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A PROSPECTIVE OBSERVATIONAL STUDY IN THE TREATMENT OF TYPE 2 DIABETES MELLITUS AT TERTIARY CARE TEACHING HOSPITAL

Syed Areefulla Hussainy*, Mariyam Hyder, Nameera Hyder, Mariyam Firdous, Sana Sultana and Dr Rafiya Sultana
MESCO College of Pharmacy, Mustaidpura, Karwan Road, Hyderabad.

ABSTRACT:
AIM & OBJECTIVE: A prospective observational study in the treatment of Type 2 Diabetes Mellitus at tertiary care teaching hospital.
METHODOLOGY: A Prospective observational study carried out in the Department of general medicine in Osmania General Hospital, a tertiary care teaching hospital for a period of 6months. All the patients of either sex attending General medicine department with established type 2 Diabetes Mellitus were included in the study. In-patients already diagnosed of Type 2 diabetes mellitus and are on treatment. In this Study, patients of more than 35 years of age group were included. Patients with Type 1 diabetes mellitus, any other severe illness, pregnant diabetics and patient with the alternative medicine were excluded.
RESULTS: During the study period a total 100 Diabetic Patients were enrolled. Out of which 70% were males and 30% were females. Among the total patients, HbA1c values in 48 patients i.e., 74% were found to be above 6.5% and in 17 patients i.e., 26% were found to be below 6.5%. It was found that GRBS values were high in patients at the time of admission in hospital, it was also noticed that the GRBS values were decreased during the period of treatment in hospital. Based on treatment, 71 patients were treated with insulin alone, 12 patients were treated with oral hypoglycemic agents (OHA) and 17 patients were treated with both insulin and OHA. It was found that maximum patients were found with hypertension as co-morbidity followed by CVA.
CONCLUSION: Much of the burden of type 2 diabetes can be prevented with stringent control of hyperglycemia and other cardiovascular disease risk factors. Treatment needs to focus on maintaining blood glucose values as close to the non-diabetic range as possible, with early initiation of effective interventions such as (combinations of) blood glucose lowering drugs and insulin, and prompt adjustment of treatment whenHbA1c is above the target value. The choice of anti-hyperglycemic agents should be based not only on efficacy, but drug safety. Special attention need to be focused on adverse effects, particularly hypoglycemia. Overall, pharmacist plays an important role in the management of Type 2 Diabetes mellitus by patient counseling and education about the lifestyle medications.
Keywords: *Type 2 Diabetes Mellitus, Oral Hypoglycemic agents, Hyperglycemia and Insulin.*

Corresponding Author*:
Syed Areefulla Hussainy,
Professor,
MESCO College of Pharmacy
Hyderabad
areefulla581@gmail.com
Ph: 9985356190

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I-INTRODUCTION:
BACKGROUND:

Diabetes is a commonest metabolic disorder characterized by resistance to the action of insulin, insufficient insulin secretion, or both. The clinical manifestation of these disorders is hyperglycemia. Many patients with type 2 diabetes are ultimately treated with insulin because they retain the ability to secrete some endogenous insulin.

Diabetes mellitus is a chronic disease that requires long-term medical attention to limit the development of its devastating complications and to manage them when they do occur.

Diabetes is associated with increased hospital admissions and length of hospital stay and it is much evidence that type 2 diabetes increases inpatient morbidity and mortality. Given the particular conditions of inpatients, there treatment requires more flexible strategies for the treatment of hyperglycemia.

Hence it was decided to undertake observational study in the treatment of type 2 diabetes mellitus.[1]

DIABETES MELLITUS:

Diabetes mellitus (commonly referred to as diabetes) is a disease of pancreas, an organ behind the stomach that produces the hormone insulin. Insulin helps the body use food for energy. When a person has diabetes, the pancreas either cannot produce enough insulin, uses the insulin incorrectly, or both. Insulin works together with glucose in the blood stream to help it enter the body cells to be burned for energy.If the insulin isn't functioning properly, glucose cannot enter the cells .this cause the glucose levels in the blood to rise , creating a condition of high blood sugar or diabetes.

It is associated with abnormalities in carbohydrate, fat, and protein metabolism and results in chronic complications including micro vascular, macro vascular and neuropathic disorders.

1.2 TYPES OF DIABETES:

Vast majority of the diabetic patients are classified into one of two broad categories , **type 1** caused by an absolute deficiency of insulin and of **type 2** is defined by the presence of insulin resistance with an adequate compensatory increase in insulin secretion, Women who develop diabetes because of the stress of pregnancy are classified as having **gestational diabetes.**

TYPE 2 DIABETES MELLITUS:

This form of diabetes is characterized by insulin resistance a relative lack of insulin secretion, with progressively lower insulin secretion over time. Most individuals with type 2 diabetes exhibit abdominal obesity, which itself cause insulin resistance.

In addition, hypertension, dyslipidemia (high triglyceride levels and low HDL-cholesterol levels), and elevated plasminogen activator inhibitor type 1 (PAI-1) levels are often present in these individuals. This clustering of abnormalities is referred to as the ***insulin resistance syndrome or the metabolic syndrome*** .Because of these abnormalities patients with type 2 diabetes are at increased risk of developing macro vascular complications.

1.3 EPIDEMIOLOGY

The prevalence of type 2 DM is increasing. Type 2 DM accounts for as much as 90% of all cases of DM, and the overall the prevalence of type 2 DM in the United States is approximately 9.6%
in persons age 20 years or older. However, there is likely one person undiagnosed for every three persons currently diagnosed with the disease.

The prevalence of type 2 DM increases with age, it is more common in women than in men in the United States, and varies widely among various racial and ethnic populations, being especially increased in some groups of Native Americans Hispanic American, Asian American, African American, and Pacific Island people.

Although the prevalence of type 2 DM increases with age, the disorder is increasingly being recognized in adolescence. Much of the increase in adolescent type 2 DM is related to an increase in adiposity and sedentary lifestyle, in addition to an inheritable predisposition .[2]
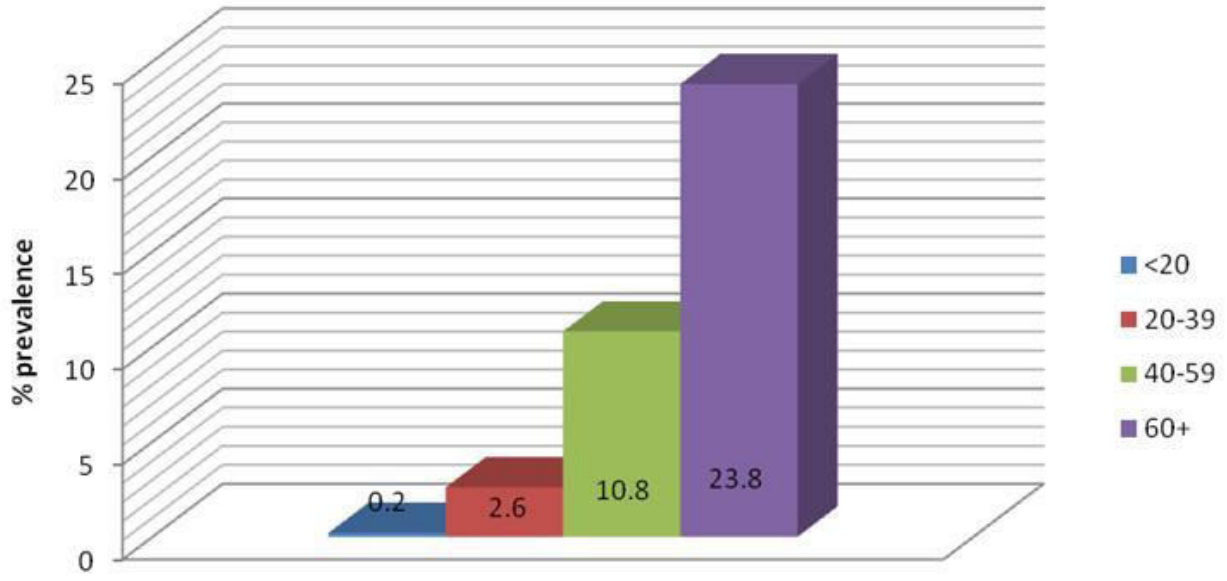
Prevalence of Diabetes by Age

Figure-1: Prevalence of diabetes by age

1.4 SIGNS AND SYMPTOMS:

Many patients with type 2 diabetes are asymptomatic.

Classic symptoms: Polyuria, polydipsia, polyphagia, and weight loss,Blurred visionLower extremity paresthesias,Yeast infections (eg, balanitis in men).[5]

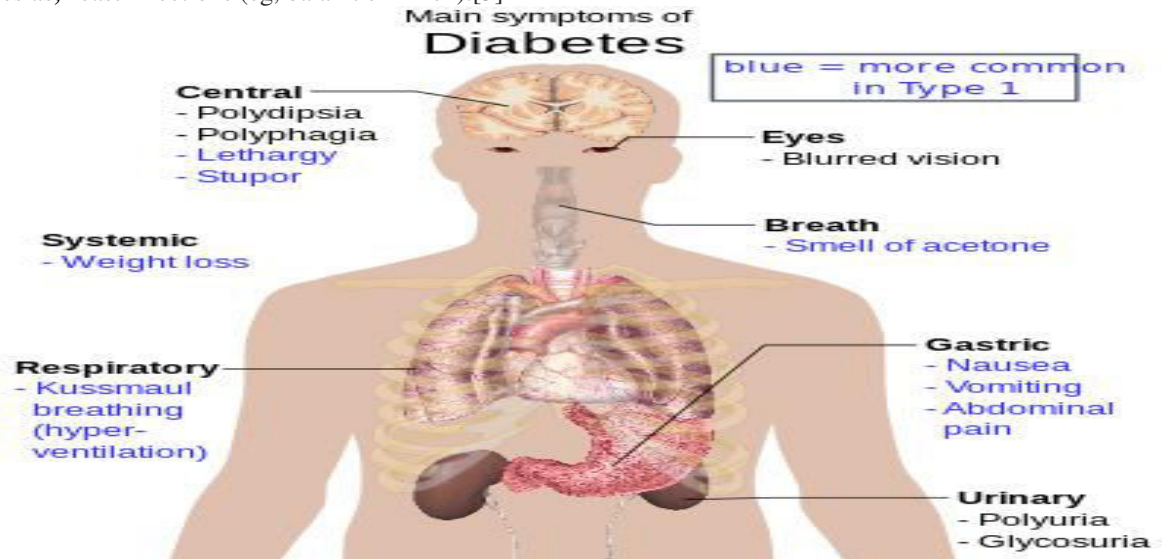**Figure-2: Symptoms of diabetes**

1.5 DIAGNOSIS:

The diagnosis of diabetes requires the identification of a glycemic cut point, which discriminates normal persons from diabetic patients. The present cut points reflect the level of glucose above which microvascular complications have been shown to increase.

The ADA recommends using the fasting glucose test as the principal tool for the diagnosis of DM in non-pregnant adults.

Criteria for the Diagnosis of Diabetes Mellitus

Symptoms of diabetes plus casual*b*plasma glucose concentration ≥200 mg/dL(11.1 mmol/L)
or
Fasting *c* plasma glucose ≥126 mg/dL (7.0 mmol/L)
or
2-hour postload glucose ≥200 mg/dL (11.1 mmol/L) during an OGTT*d*

Blood Test Levels for Diagnosis of Diabetes and Prediabetes			
	A1C (percent)	Fasting Plasma Glucose (mg/dL)	Oral Glucose Tolerance Test (mg/dL)
Diabetes	6.5 or above	126 or above	200 or above
Prediabetes	5.7 to 6.4	100 to 125	140 to 199
Normal	About 5	99 or below	139 or below

Definitions: mg = milligram, dL = deciliter
For all three tests, within the prediabetes range, the higher the test result, the greater the risk of diabetes.

Figure-3 Diagnosis of diabetes

1.6 MANAGEMENT OF TYPE 2 DIABETES:
Goals of treatment are as follows:
• Microvascular (ie, eye and kidney disease) risk reduction through control of glycaemia and blood pressure
• Macrovascular (ie, coronary, cerebrovascular, peripheral vascular) risk reduction through control of lipids and hypertension, smoking cessation
• Metabolic and neurologic risk reduction through control of glycaemia

The EASD/ADA position statement contains 7 key points:
1. Individualized glycemic targets and glucose-lowering therapies
2. Diet, exercise, and education as the foundation of the treatment program
3. Use of metformin as the optimal first-line drug unless contraindicated
4. After metformin, the use of 1 or 2 additional oral or injectable agents, with a goal of minimizing adverse effects if possible
5. Ultimately, insulin therapy alone or with other agents if needed to maintain blood glucose control
6. Where possible, all treatment decisions should involve the patient, with a focus on patient preferences, needs, and values

7. A major focus on comprehensive cardiovascular risk reduction

The 2013 ADA guidelines for SMBG frequency focus on an individual's specific situation rather than quantifying the number of tests that should be done. The recommendations include the following
• Patients on intensive insulin regimens – Perform SMBG at least before meals and snacks, as well as occasionally after meals; at bedtime; before exercise and before critical tasks (eg, driving); when hypoglycemia is suspected; and after treating hypoglycemia until normoglycemia is achieved.
• Patients using less frequent insulin injections or noninsulin therapies – Use SMBG results to adjust to food intake, activity, or medications to reach specific treatment goals; clinicians must not only educate these individuals on how to interpret their SMBG data, but they should also reevaluate the ongoing need for and frequency of SMBG at each routine visit.

Prevention of diabetic complications includes the following:
• HbA1c every 3-6 months
• Yearly dilated eye examinations
• Annual microalbumin checks
• Foot examinations at each visit
• Blood pressure < 130/80 mm Hg, lower in diabetic nephropathy

• Statin therapy to reduce low-density lipoprotein cholesterol[6]

1.7 TREATMENT:
PHARMACOLOGICAL THERAPY:
INSULIN:

Insulin is an anabolic and anticatabolic hormone. It plays major roles in protein, carbohydrate, and fat metabolism. Endogenously produced insulin is cleaved from the larger proinsulin peptide in the β cell to the active peptide of insulin and C-peptide, which can be used as a marker for endogenous insulin production. All commercially available insulin preparations contain only the active insulin peptide.

Dosing administration:
The dose of insulin for any person with altered glucose metabolism must be individualized. In type 2 DM a higher dosage is required for those patient with significant insulin resistance. Dosages vary widely depending on underlying insulin resistance and concomitant oral insulin sensitizer use.

Type of Insulin & Brand Names	Onset	Peak	Duration	Role in Blood Sugar Management
Rapid-Acting				
Lispro	15-30 min.	30-90 min	3-5 hours	Covers insulin needs for meals eaten at the *same time* as the injection.
Aspart	10-20 min.	40-50 min.	3-5 hours	
Glulisine	20-30 min.	30-90 min.	3-5 hours	
Short-Acting				
Regular	30-60 min	2-3 hours	6-8 hours	Covers insulin needs for meals eaten *within 30-60 minutes*
Intermediate-Acting				
NPH (N)	1-2 hours	8-10 hours	20-24 hours	Covers insulin needs for about half the day or *overnight*.

Figure-4 Types of insulin

ORAL HYPOGLYCEMICS:

Early initiation of pharmacologic therapy is associated with improved glycemic control and reduced long-term complications in type 2 diabetes. Drug classes used for the treatment of type 2 diabetes as shown in figure.
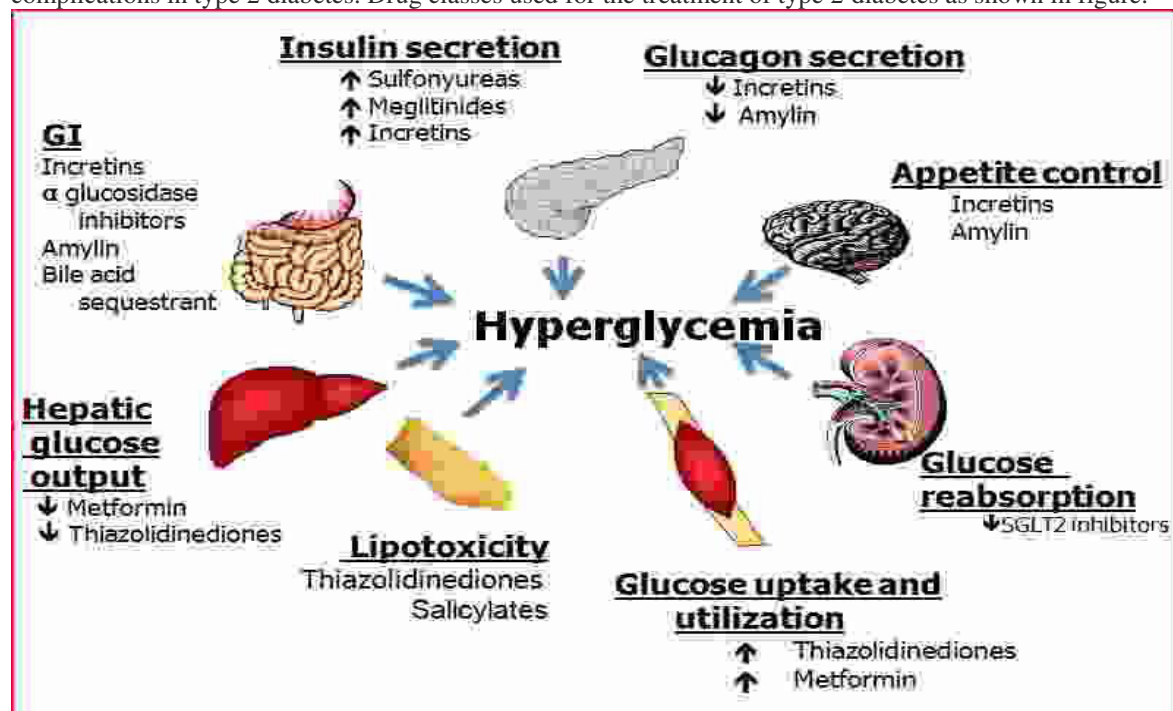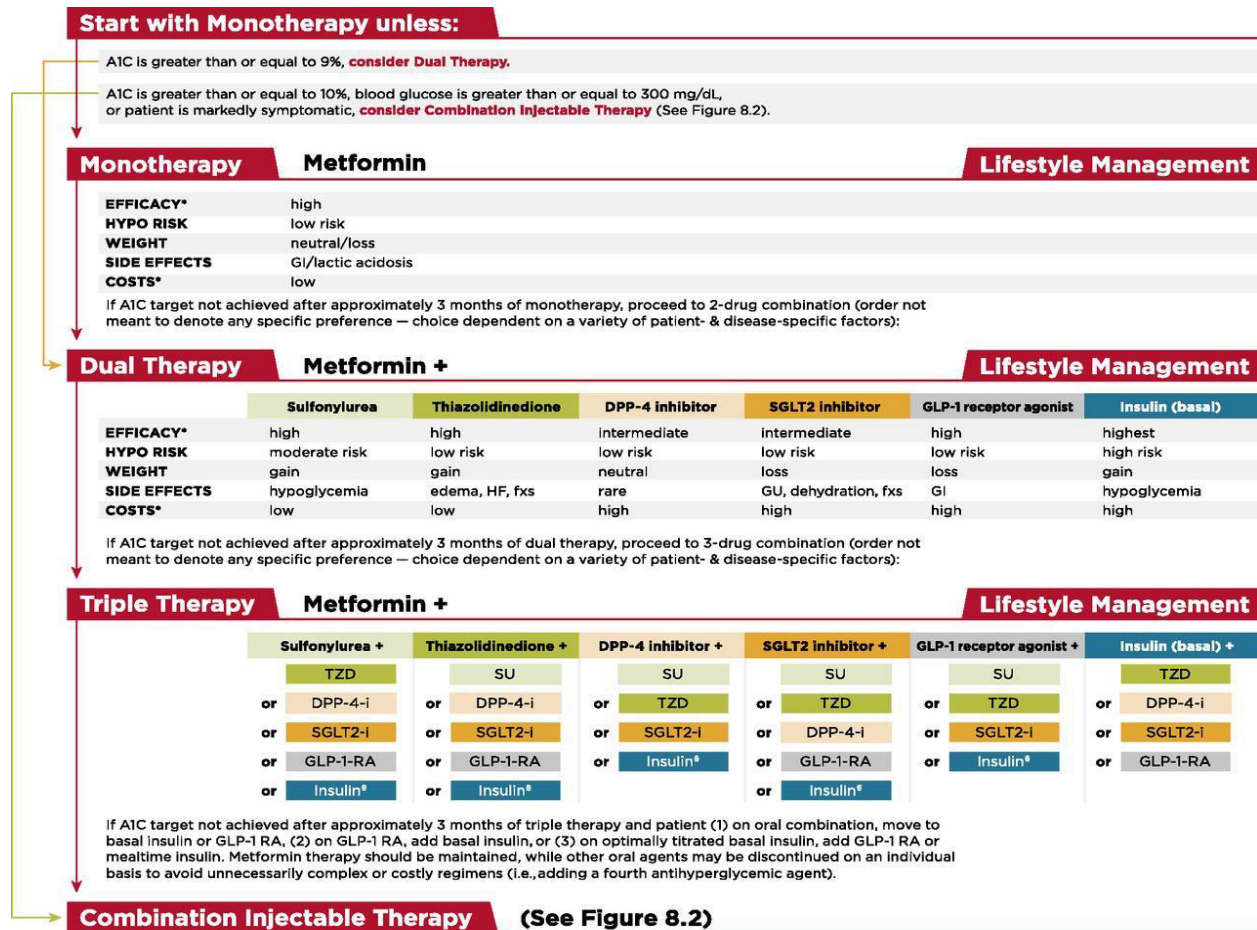

Figure-5 classification of hypoglycemic agents

Figure-6 Combination therapy

1.8 COMPLICATIONS OF DIABETES:
Diabetes complications are divided into micro vascular (due to damage to small blood vessels) and macro vascular (due to damage to larger blood vessels).
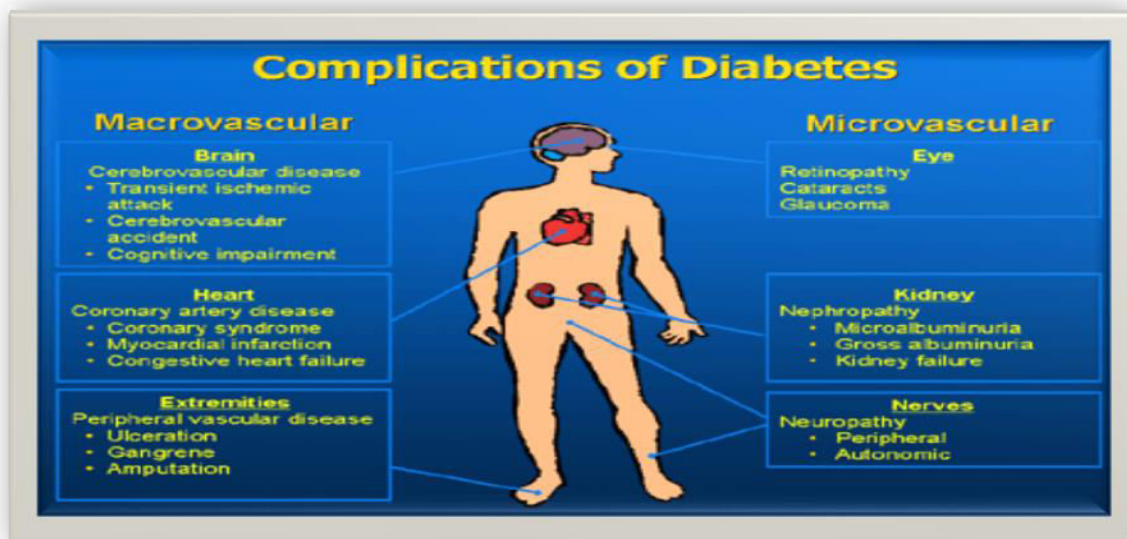

Figure-7 Complications of diabetes

III- OBJECTIVES OF THE STUDY
OBJECTIVES

To study the drugs prescribed for type 2 diabetes mellitus in the general medicine department of tertiary care teaching hospital.

NEED FOR STUDY

A complete medical evaluation is performed to detect the presence of diabetes complications,review the previous treatment and to control the risk factor in patient with established diabetes. The development of new classes of drugs to lower blood glucose has increased the treatment options for type 2 diabetes and has contributed to the uncertainty surrounding these new therapeutic approaches.

To Assesss diabetic patients with multiple co-morbidities requires a complicated medical regimen , In addition to comorbidities of obesity , HTN, the concurrent conditions such as heart failure, CVA present clinical challenges related to polypharmacy , prevalent symptoms and complexity of case.

Assesing whether the HbA1C target has been achieved within the 3 months of therapy initiation . Ideally glycated haemoglobin (HbA1C) should be as close to normal as possible without imposing a high risk of severe hypoglycaemia.

The traditional approach to lowering blood glucose in type 2 diabetes consists of an ordered sequence of lifestyle modification, oral monotherapy, oral combination therapy, and finally treatment with insulin (with or without oral drugs for lowering blood glucose). This strategy usually results in recurrent failure because patients are allowed to become hyper glycaemic before the next step is considered.

To keep glycaemic levels as near to normal as possible .The main aim is to choose interventions that effectively lower hyper glycaemia and sustain acceptable control. And to manage type 2 diabetes mellitus by patient counseling and education about the lifestyle modifications so as to improve the patient's quality of life.

IV- METHODOLOGY:

An Observational and prospective study was performed in the Department of General Medicine, Osmania General Hospital for a period of 6 months with a sample size of 100 patients.

4.1- PLAN OF WORK
PROCEDURE FOR DATA COLLECTION:

- All the relevant and necessary data has been collected from patient's case notes
- Prescription prescribed by the physician.
- Laboratory reports
- Interviewing and counseling patients or patients care taker(s) and health care professionals.
- All patients admitted at Osmania General Hospital are screened for type 2 Diabetes Mellitus are monitored and counselled for the treatment and its complications.

Each subject's detailed history regarding age, sex, weight, socioeconomic status, history of hypertension, duration of diabetes, fasting blood sugar level, HbA1c level, Lipid profile, BMI and treatment history of diabetes has been collected from all the patients.

- The selected patients has been counselled and observed for the outcome measures of interest, post- intervention
- Outcome measures of interest for Pharmacist intervention on,
- 1. HbA1c,(Normal :<4-5.6%):
- 2. Lipids
- 3. Cardiovascular System and BMI,
- 4.Other diabetes-related complications (micro-albuminuria, retinopathy, foot complication and health issues,
- 5. Mental health and medication

V- RESULTS:

| GENDER OF THE PATIENT	NUMBER OF PATIENTS	PERCENTAGE %
MALE	70	70
FEMALE	30	30

TABLE No.1 GENDER DISTRIBUTION OF THE PATIENTS

TABLE No.2 AGE DISTRIBUTION OF THE PATIENTS

Age range of the patients	Number of patients	Percentage %
35-50years	34	34
51-65years	46	46
66-80years	16	16
81-95years	4	4
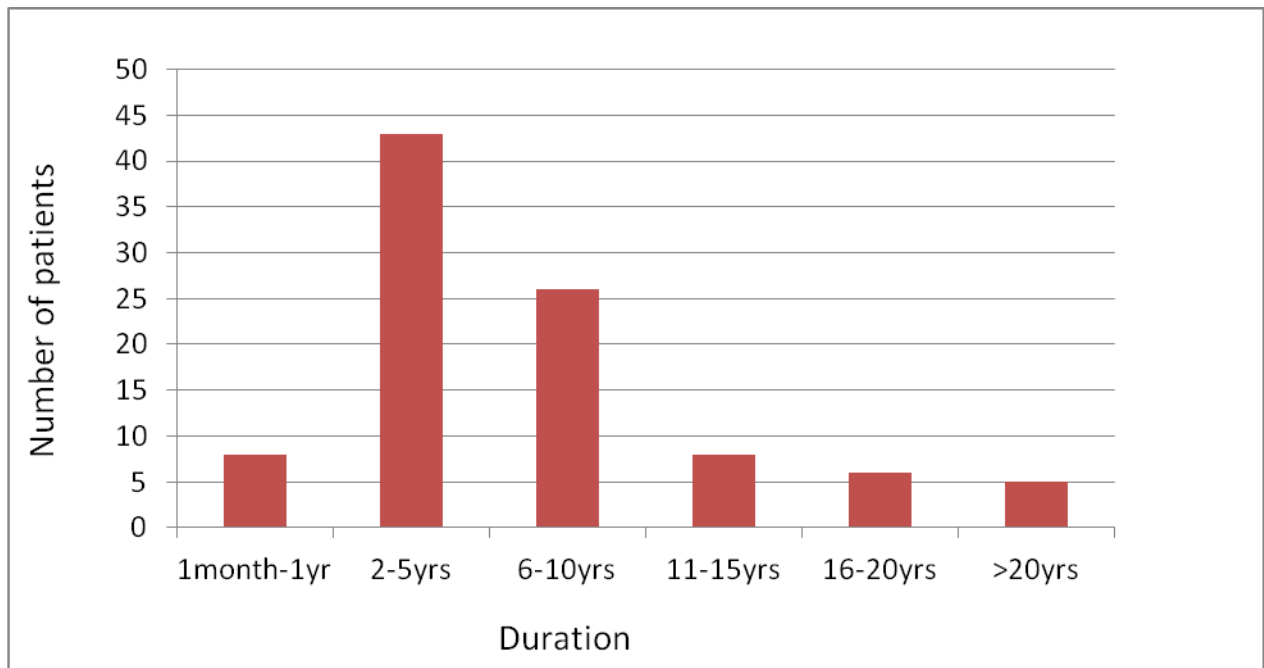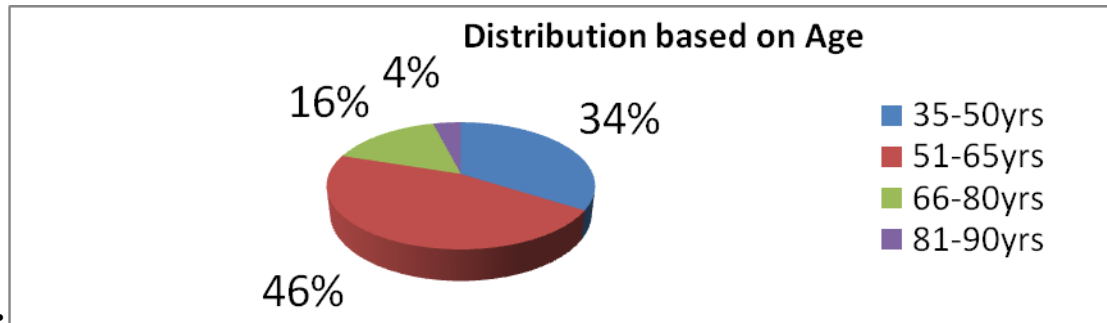
Figure-8 Age distribution of the patients

- It was found that the patients suffering from Diabetes from 2-5 years were maximum which involves 43 patients and 26 patients with 6-10 years.

TABLE No.3 FAMILY HISTORY OF THE PATIENTS WITH TYPE 2 DIABETES MELLITUS

FAMILY HISTORY	NUMBER OF PATIENTS
WITH FAMILY HISTORY	53
WITHOUT FAMILY HISTORY	31
NO SIGNIFICANT DATA	16

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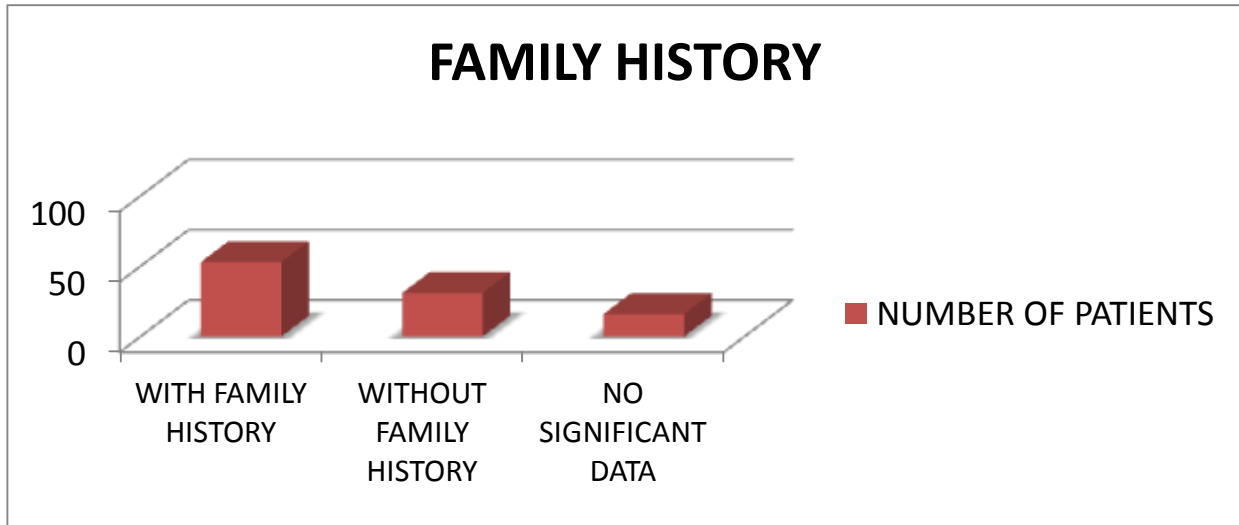
Figure-9 Family history of the patients with type 2 diabetes mellitus

- It was found that 53 patients were with family history of diabetes, 31 patients were without family history of diabetes and in 16 patients there was no significant data.

TABLE No.4 SOCIOECONOMIC STATUS OF THE PATIENTS

| SOCIOECONOMIC STATUS	NUMBER OF PATIENTS
LOWER CLASS	73
MIDDLE CLASS	27
UPPER CLASS	0

TABLE No.5 DATA SHOWING DIFFERENCE IN GRBS VALUES

PATIENT NUMBER	GRBS VALUES (ON DATE OF ADMISSION)	GRBS VALUES (DURING TREATMENT	DIFFERENCE
P1	270	257	13
P2	585	216	369
P3	210	110	100
P4	435	270	165
P5	290	210	80

P6	196	169	27
P7	360	269	91
P8	344	293	51
P9	293	216	77
P10	243	210	33
P11	190	162	28
P12	155	131	24
P13	500	366	134
P14	190	161	29
P15	277	240	37
P16	355	290	65
P17	237	220	17
P18	471	329	142
P19	213	205	8
P20	308	299	9
P21	240	180	60
P22	450	202	248
P23	200	180	20
P24	368	290	78
P25	264	110	154
P26	344	183	161
P27	216	80	136
P28	250	190	60
P29	216	190	26
P30	456	139	317
P31	448	308	140
P32	230	176	54

P33	180	176	4
P34	254	220	34
P35	488	353	135
P36	566	144	422
P37	298	259	39
P38	257	190	67
P39	250	149	101
P40	352	300	52
P41	103	101	2
P42	334	267	67
P43	434	197	237
P44	252	180	22
P45	150	120	30
P46	528	438	90
P47	352	132	220
P48	267	216	51
P49	209	173	36
P50	239	212	27
P51	499	492	7
P52	489	270	219
P53	538	438	100
P54	151	140	11
P55	464	435	29
P56	117	112	5
P57	285	220	65
P58	220	191	29
P59	331	270	61
P60	440	370	70
P61	230	170	60
P62	250	190	60
P63	415	147	274
P64	174	150	24
P65	160	140	20
P66	443	304	139
P67	254	220	34

P68	308	270	38
P69	315	220	95
P70	220	180	40
P71	510	260	250
P72	480	400	80
P73	370	216	154
P74	119	106	13
P75	235	164	71
P76	345	138	207
P77	520	210	310
P78	458	160	298
P79	225	88	137
P80	210	154	56
P81	220	160	60
P82	120	110	10
P83	240	150	90
P84	344	140	204
P85	120	107	13
P86	350	170	180
P87	420	370	50
P88	230	140	90
P89	210	160	50
P90	235	180	55
P91	225	190	35
P92	220	170	50
P93	372	270	102
P94	185	177	8
P95	205	197	8
P96	275	205	70
P97	427	380	47
P98	269	217	52
P99	456	416	40
P100	310	220	90
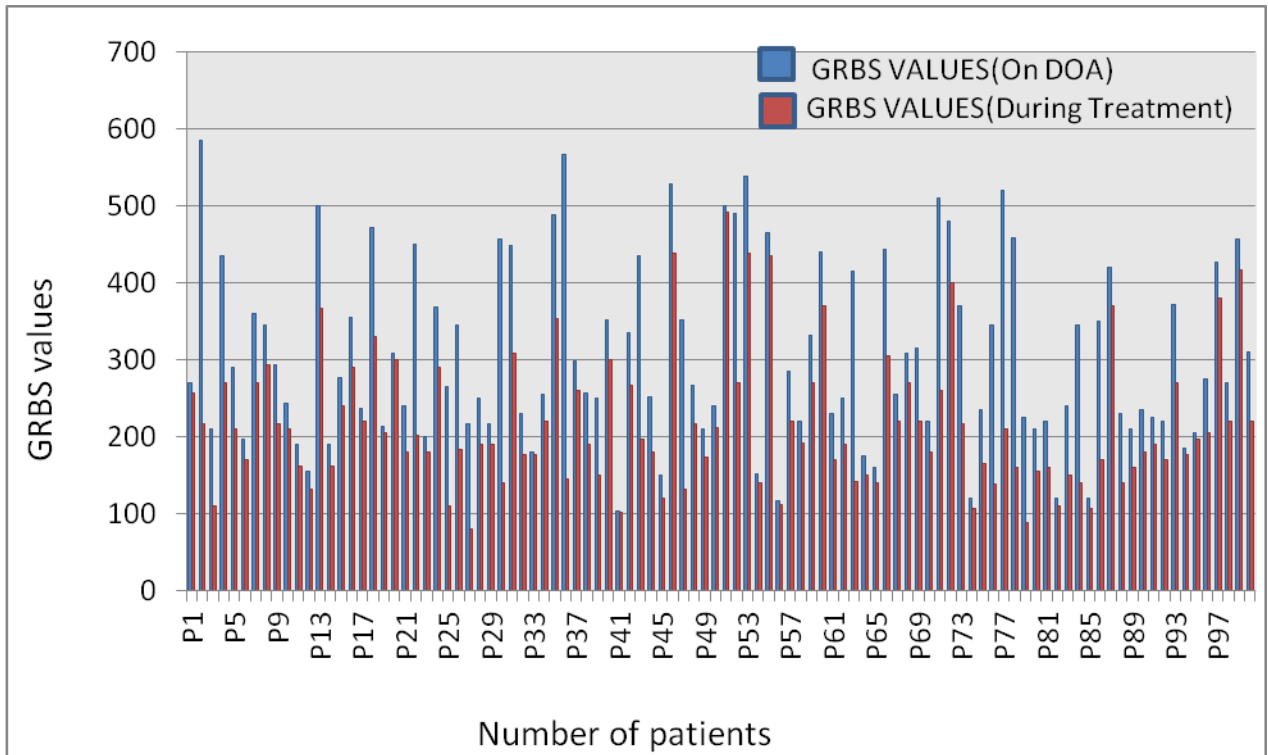
- **Figure-10 Data showing difference in GRBS values**
- It was found that GRBS values were high in patients at the time of Admission in Hospital, it was also noticed that the GRBS values were decreased during the period of Treatment in Hospital.
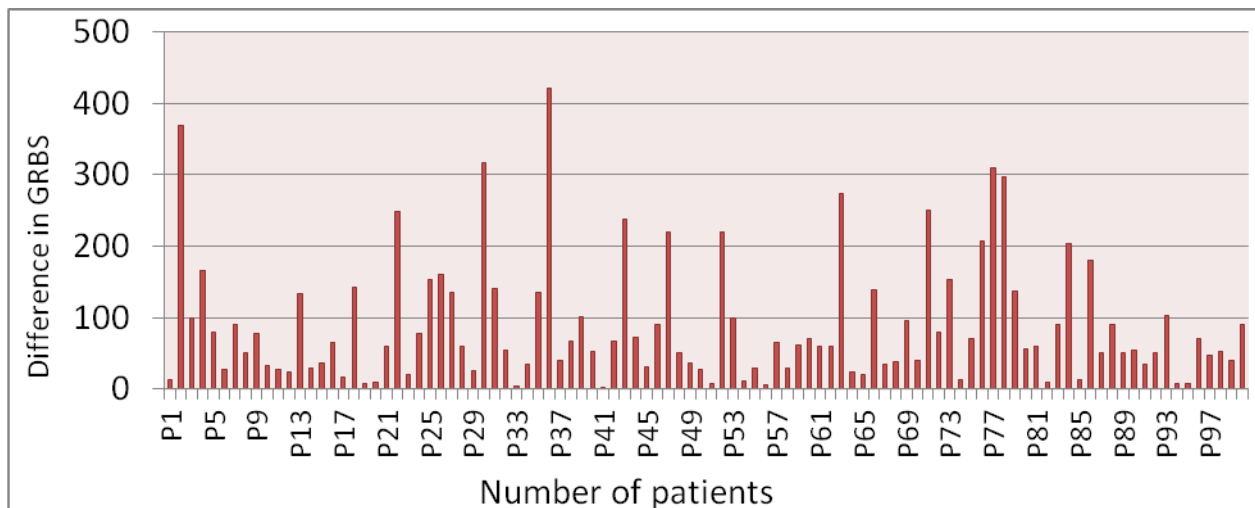
- **Figure-11 Graphical representation of difference in GRBS values**

- **TABLE No.6 ANALYSIS OF GRBS VALUES BEFORE AND AFTER SUBCUTANEOUS ADMINISTRATION OF INSULIN**

Table Analyzed	Paired t test data
Column B	After
vs.	vs.
Column A	Before
Paired t test	
P value	<0.0001
Was the pairing significantly effective?	Yes

- **TABLE No.7 ANALYSIS OF GRBS VALUES BEFORE AND AFTER ADMINISTRATION OF ORAL HYPOGLYCEMIC AGENTS (OHA)**

Table Analyzed	Paired t test data
Column B	After
vs.	vs.
Column A	Before
Paired t test	
P value	0.0056
Was the pairing significantly effective?	No

- **TABLE No.8 ANALYSIS OF GRBS VALUES BEFORE AND AFTER ADMINISTRATION OF COMBINATION OF INSULIN AND ORAL HYPOGLYCEMIC AGENTS (OHA)**

Table Analyzed	Paired t test data
Column B	After
vs.	vs.
Column A	Before
Paired t test	
P value	0.0006
P value (one tailed)	<0.0001
Was the pairing significantly effective?	Yes

Paired t test data
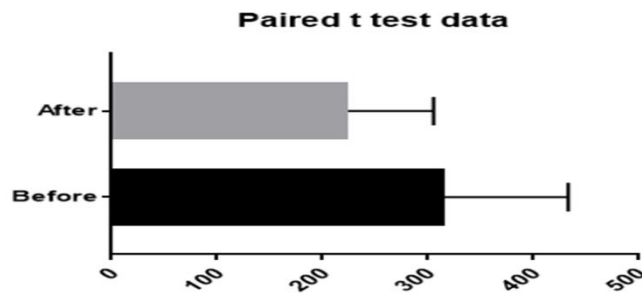
Figure-12 Analysis of GRBS values before and after subcutaneous administration of insulin

Paired t test data
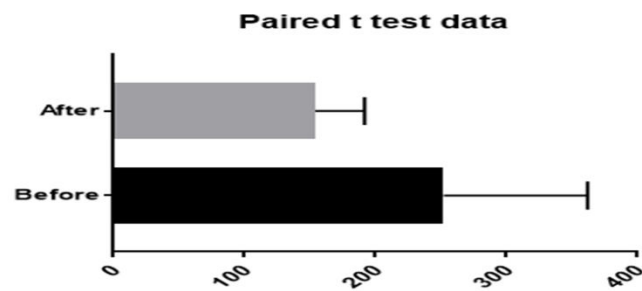
Figure -13 Analysis of GRBS values before and after administration of oral hypoglycemic agents (OHA)

Paired t test data
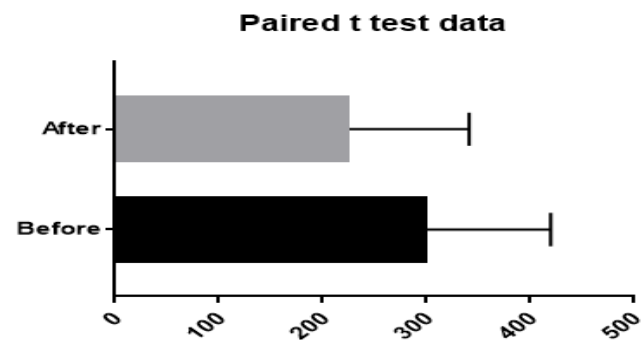
Figure-14 Analysis of GRBS values before and after administration of combination of insulin and oral hypoglycemic agents (OHA)

In the above data shown there is significant drop in blood sugar levels after administration of Insulin alone. The p value obtained was <0.0001 which indicates that the pairing is significantly effective. and there is significant drop in blood sugar levels after administration of oral hypoglycemic agents.
The p value obtained was >0.0001 which indicates that the pairing is significantly not effective.
There is significant drop in blood sugar levels after administration of combination therapy of insulin and oral hypoglycemic agents. The p value obtained was <0.0001 which indicates that the pairing is significantly effective.

TABLE No.9 DATA SHOWING HbA1c VALUES

LEVELS	PATIENTS	PERCENTAGE%
Levels below 6.5%	17	26
Levels above 6.5%	48	74
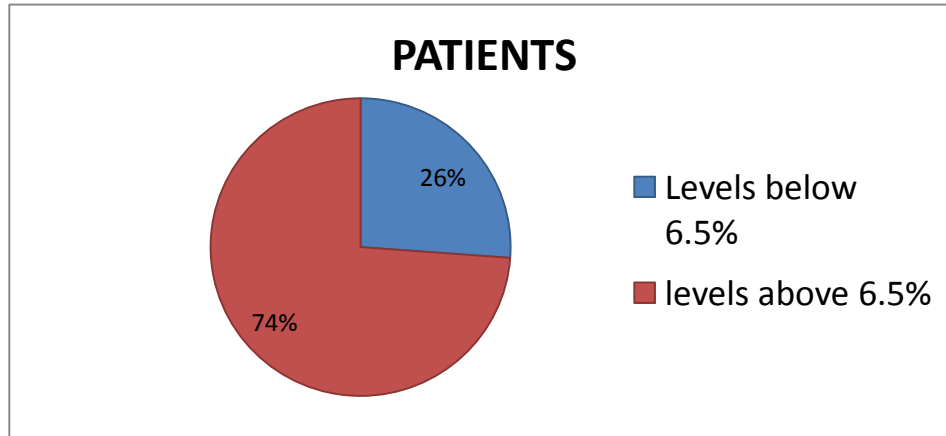
- **Figure-15 Data showing HbA1c values**
- In Total No of 48 patients i.e., 74% the HbA1c levels were found to be above 6.5% and in 17 patients with a percentage of 26% it was below 6.5%

TABLE No.10 TYPE OF TREATMENT

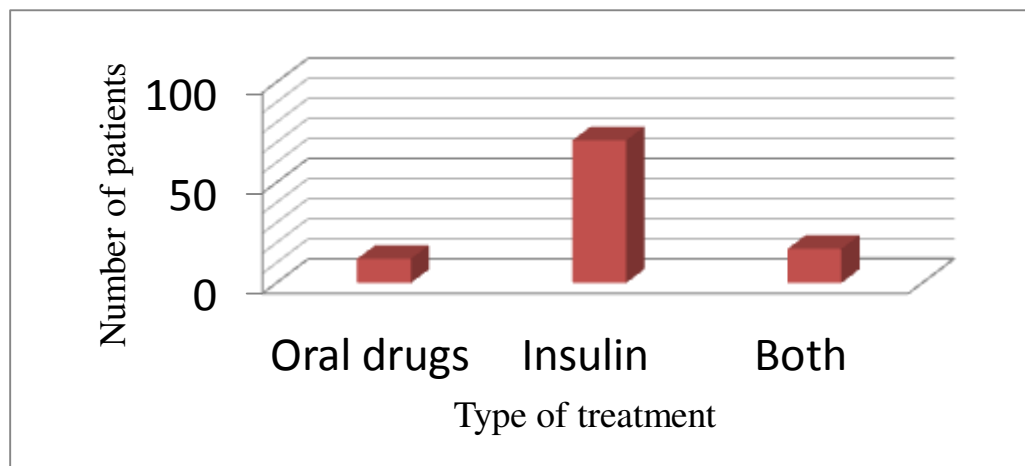| TYPE OF TREATMENT	NUMBER OF PATIENTS
ORAL DRUGS	12
INSULIN	71
BOTH	17

Figure -16 Type of treatment

- It was found that in 71 Patients Insulin was used for Treatment, in 12 patients oral drugs was used and in 17 patients both Insulin and Oral Drugs were used.

TABLE No.11 DEMOGRAPHIC PROFILE OF PATIENTS WITH COMPLICATIONS

COMPLICATIONS	NUMBER OF PATIENTS
NEPHROPATHY	10
NEUROPATHY	15
RETINOPATHY	2
DIABETIC FOOT	3
DIABETIC KETOACIDOSIS	22

•
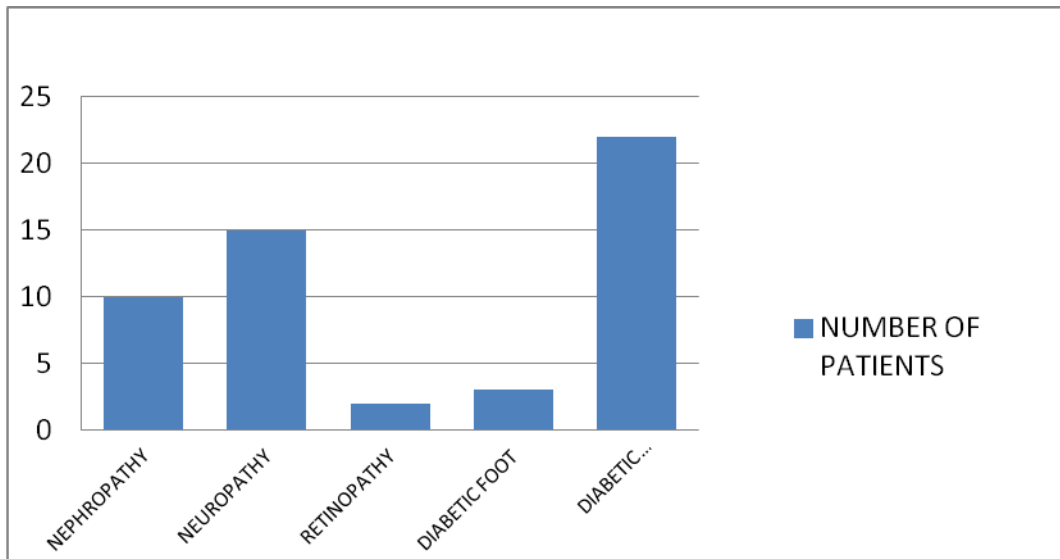
Figure-17 Demographic profile of patients with complications

It was found that maximum patients was found with diabetic ketoacidosis followed by neuropathy.

TABLE No.12 DEMOGRAPHIC PROFILE OF PATIENTS WITH CO-MORBIDITIES

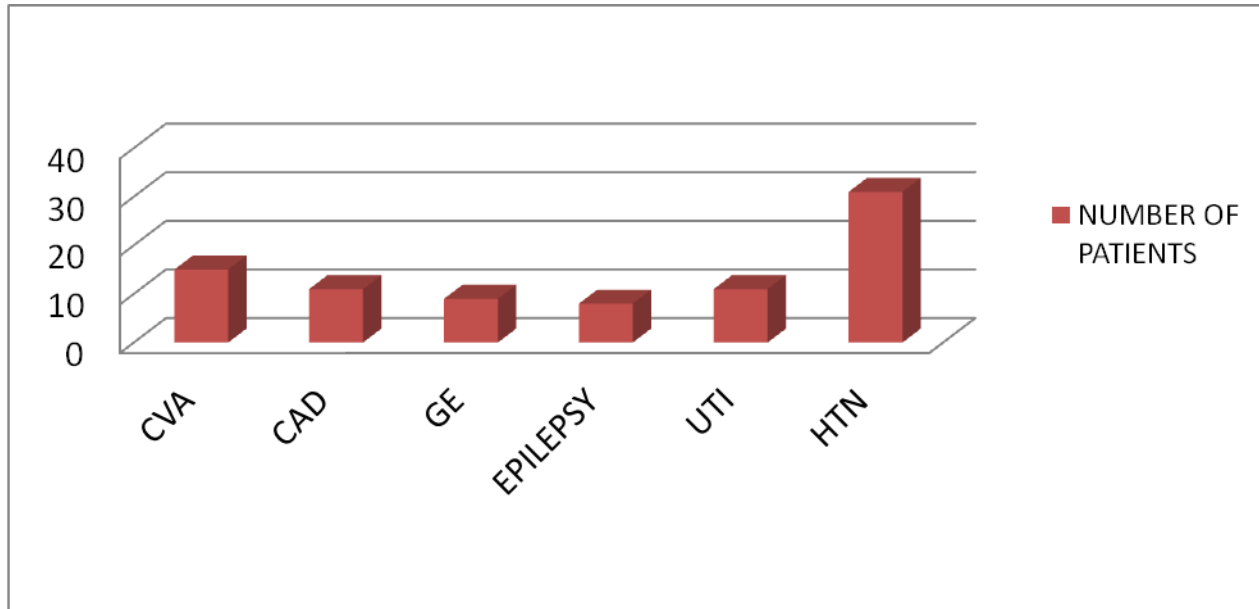| CO-MORBIDITIES	NUMBER OF PATIENTS
CVA	15
CAD	11
GE	9
EPILEPSY	8
UTI	11
HTN	31

Figure-18 demographic profile of patients with co-morbidities
It was found that maximum patients were found with hypertension as co-morbidity followed by CVA

TABLE No.13 TREATMENT DETAILS WITH COMPLICATIONS

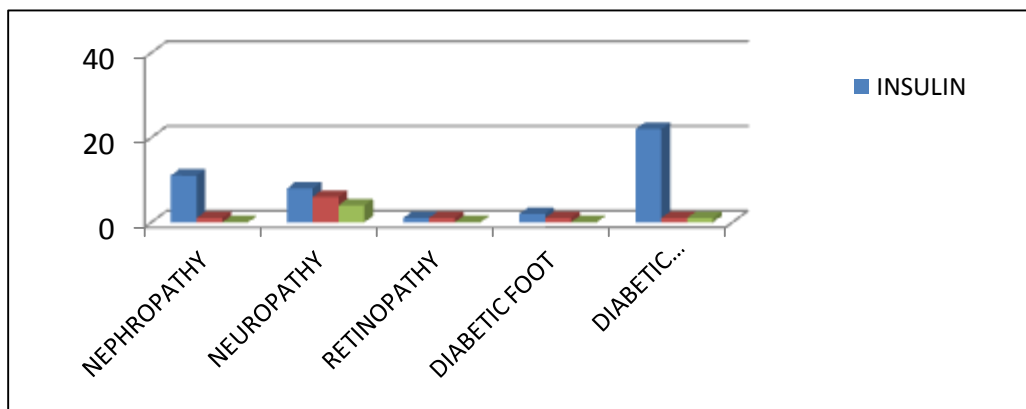| COMPLICATIONS	PATIENTS ON INSULIN	PATIENTS ON OHA	PATIENTS ON INSULIN WITH OHA
NEPHROPATHY	11	1	0
NEUROPATHY	8	6	4
RETINOPATHY	1	1	0
DIABETIC FOOT	2	1	0
DIABETIC KETOACIDOSIS	22	1	1

Figure-19 Treatment details with complications
It was found that insulin is the choice of treatment in majority of the patients with complications.

TABLE No.14 SMOKING STATUS OF THE PATIENTS

SMOKING STATUS	NUMBER OF PATIENTS
NON SMOKER	36
CURRENT SMOKER	55
FORMER SMOKER	9
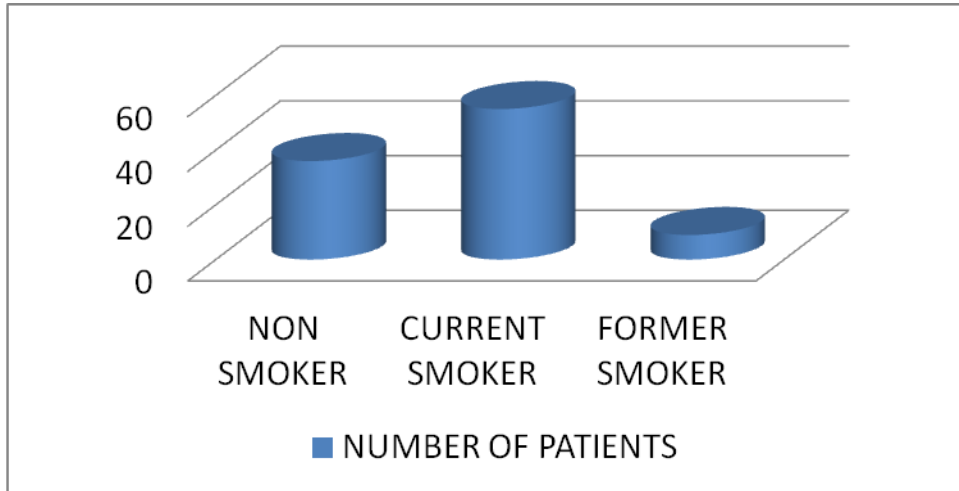
Figure-20 Smoking status of the patients

It was found that 36 patients were non smoker, 55 patients were current smoker and 9 patients were former smoker.

TABLE No.15 MEDICATION ADHERENCE OF THE PATIENTS

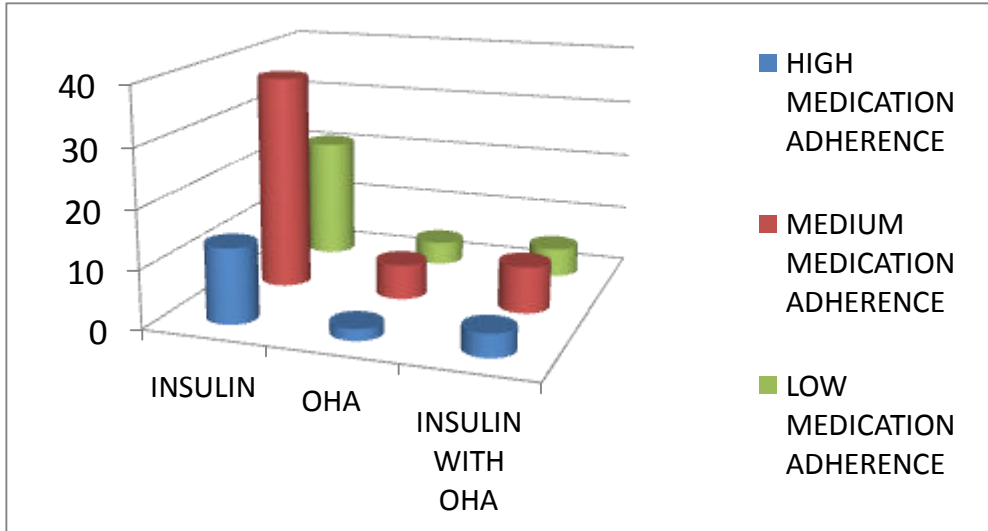| TREATMENT	HIGH MEDICATION ADHERENCE	MEDIUM MEDICATION ADHERENCE	LOW MEDICATION ADHERENCE
INSULIN	13	37	21
OHA	2	6	4
INSULIN WITH OHA	4	8	5

•

Figure-21 Medication adherence of the patients

It was found that maximum patients were with medium medication adherence.

TABLE No.16 DIET OF THE PATIENTS

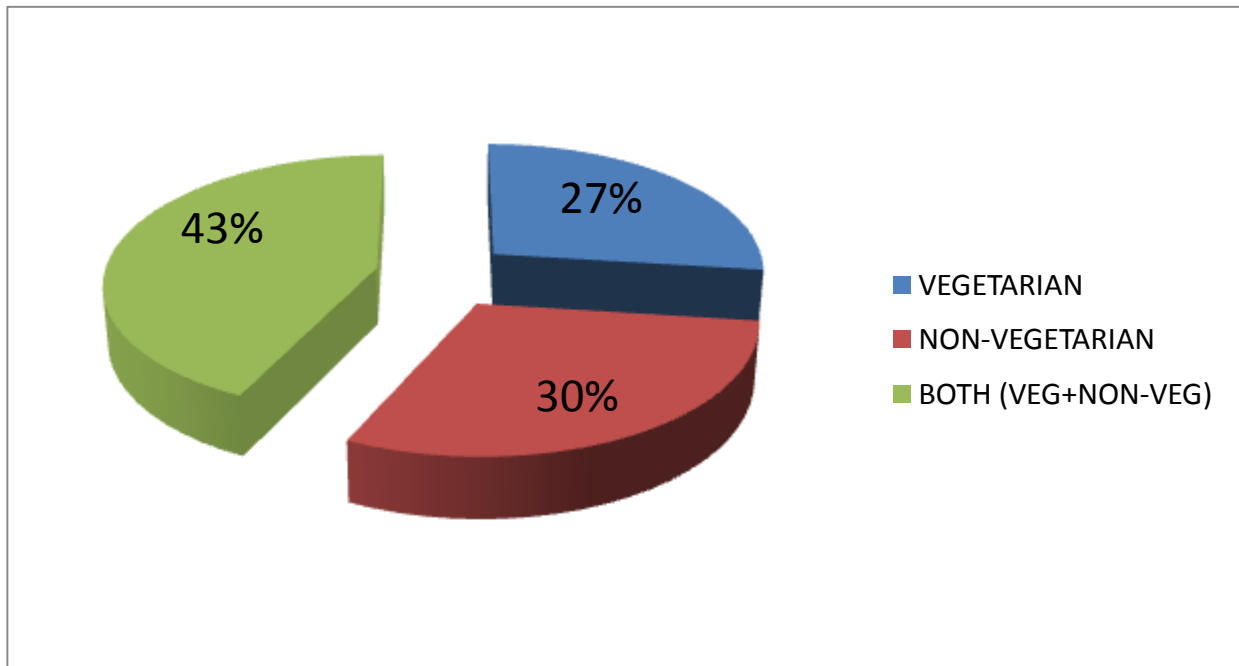| DIET	NUMBER OF PATIENTS
VEGETARIAN	27
NON VEGETARIAN	30
BOTH VEGETARIAN AND NON VEGETARIAN	43

Figure-22 Diet of the patients

It was found that 43% of patients were consuming both veg and non-veg in their Diet, 30% patients were non-vegetarians and 27% patients were vegetarians.

DISCUSSION:

The diabetes mellitus is the commonest metabolic disorder and has a high prevalence in India. The present study evidence of type 2 diabetes mellitus was observed in 100 patients at Osmania General Hospital.

Among 100 patients with diabetes mellitus, out of which 70(70%) were males and 30(30%) were found to be females. It was found that majority of patients which were affected from type 2 diabetes mellitus are from age group of 51-65yrs which accounts for 46% followed by age group of 35-50yrs which accounts for 34% and least were in age group of 81-95 yrs which accounts for 4%.

The patients suffering from Diabetes with duration of 2-5 yrs were maximum which includes 43 patients and minimum were with duration of >20years which includes 5 patients. Based on family history, it was found that 53 patients were with family history of diabetes, 31 patients were without family history of diabetes and in 16 patients there was no significant data. Socioeconomic status of the patients, it was found that maximum patients belong to lower class.

GRBS values were high in patients at the time of admission in Hospital, it was also noticed that the GRBS values were decreased during the period of Treatment in Hospital. In 48 patients (74%) the HbA1c levels were found to be above 6.5% and in 17 patients (26%) it was below 6.5%. Yen- Ling et al (2016) concluded that Basal insulin therapy was associated with a decrease in HbA1c and fasting blood glucose, and an improved treatment satisfaction which were similar to our findings.

There is significant drop in blood sugar levels after administration of Insulin alone. The p value obtained was <0.0001 which indicates that the pairing is significantly effective. And there is significant drop in blood sugar levels after administration of oral hypoglycemic agents. The p value obtained was >0.0001 which indicates that the pairing is significantly not effective. There is significant drop in blood sugar levels after administration of combination therapy of insulin and oral hypoglycemic agents. The p value obtained was <0.0001 which indicates that the pairing is significantly effective.

Based on the treatment it was found that maximum no of patients 71 (71%) were given insulin and 12 patients (12%) were given oral drugs, while 17 patients (17%) were given both insulin and oral drugs. Our results are considered with Juan José Marín- Peñalver, et al (Madrid 28031) which indicates that High blood glucose levels in hospitalized patients with T2DM are associated with increased risk of morbidity and mortality. Improved glucose control with insulin injections may improve clinical outcome and prevent some of the hospital complications. Team Samuel Grossman 20 Dale Drive (2011) concluded that Intensive glycemic control using insulin therapy may be appropriate for many healthy older adults to reduce premature mortality and morbidity, improve quality of life, and reduce health care costs which are consistent with our studies.

Patients complications profile was taken and it was found that maximum patients were with diabetic ketoacidosis (22patients) followed by neuropathy (15patients) and least were with retinopathy (2patients).

It was found that maximum patients were with hypertension (31patients) as co-morbidity followed by CVA (15patients), CAD (11patients), UTI (11patients), GE (9 patients) and least with epilepsy (8patients).

It was found that insulin is the choice of treatment in majority of patients with complications. DiethelmTschöpe et al concluded that In view of the many restrictions on the use of oral antidiabetic drugs, temporary insulin treatment remains the most practical means of glyceamic control for many hospitalized patients with type 2 diabetes which is similar to our findings.

Based on smoking status it was found that 36 patients were non smoker, 55 patients were current smoker and 9 patients were former smoker. Based on analysis of patient's diet it was found that 43% of patients were consuming both veg and non-veg in their Diet, 30% patients were non-vegetarians and 27% patients were vegetarians. ValerijaBralić Lang, et al (2015) found that Poor glycemic control was more frequent in patients who had several "unhealthy" lifestyle habits (diet, smoking cessation) which is consistent with our results.

VII- CONCLUSION:

Much of the burden of type 2 diabetes can be prevented with stringent control of hyperglycemia and other cardiovascular disease risk factors.

Treatment needs to focus on maintaining blood glucose values as close to the non-diabetic range as possible, with early initiation of effective interventions such as (combinations of) blood glucose lowering drugs and insulin, and prompt adjustment of treatment whenHbA1c is above the target value.

Our study suggests that type-2 diabetes comprises multiple defects; therefore choosing the appropriatetreatment often presents a clinical conundrum because of the plethora of variables to consider.

Therefore the goals for the diabetes treatment in older adults should be set differently in each individual patient. The choice of anti-hyperglycemic agents should be based not only on efficacy, but drug safety. Special attention need to be focused on adverse effects, particularly hypoglycemia.

Overall, pharmacist plays an important role in the management of Type 2 Diabetes mellitus by patient counseling and education about the lifestyle modifications.

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