A Kap Study on Diabetic Complications and Its Pharmacological Managements

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ABSTRACT:

AIM:
Our study was aimed to acquire knowledge, attitude, perception of vascular issues linked with type 2 DM, its management including prescription patterns.

OBJECTIVE:
➢ The primary objective is to compare macrovascular and microvascular complications and their prevalence.
➢ To assess whether hypertension serves as a comorbid condition in developing complications.
➢ To observe prescribing patterns in diabetic complications.
➢ To assess the occurrence of complications based on age.
➢ To establish a relationship between GRBS and occurrence of diabetic complications.

METHODOLOGY:
An observational prospective study was carried at tertiary care hospital semiannually from September 2022- March 2023. The study took place at the pay ward, cubicles and ICU .Patients who met the study criteria are included in the study.
Statistical methods were implied on the collected data such as Kruskal wallis to compare the macrovascular complications due to non parametric results.
2-way ANOVA assessed microvascular complications since the information collected was parametric, likewise ,one way ANOVA used to compare the GRBS and drugs and kruskalwallis test to assess complications based on GRBS.

RESULT:
Overall of 162 patients enrolled in the course of the study with diabetes, were assessed for the diabetic complications. The demonstration revealed a significant difference among consequences which was proved by rejecting null hypothesis.

CONCLUSION:
It had been observed that Prevalence of diabetic complications were slightly more in males that is 52% than females 48%.
In the complications, hypertension had maximum risk among enrolled patients. Patients who had hypertention with diabetes accounted for 85.80% whereas people with diabetes alone included 14.20%.
In the study 28% cardiopathy, 19% nephropathy, 16% cerebrovascular disease, 16% neuropathy,12% diabetic foot and 9% diabetic retinopathy cases were observed.
In the age group of 50-60, highest number of complications were noticed.

INTRODUCTION
DIABETES MELLITUS

DM is an endocrine metabolic disorder that affects the body functions and its inability to make insulin, which causes enormous difficulties. Glucose is the brain's main source of fuel and a major source of energy for the cells that generate muscles and tissues.

The principal mechanism for regulating glucose levels is the secretion of the hormone insulin from the pancreatic islet cells. Diabetes occurs due to combination of pathogenetic mechanisms. These include procedures that damage pancreatic beta cells, resulting in insulin shortage, and others that result in insulin resistance. The abnormalities in carbohydrate, lipid, and protein metabolism are caused due to insulin deficiency on target tissues leading to insulin sensitivity or its absence (Report of a WHO Consultation, 1999). Due to inadequate insulin synthesis, the blood sugar level increases than the normal range. The more the sugar level, the more the complications such as heart disease, kidney issues, eye issues, and many more. Patients with diabetes tend to have a shorter life span due to the development of serious diseases and have lower quality of life.

In the therapeutic management, biguanides were highly prescribed(82 patients) followed by sulfonylureas (50 patients).

METHODOLOGY:
STUDY DESIGN:

An observational, prospective study was carried out in multidisciplinary hospital for a duration of 6 months i.e from September 2022- March 2023.The study took place at the general ward, cubicles, ICU who met the study criteria.

COLLECTION OF DATA:

A well formatted form was made and the following details were collected
• Patients demographics.
• Prescription chart.
• Patient's Medical record.
• Doctor's note.

INCLUSION CRITERIA:

• Patients >30 years.
• Both male & female.
• Patients with type2 diabetes.

EXCLUSION CRITERIA:

• Pregnancy induced diabetes .
• Juvenile diabetes.
• Patients with STD's.

METHOD AND COLLECTION OF DATA:

• Patient was interviewed to determine the chief complaints, history of present illness, past medical and medication history.
• Medical records of inpatients.
•Patient prescription.

study on the selected study was done by referring to various research papers.
↓
Preparation of Protocol and submission to the Institutional Review Board / Ethical Committee for Approval
↓
This Study describes the vascular complications allied with diabetes, its management including prescription patterns, drug interactions, prevalence, based on severity of Disease withcomorbidities
↓
Assessing in the out-patient and in-patient department , the patient diagnosed with vascular consequences allied with diabetes were identified and the data which was required collected from them
↓
Identifying the Prevalence and assessing the complications and prescribing patterns of Diabetes patients .
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Data Processing and Analysis
The required data was gathered from the patients and their informants after taking informed consent from them. Also, their drug therapy was collected.
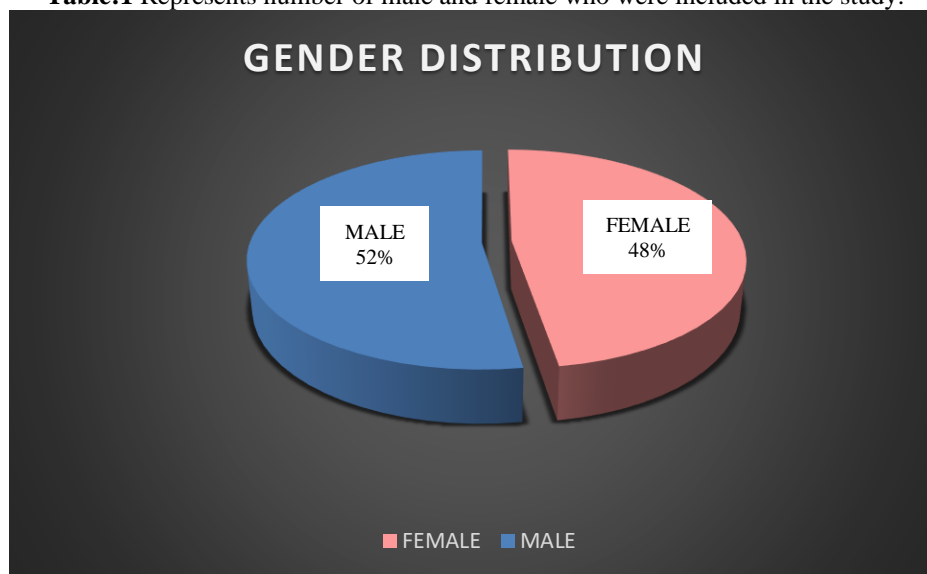↓
Result and discussion
↓
Summary and conclusion

## DURATION OF STUDY: The study was carried out for a duration of 6 months.

PLACE OF STUDY: CARE HOSPITALS.

RESULTS

| FEMALE	77	47.53%
MALE	85	52.47%
TOTAL	162	100.00%

Table:1 Represents number of male and female who were included in the study.

Fig-1 : Gender distribution pie chart representing 47.53% females and 52.47% males.

AGE WISE GENDER DISTRIBUTION

table: 2 Showing highest number of patients were in the age group of 50-60
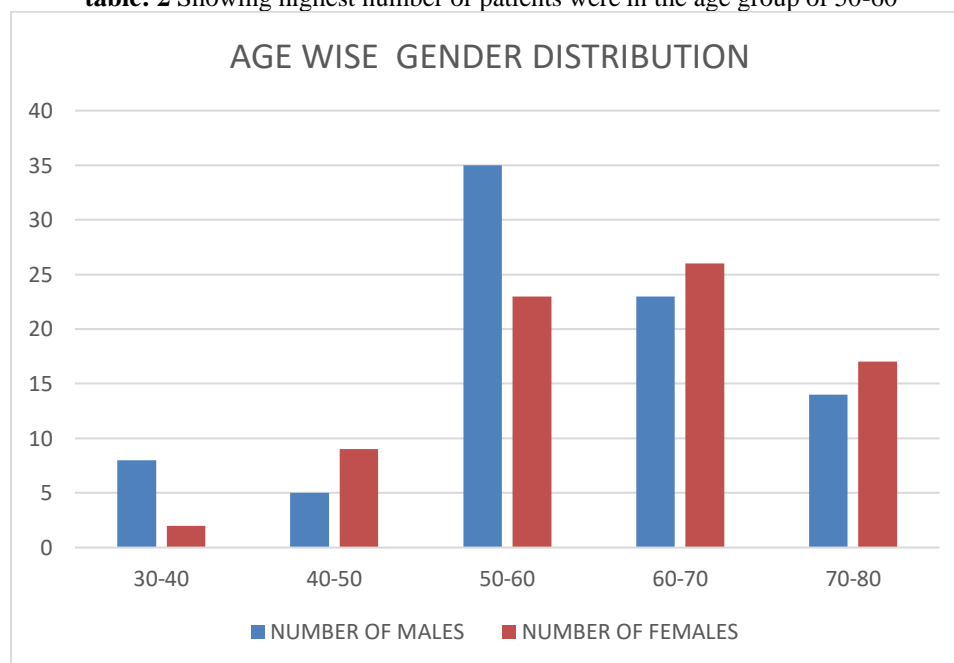
Fig : 2 Represents Age Wise Gender Distribution

CATEGORIZATION BASED ON COMPLICATION WITH AGE GROUPS IN PATIENTS

AGE GROUP	CARDIOPATHY	CEREBRO-VASCULAR	DIABETIC FOOT	NEPHRO	NEURO	RETINO	TOTAL
30-40	3	1	3	2	1	0	10
40-50	6	1	4	1	1	1	14
50-60	13	11	3	8	11	12	58
60-70	12	8	7	12	8	2	49
70-80	11	5	3	7	5	0	31
TOTAL	45	26	20	30	26	15	162

Table 3 Representing Categorization Based on Complication with Age Groups in Patients.
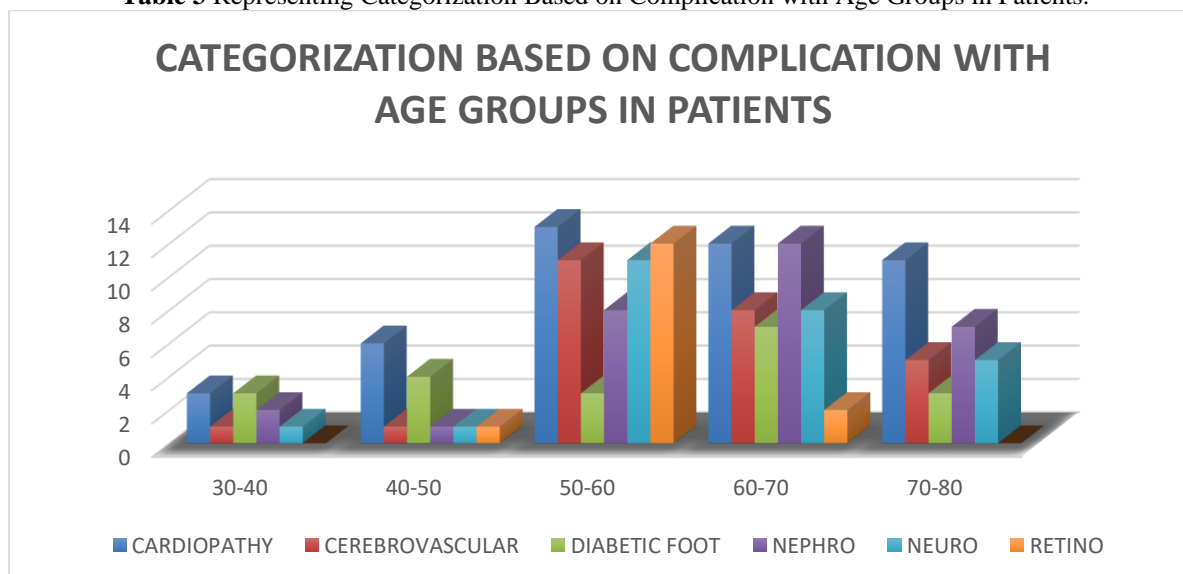
Fig 3 Representing Categorization Based On Complication with Age Groups in Patients

CATEGORIZATION OF MACROVASCULAR COMPLICATIONS WITH AGE

AGE GROUP	CARDIO(A)	CEREBRO(B)	DIABETIC FOOT (C)	TOTAL
30-40	3	1	3	7
40-50	6	1	4	11
50-60	13	11	3	27
60-70	12	8	7	27
70-80	11	5	3	19
TOTAL	45	26	20	91

Table:4 Macrovascular complications represented based on age

KRUSKAL WALLIS TEST
ASCENDING
RANKS

A	B	C	R1	R2	R3
	1			1.5	
	1			1.5	
3		3	4.5		4.5
		3			4.5
		3			4.5
		4			7
	5			8	
6			9		
		7			10
	8			11	
11	11		12.5	12.5	
12			14		
13			15		

$$H = \left[\frac{12}{N(N+1)} \sum_{j}^{K} = \frac{Rj^2}{nj} \right] - 3(N+1)$$

$= \frac{12}{15(15+1)} \left[\frac{45^2}{5} + \frac{34.5^2}{5} + \frac{30.5^2}{5} \right] - 3(15+1)$

$= \frac{12}{15(16)} [405 + 238.05 + 186.05] - 3(16)$

$= \frac{12}{240} [829.1] - 48$

$= 0.05 \times 829.1 - 48$

$= 41.455 - 48$

$= 6.545$

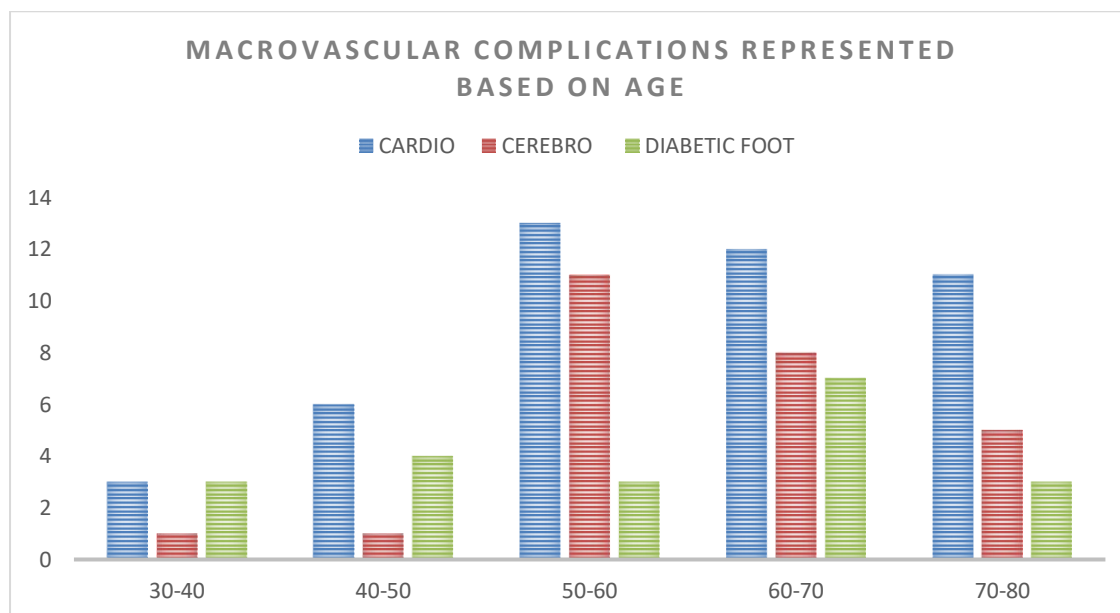Critical value is 5.025
Therefore null hypothesis is rejected.

Fig : 4 Macrovascular complications when grouped based on age showing non-parametric graph.

Representing Microvascular Complications in Different Age Groups.

AGE GROUP	NEPHRO	NEURO	RETINO
30-40	2	1	0
40-50	1	1	1
50-60	8	11	12
60-70	12	8	2
70-80	7	5	0

Table:5 Representing Microvascular Complications in Different Age Groups.

THEREFORE H$_0$ IS REJECTED .
There is a significant difference between replicates

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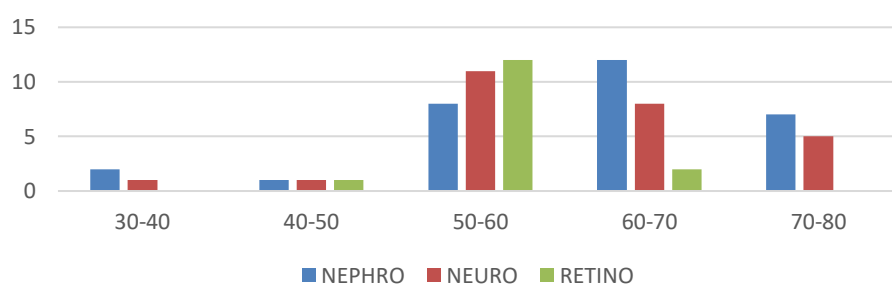**Fig 5** Representing Microvascular Complications in Different Age Groups

COMPLICATIONS	NUMBER OF PATIENTS	PERCENTAGE
HEART	45	27.78
CVA	26	16.05
DIABETIC FOOT	20	12.35
KIDNEY	30	18.52
NEURO	26	16.05
RETINO	15	9.26

Table:6 Representing Categorization Based on Prevalence of Complications
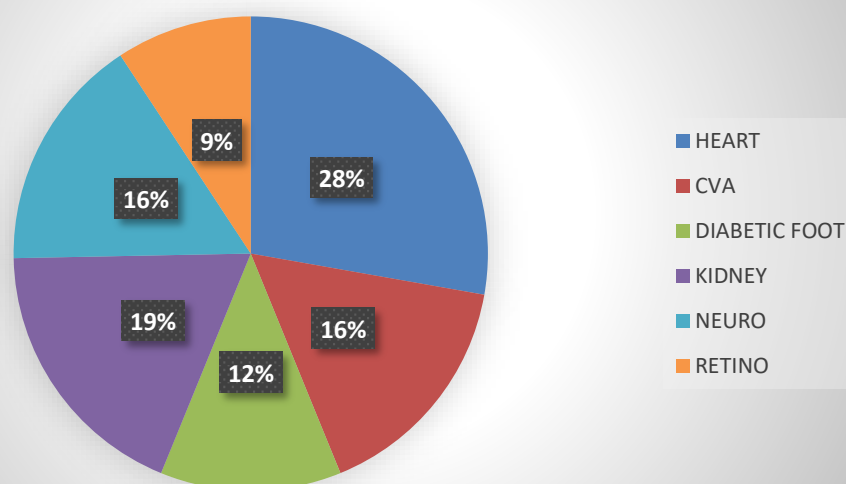
Fig:6 Representing Categorization Based on Prevalence of Complications

COMORBIDITY	TOTAL	PERCENTAGE
DIABETIC HYPERTENSIVE PATIENTS	139	85.80
DIABETIC NON-HYPERTENSIVE PATIENTS	23	14.20

Table:7 Representing Categorization Based on Prevalence of Comorbidity

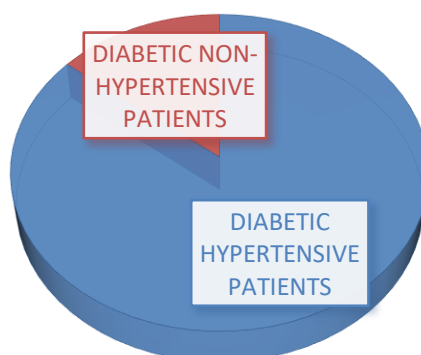**Figure:7** Showing higher percentage of diabetic hypertensive patients that is 85.80%

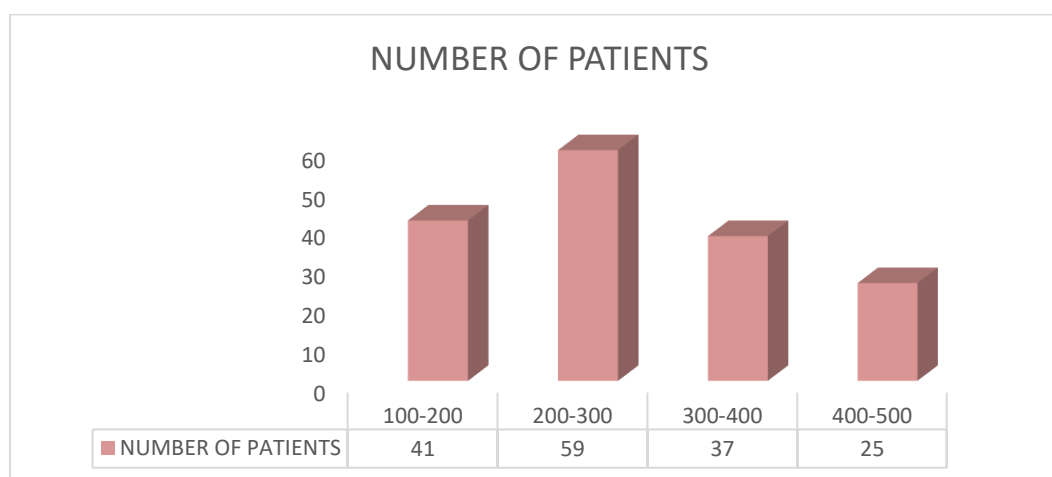| CATEGORIZATION OF PATIENTS BASED ON GRBS	
GRBS	NUMBER OF PATIENTS
100-200	41
200-300	59
300-400	37
400-500	25
TOTAL	162

Table: 8 Representing Categorization of Patients Based on GRBS

Fig:8 Representing Categorization of Patients Based on GRBS

CATEGORIZATION OF GRBS BASED ON AGE IN DIABETIC PATIENTS							
GRBS	20-30	30-40	40-50	50-60	60-70	70-80	TOTAL
100-200	0	1	3	14	16	7	41
200-300	0	8	4	23	14	11	60
300-400	0	0	5	10	15	6	36
400-500	0	2	2	10	4	7	25
TOTAL	1	10	14	57	49	31	162

Table:9 Age wise distribution of patients on the basis of GRBS
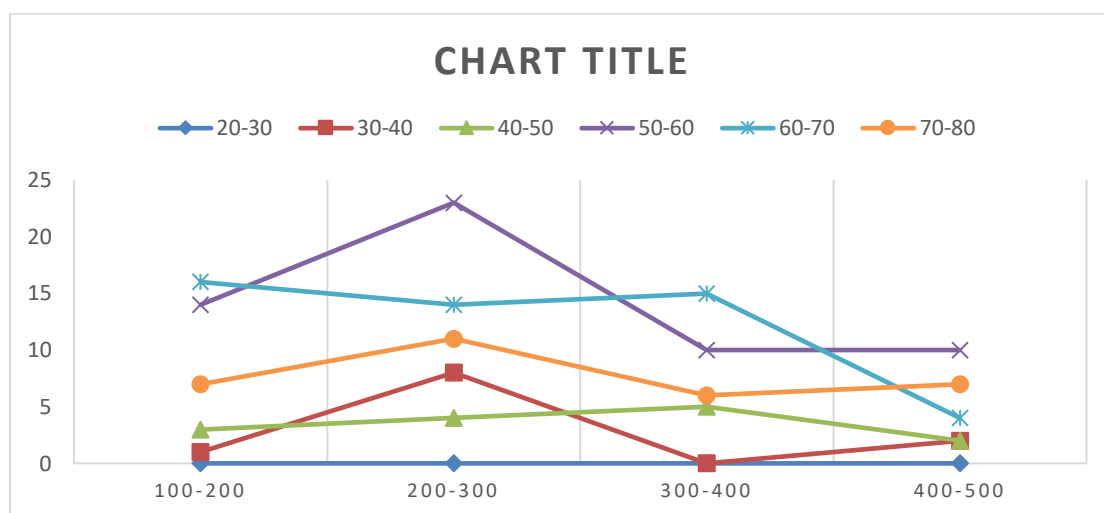
Fig:9 Representing Categorization of GRBS Based on Age in Diabetic Patients.

CATEGORIZATION OF COMPLICATIONS BASED ON GRBS

Tab:10

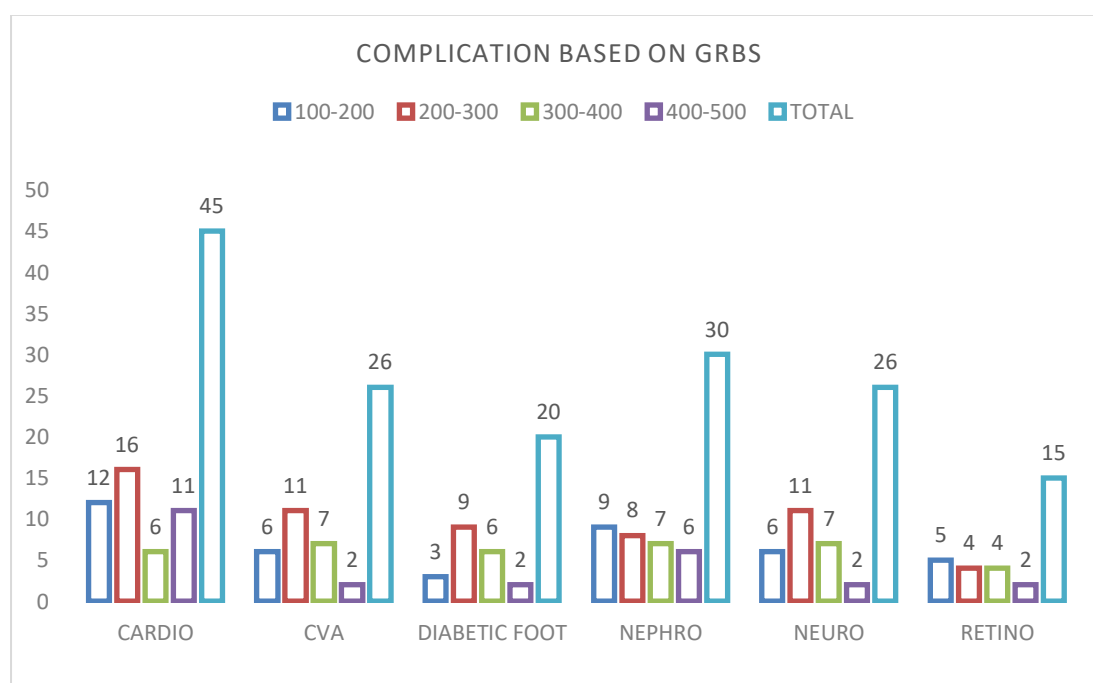| GRBS	(A) 100-200	(B) 200-300	(C) 300-400	(D) 400-500
CARDIO	12	16	6	11
CVA	6	11	7	2
DIABETIC FOOT	3	9	6	2
NEPHRO	9	8	7	6
NEURO	6	11	7	2
RETINO	5	4	4	2

Fig:10 Different consequences catogorised based on age showing highest number of cardiopathy cases

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AGE GROUP	MACROVASCULAR	MICROVASCULAR
30-40	7	3
40-50	11	3
50-60	27	31
60-70	27	22
70-80	19	12

Table:11 Macrovascular and microvascular complications catogorised based on age
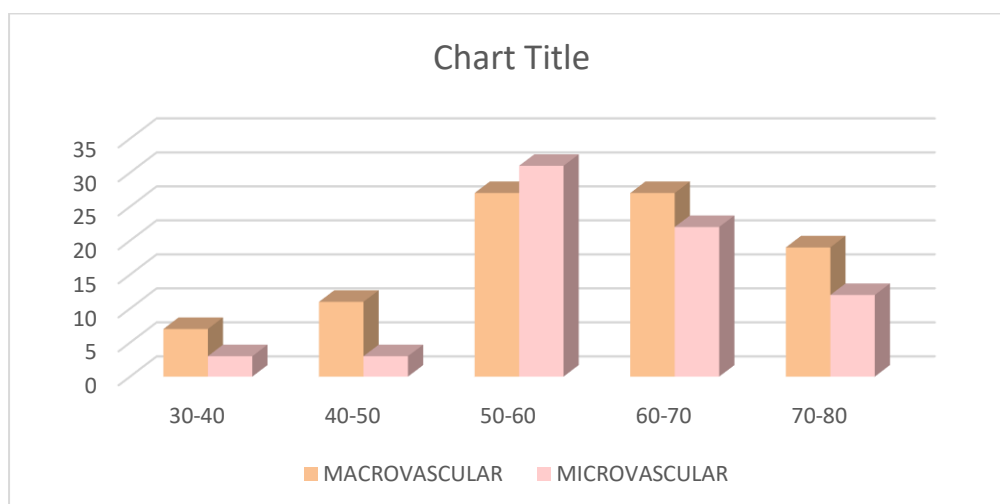

Figure:11 Showing more number of cases in the age group of 50-60

Tab:12 Different antidiabetic medications given to the patients based on GRBS values

GRBS	THIAZO-LIDINE-DIONES	SGLT-2 INHIBITOR	ALPHA-GLYCOSIDASE INHIBITOR	DPP-4	SULFONYL UREAS	BIGUANIDES	TOTAL ROWS
100-200	3	3	3	8	10	18	45
200-300	5	6	3	14	21	31	80
300-400	4	4	2	5	9	22	46
400-500	1	2	11	4	10	11	39
	13	15	19	31	50	82	210
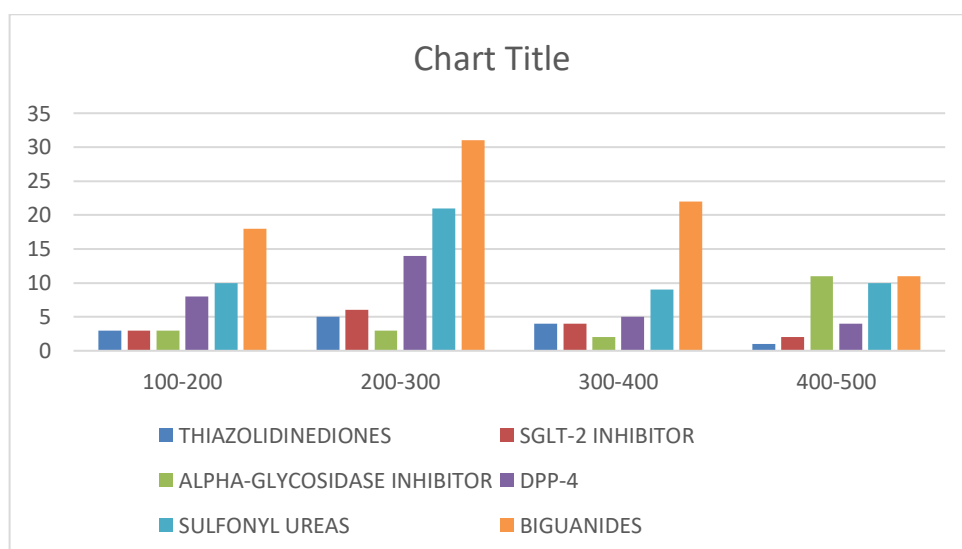
Fig:12 Shows Biguanides were used more frequently

MEDICATIONS IN TYPE 2 DIABETES	NUMBER OF PATIENTS
THIAZOLIDINEDIONES	13
SGLT-2 INHIBITORS	15
ALPHA-GLYCOSIDASE INHIBITOR	19
DPP-4 INHINITOR	31
SULFONYL UREAS	50
BIGUANIDES	82
	210

Table:13 number of patients who used different medications
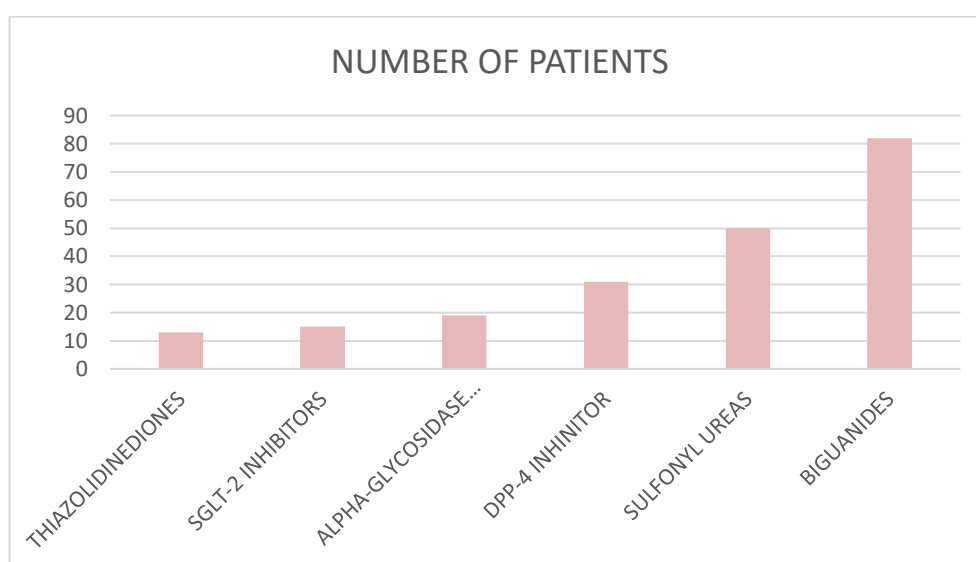
Fig:13 Biguanides followed by sulfonyl ureas were most frequently prescribed

AGE GROUP	TOTAL
30-35	3
35-40	7
40-45	5
45-50	9
50-55	35
55-60	23
60-65	20
65-70	29
70-75	19
75-80	12
	162

TABLE:14 Represents number of Patients based on age.
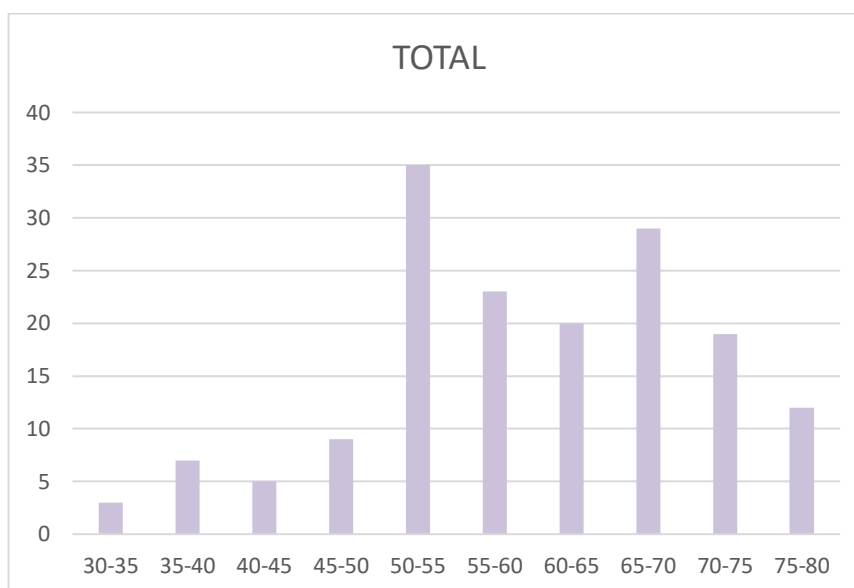
Fig:14 Highest number of cases included in the age group of 50-55

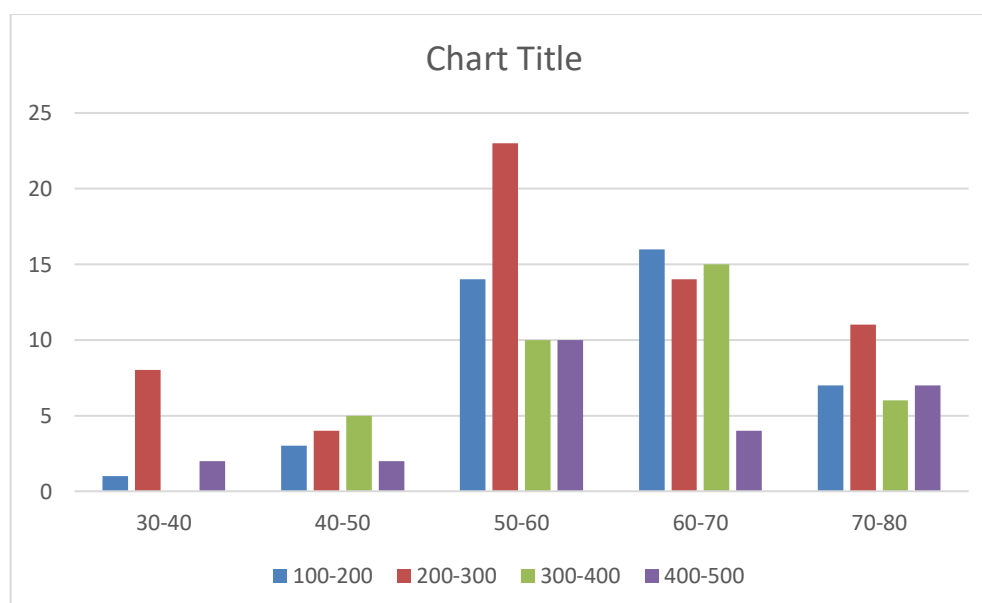| AGE GROUP	100-200	200-300	300-400	400-500	TOTAL
30-40	1	8	0	2	11
40-50	3	4	5	2	14
50-60	14	23	10	10	57
60-70	16	14	15	4	49
70-80	7	11	6	7	31
	41	60	36	25	162

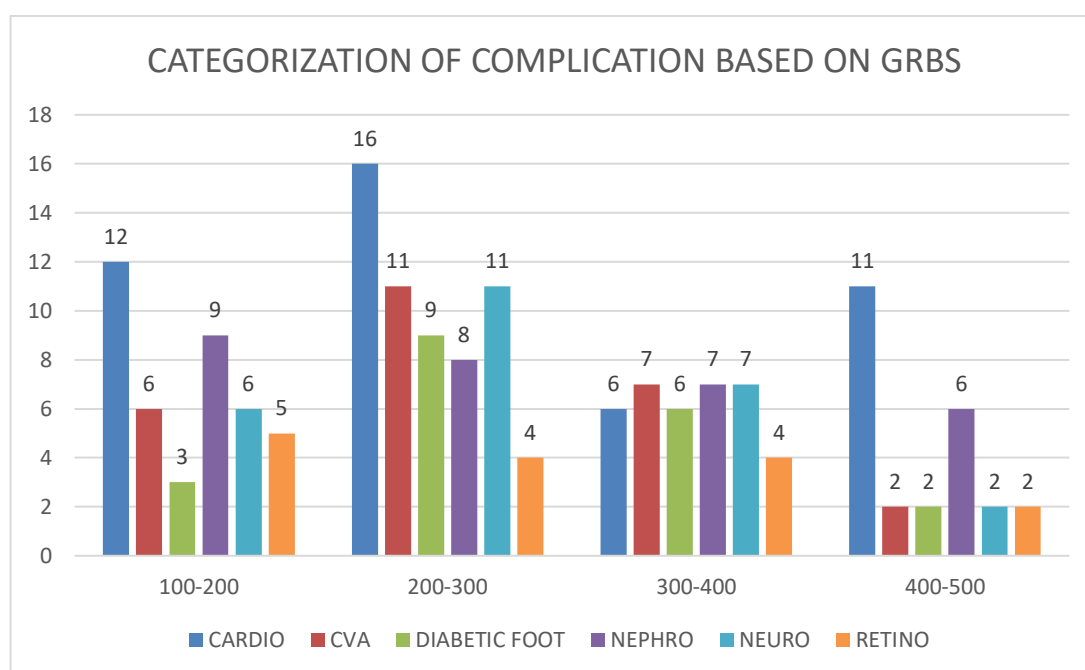**TABLE: 15** Age wise distribution based on GRBS

Fig:15 In the age group of 50-60 more number of cases were seen based on grbs

GRBS	CARDIO	CVA	DIABETIC FOOT	NEPHRO	NEURO	RETINO

100-200	12	6	3	9	6	5
200-300	16	11	9	8	11	4
300-400	6	7	6	7	7	4
400-500	11	2	2	6	2	2
	45	26	20	30	26	15

Table:16 categorization of complications based on Grbs values

Fig:16 Represents greater number of complications based on average GRBS from 200-300

DISCUSSION

In our study, we found several complications which occurs because of diabetes. Majorly diabetes and hypertension serve as a greater risk issues for consequences.

We studied vascular significances which are inter-linked with diabetes such as cardiopathy, cerebrovascular disease, diabetic foot, nephropathy, neuropathy, and retinopathy.

It was seen that inappropriate blood sugar levels and inadequate blood sugar control lead to the development of diabetic complications.

Cardiopathy was the common consequence occurred which accounts for 28% among various other consequences followed by nephropathy which is 19%.

Certain risks also serves for the development of diabetic consequences.

The statistical calculations were done which included ANOVA and kruskal-wallis.

2-way ANOVA assessed microvascular complications since the information collected was parametric and it rejected null hypothesis which was defining that there was no significant difference between the occurrence of different consequences.

50-60 years age had the highest number of microvascular consequences.

Kruskal-wallis assessed macrovascular consequences as the details were non-parametric and cardiopathic cases were more.

The occurrence of complications based on GRBS was assessed through kruskal-wallis. It showed that different GRBS values had different number of consequences.

1-way ANOVA was implied for medications used based on GRBS ranges.

The highest percentage that accounts for complications occur in age group of 50-60.

Commonest comorbidity seen is hypertension in diabetic patients which is 85.80%.

Males are seen to be slightly more affected than females.

Biguanides were prescribed more among the patients and followed by sulfonylureas.

CONCLUSION

In the study total of 162 subjects were enrolled with diabetic complications. Prevalence of complications were slightly more in males that is 52% than females 48%.

In the complications hypertension accounts for greater risk along with diabetes. Patients who are diabetic hypertension were highest that is 85.80% than patients who just have diabetes alone that is 14.20%.

The findings indicated that uncontrolled blood sugar and various risk factors accounts for most cardiopathic cases than followed by nephropathy.

In the study 28% cardiopathy, 19% nephropathy, 16% cerebrovascular disease, 16% neuropathy, 12% diabetic foot and 9% diabetic retinopathy cases were observed.

In the age group of 50-60 highest number of complications were seen.

Among macrovascular complications cardiopathy were most prevalent and in microvascular nephropathy occurred in majority.

91 patients had macrovascular where as 71 patients had microvascular consequences.

In the management biguanides were highly prescribed that is in 82 patients followed by sulfonylureas in 50 patients.

Controlling blood sugar levels, regular moderate exercise, healthy lifestyle can minimize further complications.

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11. National Institute for Health and Clinical Excellence. (2021). Type 2 diabetes: the management of type 2 Ritvik Agrawal et al: micro and macrovascular significance and risk factors in type-2 diabetes mellitus J Assoc Physicians India. 2014 Jun. PMID: 25856915 doi: 10.1177/2150132720959962.