have any symptom. A study conducted in Gujarat[15] showed that polyuria was reported by 47.4% of the participants, 31.6% of the participants reported with polydipsia, 17.5% of the participants reported with polyphagia which was much higher when compared to our study this difference might be due to the fact that our study was community based and their study was hospital based in which the patients must have been more oriented to the signs and symptoms associated with diabetes **(Table No: 14).**

In our study, we found that Hypertension was the most common single co-morbidity 115 (22.1%), retinopathy was reported by 23 (4.42%), neuropathy was seen in 28 (5.38%), nephropathy was seen in 1 (0.19%) of the study participants, multiple co-morbidities were associated with 258 (49.61%) and 60 (11.53%) of the study participants reported with no co - morbidities. In a similar study carried out in Uganda[27] it was noted that 25.6% of the participants reported with hypertension, retinopathy was reported by 33.8% of the participants which is high in comparison to

our study. In another study conducted in Central India[30] it was seen that retinopathy was reported by 11.43%, nephropathy by 22.86% and neuropathy was seen in 31.43%, the findings are much higher when compared to our study, the difference may again be due the fact that both these studies were carried out in hospital with better diagnostic facilities as compared to our study which was a community based **(Table No: 15).**

In our study we see that 162 (31.2%) of the study participants had diabetes for less than 5 years, 165 (31.7%) of the study participants had diabetes in between 6 – 10 years, 101(19.4%) of the participants had diabetes from past 11 – 15 years and 92 (17.7%) participants were those who had diabetes for > 15 years of duration, whereas study conducted in Saudi Arabia[33], showed that 22.6% of the participants duration of diabetes was less than 5 years, 20.8% of the participants duration of diabetes was between 6-10 years, 26.5% of the participants duration of diabetes was in the range of 11 – 15 years, 30% of the participants had their duration of diabetes for more than 16 years the findings are comparable to our study (Table No 16).

In our study, 225 (43.3%) of the participants were on oral hypoglycemic agents as compared on only 18 (3.5%) of the participants were exclusively on insulin therapy whereas 195 (37.5%) of the participants were taking both oral hypoglycemic agents as well as insulin and 82 (15.8%) of the participants were those who were not on medications. In a similar study done in New Delhi[45] it was seen that 70.77% of respondents were on oral hypoglycemic agents which is higher as compared to our study. In another study done in Saudi Arabia[33] it was noticed that 26.9% of the study participants were on insulin alone, 49.8% of the participants were on oral hypoglycemic agents which is higher in comparison to our study and 23.3% of the

study participants were on combination of both which is less as compared to the results of our study **(Table No 17).**

In our study it was observed that 293 (56.3%) of the study participants had their FBG levels below 126mg/dl whereas 227 (43.7%) of the study participants had their FBG levels more than 126mg/dl. It was also noted that 337 (64.8%) of the study participants had their PPBG levels below 180mg/dl, whereas 183 (35.2%) of the study participants had high PPBG levels (>180 mg/dl), similarly 169 (32.5%) of the study participants had good glycemic status (HbA1C <7%) and 351 (67.5%) of the study participants had poor glycemic status (HbA1C >7%). A study done in Patiala, Punjab[22] showed 44.8% of the participants with good glycemic control of HbA1C <7% which was higher as compared to our study and 55.2% of the participants had poor control of glycemic status which is less in comparison to our study. In another study conducted in Kenyatta[25] 24.5% of the participants met the recommended HbA1C target level of <7%, which is a bit low when compared with our study **(Table No 18).**

3. World Health Organization QOL- BREF Questionnaire:

In our study, we found that in WHO-QOL-BREF questionnaire majority of the participants 271 (52.1%) reported to have an average general quality of life, 86 (12.5%) of the participants reported to have very poor quality of life and 112 (21.5%) of the participants reported with a poor quality of life, in a study conducted in Southern India[19] it was observed that 7% of the participants reported with poor quality of life, 38.5% of the study participants reported with average quality of life which is less as compared to our study probably because we involved a large sample size of 520 in comparison with their study which had a smaller sample size of 52. In another

study carried out in Guajrat[15] it was noted that 38.6% of the participants had an average general quality of life, 36.8% of the participants had a poor quality of life and 1.8% reported with very poor quality of life which is again less as compared to our study the reason for higher poor quality of life in our study may be that we involved participants from all socio economic classes across the society and a larger sample size in comparison to study done in Gujarat.

In our study sex life was maximally impacted domain with 450 (86.5%) of the study participants reported to have a very poor sex life, whereas maximum average responses were reported in the environmental domain with 416 (80%) of the participants reported that they had an average safe environment at home and maximum good responses were noted in home environment domain under the environment domain in which 180 (34.6%) of the participants reported to have on an average a good environment at home. In a study conducted in Gujarat[15] it was also observed that social domain of QOL was affected maximally which is similar to our study and physical domain was least affected which is different in comparison to our study. In a study conducted in Kolar, Karnataka[16] it was observed that all the four domains were affected in diabetes patients leading to poor quality of life. This difference when compared to our study may be because of the fact that the Kolar study was done in rural area whereas our study was done in an urban area **(Table No: 19).**

4. Appraisal of Diabetes Scale:

In the present study, maximum poor responses were observed in Question number 1 under ADS (How upsetting is having diabetes for you?) with mean of 3.20 ± 0.89 and the best response was observed in Question number 7 (To what degree

does diabetes get in your way of developing life goals?) with a mean of 2.48 ± 0.78. In a study done in Gujarat[15] Question number 1 (How upsetting is having diabetes for you?) was most affected with a mean of 3.32 ± 0.66 which is similar to our study and the best reported response was in Question number 2 (How much control over your diabetes do you have?) with a mean of 2.07 ± 0.84 which was different when compared to our study which may be of the fact that their study involved mainly patients attending diabetes OPD. In another study carried out in New York[46] it was seen that most poor responses were observed in Question number 4 (How likely is your diabetes to worsen in next few years?) with a mean of 3.025 ± 0.943 and the best response was observed in Question number 5 (Do you believe that achieving good diabetic control is due to your efforts?) with a mean of 2.457 ± 0.843 which is different as observed in our study probably due to the difference in sample size as our study we had a sample size of 520 as compared to a sample size of 200 in New York study **(Table No: 20).**

5: Comparison between WHO-QOL- BREF and ADS:

ADS score was higher in uncontrolled type 2 diabetes participants with a mean of 19.29 ± 2.73 which signifies poor quality of life in uncontrolled type 2 diabetes mellitus participants. WHO-QOL-BREF domain score were higher in patients with controlled diabetes as compared to uncontrolled diabetes, significant difference is noted in all the five domains irrespective of generic or disease specific QOL instruments and it depicts poorer QOL in uncontrolled diabetes mellitus patients, which was very much similar to the study done in Gujarat[15] expect for the physical domain which was low in controlled diabetes mellitus participants **(Table No: 21).**

6: Association of Quality of Life with various Variables:

In our study quality of life in Type 2 Diabetes Mellitus was seen to be significantly associated with the age of the participants, duration of diabetes mellitus, association of co-morbidities, treatment of diabetes mellitus, educational status and HbA1C levels with p value <0.001, whereas negative association was noted with sex of the participants (p value = 0.843), presence of the cardinal symptoms of diabetes (p value= 0.234), and with BMI levels (p value =0.189). A study done in Gujarat[15] showed that older age, female sex, symptoms, presence of co morbidities and non-pharmacological measures were all positively associated with the Quality of life whereas symptoms, duration of diabetes showed negative correlation with the quality of life which is different as compared to the findings in our study. In another study carried out in Kolar, Karnataka[16] it was observed that increase in age was correlated positively among four domains of QOL, negative co-relation was noted with factors such as BMI and obesity the findings are similar with the observations in our study. In another study conducted in Kenyatta[25] it was observed that poor quality of life was significantly associated with age, level of income and health care financing, employment status, duration of diabetes and its complications which was comparable to our study in age and duration of diabetes. In a study conducted in Southern India[19] significant association was noted between the state of therapeutic control (treatment) and the quality of life of patients with diabetes which was similar to our study **(Table No: 22 -28).**

CONCLUSION

The quality of life was affected in Type 2 Diabetes Mellitus patients. Now a days with advances in treatment and patient care quality of life has gained more importance and is considered as one of the important measurement in the success of treatment. In our study it was observed that participants had poor to average quality of life with poor quality of life being reported in 38% of the participants and average quality of life being reported among 52.1% of the participants. Age, duration of diabetes, associated co- morbidities, treatment regimen and glycemic status played a significant role in the outcome of quality of life. There is a need for diabetes education for patients with diabetes mellitus so as to make them ready to cope with the complications as a result of the disease and help them to adjust better. Larger studies are needed to analyze the associated factors influencing the quality of life in Type 2 Diabetes Mellitus patients. Based on these results it can be concluded that, WHO- QOL- BREF and ADS questionnaire are reliable in assessing the quality of life in Type 2 Diabetes patients.

LIMITATIONS

The limitations of the study are:

- The results of the study would have been more generalizable if all Type 2 Diabetes Mellitus patients in the study area would have been included.
- A follow up of study participants would have given us more information regarding the domains of quality of life.
- Information regarding associated morbidities in some of the study participants was self-reported which could have led to recall bias.
- It was not possible to investigate all the study participants for HbA1C levels due to financial constraint.

RECOMMENDATIONS

On the basis of this study, following recommendations are being suggested to improve the quality of life in Type 2 Diabetes Mellitus patients:

- Universal screening for diabetes mellitus is suggested.
- Diabetes education by a trained Diabetes Educator is suggested in all patients diagnosed with diabetes to help them to lead a better life.
- Life style modification w.r.t diet, exercise and diabetes should be started at an early age and continued.
- Self-care in diabetes should be practiced and encouraged, patients should be taught about self-monitoring of blood glucose (SMBG), eye care, foot care etc.
- Regular checkup of blood glucose, consultation with doctor and adherence to the line of treatment should be strictly followed.

SUMMARY

The present study was a cross sectional study undertaken to assess the quality of life in Type 2 Diabetes Mellitus patients.

This study was carried out in Urban Health Center of Ashok Nagar which is urban field practice area of Department of Community Medicine, J. N. Medical College, Belagavi. A total of 520 Type 2 Diabetes Mellitus patients were included for the study and the duration of study was one year from 1st January 2015 to 31st December 2015. A pre-designed and pre-tested questionnaire was used to collect the data from the participants. Quality of life of the participants was assessed using WHO-QOL-BREF and Appraisal of Diabetes Scale questionnaire.

In the current study, majority i.e. 38.1% participants belonged to 51-60 years of age group and mean age was 59.34 ± 9.16, 65.96% were Hindu by religion. A large number of study participants 29.8% had studied only up to primary level. As many 91.8% of the female participants were housewives and 44.3% of the male participants were involved in business. 66.92% of the participants were living in a joint family. Most of the participants belonged to class III socio-economic status as per modified B. G. Prasad classification. In this study, 66.7% of the participants engaged themselves in regular physical activity. 85% of the participants were symptomatic, with polyuria being the most common symptom reported. Hypertension was the most common single co-morbidity reported in 22.1% of the participants, 31.7% of the participants reported to have diabetes from past 6 -10 years. Oral hypoglycemic agents was the most common modality of treatment.

351 (67.5%) of the participants had a poor glycemic control with HbA1C levels >7%.

Majority of the participants reported with an average quality of life 271 (52.1%). Sex life was the most affected domain among the participants and 34.6% of the participants reported with good home environment under WHO-QOL-BREF questionnaire.

Majority of the participants reported as saying that it was very upsetting for them to have diabetes (mean of 3.20 ± 0.89) and the best response was observed in question number 7, with a mean of 2.48 ± 0.78 under Appraisal of Diabetes Scale.

Mean BMI of the study participants was 23.42 ± 2.62 kg/m^2 and 69.23% had normal BMI.

Statistically significant association was observed with factors such as age, duration of diabetes mellitus, presence of co-morbidities, treatment modalities, education status and HbA1C levels with p values <0.001.

The increased trend of Diabetes Mellitus in India has become a major public health problem. Timely action should be taken to screen all the individuals who are at risk for developing the disease with glucose tolerance test. The following measures like, a healthy diet, regular physical activity and regular follow up at diabetes clinics, would definitely help the patients of Type 2 Diabetes to cope up better with the disease. Good health education will help these patients to identify the complications associated with diabetes at an early stage and help them to lead a better quality of life.

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ANNEXURE – I – ETHICAL CLEARANCE LETTER

K.L.E.UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
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Ref: MDC/DOME/ 178 **Date: 14/11/2014**

To,

(REG.NO.BD0114002)
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"ASSESSMENT OF THE QUALITY OF LIFE IN TYPE – 2 DIABETES MELLITUS PATIENTS USING WORLD HEALTH ORGANIZATION QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr.Hema Dhumale)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr.Ganga Pilli)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

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ANNEXURE II

INFORMED CONSENT

ASSESSMENT OF QUALITY OF LIFE IN TYPE 2 DIABETES MELLITUS PATIENTS USING WHO-QOL-BREF QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE

INVESTIGATORS: _____

_____

Introduction

Diabetes mellitus is a major public health problem. Diabetes mellitus is associated with increased incidence of hypertension, cardio vascular diseases, kidney diseases and risk of developing number of morbidities in later life. Therefore this study is being conducted to find out the Quality of life in Type 2 diabetes mellitus residing in the area of urban health centre Ashok Nagar, Belagavi and you are invited to participate in this study. Participation in this study is completely voluntary.

Explanation of procedures

In this study you will have to answer a few questions about your general socio-demographic details, about general quality of life your perception about various domains of life under WHO-QOL-LIFE BREF questionnaire and about your outlook towards life with diabetes under Appraisal of Diabetes Scale. The entire procedure may take about 45 mins.

Possible benefits

The investigator does not promise or guarantee that you will receive direct benefit being in the study. It will benefit the whole community because by this study

we will know the quality of life in Type 2 Diabetes Mellitus patients, and accordingly the preventive, control and health education measures can be taught.

Possible risks

There are no risks involved for participation in the study

Confidentiality

Your identity will not be revealed. All information collected will be coded so that no one come to know your identity.

Withdrawal

Participation in this study is voluntary. If you do not wish to participate in this study, you will not lose any benefits to which you are entitled.

Costs of participation

The cost of the study will be borne by the researcher. There will be no additional cost to you for participating in this study.

Payment of participation

There will be no incentives to you for participating in this study.

Authorization to publish results

The researchers may use the information gathered from this study for presentation in scientific journals. However your identity will not be disclosed in such presentation or publication.

Legal rights

By signing this consent form, you are not waiving any of your legal rights.

Questions

If you have any questions about this study, you may contact Dr. Ganga S. Pilli, Chairman, JNMC Institutional Ethics Committee on human subjects research at 0831-2741701.

Consent statement

I volunteer and consent to participate in this study. I have read the consent or explained to me in my local languages. The study has been fully explained to me and I have been given an opportunity to ask questions and that they have been answered to my satisfaction and I have received a copy of this signed consent form.

Name of the participant: _____ Signature/ left thumb impression

Name of the eyewitness: _____ Signature/ left thumb impression

Name of the interviewer: _____ Signature

Date: | | | |

ANNEXURE III – PROFORMA

K.L.E. UNIVERSITY's

J.N.MEDICAL COLLEGE, BELAGAVI

DEPARTMENT OF COMMUNITY MEDICINE

RESEARCH QUESTIONNAIRE

Investigator:

"ASSESSMENT OF QUALITY OF LIFE IN TYPE 2 DIABETES MELLITUS PATIENTS USING WHO-QOL-BREF QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE"

PART - I SOCIO DEMOGRAPHIC DATA

SOCIO DEMOGRAPHIC DATA

Name :

_____

Age : _____years Sex: M / F

Area of residence :

_____

1. Religion: 1. Hindu
   2. Muslim
   3. Christian
   4. Others (specify).
2. Education: 1. Illiterate
   2. Primary school
   3. High school
   4. Pre-university I
   5. Pre-university II
   6. College

3. Occupation: House wife/ Govt. Job/ Private Job / Business / others specify _____

   Is your work is related to radiation exposure? Yes / No

4. Marital status:

   1. Married
   2. Widowed
   3. Divorced / Separated

5. Type of Family: 1. Joint
   2. Nuclear
   3. Broken family
   4. Problem family

6. a. Monthly income of the family:

   b. Total number of family members:

   c. Monthly per capita income:

   d. B.G Prasad class:

7. General Physical Examination: _____

8. Systemic Examination:

   CVS: CNS:

   R/S: P/A:

9. Family History:

10. Duration of Diabetes: a) 0 – 5 years (b) 6 -1 0 years (c) 11 – 15 years (d) > 16 years

11. Past H/O: HTN/IHD/CVA/RETINOPATHY/NEPHROPATHY

12. Symptoms: Polyuria/polydipsia/polyphagia/ all three / none

13. Medications: 1) OHA 2) INSULIN 3) BOTH 4) NONE

14. World Health Organization Quality Of Life BREF (WHOQOL – BREF) Questionnaire:

Items WHOQOL-BREF	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Overall General Health i) General QOL ii) General Health					
Physical iii) Pain and discomfort iv) Dependence medication v) Energy and fatigue vi) Mobility vii) Sleep and rest viii) Activities of daily living ix) Working capacity					
Psychological x) Positive feelings xi) Spirituality, religion and personal beliefs xii) Thinking, learning memory, concentration xiii) Body image xiv) Self esteem xv) Negative feelings					
Social xvi) Personal relations xvii) Sex life xviii) Practical social support					
Environment xix) Safety xx) Home environment xxi)Financial resources xxii) Information xxiii) Recreation and leisure xxiv) Physical environment xxv) Access to health care xxvi) Transport					

Scoring will be done as shown above ranging from very poor, poor, average, good, and very good scores allotted will be from 1 to 5 respectively.

15) Appraisal of Diabetes Scale (ADS) QUESTIONNAIRE:

Items	1 Not at all	2 Slightly upsetting	3 Moderately upsetting	4 Very upsetting	5 Extremely upsetting
i) How upsetting is having diabetes for you?					
ii) How much control over your diabetes do you have?					
iii) How much uncertainty do you currently experience in your life as a result of being diabetic?					
iv) How likely is your diabetes to worsen over the next several years?					
v) Do you believe that achieving good diabetic control is due to your efforts as compared to factors which are beyond your control?					
vi) How effective are you in coping with your diabetes?					
vii) To what degree does your diabetes get in the way of your developing life goals?					

Scale will be graded as described above from 1 to 5

Not at all: 1, slightly upsetting: 2, moderately upsetting: 3, Very upsetting: 4, extremely upsetting: 5

16) FBS:

17) PPBS:

18) HbA1c

19) Whether doing physical exercise:

a) Regularly

b) Irregularly/ Occasionally

c) Not doing at all

20) Diet: a) Vegetarian

b) Non- Vegetarian

c) Vegetarian and Non Vegetarian

21) BMI: _____ kg/m^2

ANNEXURE V – KEY TO MASTER CHART

A. Serial Number

B. Age in years.

C. Sex :

1. Male
2. Female

D. Area of residence

1. Ashok Nagar
2. Shri Nagar
3. Police Lines
4. Nehru Nagar
5. Others

E. Religion

1. Hindu
2. Muslim
3. Christian
4. Others

F. Education

1. Illiterate
2. Primary school
3. High school
4. PUC
5. College / Graduation

G. Occupation

1. Housewife
2. Govt. Employee
3. Private Employee
4. Business
5. Others (Retd/ pensioners)

H. Exposure to Radiation:

1. Yes
2. No

I. Marital Status

1. Married
2. Widowed
3. Divorce / Separated

J. Type of Family :

1. Joint
2. Nuclear
3. Broken Family
4. Problem Family

K. Monthly Income :

1. < 5000 rupees
2. 5001 – 10000
3. 10001 – 15000
4. > 15001 rupees

L. Total number of family members

1. 0 – 2
2. 3 – 4
3. 5 - 6
4. > 7

M. Monthly Per capita Income:

1. > Rupees 5965
2. Rupees 2983 – 5905
3. Rupees 1789 – 2923
4. Rupees 895 – 1730
5. Below Rupees 895

N. Modified B.G. Prasad Classification of Socio Economic Status:

1. Class I : Above Rupees 5965
2. Class II Rupees 2983 - 5905
3. Class III Rupees 1789 – 2983
4. Class IV Rupees 897 – 1730
5. Class V Below Rupees 895

O. General Physical Examination:

1. Pulse Rate
2. Blood pressure

P. Systemic Examination :

Q. Family History of Diabetes

1. Yes
2. No
3. Don’t Know

R. Duration of Diabetes :

1. 0 – 5 years
2. 6 – 10 years
3. 11 – 15 years
4. > 16 years

S. Past History

1. Hypertension
2. Ischemic Heart Disease
3. Cerebro Vascular Accidents
4. Retinopathy.
5. Neuropathy.
6. Nephropathy.
7. Others.
8. None

T. Cardinal Symptoms of Diabetes :

1. Polyuria
2. Polydipsia
3. Polyphagia
4. More than one
5. All three.
6. None

U. History of Medication :

1. Oral Hypoglycemic Agents
2. Insulin
3. Both
4. None

WHO – QOL- BREF Questionnaire, the response were graded on Likert scale as shown in the questionnaire?

V. General Quality of Life

W. General Health

X. Pain and Discomfort

Y. Dependence Medication

Z. Energy and Fatigue

AA. Mobility

AB. Sleep and Rest

AC. Activities of Daily Living

AD. Working Capacity

AE. Positive Feelings

AF. Spirituality, religion and personal beliefs

AG. Thinking, learning, memory, concentration

AH. Body Image

AI. Self Esteem

AJ. Negative Feelings

AK. Personal Relations

AL. Sex Life

AM. Practical Social Support

AN. Safety

AO. Home Environment

AP. Financial Resources

AQ. Information

AR. Recreation and Leisure

AS. Physical Environment

AT. Access to Health care

AU. Transport

APPRAISAL OF DIABETES SCALE: responses were again graded for 1 to 5 as described in the questionnaire (1 = very poor and 5 = very good)

AV**.** How upsetting is having diabetes for you?

AW. How much control over your diabetes do you have?

AX. How much uncertainty do you currently experience in your life as a result of being diabetic?

AY. How likely is your diabetes to worsen over the next several years?

AZ. Do you believe that achieving good diabetic control is due to your efforts as compared to factors which are beyond your control?

BA. How effective are you in coping with your diabetes?

BB. To what degree does your diabetes get in the way of your developing life goals?

BC Fasting Blood Glucose:

1. <126 mg/dl
2. > 126 mg/dl

BD. Post Prandial Blood Glucose:

1. < 180 mg/dl
2. > 180 mg/dl

BE. HbA1C level:

1. < 7 %
2. > 7%

BF. Diet:

1. Vegetarian
2. Non Vegetarian
3. Vegetarian and Non Vegetarian

BG. Exercise:

1. Regular
2. Occasional
3. Not doing

BH. BMI: _____ kg/m^2

"ASSESSMENT OF QUALITY OF LIFE IN TYPE 2 DIABETES MELLITUS PATIENTS USING WORLD HEALTH ORGANIZATION QUALITY OF LIFE BREF QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE- A CROSS SECTIONAL STUDY"

Submitted By

(REG.NO.BD0114002)

DISSERTATION

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in

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DEPARTMENT OF COMMUNITY MEDICINE,
JAWAHARLAL NEHRU MEDICAL COLLEGE,
BELAGAVI, KARNATAKA

APRIL 2017

KLE UNIVERSITY, BELAGAVI, KARNATAKA

Endorsement by the HOD, Principal/ Head of the Institution

This is to certify that the dissertation entitled **"ASSESSMENT OF QUALITY OF LIFE IN TYPE 2 DIABETES MELLITUS PATIENTS USING WORLD HEALTH ORGANIZATION QUALITY OF LIFE BREF QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE – A CROSS SECTIONAL STUDY"** is a bonafide research work done by **(REG.NO.BD0114002).**

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UNDERTAKING

I, **(REG.NO.BD0114002)** hereby declare that the information and the data mentioned in my thesis entitled "**ASSESSMENT OF QUALITY OF LIFE IN TYPE 2 DIABETES MELLITUS PATIENTS USING WORLD HEALTH ORGANIZATION QUALITY OF LIFE BREF QUESTIONNAIRE AND APPRAISAL OF DIABETES SCALE – A CROSS SECTIONAL STUDY"** belongs to me and is original.

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Date:

Place: Belagavi **REG. No. BD0114002**

LIST OF ABBREVIATIONS USED

ADS	-	Appraisal of Diabetes Scale
ADDQOL	-	Audit of Diabetes Dependent Quality of Life
BMI	-	Body Mass Index
BP	-	Blood Pressure
Cms	-	Centimeters
DM	-	Diabetes Mellitus
df	-	Degree of Freedom
FBG	-	Fasting Blood Glucose
Hb	-	Haemoglobin
HbA1C	-	Glycosylated Haemoglobin
HRQOL	-	Health Related Quality of Life
IDF	-	International Diabetes Federation
i.e	-	that is
kgs	-	kilograms
mg/dL	-	Milligram per deciliter
NCD	-	Non Communicable Disease
OPD	-	Out Patient Department
PPBG	-	Post Prandial Plasma Glucose
PUC	-	Pre University College
QOL	-	Quality of Life

QOLID	-	Quality of Life for Indian Diabetic Patients
SD	-	Standard Deviation
SMBG	-	Self Monitoring of Blood Glucose
SPSS	-	Statistical Product and Service Solutions
T2DM	-	Type 2 Diabetes mellitus
UHCs	-	Urban Health Centres
vs	-	Versus
WHO	-	World Health Organization
WHO- QOL- BREF –		World Health Organization Quality of Life Bref questionnaire
w.r.t.	-	with respect to
Yrs	-	Years
χ^2	-	Chi – square test

ABSTRACT

BACKGROUND

Diabetes is one of the most common non communicable disease (NCD).The prevalence of GDM in India varies from 3.8 to 21% in different part of country, depending on geographical locations. In 2015, India had around 69.1 million people with Type 2 Diabetes, which is predicted to reach about 100 million in 2030 as estimated by the International Diabetes Federation (IDF), Belgium. Detrimental effect of diabetes has been noted on the quality of life of patients**.** Diabetes has had a notable impact on the Quality of life of patients. Patients are at an increased risk of micro and macro vascular complications. All this leads to a poor quality of life. This part of North Karnataka such studies are rare and thus a need for such study arises.

OBJECTIVES

To assess the quality of life in Type 2 Diabetes Mellitus patients using WHO-QOL-BREF and ADS questionnaire.

METHODOLOGY

A cross sectional study was done in UHC Ashok Nagar, which is urban field practice area of Jawaharlal Nehru Medical College, Belagavi. Data was collected from 520 Type 2 Diabetes Mellitus (T2DM) patients residing in the area of UHC Ashok Nagar. Information on socio demographic details and risk factors associated with T2DM were obtained. Quality of Life in T2DM patients was assessed using WHO-QOL-BREF and ADS questionnaire. Responses were graded as per the Likert scale from 1 – 5 (1 being very poor – 5 very good).

RESULTS

Majority of the participants reported with an average quality of life (52.1%). Sex life was the most affected domain, 34.6% of the participants reported with good home environment under WHO-QOL-BREF questionnaire. Most of the participants reported as saying that it was very upsetting for them to have diabetes (mean of 3.20 ± 0.89) and the best response was observed in question number 7 (To what degree does diabetes get in your way of developing life goals?) , with a mean of 2.48 ± 0.78 under Appraisal of Diabetes Scale.

38.1% participants belonged to 51-60 years of age group and mean age was 59.34 ± 9.16, 65.96% were Hindu by religion. A large number of study participants 29.8% had studied only up to primary level. As many 91.8% of the female participants were housewives and 44.3% of the male participants were involved in business. 66.92% of the participants were living in a joint family. 67.5% of the participants had a poor glycemic control with HbA1C levels >7%. Mean BMI of the study participants was 23.42 ± 2.62kg/m^2 and 69.23% had a normal BMI.

Positive association was observed with factors such as age, duration of diabetes mellitus, presence of co-morbidities, treatment modalities, education status and HbA1C levels and with p values <0.001.

CONCLUSION

In this study majority of the participants reported with an average quality of life. There is a need to screen all the individuals who are at risk of developing Type 2 DM and also need arises for better treatment facilities and timely counselling of all the patients affected with Type 2 DM so as to help them lead a better quality of life.

Keywords: Type 2 Diabetes Mellitus, WHO –QOL-BREF questionnaire, Urban area, ADS.

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LIST OF TABLES

LIST OF GRAPHS