



# MALLA REDDY COLLEGE OF PHARMACY

(Affiliated to osmania university)



## DESCRIPTIVE ANALYSIS OF THE DEMOGRAPHIC AND CORRELATED THERAPHY FACTORS IN TYPE-2 DIABETES MELLITUS POPULATION AT TERTIARY CARE HOSPITAL

Under the guidance of

In partial fulfillment of practice school

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# ABSTRACT



- **Background information:** Diabetes mellitus (DM) is a chronic disease considered and important public health problem. In recent years ,its prevalence has been exponentially rising in many developing countries. Chronic complications of DM are important causes of morbidity and mortality among patients which impair their health and quality of life .Knowledge on disease prevention, etiology ,and management is essential to deal with patients, patients and care givers. The chronic metabolic disorder diabetes mellitus is a fast growing global problem with huge social, health and economic consequences. Diabetes is a chronic metabolic disorder characterized by high blood glucose levels that results from absolute or relative insulin deficiency ,in the context of beta cells dysfunction ,insulin resistance or both.
- **Methodology:**A Prospective cross sectional type, observational study was conducted over a period of 3 months at department of general medicine, of Malla Reddy Health city, suraram, Hyderabad. This study was conducted on 49 patients who were selected based on requirement criteria .Demographic details and pertinent biochemical parameters of type-2 diabetes mellitus patients were collected.



- **RESULTS & DISCUSSION:** From the study it has been concluded that the incidence of Type 2 Diabetes Mellitus condition was prone more in males (63.3%) compared to females. Whereas the age group of 51 – 60 years have diagnosed of diabetes amongst the study subjects. Subjects with no social history were depicted higher (66.3%); similarly subjects without family history of condition accounted for major (87.8%). The most observed co-morbid condition account is Hypertension (n=17), whereas least observed in Gastroenteritis (n=2). Past medical history denoted the major number of subjects with Hypertension (n=19). Majority of the subjects have displayed random blood sugar levels in the range of 121 – 171 mg/dl (n=12). Fasting blood sugar levels between 101 – 150 mg/dl observed in 14 patients. Post lunch blood levels have accounted higher in number (n=10) at range of 130 – 180 mg/dl. Most prescribed oral hypoglycemic agents observed were Biguanides (57%). Need for alteration in dose / class of regimen and patient counseling aspects, have been recognized in predominant number of subject (61%). Maximum hospital stay was 5 days in the specified subjects (n=8). Many kinds of complications exist which are present along the duration of the diabetes condition rather than the onset. Furthermore, risk factors include the demographic parameters which make specific groups more susceptible to morbid and mortal conditions. There has been humongous expenses associated with the therapeutic management of diabetes condition. Hence the clinical and economical outcomes have become dual facets in improvising the quality of life.

# LITERATURE REVIEW



- **1.Liu Z,Fu C,Wang W,Xu B:**Diabetes is characterized by the chronic induced traid of symptoms(polydipsia,polyuria,and polyphagia)caused by elevated blood glucose level and metabolic dysregulation. Untreated diabetes leads to multiorgan and systemic injury, including to the heart,kidneys,nerves and blood vessels,which impair the quality of life and increase the death rate caused by diabetes complications.[1]
- **2.S.Wild,G.Roglic,A.Green,et al:** Prevalence of type-2 DM is increasing worldwide, especially among developing nations, and it has been estimated by 2030,366 million people will affected by this disease, and two-thirds of which living in developing countries.[2,3]
- **3. AMERICAN DIABETES ASSOCIATION** :According to the American diabetes Association, DM should be considered as a group of metabolic disorders characterized by hyperglycemic state, as a result of chronic insulin resistance, which leads pancreatic beta-cell dysfunction and subsequently a massive failure on insulin secretion.DM chronic hyperglycemia has been with long-term target-organ damage, dysfunction and collapse especially among ophthalmologic, renal, neurologic and cardiovascular systems.[4,5]



4. **S.Mortaz,C.Wessman,R.Duncan,et al:** It should be noted that type-2 DM is an independent risk for coronary artery disease, peripheral vascular disease, and congestive heart failure, and is major cause of death for those patients[5].

5.**K.Yamakawa-Kobayshi,M.Natsume,S.Aoki,et al:** Although the type 2DM is an independent risk factors such as advanced age, familial history and behavioral and environmental factors that develop a relevant role in disease prognosis and evolution[6].

6.**L.W.Green,F.L.Brancati,A.Albright,et al:** In DM primary and secondary prevention strategies ,the most important are population education and information, stronger information for patients, caregivers and health professionals ,as well as supportive environments for health promotion and disease prevention ,healthy public policies , and adoption of structured healthy lifestyle intervention programs.



**7.American diabetes Association,2010a:**The most common cause of Type-1 D due to an absolute lack of insulin and has an autoimmune basis. This disorder previously known as insulin-dependent diabetes mellitus until the reclassification of diabetes mellitus based on etiopathology. An immune mediated destruction of beta - cells is the hallmark of the disorder ,and hyperglycemia only ensues when~90% of beta cell are lost. Carbohydrate intolerance that begins or first recognized during pregnancy is known as gestational diabetes .As pregnancy advances, the increasing insulin resistance creates a demand for more insulin .In the great majority of pregnancies ,the demand is readily met, and the balance between insulin resistance and insulin supply is maintained .However, if the resistance becomes hypoglycemic.[8]

**8.Yau.J.W.Y.et.al:**Diabetic retinopathy: Hyperglycemia can induced progressive damage to the blood vessels in the retina ,which can lead to the hemorrhage ,retinal detachment and blindness. Diabetic retinopathy can be classified as early ,most common non-PDR form



,characterized by weakend blood vessels ,and as the more severe ,late-stage PDR form, characterized by growth of new fragile and leaky blood vessels through out the retina and in to the vitreous. A distinct form of diabetic retinopathy involves direct damage to macula ,defined as clinically significant macular oedema[9]

**9.Sivaprasad,S.Gupta,B,Crosby-Nwaobi et al:** Diabetic retinopathy is the most common diabetes complication, with an overall prevalence in individuals with diabetes of ~35%,with wide variation among ethnic groups and populations around the world.[10]

**10.Bunce,C.&Wormald:**Further more,diabetic retinopathy is leading cause of blindness in adults in USA ,England and Wales.[11]

# INTRODUCTION:



- Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency in turn leads to chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism.
- It is the most common endocrine disorder .As the disease progresses tissue or vascular damage ensues leading to severe diabetic complications such as retinopathy, neuropathy, nephropathy, cardiovascular complications and ulceration.
- Diabetes is best controlled either by diet alone and exercise (non-pharmacological), or diet with herbal or oral hypoglycaemic agents or insulin (pharmacological).

# Types of diabetes mellitus

- Type-1 diabetes mellitus
- Type-2 diabetes mellitus
- Gestational diabetes mellitus



# DIABETES MELLITUS TYPE-1



- It is a disease caused by the lack of insulin .it comes about due to the loss of pancreatic function. The loss of pancreatic function may be due to disease or injury to the pancreas which ultimately leads to loss of optimum glycaemic control.
- Thus,insulin needs to be injected subcutaneously twice daily to compensate for the needs of the body (also referred as insulin-dependent-diabetes mellitus, and juvenile diabetes).



# DIABETES MELLITUS TYPE-2

- There is a decrease in the body's secretion and sensitivity to insulin, which usually caused by obesity. It is a disease of insulin resistance by cells.
- Type 2 diabetes mellitus is the most common type of diabetes. Treatments include
  - 1) Agents that increase the amount of insulin secreted by the pancreas.
  - 2) Agents that increase the sensitivity of target organs to insulin.
  - 3) Agents that decrease the rate at which glucose is absorbed from the gastrointestinal tract.



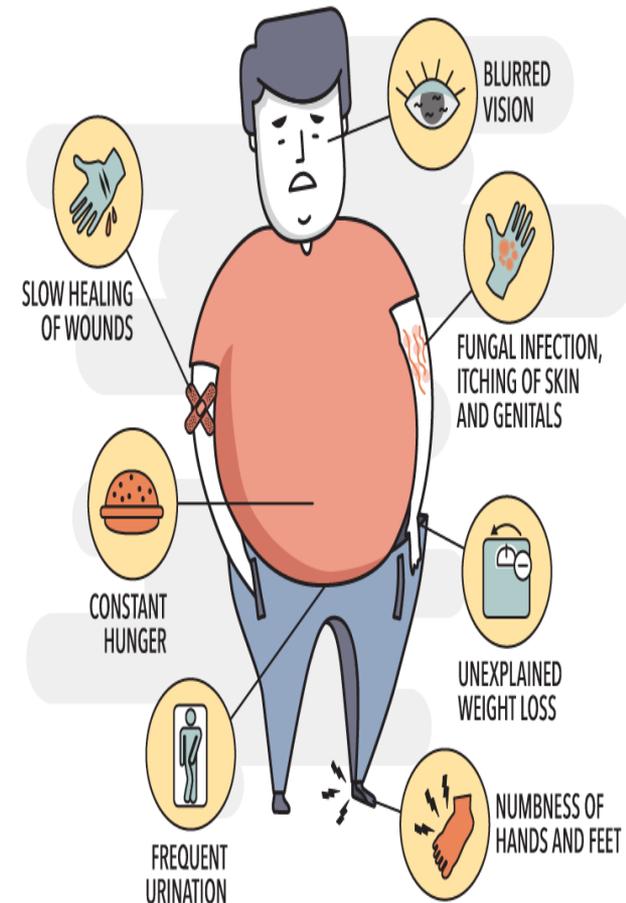
# GESTATIONAL DIABETES:

- Gestational diabetes mellitus (GDM) is defined as glucose intolerance of various degrees that is first detected during pregnancy. GDM is detected through the screening of pregnant women for clinical risk factors and, among at-risk women, testing for abnormal glucose tolerance that is usually, but not invariably, mild and asymptomatic.

# Signs and symptoms:

- Frequent urination
- Excessive thirst
- Unexplained weight loss
- Extreme hunger
- Sudden vision changes
- Tingling or numbness in the hands
- Feeling very tired much of the time
- Very dry skin
- Sores that are slow to heal
- More infections than usual

## 7 COMMON SYMPTOMS OF TYPE 2 DIABETES



# Classification:

## A. ENHANCE INSULIN SECRETION:

1. Sulfonyl ureas

a) First generation-Tolbutamide

b) Second generation-Glipizide, Gliclazide

2. Meglitinides-Repaglinide, Nateglinide

3. Glucagon-like peptide-1 receptor agonist-Exenatide, liraglutide

4. Dipeptidyl peptidase-4 inhibitors-Vildagliptin, Sitagliptin

## B. OVERCOME INSULIN RESISTANCE:

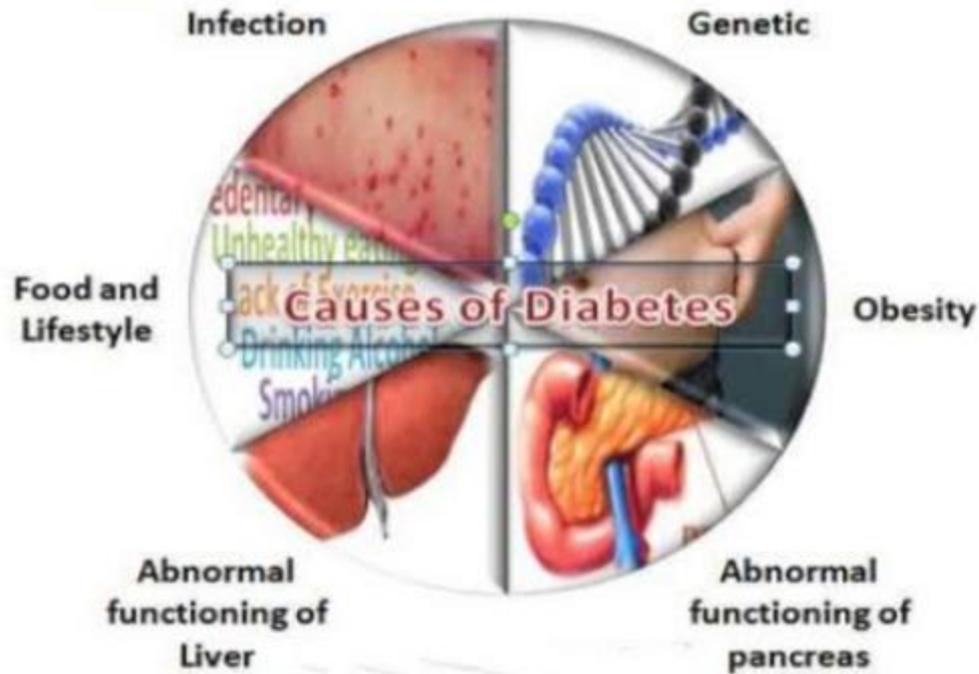
1. Biguanides-Metformin

2. Thiazolidinediones-Pioglitazone

C. Miscellaneous drugs-Acarbose, voglibose, miglitol etc.



# ETIOLOGY



# DIAGNOSIS:



A1c  $\geq$  6.5%

- No fasting needed

Fasting sugar  
 $\geq$  126 mg/dl  
(7.0 mmol/L)

- No caloric intake for at least 8 hours

Glucose tolerance test  
 $\geq$  200 mg/dL  
(11.1 mmol/L)

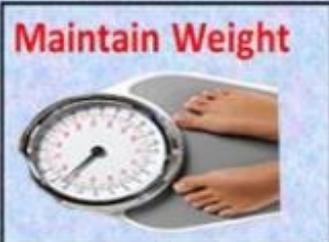
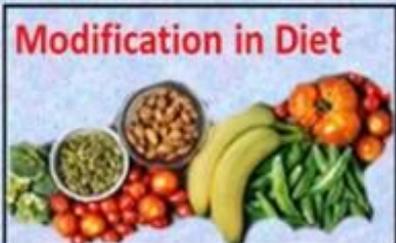
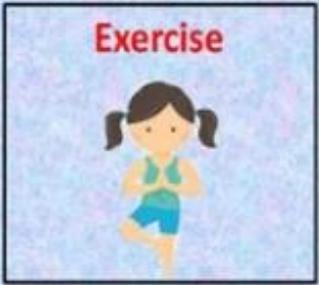
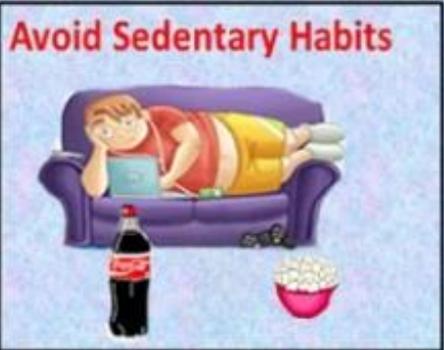
- Sugar level 2 hours after drinking a sugary drink (75 g of sugar)

Random sugar  
 $\geq$  200 mg/dL  
(11.1 mmol/L)

- Random blood sugar

# PREVENTION:

**Simple steps for prevention of diabetes**

- Maintain Weight**  

- Modification in Diet**  

- Exercise**  

- Avoid Sedentary Habits**  

- Maintain**  
**D**  
vitamin  

- Avoid**  
**Smoking** & **Alcohol**  




# Diabetes with heart failure

- Epidemiologic and clinical data from the last 2 decades have shown that the prevalence of heart failure in diabetes is very high, and the prognosis for patients with heart failure is worse in those with diabetes than in those without diabetes. Experimental data suggest that various mechanisms contribute to the impairment in systolic and diastolic function in patients with diabetes, and there is an increased recognition that these patients develop heart failure independent of the presence of its associated risk factors. In addition, current clinical data demonstrated that treatment with the [sodium glucose cotransporter 2 inhibitor empagliflozin](#) reduced hospitalization for heart failure in patients with type 2 diabetes mellitus and high cardiovascular risk.



- This review article summarizes recent data on the prevalence, prognosis, [pathophysiology](#), and therapeutic strateJ.P. van Melle, M. Bot, P. de Jonge, R.A. de Boer, D.J. van Veldhuisen, M.A. Whooley**Diabetes, glycemic control, and new-onset heart failure in patients with stable coronary artery disease: data from the Heart and Soul Study**
- Diabetes Care, 33 (2010), pp. 2084-2089

# RESEARCH METHODOLOGY:



- **Aim:** To study the descriptive analysis of the demographic and correlated therapy factors in type-2 diabetes mellitus population at tertiary care hospital.
- **Objectives:**
  - To discuss about diabetes mellitus.
  - To Identify the management of type 2 diabetes in hospitalized patients.
  - Enumerate its possible Comorbid conditions.



## MATERIALS AND METHODS:

- **STUDY SITE:**Both in-patients and out-patients who are willing to participate in study from departments (general medicine and surgical wards) at malla reddy health city, Suraram, Hyderabad.
- **STUDY PERIOD:**Study is conducted for a period of 3 months.
- **STUDY SIZE:**A total of 49 patients were selected accordingly with the departments.
- **STUDY DESIGN:**A prospective, observational study.

# STUDY CRITERIA



## A) INCLUSION CRITERIA:

1. Patients above 35 years of age to 80 years
2. Patients of either sex
3. Patients who are willing to participate in study and give informed consent.

## B) EXCLUSION CRITERIA:

1. Infants
2. Patients who are not willing to participate in study.



- **DATA COLLECTION:** Patient demographics will be obtained like age, gender, social and past medical history, diseased conditions.
- Every patients should be questioned for evaluation of past medication and medical history.
- Subjects treatment regimen will be noted in a pre-designed profile form.
- **DATA ANALYSIS:** The Obtained data will be thoroughly studied to assess diabetic patients.





# Data obtained from the survey:

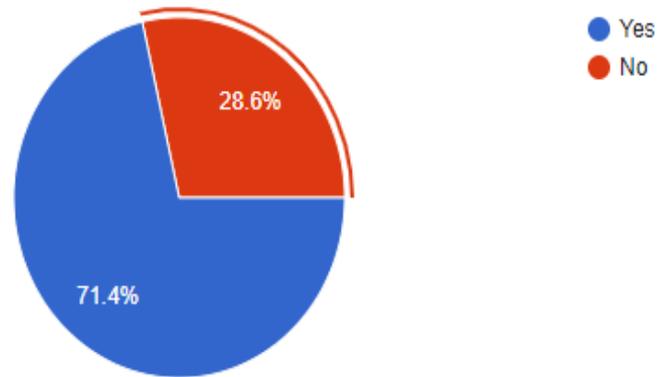
- Presence of Co-morbid conditions
- Age
- Gender
- Social history
- Family history
- Past medical history
- Blood glucose levels
- Drugs
- Need for intervention
- Length of hospitalised stay



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Whether co-morbid condition present or not

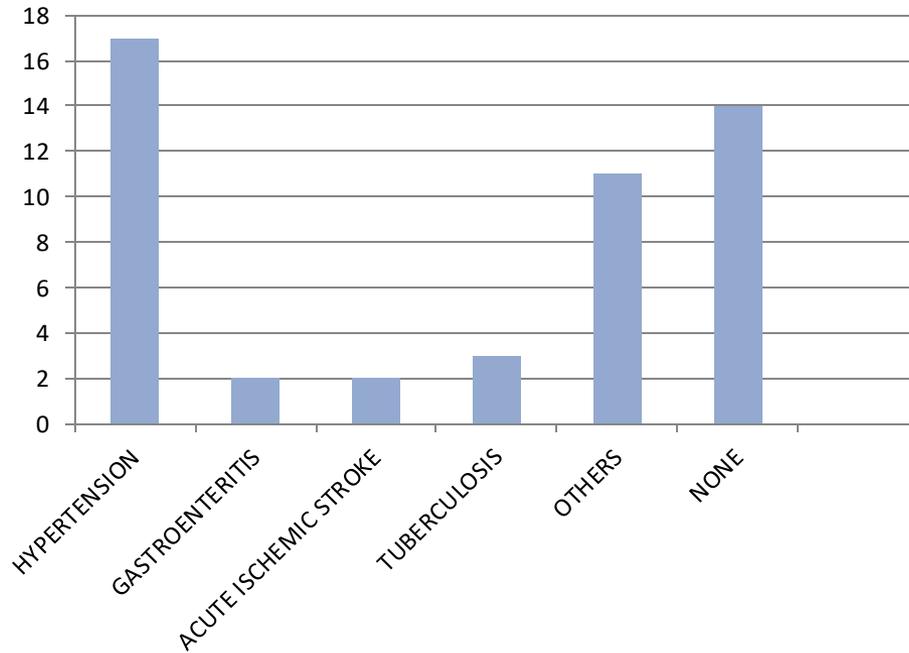
49 responses



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From the above figure :

It has been observed that most of the diabetic patients are with co-morbid conditions(71.4%)



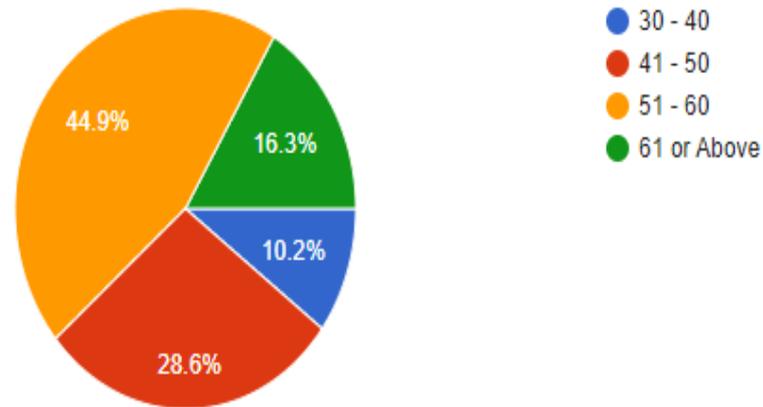
## **PRESENCE OF COMORBID CONDITIONS**

The above figure illustrates that most of the diabetic patients are diagnosed with comorbid conditions like hypertension and other diseases.



## Age of the patient

49 responses



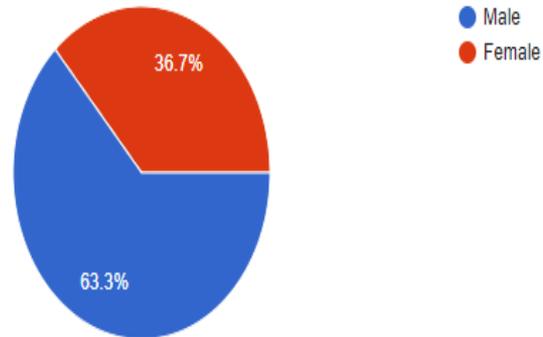
### From the above figure :

51-60 (44.9%) are more suffering with diabetes mellitus, whereas the patients with age group between 30-40(10.2%) are less suffering



Gender

49 responses



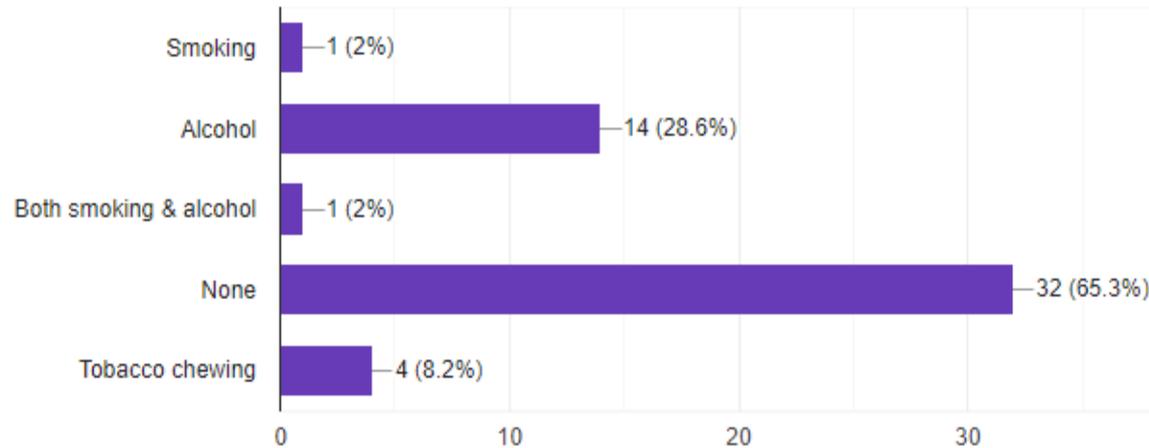
**From the above figure:**

**It has been observed that most of the males (63.3%) are affected with diabetes mellitus compared with females (36.7%).**



## Social History

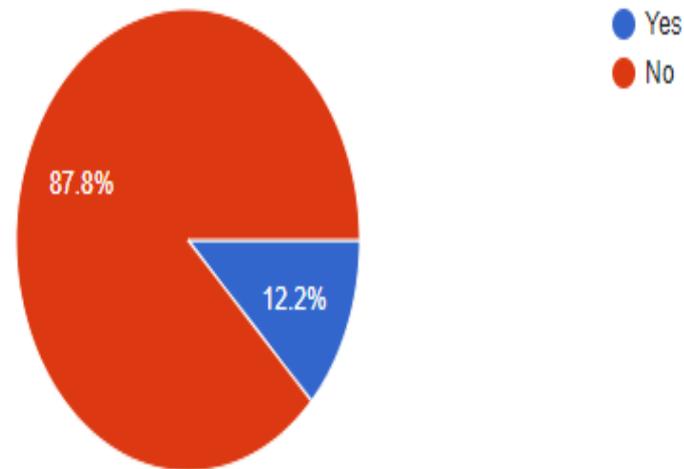
49 responses



**In the above graph It has been observed that people with no social history(66.3%) are also diabetic but in some cases alcoholic patients are more diabetic(28.6%).**

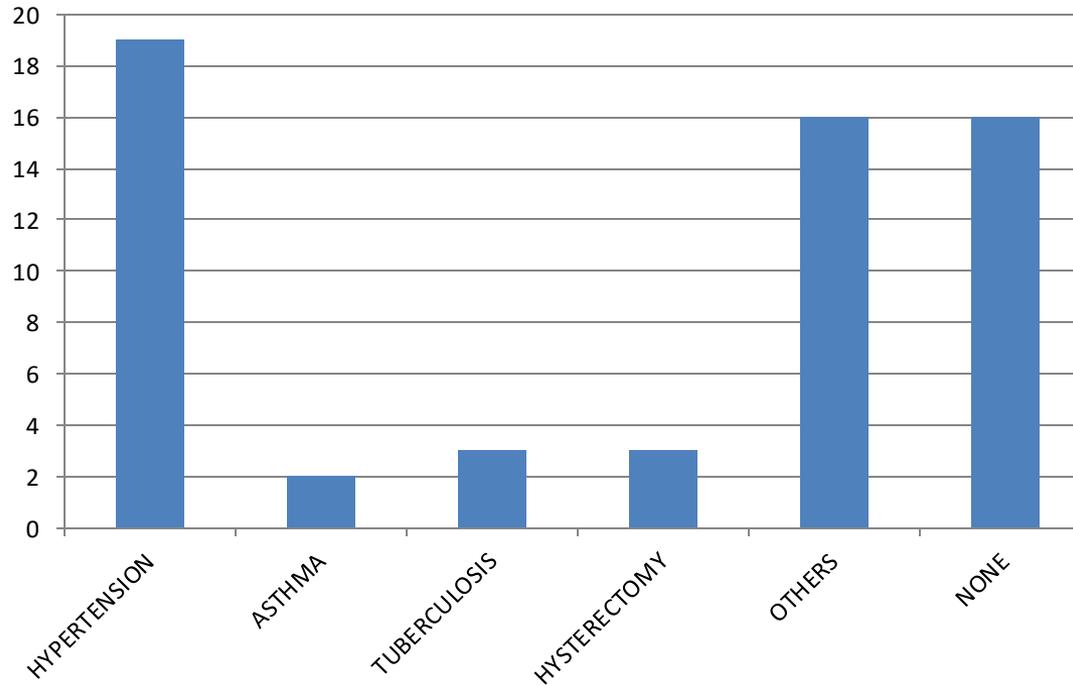
## Family history of Diabetes Mellitus

49 responses



**From the above figure :**

**It has been observed that most of the diabetic patients are without any family history(87.8%), but in some cases family history is also playing role in causing diabetes(12.2%).**

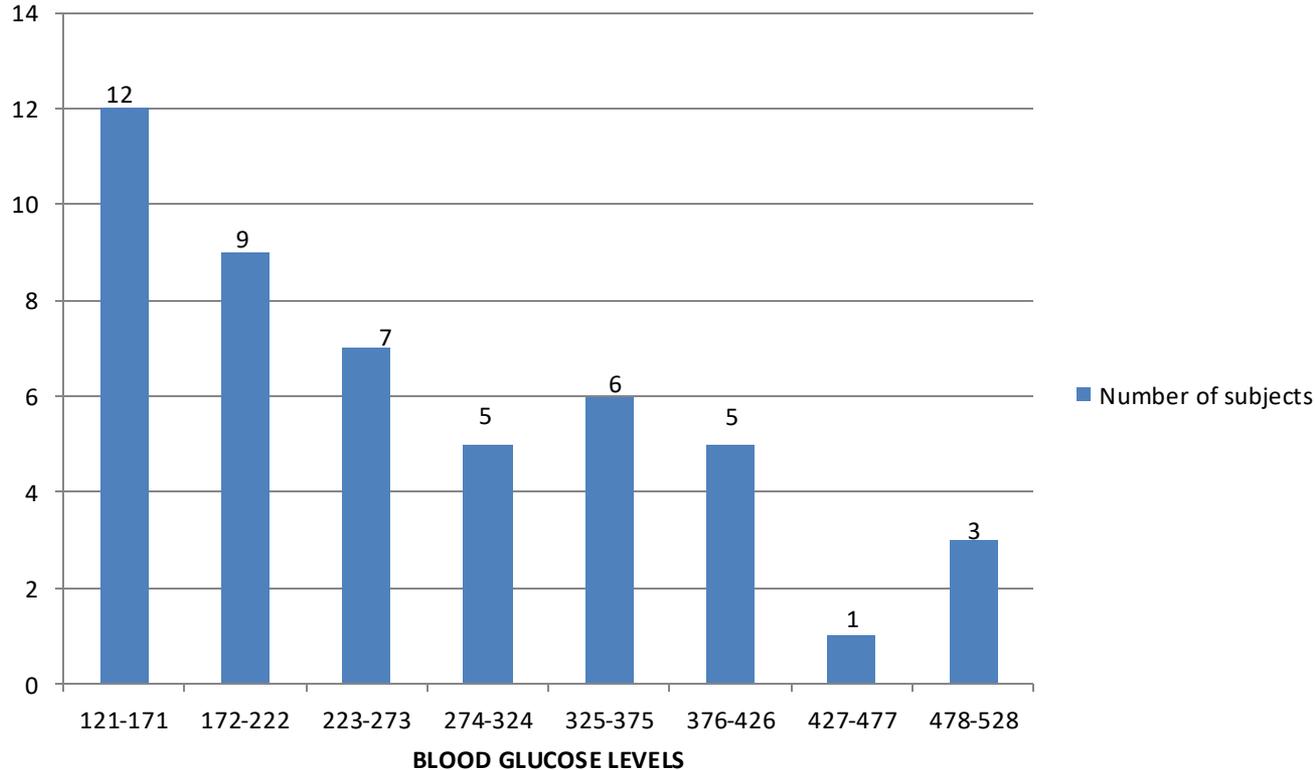


## PAST MEDICAL HISTORY

From the above graph we had illustrated that patients suffering with hypertension are more prone to diabetes mellitus(38.8%) in their past medical history.



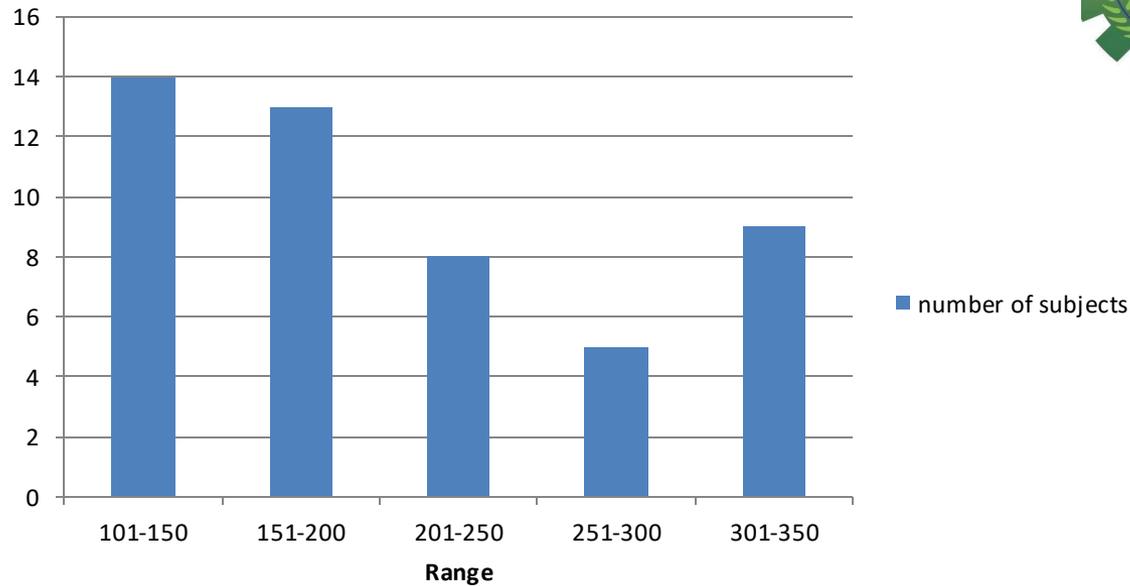
## Random blood sugar levels in the subjects



Most of the diabetic patients are having the random blood sugar levels at range between 121-171mg/dl but some of the patients having random blood sugar levels between the range of 172-222 mg/dl.



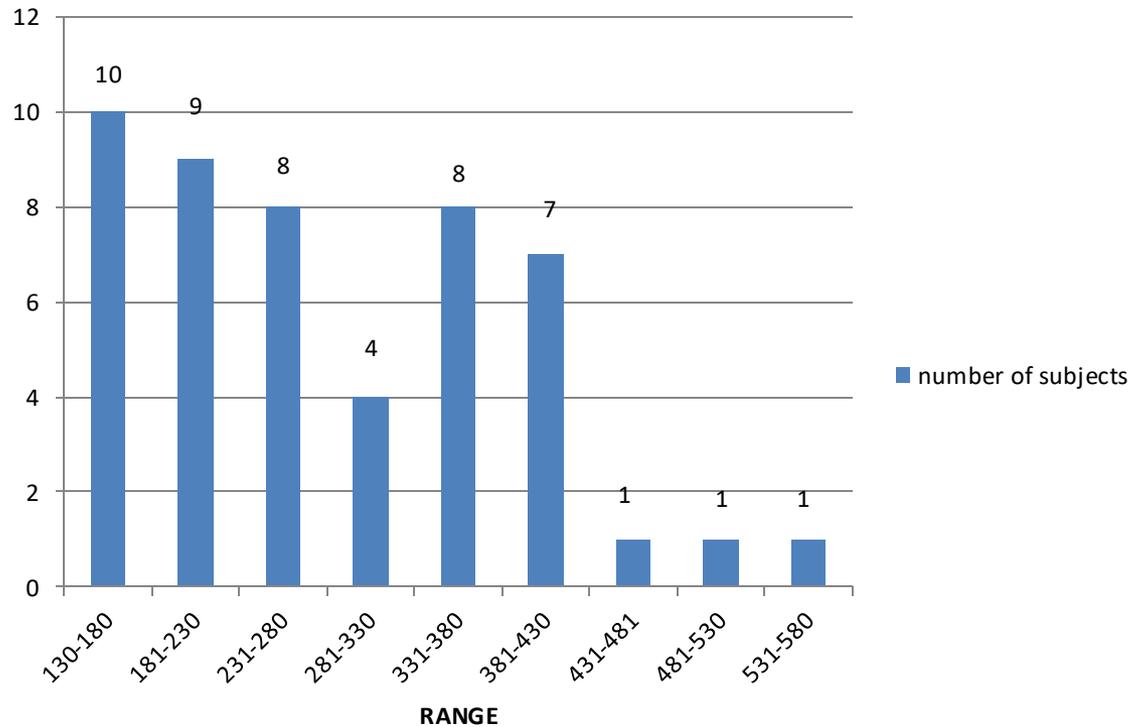
## fasting blood sugar levels of subjects



From above graph:

We observed that most of the diabetic patients are having fasting blood sugar levels ranges between 162mg/dl-183mg/dl(8.2%).

## Post lunch sugar levels of subjects

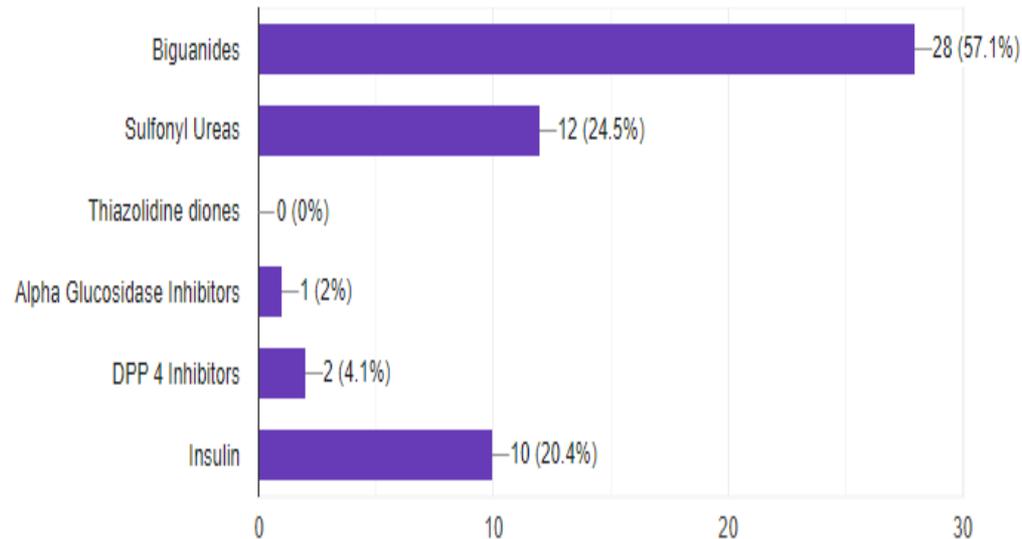


From the above graph it illustrates that most of the diabetic patients having post lunch blood sugar levels are at the range of 130-180.



## Therapeutic agents involved

49 responses



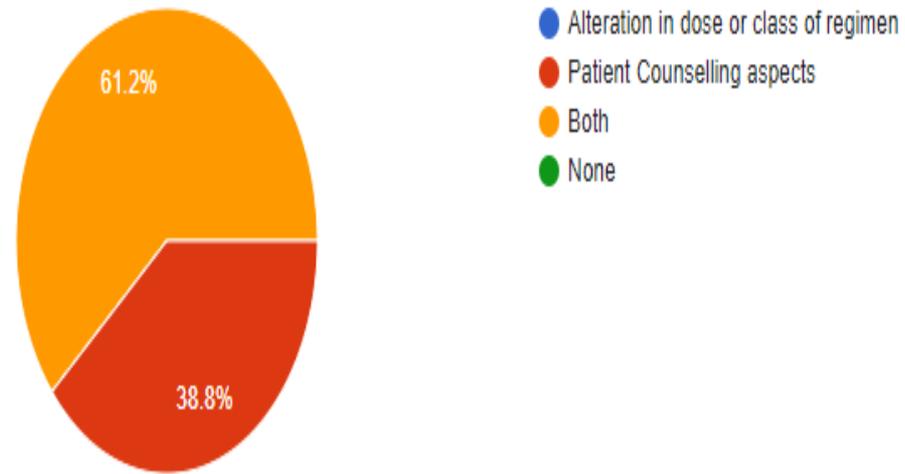
**From the above figure:**

**we observed that most of the diabetic patients are treating by oral hypoglycemic agents ,primarily by using biguanides(ex:metformin),secondarily by sulfonyl ureas(ex:tolbutamide)**



## Need for intervention

49 responses

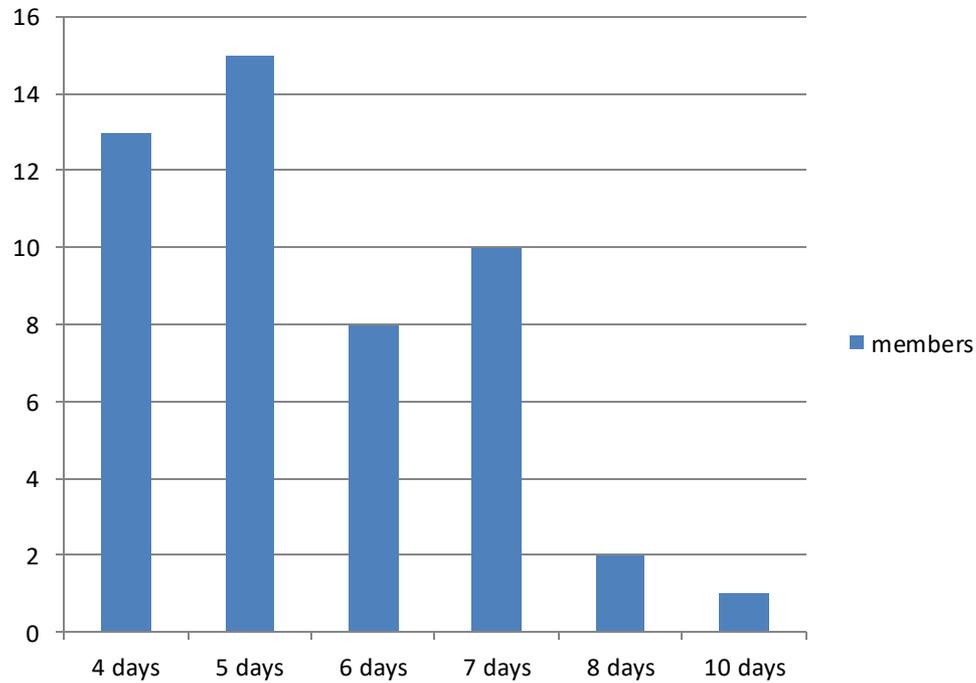


**From the above figure:**

**most of the diabetes patients are suggested to control diabetes by altering in dose and patient counselling.**



## Hospital duration of subjects



**From above figure:**

**we observed that ,most of the diabetic patients are hospitalised for 5 days (n=15).**

# RESULTS AND DISCUSSIONS:

- A total of 49 diabetic patients data were studied, In that majority of the patients are with co-morbid conditions mostly Hypertension. A research article from cureus journal of medical science in 2021 concluded that most common co-morbid condition is Hypertension.
- In our study we observed that the most of the risk factors are smoking and alcohol consumption. A research study conducted by tropical medicine and international health in 2019 concluded that most of the risk factors are alcohol and smoking.
- Males are more prone to diabetes according to our study and a research article from national journal of community medicine in 2021 concluded the same.
- Dietary Modifications and physical exercise is necessary in order to control glucose levels mentioned in the journal of natural science, biology and medicine 2018.

# CONCLUSION:

From the demographic data we can conclude the following details :

- Participants with diabetes tended to have a higher risk of mortality rate due to cardiovascular diseases , respiratory diseases , pneumonia and kidney diseases as co morbidity conditions.
- Type 2 diabetes continues to increase in prevalence , incidence , and as a leading cause of human suffering and deaths . Despite significant investments in clinical care , research and public health interventions, there appears to be no sign of reduction in the rate of increase.
- Majority of patients are suffering with diabetes is using biguanides as first line drugs to treat this epidemic. People having higher sugar levels are hospitalized with various comorbid conditions and are having a lengthy hospitalized stay.
- Healthy eating options need to be subsidized and unhealthy foods need to be reduced in order protect oneself from these epidemic.
- A vast majority of diabetic patients was not doing exercise had least knowledge of self monitoring blood glucose levels and did not follow diabetic diet.



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THANK YOU