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TREATMENT CHOICE, MEDICATION ADHERENCE AND GLYCEMIC EFFICACY IN PATIENTS WITH TYPE-2 DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL

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ABSTRACT:

In people with diabetes blood sugar levels remains high. This may be because insulin is not being produced at all or it is not made at sufficient levels, or is not effective as it should be. The most common forms of diabetes are type-1diabetes (5%), which is an autoimmune disorder, and type-2 diabetes (95%), which is associated with obesity. Gestational diabetes is a form of diabetes that occurs in pregnancy, and other forms of diabetes are very rare and are caused by a single gene mutation.

For many years, scientists have been searching for clues in our genetic makeup that may explain why some people are more likely to get diabetes than other. The genetic landscape of diabetes introduces some of the genes that have been suggested to play a role in the development of diabetes.

Key words: type-1diabetes , type-2 diabetes , gene mutation., Gestational diabetes

INTRODUCTION

In 1999, WHO defined diabetes mellitus as "a metabolic disorder of multiple etiologies, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long-term damage, dysfunction and failure of various organs". Thus, the metabolic abnormalities of diabetes result from inadequate insulin action on target tissues, due to deficient insulin secretion or insensitivity to insulin action, or a combination of both. [1].

In people with diabetes blood sugar levels remains high. This may be because insulin is not being produced at all or it is not made at sufficient levels, or is not effective as it should be. The most common forms of diabetes are type-1diabetes (5%), which is an autoimmune disorder, and type-2 diabetes (95%), which is associated with obesity. Gestational diabetes is a form of diabetes that occurs in pregnancy, and other forms of diabetes are very rare and are caused by a single gene mutation.

For many years, scientists have been searching for clues in our genetic makeup that may explain why some people are more likely to get diabetes than other. The genetic landscape of diabetes introduces some of the genes that have been suggested to play a role in the development of diabetes.

CLASSIFICATION AND TYPES OF DM:

Diabetes is classified by underlying cause [2].

The categories are type-1 diabetes process of beta cells destruction leads to diabetes. Type 1 is usually characterized by the presence of anti-glutamic acid decarboxylase (anti-GAD) antibodies, islet cell or insulin antibodies which identify the autoimmune processes that lead to ß-cell destruction. In some subjects with this clinical form of diabetes, particularly non-

Caucasians, no evidence of an autoimmune disorder is demonstrable and these are classified idiopathic type 1. Etiological classification may be possible in some circumstances and not in others. Thus, the category of type 1 diabetes can be identified if appropriate antibody determinations are performed. It is recognized that such measurements may be available only in certain centers at present.

Type 2 diabetes mellitus

Type 2 is the most common form of diabetes and is characterized by disorders of insulin action and insulin secretion, either of which may be the predominant feature. Both are usually present at the time that this form of diabetes is clinically manifest. The specific reasons for the development of these abnormalities are not yet know.

Other specific types are currently less common causes of diabetes mellitus, but are conditions in which the underlying defect or disease process can be identified in a relatively specific manner. They include:

- Genetic defects in ß-cells, such as maturity-onset diabetes of the young
- Genetic defects in insulin action, such as Leprechaunism.
- Diseases of the exocrine pancreas, such as cancer of the pancreas, cystic fibrosis and fibrocalculous pancreatopathy (a form of diabetes, which was formerly classified as one type of malnutrition-related diabetes.
- Endocrinopathies, such as Cushing syndrome, acromegaly and phaeochromocytoma
- Drugs or chemicals, such as steroids and thiazides.

Below table represents the phenotype and genotypes of diabetes type-1 and type-2.

TABLE-1

	TYPE-1 DIABETES	TYPE-2 DIABETES
PHENOTYPE	Onset primarily in childhood and adolescence.	Onset primarily after 30 years.
	Often thin or normal weight.	Often obese
	Prone to ketoacidosis.	No ketoacidosis
	Insulin administration required for Survival	Insulin administration is not required for survival.
	Absolute insulin defiency	Relative insulin deficiency and /or insulin resistance.
	Treatment: Insulin injections	Treatment : 1) Healthy diet and increased exercise. 2) Hypoglycemic tablets. 3) Insulin injections.
	Pancreas is damaged by an auto immune attack.	Pancreas is not damaged by an auto immune attack.

TABLE-2

Genotype	Increased prevalence in relatives.	Increased prevalence in relatives.
	Identical twin studies :< 50% usually concordance.	Identical twins studies: above 70% concordance.

TYPE-1 AND TYPE-2 DIABETES

TABLE-3

Characteristics	Type – 1	Type – 2
Other names	Previously type1:insulin-dependent diabetes mellitus(IDDM)juvenile diabetes mellitus	Previously type 2, noninsulin - dependent diabetes mellitus (NIDDM) adult onset of diabetes mellitus.
Percentage of diabetic population	5-10%	90%
Age at onset	Usually <yr. peak 12-14 year some adult develop type1 during the decade	Usually >40yr but increasing prevalence among obese children
Pancreatic function	Usually none those although some residual c peptise can sometime be detected at diagnosis especially in adults	Insulin present is low normal or high amounts
Pathogenesis	Associated with certain HLA types: presence of islet cell antibodies suggests autoimmune Process	Defects in insulin secretion tissue resistance to insulin increase hepatic glucose output
History of keto acidosis	Often present	Rare except in unusual stress (eg infection)
Clinical presentation	Moderate to severe symptoms that generally progress relatively rapidly, weight Loss.	mild polyuria ,fatigue, often diagnosed on routine physical or dental examinations
Treatment	Insulin ,diet, exercise	Diet ,exercise and oral anti diabetic agents (biguanides,meglitinides,sufonylurease ,thizides) insulin

Type-2 diabetes is increasingly diagnosed in younger patients. Type-2 diabetes commonly occurs in adults who are obese. There are many underlying factors that contribute to high blood glucose levels in these individuals. An important factor is body's resistance to insulin in the body, essentially ignoring its insulin secretions. A second factor is falling production of insulin by the beta cells of the pancreas. Therefore, an individual with type-2 diabetes may have a combination of deficient secretion and deficient action of insulin.

In contrast to type-2, the type-1 diabetes most commonly occurs in children and is a result of the body's immune system attacking and destroying the beta cells. The trigger for this auto immune attack is not clear, but the result is end of insulin production.

OBJECTIVES OF THE STUDY:

Primary Objective:

To evaluate the glycemic efficacy and prevention of complications by medication adherence in diabetic patients**.**

Secondary Objectives:

- To identify age, gender, and other factors that are causing diabetes.
- To assess the dietary factors and lifestyle management in patients with diabetes.
- To assess the impact of social habits and risk factors in diabetes patients.
- To assess the efficacy of oral hypoglycemic agents and insulin in diabetes patients.
- To educate the people regarding the diabetes.
- To create the awareness among the patients.

REVIEW OF LITERATURE:

- **IldikonLingvay et al:** Fifty eight patients were randomized at the end of the 3

month run in period: 29 continued insulin based treatment and 29 began triple oral therapy. The baseline characteristics of these two groups are described.HbA1c improved from 10.8% to 5.9% during the 3 month lead in period. This excellent degree of glycemic control was maintained throughout the 3 year study follow up. Based on per protocol analysis of the participants who finished the study, at completion, HbA1c in the insulin treated group was 6.1+- 0.6% versus 6.0+- 0.8% in the triple oral group (P=0.26). This linear mixed model did not find significant difference in treatment effects between the two groups either (p=0.41). The percentage of patients meeting ADA guideline treatment target of Hb1Ac less than 7 % was 1005 in both groups at base line ;92%(22/24) of patients in the insulin group and 76% (16/21) of patients in the triple oral group met that guide line at the end of 36 months. The average insulin dose at the time of randomization was 64+- 31 units (0.63+-0.29 U/kg);at the end of the follow up the insulin dose in the insulin treated group increased to 80+-61 units (0.75+-0.40U/kg).Three patients in each group reached the 'treatment failure' end point . These failures occurred earlier in the triple oral group (at 9, 10, and 12 months after randomization), compared to the insulin group (at 18,21and 27 months after randomization) [10].

- **Arun Chaudhury et al**: Type II diabetes mellitus is one of leading causes of renal failure, ASCVD, non –traumatic lower limb amputation and death worldwide. It is serious chronic medical condition that requires a multidisciplinary team approach, consisting of health care professionals, dieticians, patient educators, patients, and their

families. Life style intervention designed to manage body weight and treat obesity are essential for all patients with diabetes.

By the year 2030 greater than 70%of people type II diabetes mellitus shall reside in developing countries. Primary prevention of Type II DM should be an urgent public health policy.

- **Jaya Krishnan et al**: Diabetes is a major and growing health problem in India. When antidiabetic drug therapy is indicated metabolic control depends on adherence to both pharmacological and nonpharmacological treatment .Greater adherence to medical regimens would be associated with better metabolic control .Poor adherence to recognized standards of care is the principal cause of development of complications of diabetes. DUE studies identify treatment adherence problem are reasons for non-adherence. Thus DUE studies are interventions to improve drug use. Morisky Medication Adherence Scale was used to study patient medication adherence out of the total 400 patients majority of them had shown medium adherence towards oral hypoglycemic adherence therapy.

  35.3% of the patients are shown low adherence and only 21.8% of patients shown high adherence towards the therapy. 19.7% of the patient shown high adherence (monotherapy) and 24% of the patients shown higher adherence (poly therapy).Here p=0.518 >0.000. This indicates that there was no significant relation between number of drugs and patient adherence in the study.

- **Mignote Hailu et al**: The prevalence of diabetes is rising worldwide and is more in the developing countries which is unfortunately already suffering from communicable diseases. Health education including adherence counseling to create awareness towards DM and its medications is mandatory. The overall adherence

towards antidiabetic medications in the study was high. Educational status, duration of diabetes and knowledge towards diabetes and its medications are significantly associated with antidiabetic medication adherence of patients. Unable to read and write, a duration of less than three years since medically diagnosed for diabetes, and being not knowledgeable were factors associated with nonadherence to antidiabetic medication [11].

- **Vijay Sena Reddy DENDI ET**: Type II DM is a global pandemic, as evident from the global cartographic picture of diabetes by the International Diabetes Federation Diabetis mellitus is a chronic progressive, incompletely understood metabolic condition chiefly characterized by hyperglycemia. Impaired insulin secretion, resistance to tissue actions of insulin, or a combination of both are thought to be the commonest reasons contributing to the pathophysiology of Type II DM, a spectrum of disease originally arising from tissue insulin resistance and gradually progressing to a state characterized by complete loss of secretory activity of the beta cells of the pancreas. Type II DM is a major contributor to the very large rise in the state of non-communicable disease affecting developed as well as developing nations. In this main review, we endeavor to outline the current management principles, including the spectrum of medications that are currently used for pharmacologic management, for lowering the elevated blood glucose in Type II diabetes.

  A total of 288 diabetes patients were involved in the study. The response rate was 100%. Among the total of 288 responders, 111(38.5%) and 177(61.5%) were males and females, respectively .The mean age was 55.2(SD 10.996) years. Majority 272(94.4%) and 256 (88.9%), of the respondents were amharaand orthodox, respectively. One hundred sixty nine (58.75) were married. Ninety eight 34%) had

certificate and above while seventy two (25%) cannot read and write. Majority, 98(34%), of the participants were housewives and government employee, 50(17.4%).The mean average monthly income was 1231.02 (SD1344.580) ET Birr. Large proportion, 240(83.3%), were urban with their residence.

RESULTS

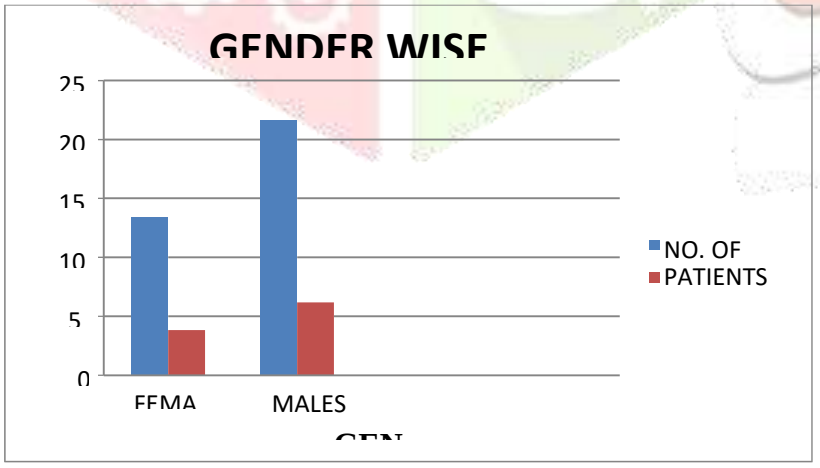
A total of 350 cases were collected in all departments of sunshine hospital, secunderabad for a period of six months. The following evaluation was made from the collected data.

GENDER WISE DISTRIBUTION OF DATA:

TABLE-5

GENDER	NO.OF PATIENTS	PERCENTAGE
FEMALE	134	38.28
MALE	216	61.72
TOTAL	350	100

GRAPH-1



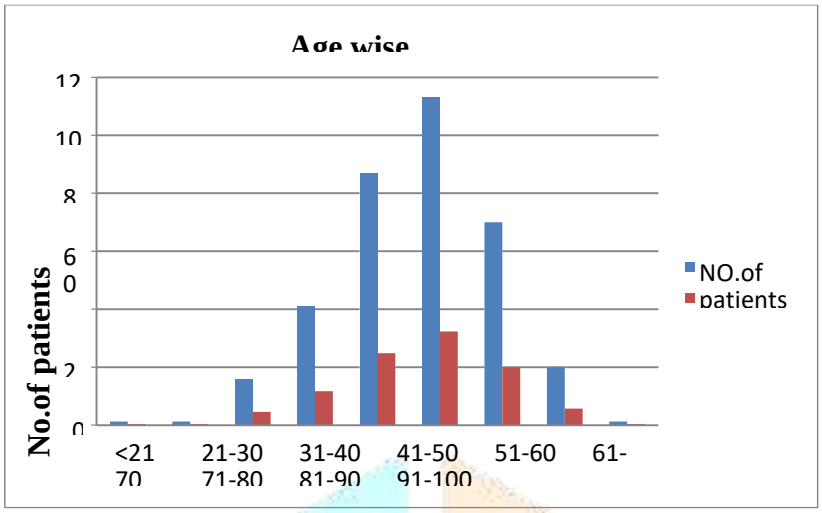
In our present study, it was found that more male patients are admitted to the various departments in the hospital, when compared to female patients. Out of 350 patients enrolled the number of male patients was found to be 216(61.72%) while number of female patients was 134(38.28%). The reason for higher incidence of male patients may be due to uncontrolled diet and improper exercise.

AGE WISE DISTRIBUTION OF DATA

TABLE-6

AGE	NO.OF PATIENTS	PERCENTAGE
<21	1	0.29
21-30	1	0.29
31-40	16	4.57
41-50	41	11.72
51-60	87	24.85
61-70	113	32.28
71-80	70	20
81-90	20	5.71
91-100	1	0.29
TOTAL	350	100

GRAPH-2



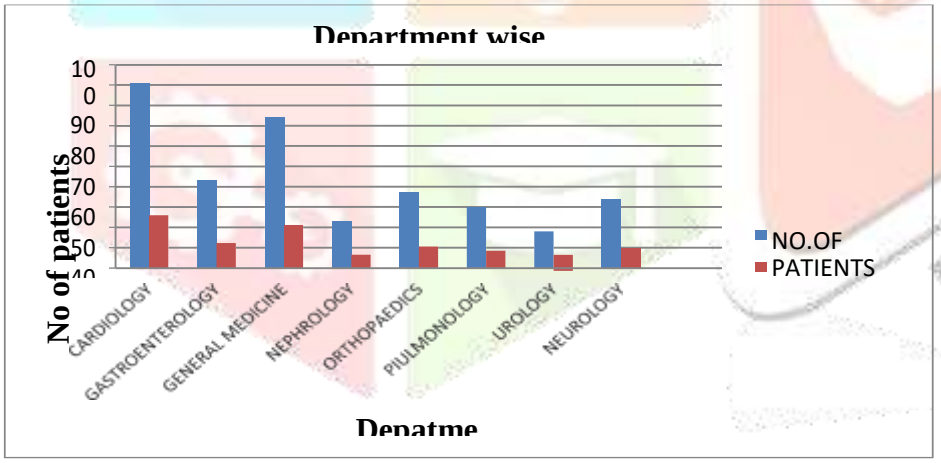
Out of 350 patients, the maximum number of patients aged between 61-70 is suffering from diabetes followed by age group (51-60).

DEPARTMENT WISE DISTRIBUTION:

TABLE-7

DEPARTMENT	NO.OF PATIENT	PERCENTAGE
CARDIOLOGY	91	26
GASTROENTEROLOGY	43	12.28
GENERAL MEDICINE	74	21.15
NEPHROLOGY	23	6.57
ORTHOPAEDICS	37	10.57
PULMONOLOGY	30	8.57
UROLOGY	18	5.14
NEUROLOGY	34	9.72
TOTAL	350	100

GRAPH-3



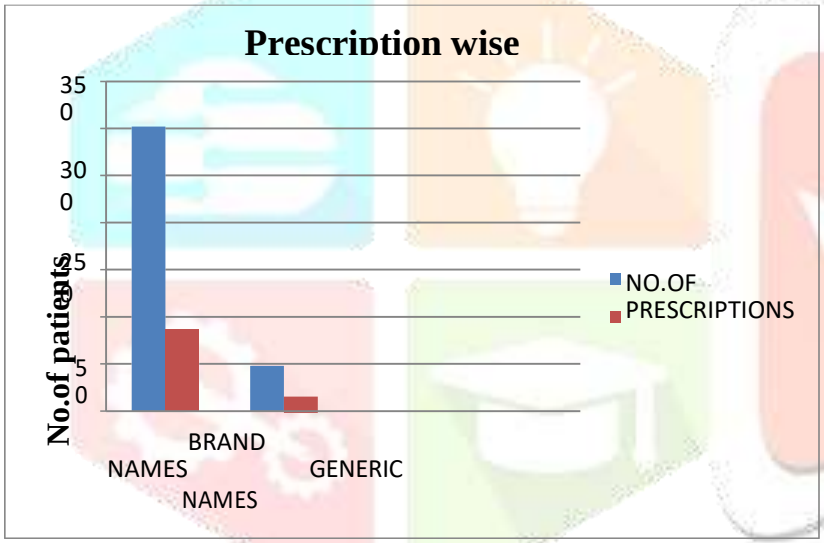
During the study, out of 350 patients it was found that there are more patients from the cardiology 91patients (26%) and general medicine 74 patients (21.15) are suffering from diabetes

PRESCRIPTION WISE DISTRIBUTION:

TABLE-8

PRESCRIBED AS	NO.OF PRESCRIPTIONS	PERCENTAGE
BRAND NAME	302	86.28
GENERIC NAME	48	13.72
TOTAL	350	100

GRAPH-4



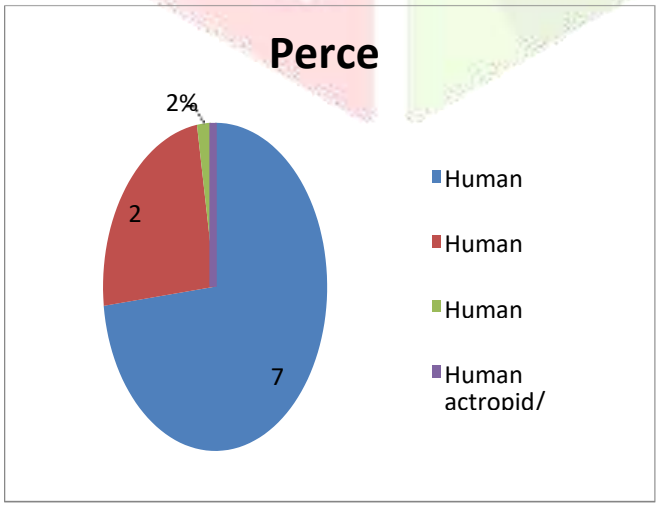
Out of 350 cases, a majority of then drugs were purely prescribed based on the brand names i.e., 302(86.28%) followed by generic namesi.e.,48 (13.72%). The pattern of prescription in terms of the genric name was found to be low and should be encouraged.

TYPES OF INSULIN PRESCRIBED

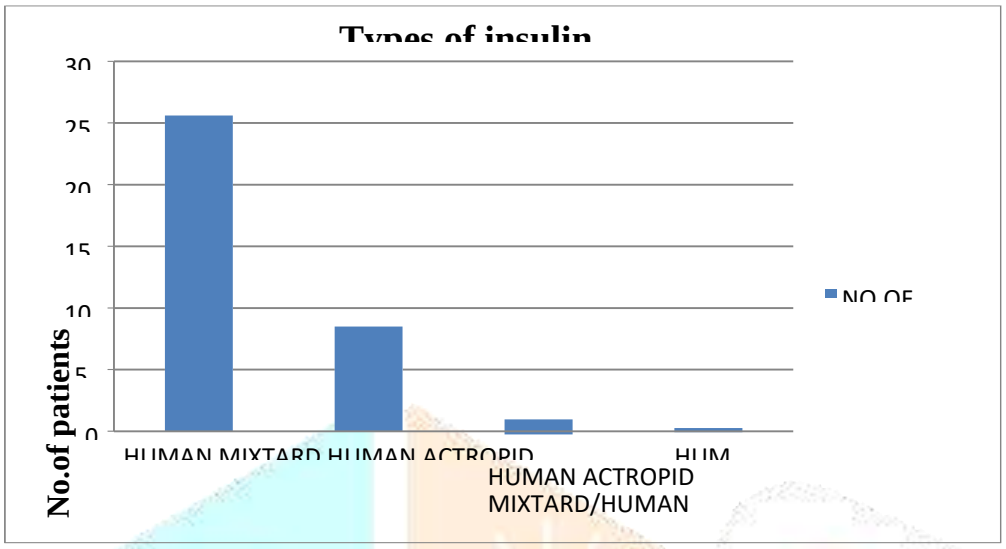
TABLE-9

DRUG NAME	NO.OF PATIENTS	PERCENTAGE(%)
Human actropid	256	73.14
Human mixtard	85	24.28
Human actropid+Human Mixtard	7	2
Human actropid/Human Mixtard	2	0.58
Total	350	100

PIE-CHART-1



GRAPH-5



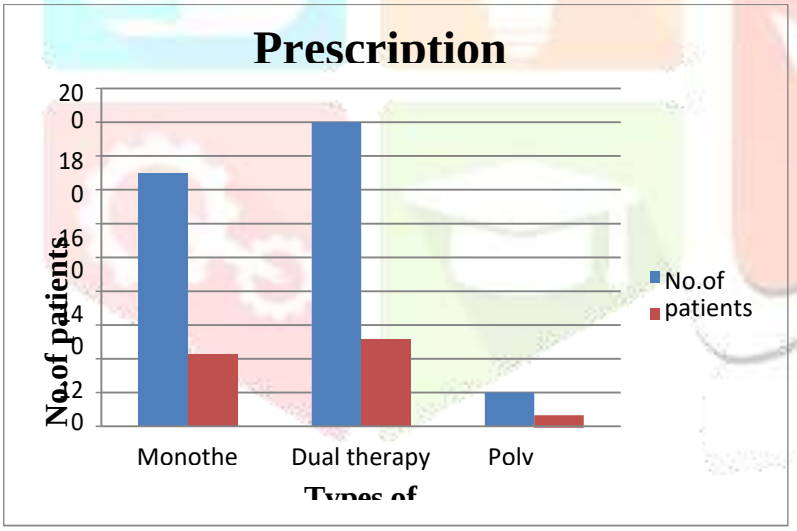
From the above table it is inferred that out of 350 prescrptions frequently prescribed insulin was human actropid 256 patients (73.14), followed by human mixtard 85 patients (24.28), human mixtard+ human actropid 7 patients (2%) and finally human mixtard or human actropid 2 patients (0.58%).

PRESCRIPTION PATTERN OF HYPOGLYCEMIC AGENTS

TABLE-10

Prescribing pattern of hypoglycemic agents	No. of patients	Percentage
Monotherapy	150	42.85
Dual therapy	180	51.43
Polytherapy	20	5.72
Total	300	100

GRAPH-6



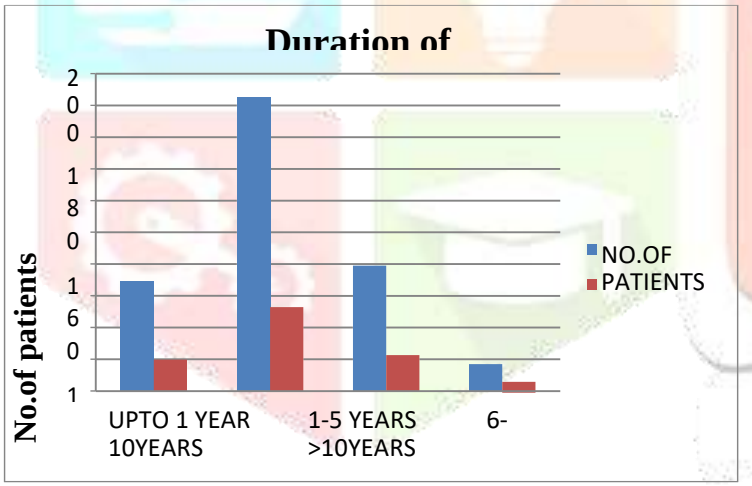
From the above table it is inferred that from 350 patients about 180 patients (51.2%) people are prescribed by dual therapy followed by monotherapy 150 patients (42.85) and with poly therapy 20 patients (5.72%)

DURATION OF HYPOGLYCEMIC AGENT USE

TABLE-11

TIME PERIOD	NO.OF PATIENTS	PERCENTAGE(%)
UPTO 1 YEAR	69	19.72
1-5 YEARS	185	52.85
6-10 YEARS	79	22.57
>10YEARS	17	4.86
TOTAL	350	100

GRAPH-7



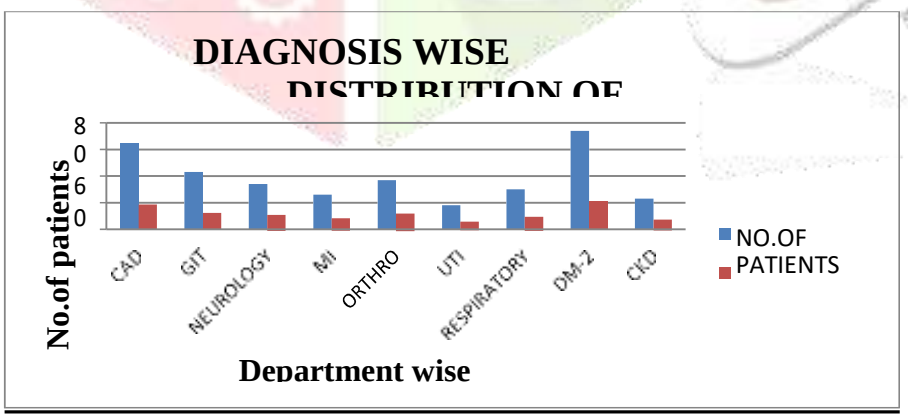
From the above chart we found that out of 350 patients 185 patients (52.85%) patients were found with 1-5 years of hypoglycemic agent use followed by 79 patients (22.57) are found with 6-10years use, 69 patients (19.72%) upto 1 year and finally more than 10 years 17 patients (4.86%) .

DIAGNOSIS WISE DISTRIBUTION OF INSULIN:

TABLE-12

DISEASE	NO.OF PATIENTS	PERCENTAGE
CAD	65	18.57
GIT	43	12.28
NEUROLOGY	34	9.72
MI	26	7.43
SURGERY	37	10.57
UTI	18	5.14
RESPIRATORY	30	8.57
DIABETES	74	21.15
CKD	23	6.57
TOTAL	350	100

GRAPH-8



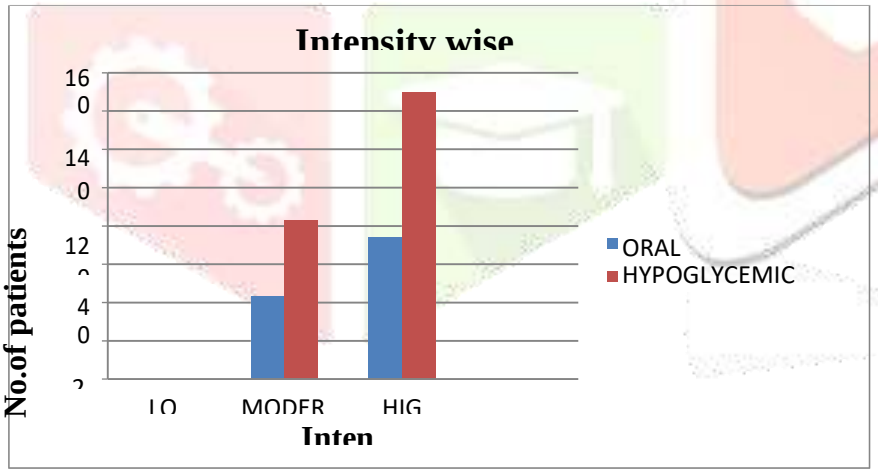
From the above table it is inferred that out of 350 cases the highest no.of patients were diagnosed with CAD 65(18.75) and least CKD 23(6.57).

INTENSITY WISE DISTRIBUTION ORAL HYPOGLYCEMIC AGENTS V/S INSULIN

TABLE-13

INTENSITY	ORAL HYPOGLYCEMIC AGENTS	INSULIN
LOW	0	0
MODERATE	43	83
HIGH	74	150
TOTAL	117	233

GRAPH-9



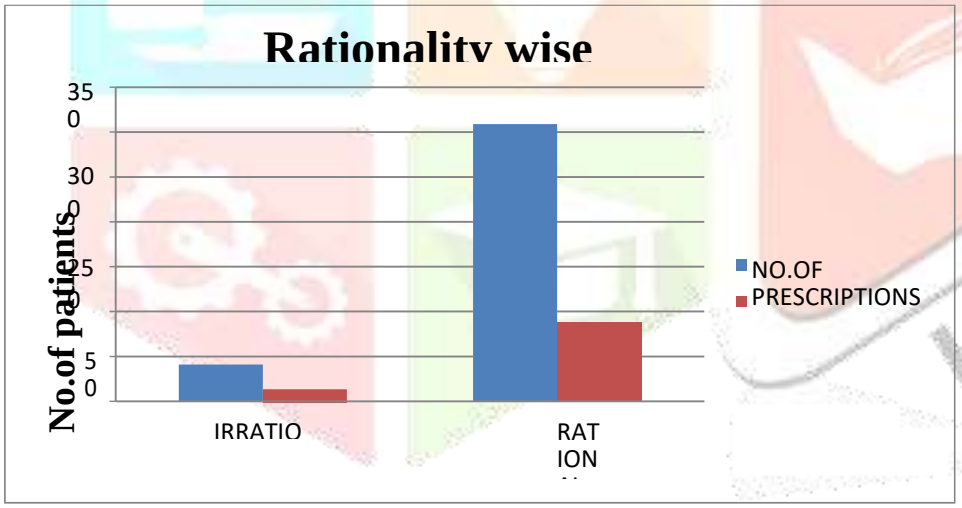
From the above table, it is inferred that out of 350 patients, majority of patients are prescribed by insulin i.e,150 followed by moderate use of oral hypoglycemic agents i.e,83.

RATIONALITY WISE DISTRIBUTION:

TABLE-14

RATIONALITY	NO.OF PRESCRPTIONS	PERCENTAGE(%)
IRRATIONAL	41	11.72
RATIONAL	309	88.28
TOTAL	350	100%

GRAPH-10



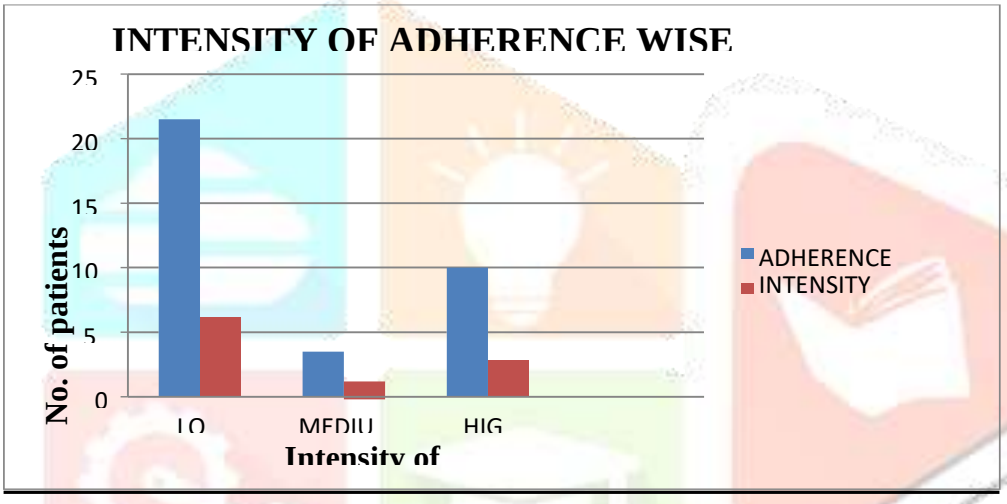
From this study, it was found that out of 350 patients who were given hypoglycemic agents(insulin and oral hypoglycemic agents), 309(88.28%)patients were prescrinbed rationally while 41(11.72%) patients were prescribed irrational.

INTENSITY OF MEDICATION ADHERENCE WISE DISRTIBUTION:

TABLE-15

INTENSITY OF ADHERENCE	ADHERENT	PERCENTAGE
LOW	215	61.44
MEDIUM	35	10
HIGH	100	28.56
TOTAL	350	100

GRAPH-11



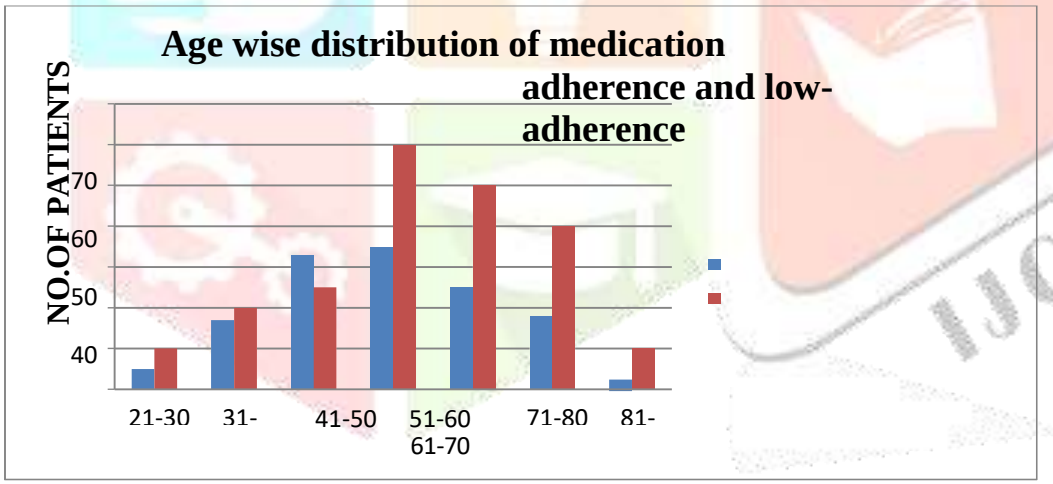
From the above table, it was confirmed that very less number of people are adherent to diabetes (100 patients) where as majority of people (215 patients) are low- adherent followed by (35 patients) with moderate adherence.

AGE WISE DISTRIBUTION OF MEDICATION ADHERENCE AND NON ADHERENCE

TABLE-16

AGE	MEDICATION AHERENCE	MEDICATION LOW ADHERENCE
21-30	5	10
31-40	17	20
41-50	33	25
51-60	35	60
61-70	25	50
71-80	18	40
81-90	2	10
TOTAL	135	215

GRAPH-12



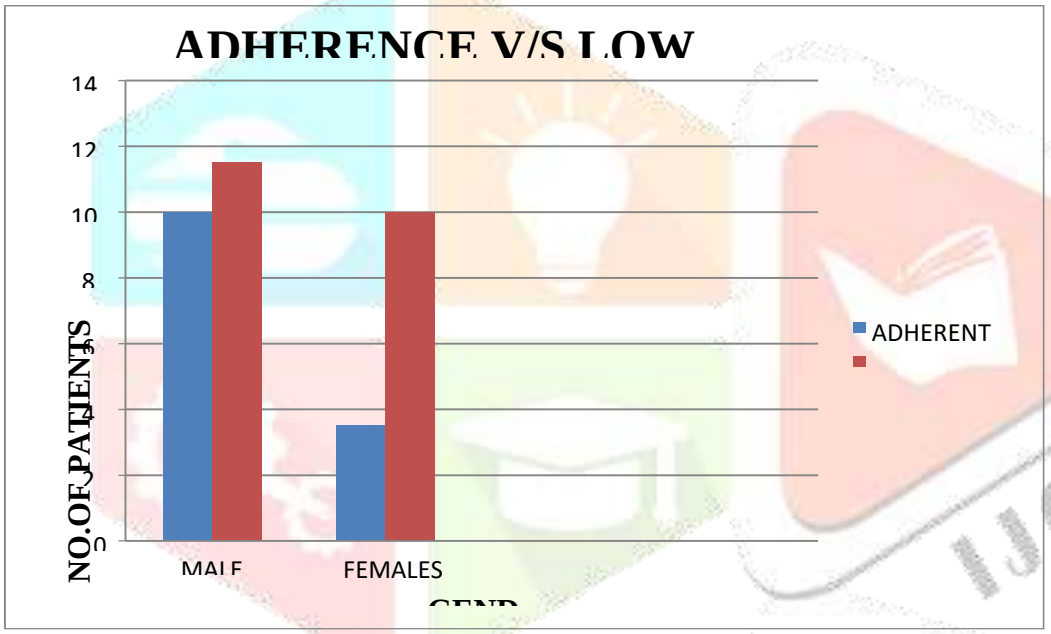
From the above table it is inferred that majority of people ager grouped51-60(70) are non adherent to diabetes followed by 61-70(60) are non adherent and only 51-60(25) are adherent followed by 61-70(15) are adherent to diabetes.

GENDER WISE DISTRIBUTION OF ADHERENCE:

TABLE-17

GENDER	ADHERENT	LOW ADHERENT
MALE	100	115
FEMALE	35	100
TOTAL	135	215

GRAPH-13



From the above table it is inferred that out of 350 patients most of the males patients are low adherent(115) when compared with the female patients(100) and only 100 male patients are adherent to diabetes and only 35 female are adherent.

COMPARISION OF DEPARTMENT WITH REFERENCE TO GENDER:

TABLE-18

Gender	Cardio	GE	GM	Nephro	Neuro	Ortho	Pulmn	Uro	P-value
Female	26	19	33	10	9	19	11	7	P=0.0329
Male	65	24	41	13	25	18	19	11	
Total	91	43	74	23	34	37	30	18	350

From the above table it was inferred that out of 350 cases, when we compare department with respect to gender, majority of cases were found in males 65 in cardiology, 41 in general medicine, 25 in neurology, 24 in gastro enterology,19 in pulmonology, 18 in orthopaedics, 13 in nephrology and 11 in urology. In females 33in general medicine, 26 in cardiology, 19 in both gastroenterology and orthopaedics, 10 in nephrology, 9 in neurology and finally 7 in urology. The least number in both females and males are in urology (7 and 11 respectively). When we compare the two values in regression we get p-value (P=0.0329). thus the null hypothesis is accepted. Males are more prone to diabetes when compared to females.

COMPARISION OF DEPARTMENT WITH REFERENCE TO AGE:

TABLE-19

Age group	Cardio	GE	GM	Nephro	Neuro	Orthro	Pulmn	Uro	P value
<21	-	-	1	-	-	-	-	-	
21-30	-	-	1	-	-	-	-	-	
31-40	6	1	4	2	1	1	1	1	
41-50	10	4	11	5	2	4	5	1	
51-60	20	12	16	4	8	9	6	5	0.0038
61-70	30	15	23	6	9	8	5	4	
71-80	21	6	15	4	6	12	10	5	
81-90	3	5	3	2	8	3	3	2	
91-100	1	-	-	-	-	-	-	-	
Total	91	43	74	23	34	37	30	18	

In this study, out of 350 cases, when we compare department with respect to age, majority of cases who are suffering from diabetes are found in cardiology department 30 cases (61-70) followed by 23 cases (60-70) in general medicine very few cases were noted in age group 91-100 years i.e., 1cases in cardiology and in <21 years of age 1 case in general medicine and in 21-30 years 1 case. P- Value was found to be 0.0038 and the null hypotheses is accepted.

COMPARISION OF DISEASE WITH REFERENCE TO RATIONAL USE:

TABLE-20

Rational use	GE	GM	NEURO	ORTHO	PULMN	CARDIO	URO	NEPHRO	P-Value
Irrational	3	10	4	7	5	10	1	1	0.007609
Rational	40	64	30	30	25	81	17	22	
Total	43	74	34	37	30	91	18	23	

In this study, out of 350 cases when we compare disease with respect to rationality, the rational use was found to be more in cardiology department (i.e, 81cases in cardiology, 64 cases general medicine, 40 cases in gastro enterology, 30 cases in both neurology and orthrology, 25 cases in pulmonology, 22 cases in nephrology and 17 cases in urology, while irrational use of drugs were found 10 in GM and CARDIO 7 in Orthro, 5 in Pulmonology, 4 in Neurology, 3 in GE, 1in both Uro and nephrology departments. P- Value is significant 0.007609.

COMPARISION OF DISEASE WITH REFERENCE TO DRUG DISTRIBUTION:

TABLE-21

Prescribed in	Cardio	GE	GM	Nephro	Neuro	Orthro	Pulmo	Uro	P-value
Brand Name	80	39	63	20	30	30	24	16	P=0.003219
Generic Name	11	4	11	3	4	7	6	2	
Total	91	43	74	23	34	37	30	18	

From the above table, when we compare the disease with respect tom drug distribution, the majority of the drugs prescribed in their brand names i.e., 80(cardiology), 63(general medicine), 39(gasrtology) 30(Neuro and Orthro), 24 (Pulmo), 20 (Nephro) and 16(urology), followed by generic names in 11(cardio), 11(general medicine), 7(Orthro), 6(Pulmo), 4(Neuro), 3(Nephro), 2(urology) departments.

COMPARISION OF AGE GROUP WITH REFERENCE TO MEDICATION ADHERENCE

TABLE-22

AGE GROUP	MEDICATION ADHERENCE	LOW-MEDICATION ADHERENCE	P-VALUE
21-30	5	10	0.043242
31-40	17	20	
41-50	33	25	
51-60	35	60	
61-70	25	50	
71-80	18	40	
81-90	2	10	

In this study, out of 350 cases, when we compare age group with respect to medication adherence and low-medication adherence. It was found that low-medication adherence was more in age group 51-60 (60 patients) followed by 61-70(50 patients) followed by 71-80 (40 patients) followed by 41-50 (25 patients) followed by 31-40 (17 patients) followed by 21-30 (5 patients) finally followed by 81-90 (10 patients). Medication adherence was very less in age group 81-90 (2 people) followed by 21-30 (5 patients) followed by 31-40 (17 patients) followed by 71-80 (18 patients) followed by 61-70 (25 patients) followed by 41-50 (33 patients) followed by 51-60 (35 patients).

COMPARISION OF MEDICATION ADHERENCE WITH REFERENCE TO GENDER

TABLE-23

Gender	Cardio	Ortho	Neuro	Pulmo	GM	GE	Urology	Nephro	P-Value
Males	40	15	5	4	16	10	5	5	0.356548
Females	5	5	3	3	12	3	1	3	

According to our study, out of 350 cases, when we compare department with respect to the medication adherence with reference to gender the adherence was found that the adherence was very low among females when compared with the males, in cardiology (40 males and 5 females) followed by only patients with diabetes (16 male and 12 females) followed by orthrology (15 males and 5 females) followed by GE (10 males and 3 females) very low number was followed by urology (5 males and 1 female) followed by nephrology (5 males and 3 females) followed by urology department (males-5 and females-1) followed by pulmonology (4 males and 3 females) followed by neurology (5 males and 3 females) and the null hypothesis was rejected (0.35648) i.e., more number of people are having medication adherence. From this we can analyse that very less number of people are having medication adherence.

COMPARISION OF LOW -MEDICATION ADHERENCE WITH REFERENCE TO GENDER

TABLE-24

Gender	Cardio	Ortho	Neuro	Pulmo	DM	GE	Urology	Nephro	P-Value
Males	25	3	20	15	25	14	6	7	0.040654
Females	21	14	7	8	21	16	6	7	

According to our study, out of 350 cases, when we compare department with respect to the medication adherence with respect to gender the low-adherence was found that the low-adherence was very high in cardio and general medicine (Only diabetes) male patients (i.e.,25 and 25). Followed by female patients (21 and 21) in both diabetes and cardio department. Followed by Neuro (20 males and 7 females) followed pulmonology (15 males and 8 females) followed by GE (14 males and 16 females) followed by nephrology (7 males and 7 females) followed by urology (6 males and 6 females) finally there are very less number of patients in Orthro department (3 males and 14 females). The null hypothesis was accepted (0.040654) i.e., more number of people are not having medication adherence. From this we can analyse that majority of people are not having medication adherence.

DISCUSSION:

- The data was collected prospectively from 350 patients and medication adherence and glycemic control were analysed. In this study demographics characteristics shown males (216 i.e., 61.72) and females (134 i.e., 38.28) are commonly diagnosed as diabetes from this we can analyse that more male patients are diagnosed to have diabetes than the female patients.
- The maximum number of patients who were diagnosed as diabetes were between the age group of 61-70 (32.28) followed by 51-60(24.85) and 41-50(11.72). The reason for higher incidence of older patients i.e., above 51 years may be due to environmental triggers and uncontrolled diet which may lead to diabetes. This can be attributed to the fact that the age group above 60years are mainly diagnosed as diabetes.
- The use of anti-diabetic agents was rational in most of the cases i.e., (309) and irrational use was found in (41 patients).
- Out of 350 cases, a majority of the drugs are prescribed based on the brand names 302 followed by generic names 48. Use of brands names were more frequent and could be as a result of various promotional strategies from different pharmaceutical companies trying to ace their products. Prescribing drugs by generic names would become easy for the hospital to have maintence over its regulatory stock and would also lower the cost the treatment.
- Insulin is more prescribed than the oral hypoglycemic agents mainly in cardiology and in general medicine areas.
- The most prescribed insulin's are human actropid for 256 patients followed by human mixtard 85 patients.

- Majority of patients are on dual therapy that is they are taking both insulin and oral hypoglycemic agents (180, 51.43%) followed by mono therapy (150, 42.85%) and poly therapy (20, 5.72%)
- Majority of patients are using hypo glycemic agents for more than 1-5years (185-52.85) followed by 6-10 years (79, 22.57%) and more than 10 years are (17, 4.82%).
- Out of 350 cases we found that there are (74 patients 21.15%) are only suffering from diabetes followed by (65 patients 18.57%) diabetes with CAD followed by (43 patients 12.28) diabetes with GIT followed by (37 patients 10.57%) diabetes with Orthro followed by (34 patients 9.72%) diabetes with neurology followed by (30 patients 8.57%) diabetes with respiratory tract infections followed by (26 patients 7.43%) diabetes with MI followed by (23 patients 6.57%) diabetes with CKD followed by very least number of patients i.e., (18 patients 5.14%) diabetes with urinary tract infections.
- Majority of patients are treated with insulin i.e., 233 patients followed by oral hypoglycemic agents i.e., 117 patients.
- Majority of patients are low-adherent (2615) to diabetes when compared with the adherent patients (135).
- Type-1 and type-2 are managed holistically by a combination of life style modifications and glucose-lowering therapies.

SUMMARY:

Optimal glycemic management is essential to avoid the downstream health and economic consequences of type 2 diabetes, both at a patient and population level. In addition to dietary and lifestyle factors, choice of medication for type 2 diabetes represents a key determinant of the achievement and maintenance of glycemic control.

- The evolution of type 2 diabetes is characterized by elevations in glycated haemoglobin A1C (HbA1c) levels over time and an on-going requirement to adjust med medication with respect to glucose-lowering efficacy, patient preferences and side effect profiles.
- In patients newly diagnosed with type 2 diabetes, metformin (MET) or sulfonylurea (SU) are common first-line therapeutic strategies.
- These therapies often elicit a good, initial glucose-lowering response; however, in patients who experience intolerable side effects (including gastrointestinal symptoms and/or hypoglycaemia) or do not achieve sufficient glycemic control with these therapies (initially or over time as the disease progresses), there is a requirement to escalate to alternative monotherapy or combination regimens.
- These may include other oral antihyperglycemic agents (OHA) such as thiazolidinedione (TZD), sodium-glucose co-transporter-2 inhibitors (SGLT-2i) and dipeptidyl peptidase-4 inhibitors (DPP-4i) or injectable regimens including glucagon-like peptide-1 (GLP-1) and insulin-based therapies.
- These alternative classes of medication are each associated with unique efficacy and side effect profiles which, on their own or in combination, may determine patient adherence and levels of glycemic control.

- One factor that contributes to achieving good glycemic control is treatment with anti-diabetic medications as well as strict medication adherence.
- Type-2 DM is characterised by impaired insulin secretion, insulin resistance, excessive hepatic glucose production, and abnormal fat metabolism.
- While many patients with type-2 diabetes present with increased urination and thirst, many others have an insidious onset of hyperglycaemia and are asymptomatic initially.
- The care of individuals with type-2DM must also include attention to the treatment of conditions associated with type-2 DM (obesity, hypertension, dyslipidaemia, cardiovascular disease) and management of DM-related complications.
- Adherence is a multi-dimensional phenomenon determined by the interplay of the five sets of factors, termed dimensions by the WHO, they are social/economic factors, provider-patient/health care system factors, and condition-related factors. Therapy-related factors and patient-related factors.

RESULTS: A total of 350 cases were collected in in-patient and out-patient department in sunshine hospital, secunderabad for a period of six months. The following evaluation was made from the collected data.

ONE DIMENSIONAL STUDIES were conducted with respect to distribution of gender, age, department, rationality, prescription, route of administration, disease p value is ($p<0.0001$)

TWO DIMENSIONAL STUDIES WERE CONDUCTED IN RESPECT TO:

1. **DEPARTMENT:**
    a) Comparison of department with reference to gender (p=0.0329)
    b) Comparison of department with reference to Age (p=0.003813)
    c) Comparison of department with reference to Rational use(p=0.007609)
    d) Comparison of department with respect to drug distribution(p=0.003219)

2. DISEASE:

a) Comparison of disease with reference to gender(p= 0.0329)

b) Comparison of disease with reference to age(p=0.007609)

c) Comparison of age group with reference to medication adherence(p=0.043242)

d) Comparison of medication adherence with reference to gender (p=0.356548)

e) Comparison of non-medication adherence with reference to gender (p=0.040654)

PHARMASICT ROLE IN TREAMENT CHOICE AND MEDICATION ADHERENCE OF DIABETES:

- Collecting, analysing, and evaluating patient-specific data to identify, resolve, and prevent medication related problems.
- Interpreting and reporting MUE findings and recommended changes in medication-use processes.
- Preventing medication related problems.
- Providing information and education based on medication adherence.

CONCLUSION:

- In our study, we found that only 13.72% cases were presented with generic name, rest all prescriptions were found to be according to Brand name.
- From overview of study, Diabetes is a common disease found in all departments. Majority in cardiology and General Medicine department departments.
- Rational prescribing of hypoglycemic agents (Insulin and oral hypoglycemic agents) would help in avoiding polypharmacy and prevent drug resistances.
- Majority of patients were found in CAD (18.57%), GIT (12.28%), SURGERY (10.57%) and others (21.15%).
- The clinical use of INSULIN is likely to be considered in patients who are hospitalized or immune compromised.
- INSULIN is administered subcutaneously or intravenously according to the glucose levels in the patients.
- INSULIN is used to treat diabetes along with oral hypoglycemic agents.
- According to intensity wise distribution of oral hypoglycemic agents vs insulin .High use of insulin is found(150 patients) followed by 83 patients were given insulin moderately, whereas oral hypoglycemic agents high use is 74 patients followed by moderate use 43 patients.
- The prescribing pattern of hypoglycemic agents of monotherapy were found to be (42.85%), Dual therapy were found to be (51.43%), Polytherapy (5.72%).
- Majority of the INSULIN prescribed was Human actropid (73.14%) followed by Human Mixtard was found to be (24.28%).

- According to our study, majority of patients were found to be Non-adherent to diabetes (270 patients), whereas patients adherent to diabetes were found to be (80 patients).
- In our study we were able to confirm the beneficial effects of Metformin in more than 150 patients were treated.
- INSULIN is safe, well accepted, and effective for on-going treatment of patients with newly diagnosed type II diabetes.
- Chronic hyperglycaemia is thought to contribute to pancreatic beta cells dysfunction and loss of insulin secretory capacity by exerting a glucotoxic effect and possibly exhaustion from the increased demand.
- This self-perpetuating cycle leads to progressive and often profound insulin deficiency and such patients ultimately require INSULIN to maintain their HBA1C levels at goal.
- Some commonly cited barriers to INSULIN initiation were patient fear of disease progression and needle anxiety, as well as patient and providers fear of weight gain and hypoglycemic episodes.
- In our study, we found that INSULIN therapy was more cost-effective and produced greater reduction in HBA1C levels.
- In our study, we found that patients will visit pharmacies more than they visit any other health care professional; it is believed that there is an untapped opportunity for pharmacist to provide self-management education and support for medications.
- A medication adherence service for diabetes mellitus is important and we educated patients by giving them patient leaflets and also by asking different questions regarding diabetes medication adherence.

FUTURE DIRECTIONS

- The number of individuals, with diabetes will greatly increase world-wide in the coming years.
- Currently, many individuals with diabetes do not achieve adequate glycemic control, and an earlier start of insulin therapy in patients with type-2 diabetes may help to prevent and /or delay long-term diabetes complications.
- Considerable progress has been made on our way toward optimal treatment of patients with diabetes mellitus (DM), and many insulin therapy strategies are now available for these patients.
- All these developments, however, depend on the willingness of the health care economic systems to fund these new advances.
- The major break down of this disease is the difficulty in treatment of diabetes mellitus related late complications, yet an increased investment in the quality of metabolic control can result in a reduced incidence of these complications.
- The future of new insulin formulations or new types of insulin formulations or new types of insulin applications depends very much on the performance of adequate clinical trials to prove the benefits of such innovations.
- The glucose-lowering efficacy of type-2 diabetes medications may only be realized through optimal patient adherence.
- In our study we found that across oral antihyperglycemic agents(OHA) lines of therapy (mono, dual or triple therapy), regimens typically associated with weight loss and lower incidence of hypoglycaemia were generally associated with better medication adherence, which in turn was related to improved glycemic control.

- Analyses found that reduced medication adherence was associated with smaller HbA1c reductions among patients treated with OHA monotherapy, dual therapy and triple-therapy regimens.
- The involvement of clinical pharmacists in clinical practice helps to increase proper usage of medications and insulin and finally the quality of life of the patient.
- The pattern of prescription in terms of generic name was found to be low and should be encouraged more.
- Our study also emphasized the need for creating more awareness among the general practitioners and clinicians on this important public health issue of diabetes mellitus type-2.
- The drug prescription pattern suggests the need to establish rational use of anti-diabetic agents.
- The therapy provided in the prescriptions were efficacious but there is a need to emphasize to all prescribers encourage prescribing by generic name.

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