Patients With Type II Diabetes Mellitus At A Tertiary Care Hospital: A Prospective Study On Anti-Diabetic Drug Prescribing Patterns

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Abstract

The main aim is to study on prescribing patterns of anti-diabetic drugs for patients with type- II diabetes mellitus. Out of 457 patients screened, 426patients were enrolled according to inclusion and exclusion criteria. Among them 62.44% were males and 37.55% were females. The study found to be a higher incidence of diabetes among elderly patients, with a high incidence in the age group between 41-60 years (50.70%) and followed by 61-80 years (19.24%). The study resolved that most of the patients were suffering from diabetes for 5 to 10 years, 221 (73.94%) of duration years followed by 1 to 5 years, 94 (22.06%). A total of 1565 drugs were prescribed in the overall study period. 68.62% were diabetic drugs, 13.41% hypertensive drugs, 07.85% NSAIDs, 07.66% asthmatic drugs, 03.57% antidepressants, and 04.40% supplements of drugs. The study resolved that drugs were prescribed as monotherapy was 49.76%, two drug therapy were 36.61%, three-drug therapy were 08.45% and four-drug therapy was 05.16%. In this study, 426 anti-diabetic drugs prescribed, among that, the physician's most well-liked single-drug therapy more than multiple drug therapy and also the most often prescribed category was Biguanides category of anti-diabetic agents. Among Biguanides, Metformin was the foremost often utilized anti-diabetic drugs. The foremost prevalent combination of the drug was a two-drug therapy of Biguanides +sulfonylureas, among these combinations, Metformin + Glimipride was the foremost often utilized anti-diabetic drugs. Followed by 3 drug therapy were Biguanides +sulfonyl ureas+ thiazolidinedione and 4 drug therapies were Biguanides + sulfonylureas + DPP 4 inhibitors + thiazolidinedione.Pharmacists can contribute drastically to promote the rational use of medicines, even in resource-limited settings. This, of course, requires strong collaboration between different institutions and commitments of the pharmacists to the cause. Pharmacist medication review, patient counseling and telephone follow-up can limit the Adverse Drug Reactions. Medication discrepancies before and after discharge were common targets of intervention.

INTRODUCTION:

Diabetes mellitus is a pandemic disease that has struck each and every corner of the world. According to the Indian Council of Medical Research-Indian Diabetes study (ICMR), a national diabetes study, India currently has 62.4 million people with diabetes.[1] This is set to increase to over 100 million by 2030.[2] The prevalence of diabetes among adults has reached approximately 20% in urban and approximately 10% in rural populations in India.[3]Various classes of anti-diabetic drugs including insulin and oral hypoglycemic agents (OHA) are currently used in the treatment of diabetes, which acts by different mechanisms to reduce the blood-glucose levels to maintain optimal glycemic control.[4,5]The United Kingdom Prospective Diabetes Study showed intensive blood-glucose control by either sulfonylureas or insulin substantially decreased the risk of microvascular complications.[6,7]The currently used anti-diabetic drugs are very effective, however because of lack of patient compliance, clinical inertia, insulin resistance, lack of exercise and lack of dietary control leads to unsatisfactory control of hyperglycemia.[8,9,10,11,12,13,14,15] In India, limited studies have focused on diabetes care and provide an insight into the current profile of patients and their management. More than 50% of people with diabetes have poor glycemic control, uncontrolled hypertension and dyslipidemia, and a large percentage have diabetic vascular complications.[16,17]. Diabetes Mellitus is defined as a heterogeneous metabolic disorder and it is characterised by chronic hyperglycaemia with disturbance of carbohydrates, fats, and protein metabolism. Diabetes is the most common type of endocrine disorder. DM occurs due to reduced insulin secretion with or without insulin resistance. [18] The main aim is to study on prescribing patterns of anti-diabetic drugs for patients with type- II diabetes mellitus.

Study design:
METHODOLOGY
It is a prospective observational study.

Study site:
The research work was conducted at a Aware global Hospital, Hyderabad.

Study period:
6 months

Inclusion criteria:
- Type-II diabetic outdoor patients.
- Patients with co-morbidities disease conditions.
- Aged more than 18 years, of both sexes.
- Who gave consent from the patient's side.

Exclusion criteria:
- Those patients, who had complications like retinopathy, neuropathy, diabetic foot, stroke, and myocardial infarction.
- Type-1 diabetic indoor and outdoor patients.
- Pediatric and pregnant women.
- Patients not willing to participate.

Source of data:
The data collected from the patient's prescription and also through a direct patient interview.

Informed consent and ethical clearance
The study protocol had been approved by the Institutional Ethical Committee. The nature and purpose of the study was explained and their consent sought.

WORK METHODOLOGY

Based on the inclusion and exclusion criteria the study was conducted at Aware global hospital for six months. A complete of 426 prescriptions were enrolled and analyzed in diabetes patients at outpatient departments. Data of patients matching inclusion criteria were recorded. Before including within the study, patients were explained regarding the aspects of research work. Written consent was taken before including him or her into the study. Once the consultation by the doctor was over, patients were screened for study criteria. Interviewed such patients and reviewed their prescriptions. Details like age, sex, duration of illness, on-going treatment concurrent medicines, assess the prescription patterns, family history, coexistent diseases, socio-economic standing were recorded in the data entry form.

RESULTS

Table 1: Gender wise distribution of patients in treatment with anti-diabetes drugs

Gender	Number of patients(n=426)	Percentage (%)
Male	266	62.44
Female	160	37.55

Figure 1: Gender wise distribution of patients in treatment with anti-diabetes drugs
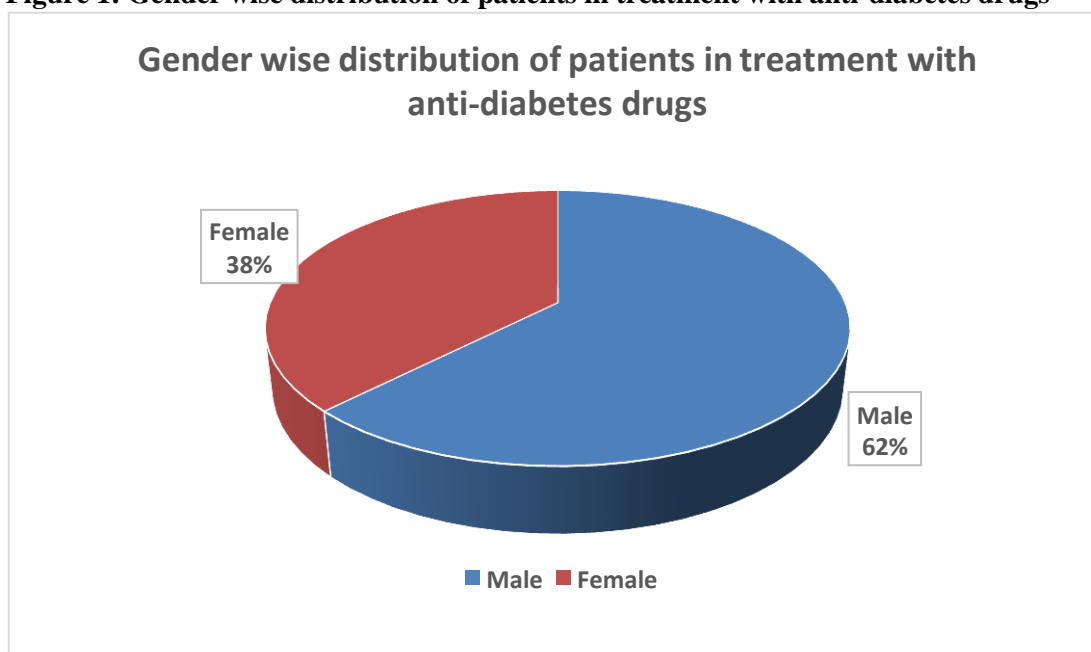
Table 2: Age wise distribution of patients in treatment with anti-diabetes drugs

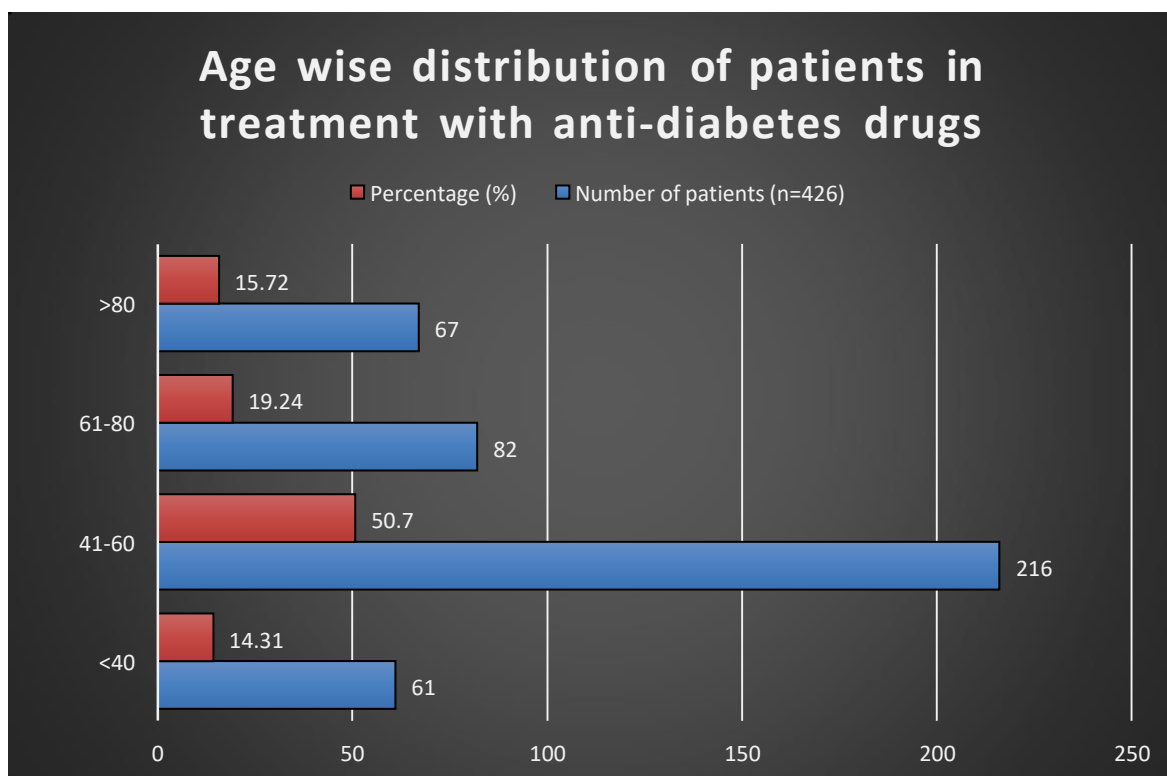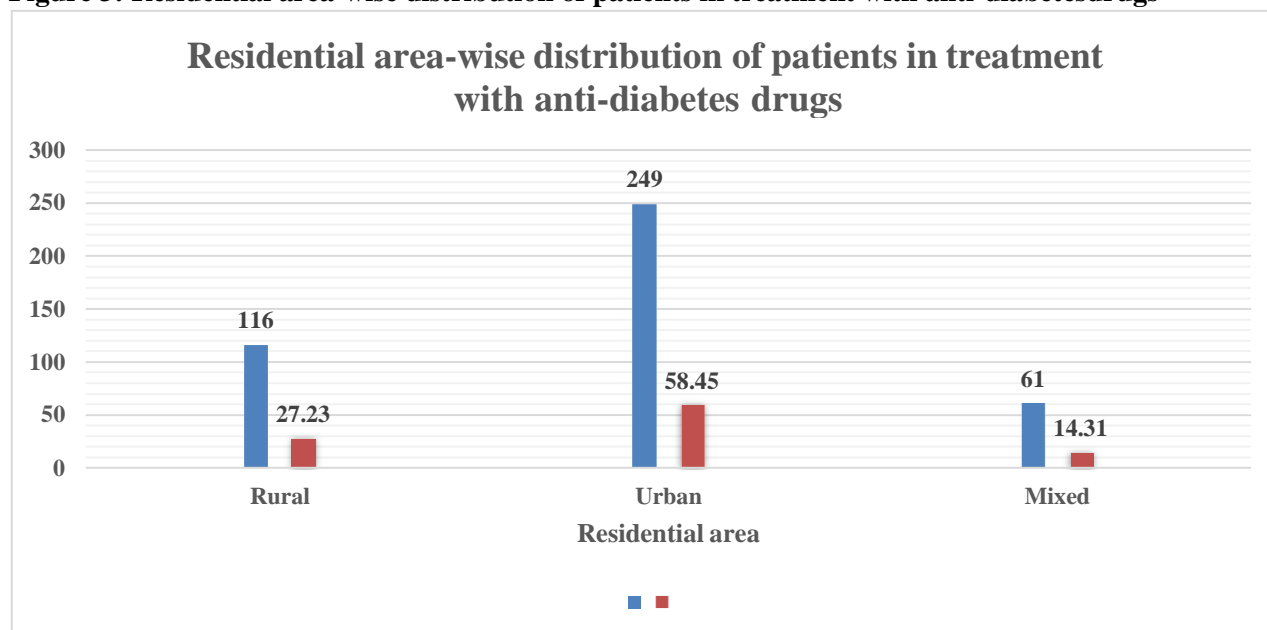| Sl. No.	Age (in years)	Number of patients(n=426)	Percentage (%)
1.	<40	61	14.31
2.	41-60	216	50.70
3.	61-80	82	9.24
4.	>80	67	15.72

Figure 2: Age wise distribution of patients in treatment with anti-diabetes drugs

Table 3: Residential area-wise distribution of patients in treatment with anti-diabetesdrugs

Residential area	Number of patients(n=426)	Percentage (%)
Rural	116	27.23
Urban	249	58.45
Mixed	61	14.31

Figure 3: Residential area-wise distribution of patients in treatment with anti-diabetesdrugs

Table 4: Distribution of food consumption based on patients

Food consumption	Number of patients(n=426)	Percentage (%)
Vegetarian	91	21.36
Vegetarian & Non-vegetarian	335	78.63

Figure 4: Distribution of food consumption based on patients
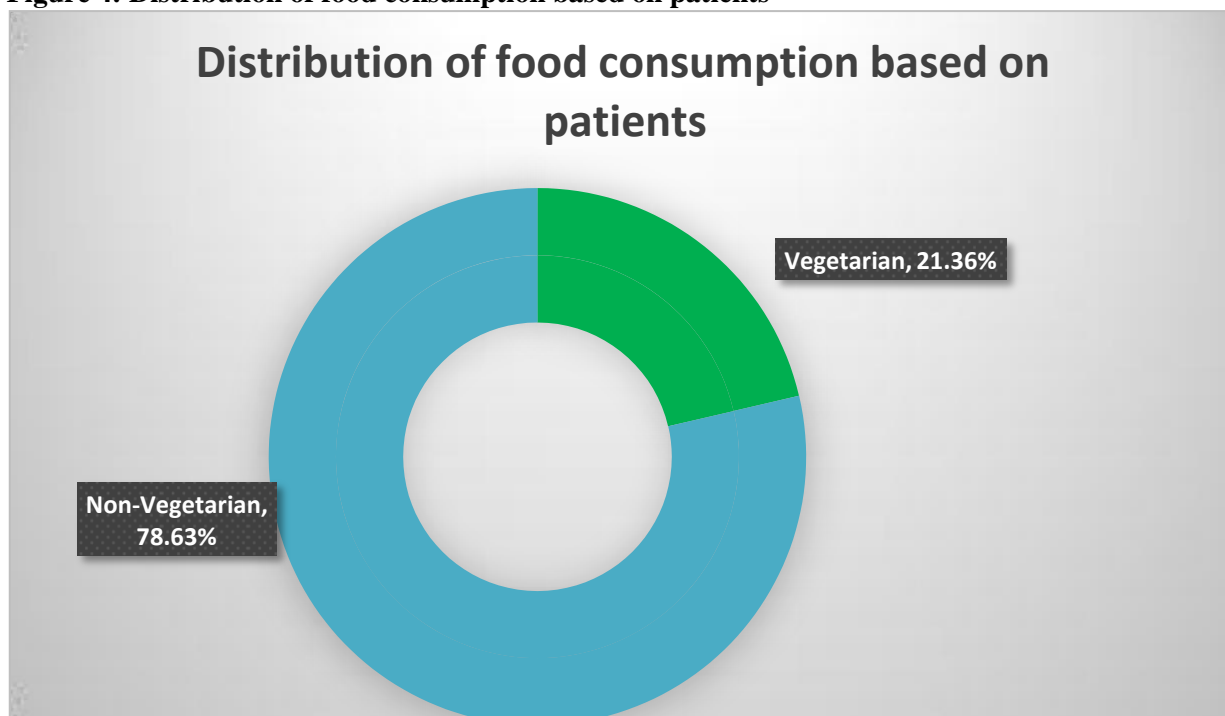
**Table 5: Social distribution of diabetes patients**

Social risk factors	Number of patients(n=426)	Percentage (%)
Smoking	94	22.06
Tobacco chewing	76	17.84
Alcohol	104	24.41
Smoking + tobacco + alcohol	99	23.23
None	53	12.44

Figure 5: Social distribution of diabetes patients
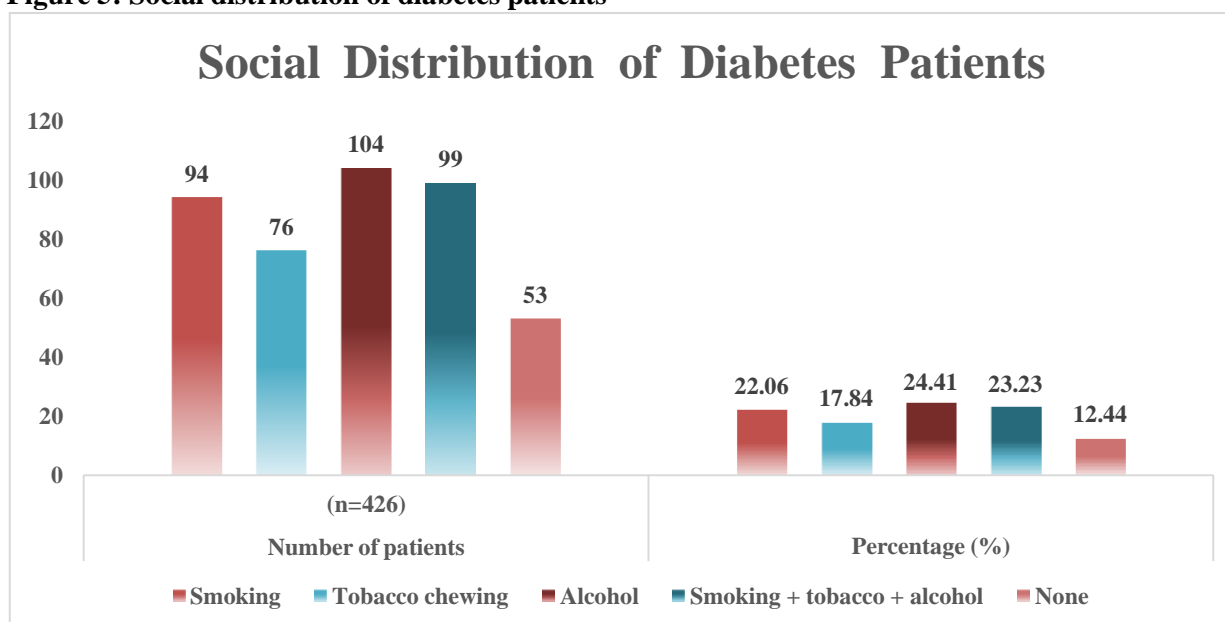
Table 6: Distribution of family history for diabetes patients

Family relationship	Number of patients(n=426)	Percentage (%)
Father	213	50.00
Mother	95	22.30
Both	45	10.56
Others	31	07.27
None	42	09.85

**Figure 6: Distribution of family history for diabetes patients**

Distribution of Family History For Diabetes Patients
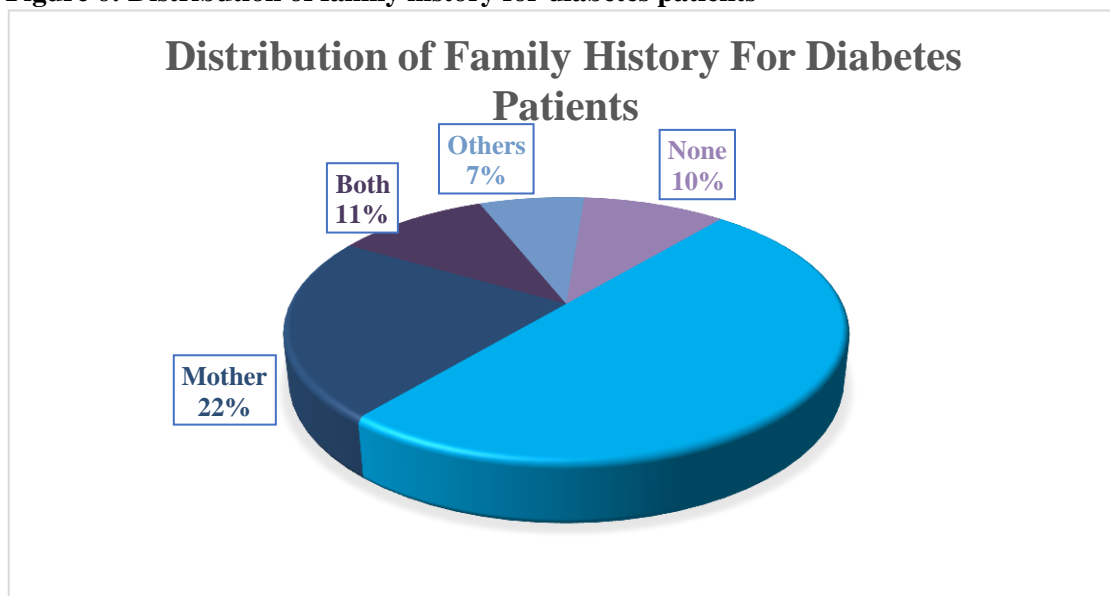
Table 7: Distribution of the diabetic patients according to duration of years

Duration of years	Number of patients(n=426)	Percentage (%)
Within Past 12 months	42	09.85
1 to 5 years	94	22.06
5 to 10 years	221	73.94
More than 10 years	69	16.19

Figure 7: Distribution of the diabetic patients according to duration of years

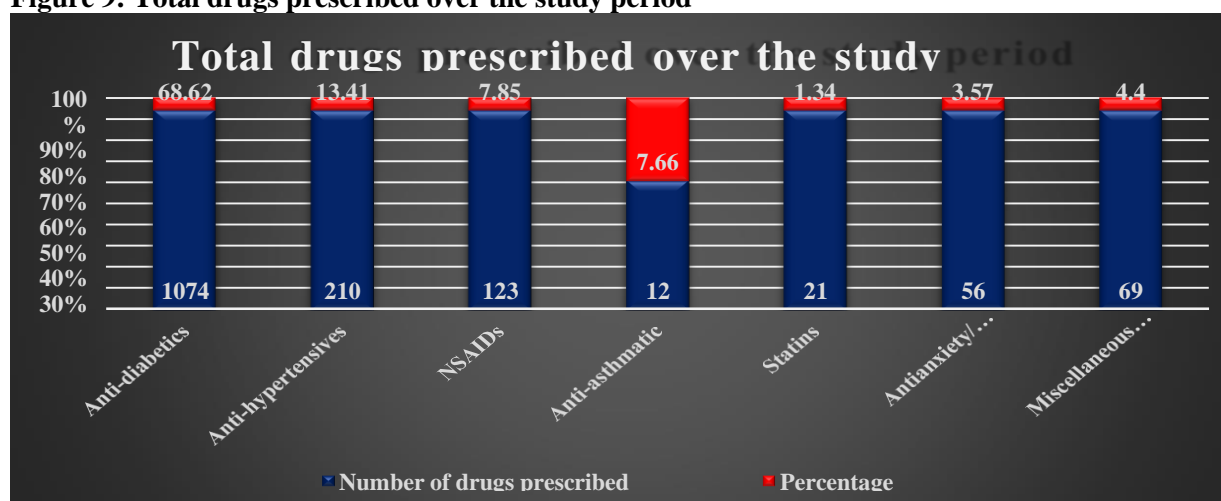Distribution of the diabetic patients according to duration of years
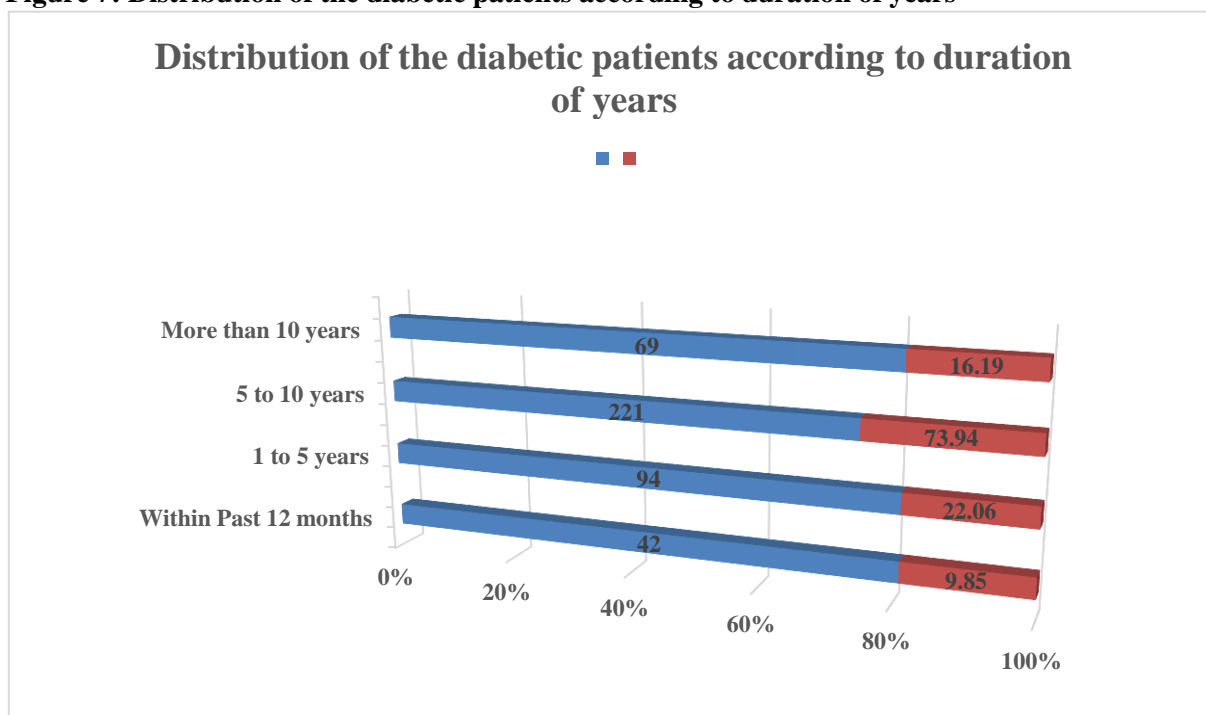
Table 8: Co-morbidities illness in patients with diabetes

| Co-morbidities illness	Number of patients(n=426)	Percentage (%)
Diabetes mellitus alone	174	40.84
Diabetes + Hypertension	99	23.23
Diabetes + Cardiovasculardiseases	49	11.50
Diabetes +Asthma	57	13.38
Diabetes + kidney disease	35	08.21
Diabetes + Hypertension + asthma	7	1.64
Diabetes + Hypertension + kidney disease	5	1.17

Figure 8: Co-morbidities illness in patients with diabetes
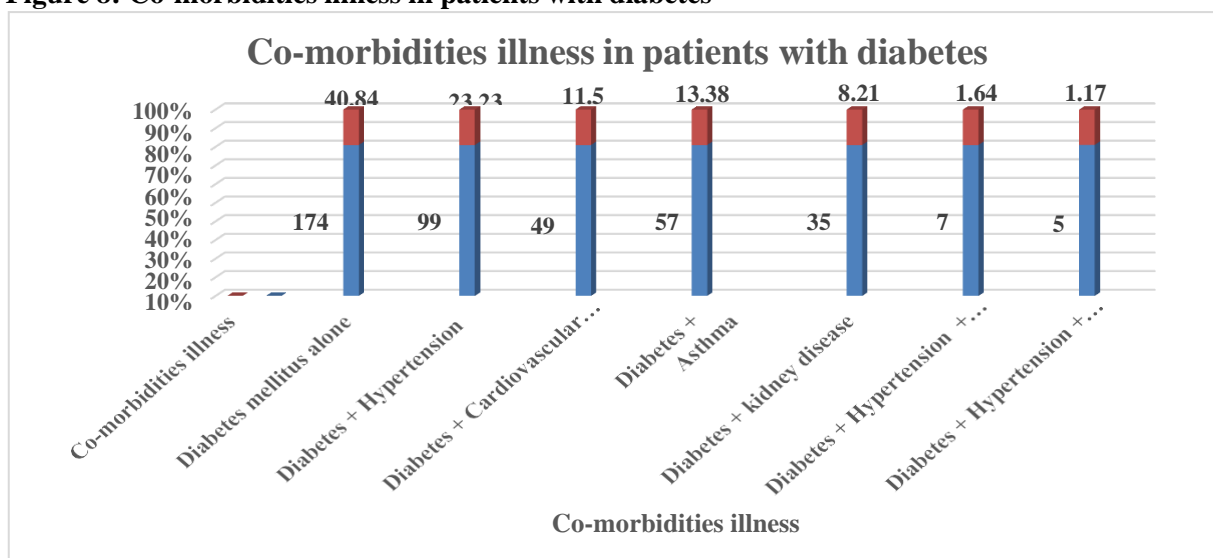
Table 9: Total drugs prescribed over the study period

| SI.No	Drugs prescribed	Number of drugs prescribed (n=1565)	Percentage (%)
1.	Anti-diabetics	1074	68.62
2.	Anti-hypertensives	210	13.41
3.	NSAIDs	123	07.85
4.	Anti-asthmatic	12	07.66
5.	Statins	21	01.34
6.	Antianxiety/ antidepressants	56	03.57
7.	Miscellaneous (Supplement's)	69	04.40

Figure 9: Total drugs prescribed over the study period

Table 10: Distribution of the diabetic patients according to prescribing pattern

Type of Therapy	Number of patients(n=426)	Percentage (%)
Monotherapy	212	49.76
Two drug therapy	156	36.61
Three drug therapy	36	08.45
Four drug therapy	22	05.16

Figure 10: Distribution of the diabetic patients according to prescribing pattern
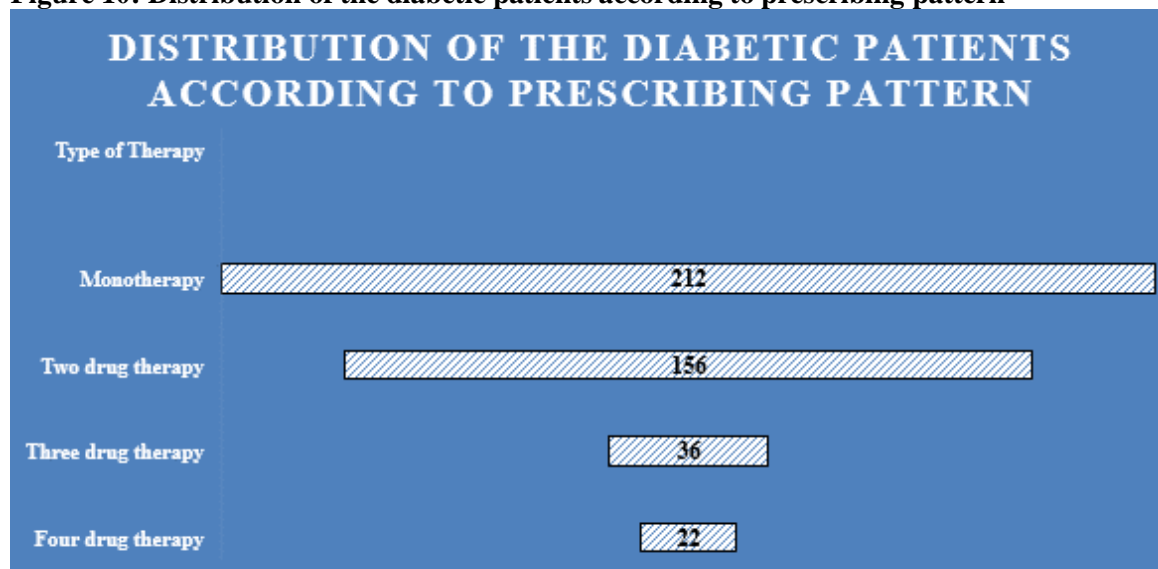
Table 11: Class of anti-diabetic therapy(MONOTHERAPY)

| Class of drugs	Number of drugs prescribed(n=212)	Percentage (%)
Biguanides	86	40.56
Sulfonylureas	66	31.13
DPP-4 Inhibitors (Gliptins)	33	15.56
Thiazolidinediones	16	7.54
Alpha - glucosidase inhibitors	11	5.18

Figure 11: Class of anti-diabetic therapy(MONOTHERAPY)
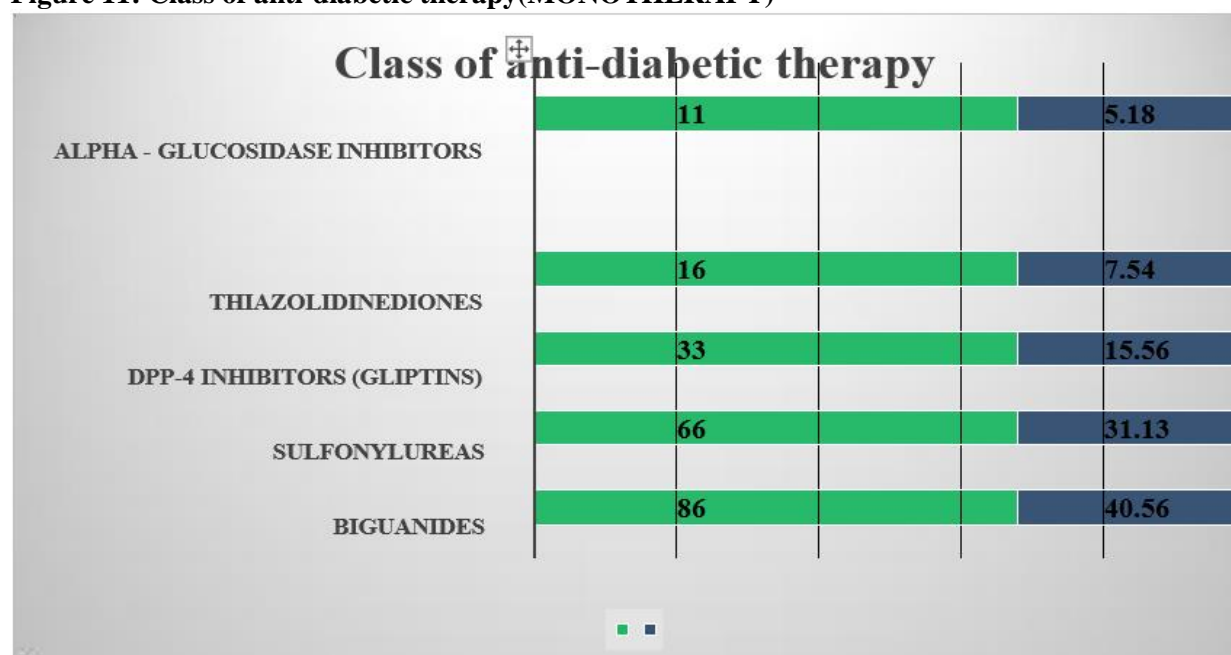
Table 12: Class of anti-diabetic therapy(TWO DRUG THERAPY)

Classes of drugs	Number of patients(n=156)	Percentage (%)
Biguanides +sulfonylureas	76	48.71
DPP 4 inhibitors +Biguanides	31	19.87
Biguanides +alpha glucosidaseinhibitors	25	16.02
Biguanides +DPP 4 inhibitors	12	07.69
Sulfonyl ureas+Biguanides	7	04.48
Thiazolidinediones +Biguanides	5	03.20

Figure 12: Class of anti-diabetic therapy(TWO DRUG THERAPY)
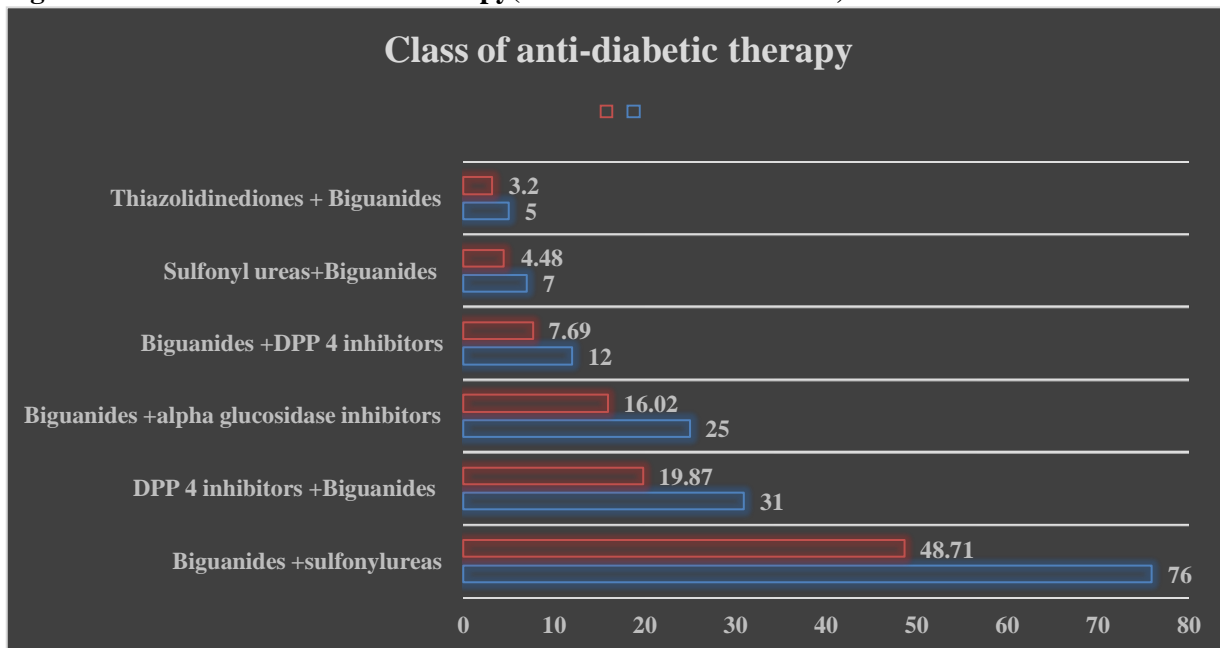
Table 13: Class of anti-diabetic therapy(THREE DRUG THERAPY)

| Class of drugs	Number of patients(n=36)	Percentage (%)
Biguanides +sulfonyl ureas+thiazolidinedione	12	33.33
DPP 4 inhibitors + Biguanides + sulfonyl ureas	09	25.00
DPP 4 inhibitors+ Biguanides+alpha glucosidase inhibitors	5	13.88
Biguanides+ DPP 4 inhibitors+sulfonyl ureas	4	11.11
Biguanides+ sulfonyl ureas+DPP 4 inhibitors	3	08.33
Sulfonyl ureas+ Biguanides+thiazolidinedione	2	05.55
Alpha glucosidase inhibitors+Biguanides+ thiazolidinedione	1	02.77

**Figure 13: Class of anti-diabetic therapy(THREE DRUG THERAPY)**
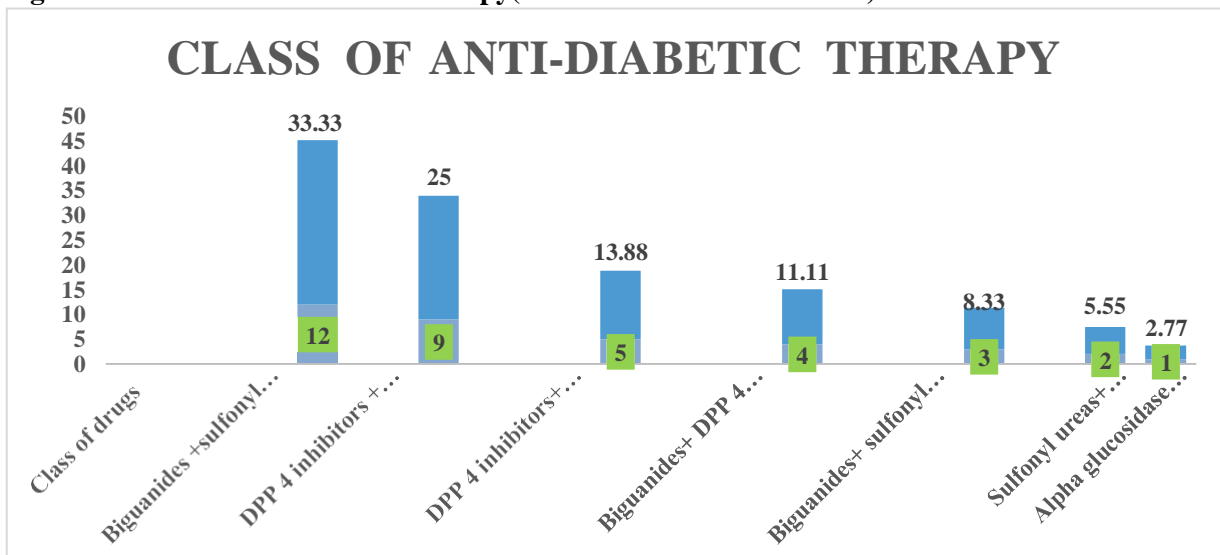
Table 14: Class of anti-diabetic therapy(FOUR DRUG THERAPY)

Classes of drugs	Number of patients(n=22)	Percentage (%)
Biguanides + sulfonyl ureas + DPP 4 inhibitors +thiazolidinedione	10	45.45
DPP 4 inhibitors + Biguanides + sulfonyl ureas+ alpha glucosidase inhibitors	08	36.36
DPP 4 inhibitors + Biguanides + sulfonyl ureas + thiazolidinedione	04	18.18

Figure 14: Class of anti-diabetic therapy(FOUR DRUG THERAPY)
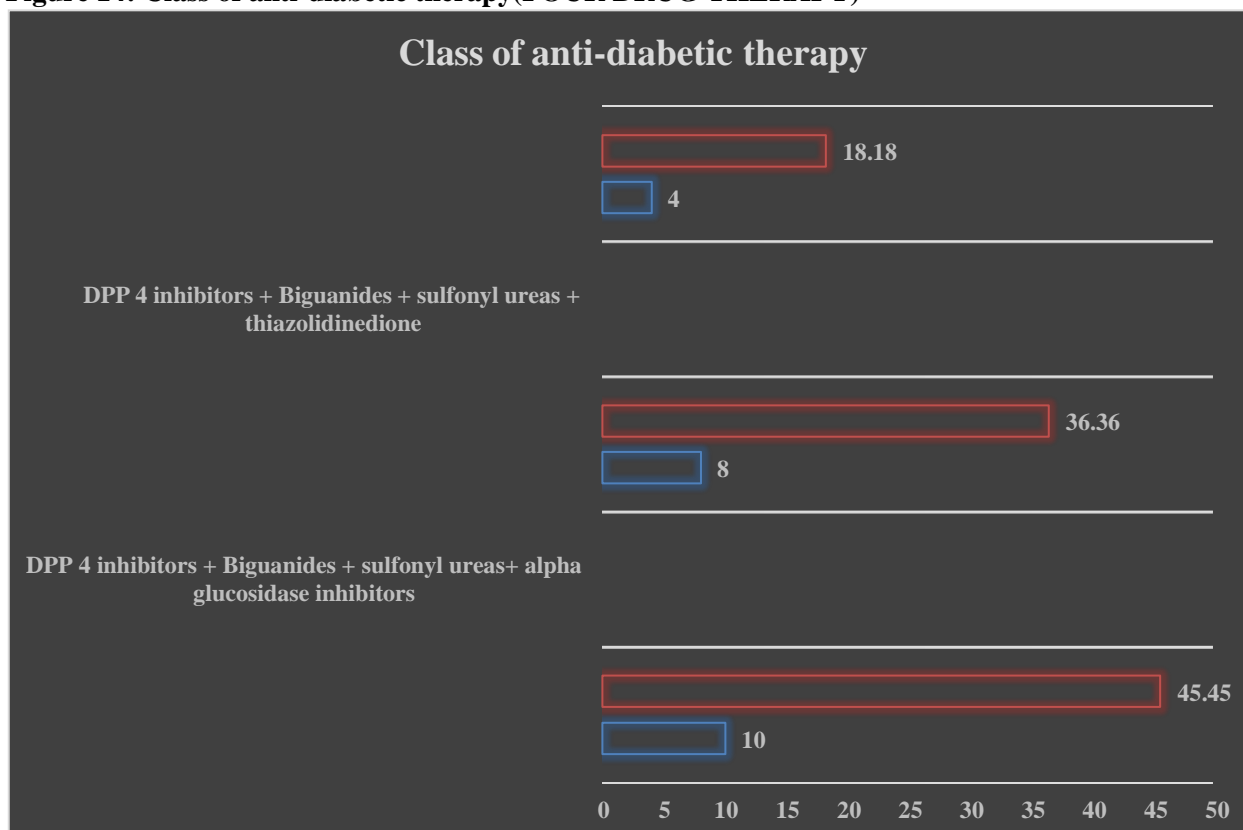
Table 15: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus MONOTHERAPY

Drugs prescribed	Number of patients(n=212)	Percentage (%)
Metformin	79	37.26
Glimepiride	51	23.94
Glibenclamide	31	14.62
Tenegliptin	22	10.37
Glipizide	08	03.77
Voglibose	7	03.30
Sitagliptin	6	02.83
Acarbose	4	01.88
Gliclazide	2	0.94
Vildagliptin	2	0.94

Figure 15: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus MONOTHERAPY
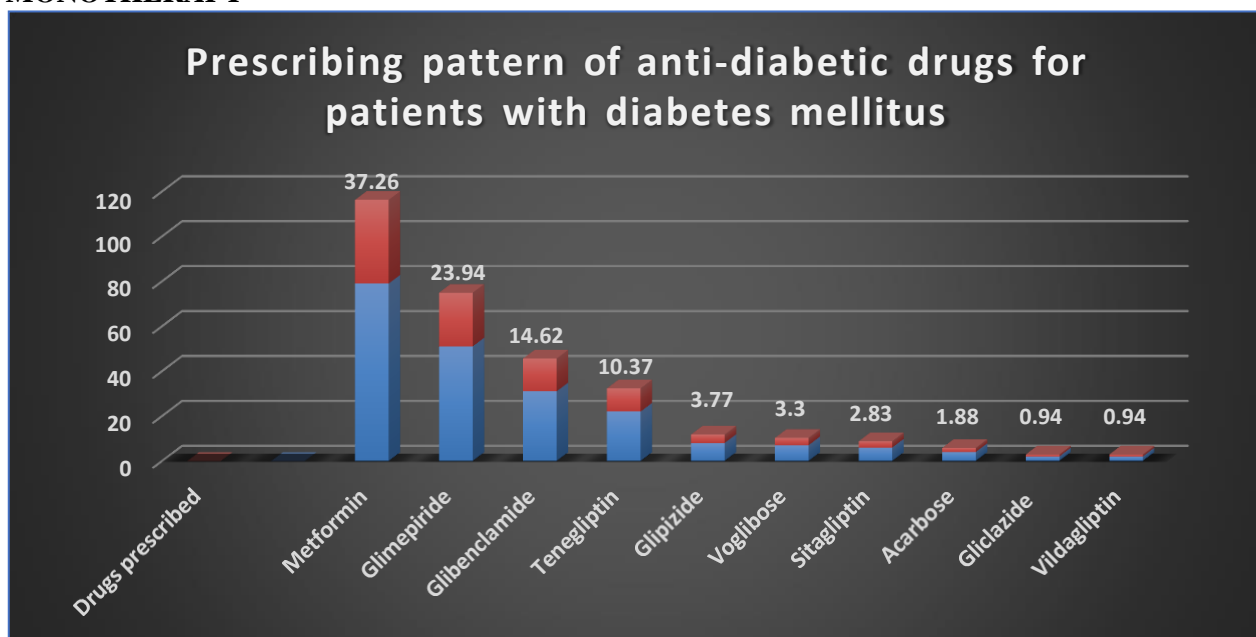
Table 16: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus TWO DRUG THERAPY

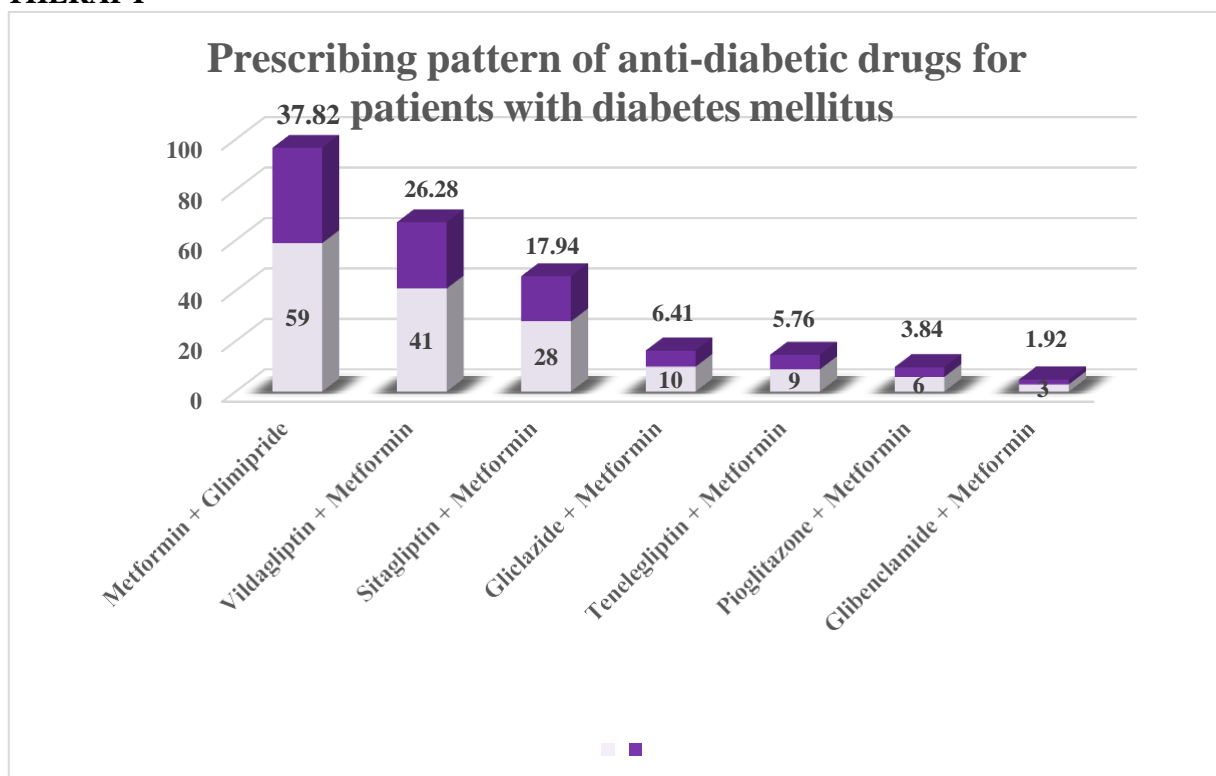| Drugs prescribed	Number of patients(n=156)	Percentage (%)
Metformin + Glimepiride	59	37.82
Vildagliptin + Metformin	41	26.28
Sitagliptin + Metformin	28	17.94
Gliclazide + Metformin	10	06.41
Tenelegliptin + Metformin	9	05.76
Pioglitazone + Metformin	6	03.84
Glibenclamide + Metformin	3	01.92

Figure 16: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus TWO DRUG THERAPY

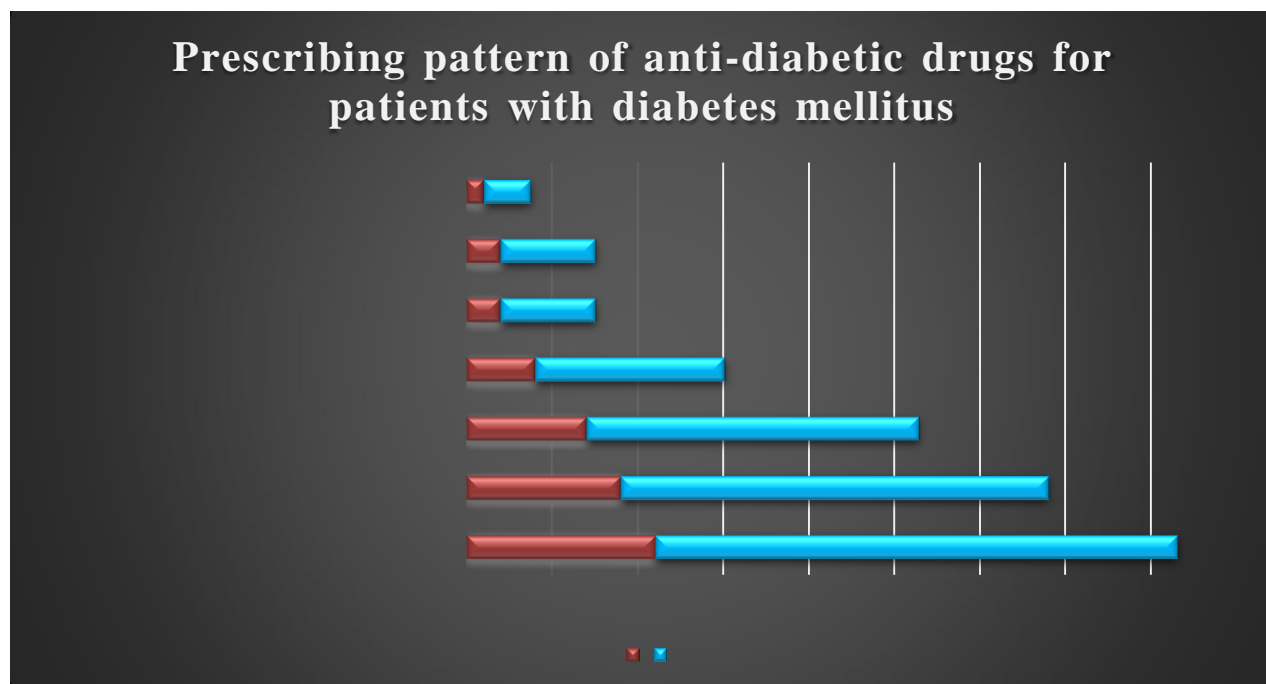**Table 17: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus THREE DRUG THERAPY**

| Drugs prescribed	Number of patients(n=36)	Percentage (%)
Metformin + Glimepiride + Pioglitazone	11	30.55
Vildagliptin + Metformin + Glimepiride	09	25.00
Sitagliptin + Metformin + Acarbose	7	19.44
Metformin + Sitagliptin + Glimepiride	4	11.11
Metformin + Glimepiride + Teneligliptin	2	05.55
Gliclazide + Metformin + Pioglitazpne	2	05.55
Voglibose + Metformin + Pioglitazone	1	02.77

Figure 17: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitusTHREE DRUG THERAPY

Voglibose + Metformin + Pioglitazone	1	2.77	
Gliclazide + Metformin + Pioglitazpne	2	5.55	
Metformin + Glimepiride + Teneligliptin	2	5.55	
Metformin + Sitagliptin + Glimepiride	4	11.11	
Sitagliptin + Metformin + Acarbose	7	19.44	
Vildagliptin + Metformin + Glimepiride	9		25
Metformin + Glimepiride + Pioglitazone	11		30.55

Table 18: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitusFOUR DRUG THERAPY

Drugs Prescribed	Number Of Patients(n=22)	Percentage (%)
Metformin + Glimepiride +Sitagliptin + Pioglitazone	10	45.45
Vildagliptin + Metformin +Glimepiride + Acarbose	08	36.36
Sitagliptin + Metformin +Glicazide +Pioglitazone	04	18.18

Figure 18: Prescribing pattern of anti-diabetic drugs for patients with diabetes mellitus FOUR DRUG THERAPY
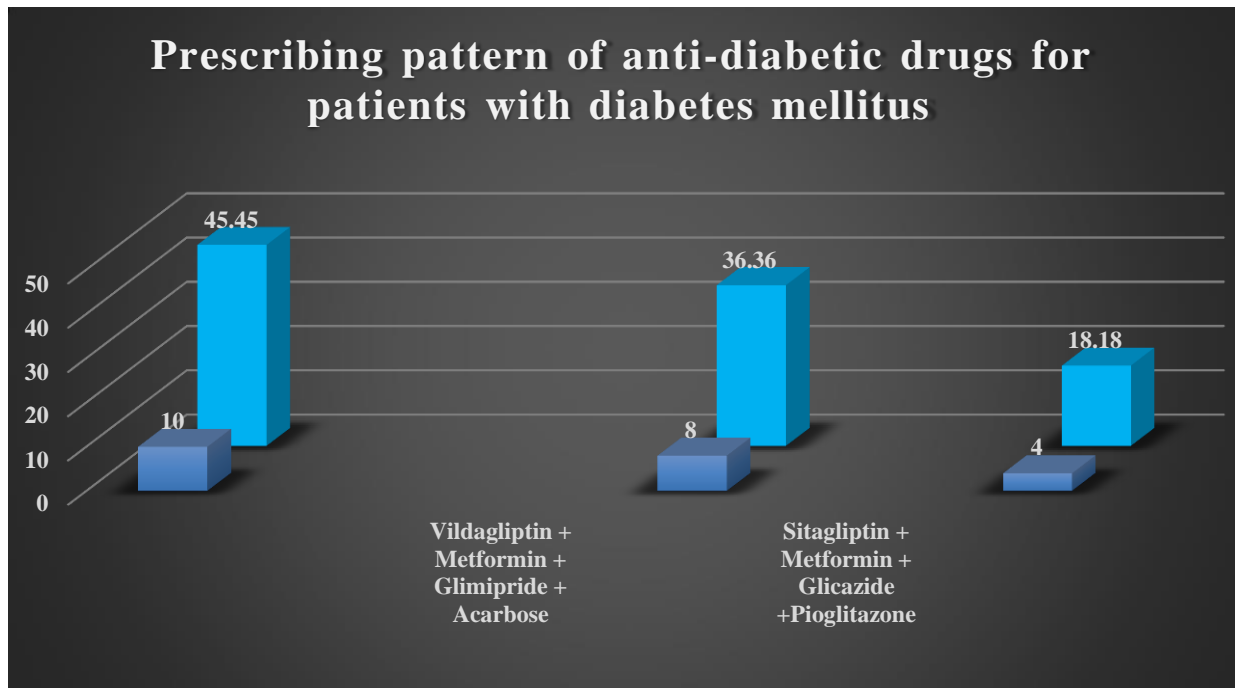
Table 19: Cost of Therapy during the Study

Cost in rupees (INR per month)	Number of prescription (n=426)	Percentage (%)
1-600 Rs.	129	30.28
601-1200 Rs.	193	45.30
1201-1800 Rs.	69	16.19
1801-2400 Rs.	24	05.63
>2401 Rs.	11	02.58

Figure 19: Cost of Therapy during the Study
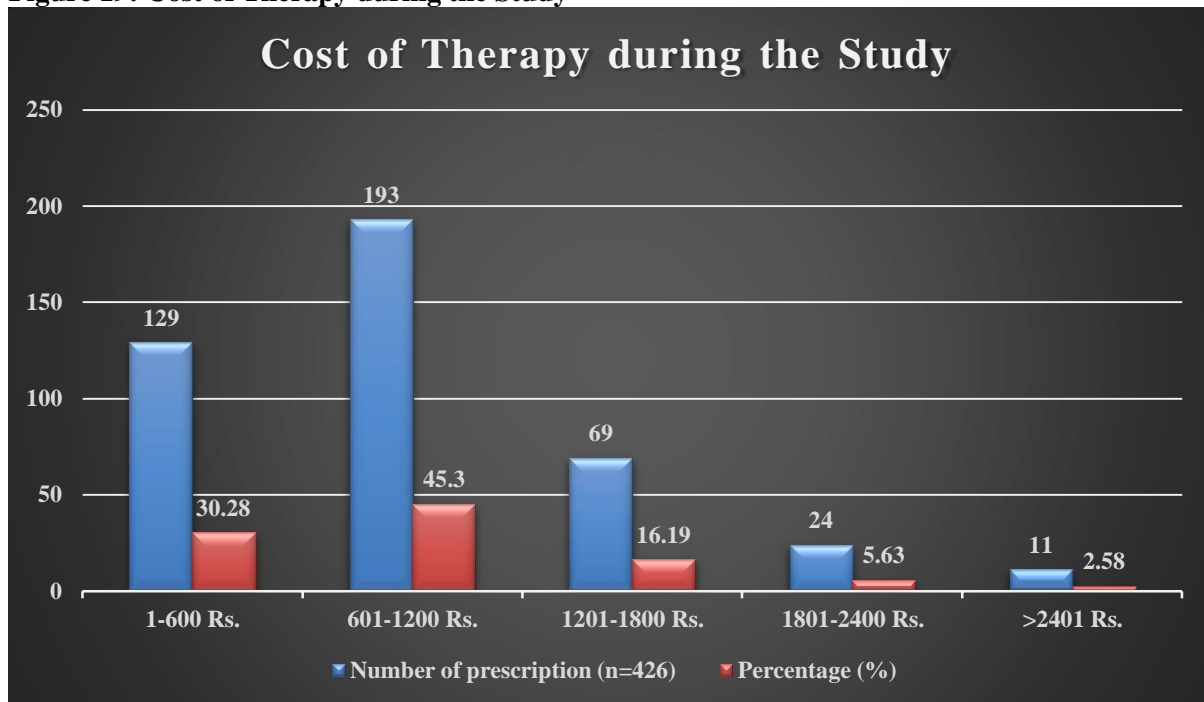
DISCUSSION

A drug utilization study was considered to be one of the most effective methods to assess and to evaluate the prescribing attitude of a physician and helps to promote the rationaluse of drugs. Diabetes mellitus is a major public health problem worldwide. Its' prevalence was rising in many parts of the developing world and India, there is no exception to this. Individuals with Type 2 diabetes were considered on high priority as they are potential candidates for rapid evaluation to prevent and halt the progression of many complications.

Type 2 diabetes is a chronic disease requiring lifelong treatment. Although lifestyle modification plays an important role in managing diabetes, the usage of medication became unavoidable in many patients. A prescription based study was considered as one of the most effective methods to assess and to evaluate the prescribing pattern of medications. This study analyzed the prescribing pattern of type 2 diabetic patients who visited in the diabetic clinic.

Out of 457 patients screened, 426patients were enrolled according to inclusion and exclusion criteria. Among them 62.44% were males and 37.55% were females (Table 1). The study found to be a higher incidence of diabetes among elderly patients, with a high incidence in the age group between 41-60 years (50.70%) and followed by 61-80 years (19.24%) Table 2. Similar results were obtained in the studies done by Mandal S et al. from their study it was found that the prevalence of type 2 diabetes was high in middle-aged persons, i.e. 40 to 60 years of age.

Among 426 diabetes patients living in urban areas 58.45%, followed by rural areas 27.23% in the study populations (Table 3). It was found to be that from 426 diabetes patients, 78.63% were more prone to consumption of non-vegetarian varieties of foods (Table 4). Based on the Social demographic risk factors study was observed that diabetes patients, 104 (24.41%) weremore prone to alcohol consumption followed by 99 (23.23%) (Table 5).

Among the study population, family history for diabetes patients, majority of incidence in father alone 213 (50.00%) had more prone to diabetes in their family history followed by mother alone 95 (22.30%) (Table 6). This was a similar study conducted by Kannan et al.[59] Among the study population, 11 (5.44%) had their father alone suffering from diabetes, 17 (8.42%) had their mother alone suffering from diabetes, 103 (50.99%) had their other family members suffering from diabetes, 9 (4.45%) had both their father and mother suffering from diabetes and 62 (30.69%) patients had no family members with diabetes.

The study resolved that most of the patients were suffering from diabetes for 5 to 10 years, 221 (73.94%) of duration years followed by 1 to 5 years, 94 (22.06%) (Table 7). This was a similar study obtained in the studies done by Chakrabarty et al.[53] It is evident from the table that most of the patients were suffering from Type II DM for less than 5 years of durations. Inthis study found that there were a total of 426 co-existing illness from diabetes patients, among that 40.84% were diabetes alone, 23.23% were Diabetes + Hypertension, 11.50% Diabetes + Cardiovascular Diseases, and 13.38% were Diabetes + Asthma (Table 8). Similar study. Which was comparable with the study done by Kannan et al. In this study there were a total of 306 co-existing illness in 202 patients. Hypertension was accounted for 33.33% of the total complications in diabetes patients, denoting the highest percentage of the complications. This study showed that hypertension was usually the most common co- existing illness seen with diabetes mellitus (DM).

A total of 1565 drugs were prescribed in the overall study period. 68.62% were diabetic drugs, 13.41% hypertensive drugs, 07.85% NSAIDs, 07.66% asthmatic drugs, 03.57% antidepressants, and 04.40% supplements of drugs (Table 9). Polypharmacy is associated with higher cost increase the risk of side effects, drug interactions, and non-compliance.[60] In general diabetic patients are at higher risk of developing depression. Studies suggest that diabetes doubles the risk of depression [61.] In this study, doctors prescribed antidepressants

almost 4% of the total drugs prescribed. These patients are more vulnerable to miss their medications, and the possibility of non-adherence is very high. Doctors should be careful while prescribing Tricyclic antidepressants [TCAs] to these patients. According to one study, the use of a higher dose of Tricyclic antidepressants [TCAs] was associated with an increased risk of sudden cardiac death. Overuse of vitamins were also observed [64]. In the present study, vitamins accounted only for 4.40% of the total drugs. This is low compared to other studies. This is a positive effect. Analgesics and anti-inflammatory drugs accounted for 07.85% of the total drugs. The prescriber should be aware of the interaction between OHAs and Non-steroidal anti-inflammatory drugs (NSAIDs). Concurrent use of NSAIDs and sulfonylurea may result in an increased risk of hypoglycemia.

In our study observed that the average number of drugs per prescription was 3.67. Which wassimilar results were obtained in the study done by Kannan et al.[59] The average number of drugs per prescription was 4. The high average number of drugs prescribed to patients with diabetes is not surprising. It is recognized that

patients with diabetes mellitus are generally prescribed more drugs than other patients. In general, due to the multiple diseases, diabetes patients were at a greater risk of polypharmacy. In this study, 68.62% prescription contains two or more drugs. It shows that polypharmacy is high.

The study resolved that drugs were prescribed as monotherapy was 49.76%, two drug therapy were 36.61%, three-drug therapy were 08.45% and four-drug therapy was 05.16% (Table 10). Similar study done by Venkateswaramurthy et al. Drugs were prescribed as monotherapy in 78.61% patients. Two drug combinations were prescribed to 17.92% patients and three- drug combinations were prescribed to 4.62% patients.

The study revealed that the most commonly prescribed anti-diabetic drugs in monotherapy were Biguanides 40.56%, followed by Sulfonylureas were 31.13%. Whereas in metformin 37.26% was mostly prescribed drugs in Biguanides, followed by Glimepiride 23.94% was

prescribed in Sulfonylureas (Table 11 and 15). Similar study conducted by Mandal S et al.[52] Amongst antidiabetic medications, metformin was the most commonly prescribed drug whichwas given in 144 (79.6%) patients followed by sulphonylureas in 121(66.9%) and pioglitazone in 37 (20.4%) patients. Most of the patients required two or more drugs to achieve glycemic control. The most possible reason for this is that type 2 DM is a chronic disease with a progressive deterioration in glycemic control due to the continuing loss of β-cell function and henceforth. Monotherapy for type 2 diabetes may therefore not be sufficient to maintain glycemic control over time.

In our study, the most commonly prescribed anti-diabetic drugs in two drug therapy was Biguanides +sulfonylureas 48.71%, followed by DPP 4 inhibitors +Biguanides 19.87%. Whereas in Metformin + Glimipride 37.82% was mostly prescribed in Biguanides + sulfonylureas, followed by Vildagliptin + Metformin 26.28% was mostly prescribed drugs in DPP 4 inhibitors +Biguanides (Table 12 and 16). Similar study conducted in two drug therapy done by Geetha et al. The add-on therapy of sulfonylurea to metformin is the common procedure after the metformin fails to control glycemic levels, sulfonylureas have been associated with hypoglycemia, sometimes need of hospitalizations, particularly in elderly patients.

In three drugs therapy of anti-diabetic, mostly prescribed drugs was Biguanides +sulfonyl ureas+ thiazolidinedione 33.33%, followed by DPP 4 inhibitors + Biguanides + sulfonylureas 25%. In that Metformin + Glimepiride + Pioglitazone 30.55% was mostly prescribed in Biguanides +sulfonyl ureas+ thiazolidinedione, followed by Vildagliptin + Metformin + Glimepiride 25% was mostly prescribed in DPP 4 inhibitors + Biguanides + sulfonylureas (Table 13 and 17) the most common combination was observed by Venkateswaramurthy et al.[51] Under three-drug combinations, the combination of metformin, pioglitazone, and glimepiride (2.86%) was highly prescribed followed by metformin + glimepiride + sitagliptin

(1.71%). Pioglitazone comes under thiazolidinediones that help in increasing insulin sensitivity in target tissues. In combination with other hypoglycemic drugs, pioglitazone is an effective protocol in attaining glycemic control. Voglibose comes under alpha-glucosidase inhibitor that lowers the daily glycemic conversions and inhibits overwork of the pancreatic beta cells and shows a little effect on insulin sensitivity in patients with NIDDM. Several newdrugs with certain advantages like high glucose-lowering efficacy are available, that include injectable glucagon-like peptide-1 agonists and DPP-4 inhibitors. These agents offer a low risk of hypoglycemia combined with sustained weight loss. Oral drug therapy for type 2 DM will achieve greater control on glycemic targets when it's used appropriately and safely with certain assistance patients can achieve glycemic targets within a short period. However, the progressive nature of type 2 DM usually requires a combination of two or more oral agents inthe longer term, often as a prelude to insulin therapy.

The study revealed that, four drug therapies the most commonly prescribed drug was Biguanides + sulfonylureas + DPP 4 inhibitors + thiazolidinedione 45.45%, followed by DPP 4 inhibitors + Biguanides + sulfonyl ureas+ alpha-glucosidase inhibitors 36.36%. Whereas in Metformin + Gimipride + Sitagliptin + Pioglitazone 45.455 was mostly prescribed drugs in Biguanides + sulfonylureas + DPP 4 inhibitors + thiazolidinedione, followed by Vildagliptin

+ Metformin + Glimipride + Acarbose 36.36% was mostly prescribed drugs in DPP 4inhibitors + Biguanides + sulfonyl ureas+ alpha-glucosidase inhibitors (Table 14 and 18).

Cost of drug therapy is a cause for non-adherence. In this study resolved that higher cost in rupees in per month 601-1200 Rs. were 45.30% had consumed, followed by 1-600 Rs. were 30.28% had consumed (Table 19). Which is a similar study conducted by Kannan et al.Cost of prescription is important in chronic diseases like diabetes. One of the better approaches to decrease the prescription cost is to prescribe cheaper brands. A study from Nepal reported a huge variation in cost among brands of a particular drug [72]. Also in India, huge variations in the cost of antidiabetic medications have been documented [73]. A similar finding has been seen in other developing countriesThus there is a huge scope in reducing the prescription cost by prescribing cheaper alternatives. However, while choosing cheaper brands, one should keep in mind the quality of the

brands.

CONCLUSION

The current study reported that type 2 diabetes was more prevalent in males than in females. A total of 426 patients had co-morbid conditions along with diabetes. Commonly seen co-morbid condition in the study was hypertension.

In this study, 426 anti-diabetic drugs prescribed, among that, the physician's most well-liked single-drug therapy more than multiple drug therapy and also the most often prescribed category was Biguanides category of anti-diabetic agents. Among Biguanides, Metformin was the foremost often utilized anti-diabetic drugs. The foremost prevalent combination of the drug was a two-drug therapy of Biguanides +sulfonylureas, among these combinations, Metformin + Glimipride was the foremost often utilized anti-diabetic drugs. Followed by 3 drug therapy were Biguanides +sulfonyl ureas+ thiazolidinedione and 4 drug therapies were Biguanides + sulfonylureas + DPP 4 inhibitors + thiazolidinedione.

Pharmacists can contribute drastically to promote the rational use of medicines, even in resource-limited settings. This, of course, requires strong collaboration between different institutions and commitments of the pharmacists to the cause. Pharmacist medication review, patient counseling and telephone follow-up can limit the Adverse Drug Reactions. Medication discrepancies before and after discharge were common targets of intervention.

These efforts need to encompass both studies to understand the high-quality strategies tosupport more successfully the splendid use of medications according to regular guidelines and progressive tools to support physician decision making and affected person compliance. This study suggests that patient expertise about the drugs is low. In this find out about cost oftablets per prescription was found to be very high. The price of prescription can be decreased employing deciding on most monetary drugs without altering its quality.

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