



PRESCRIBING PATTERNS OF ANTIDIABETIC MEDICATIONS IN A TERTIARY CARE TEACHING HOSPITAL, BAREILLY, UP, INDIA

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ABSTRACT

Multi systems are involved in diabetes mellitus so there is higher risk of polypharmacy & more vulnerable to irrational prescription. The study aimed to describe the prescribing patterns of antidiabetic medication in outpatient department of this Institute & to assess the co-morbidities.

The study was a cross sectional survey of all prescriptions received from 186 patients attending OPD of this Institute from Oct 12- Jan 13. Informed verbal consent was obtained from each patient. All the details of prescriptions were entered in structured patient profile form & filled forms were analyzed.

Among 186 prescriptions, 102 (54.83%) were male patients and 84(45.16%) were female. Greatest number of patients {59 (31.72%)} belonged to age group of 51-60 years. 67 patients (36.02%) had a diabetic history of <5years and 157 patients (84.4%) had at least one concurrent illness. Average number of drugs per prescription was 5.97. Prescriptions contained various other drugs apart from antidiabetic medications. Among various antidiabetics, sulfonylureas accounted for highest prescriptions i.e. 26.74% followed by combination of sulfonylurea & metformin (18.60%) that in turn was followed by metformin (17.44%). Pioglitazone alone was also prescribed to sizable number of patients (13.56%). Other combination therapies were also prescribed. Insulin therapy was given to 18.6% of patients to type 1 as well as uncontrolled type 2 diabetics. Human mixtard 30/70 penfil was most commonly prescribed preparation (62.5%)

Insulin & sulfonylurea were most commonly prescribed antidiabetics. Polypharmacy was a great problem especially for elderly people. There is a need to develop & use evidence based guidelines for specific conditions by independent bodies. Drug use by their generic name should be encouraged

KEY WORDS: Antidiabetic drugs, prescription, utilization pattern, sulfonylurea, insulin, Bareilly

INTRODUCTION

Diabetes is increasing in prevalence & currently affects more than 170 million people worldwide and is estimated to increase as high as 366 million people in 2030 and people above 65 years of age will increase in proportion globally^{1,2}.

Both types of diabetes have microvascular and macrovascular complications^{3,4}. Screening for complications like retinopathy, nephropathy, neuropathy, ischemic heart disease, peripheral vascular disease and cerebrovascular accidents etc should be done. Fortunately these chronic complications can be mitigated in many patients by proper management of diabetes that includes strict glycemic control achieved by diet, life style changes, exercise & through medication. Associated conditions like hypertension, obesity, cardiovascular disease & depression should also be treated.

Pharmacotherapy for type 1 diabetes includes mainly insulin and for type 2, it is oral hypoglycemic drugs and sometimes insulin also. Several classes of drugs are available & each class contains multiple drugs. So, it is the physicians' duty to prescribe the drug which is most beneficial for the patient.

Many newer international and national guidelines are available which provide evidence based recommendations for the treatment^{5,6} but these cannot always be implemented in daily practice because of various patient related factors like age, gender, body mass index(BMI) and coexisting illness which need to be considered while prescribing any drug.

Often diabetic patients suffer from multiple diseases & hence are prescribed multiple drugs. Moreover, irrational prescribing can lead to an increase in the cost of the drug

therapy, drug interactions leading to either attenuation of drug response or drug overdose. All these factors may lead to non adherence of therapy. A study from United States of America reported that about 1.3 million adults with diabetics did not take their medications as prescribed because of cost & as a result more than half reported health problems^{7,8}. So, strict adherence to drugs is required to prevent or delay complications.

Drug utilization studies are valuable for researchers, policy makers and drug & therapeutic committee to determine rational drug use pattern. Therefore, the present study was conducted to establish current prescribing pattern of antidiabetic drugs in Shri Ram Murti Smarak Institute of Medical Sciences (SRMSIMS), a tertiary care teaching hospital, Bareilly, UP-India.

SUBJECTS & METHODS

A retrospective observational epidemiological study was undertaken for four months (Oct12-Jan13) in outpatient and inpatient department of Medicine of the Institute. The study enrolled 186 patients' prescription. Informed verbal consent was received from each patient & they were further inquired for other comorbidities. The contents of the prescriptions were assessed & brand names were decoded to generic names using standard CIMS India & internet. Prescriptions of diabetic patients being treated at the hospital during the past six months were also included in this study.

Patients' inclusion criteria

- Patient suffering from type 1 and type 2 diabetes
- Diabetic patients of both the sexes
- Diabetic patients of all ages between 20-70 years
- Patients having concurrent illness like hypertension, ischaemic heart disease & obesity

Patients exclusion criteria

- Pregnant females having diabetes

After collecting the data, the details were entered in the structured patient profile format.

Results Analysis

The filled patient profile form was analyzed for various parameters like age distribution & gender of patients, duration of diabetes, concurrent illness, family history of diabetes, number of drugs per prescription, different categories of drugs used, class of antidiabetics, types of insulin preparations used and duration of therapy.

Table 1- Age and sex distribution of diabetic patients

Age group (years)	Male	Female	Total	Percentage
30-40	05	10	15	8.06
41-50	17	28	45	24.19
51-60	36	23	59	31.72
61-70	30	25	55	29.56
>70	12	0	12	6.45
Total	102	84	186	100

Table 2- Percentage of antidiabetic medication prescribed

Name of drug	Dosage form	Number of times prescribed	% of total drugs prescribed
Insulin	Human mixtard30/70, Human actrapid, isophane, Insulin glargine penfil	33	12.79
Insulin + anti diabetic drugs	Human mixtard30/70 penfil + tablets	15	5.81
Sulfonylurea (Glimepiride, glipizide)	1,2 mg; 5mg tab	69	26.74
Glimepiride+Metformin	1,2 mg; 500, 1000mg tab	48	18.60
Pioglitazone	15,30 mg tab	35	13.56
Glimepiride + Pioglitazone	1,2 mg; 15,30mg tab	3	1.16
Glimepiride + Pioglitazone + Metformin	1,2 mg; 15,30 mg;500, 1000 mg tab	6	2.32
Sitagliptine	100 mg tab	2	0.77
Acarbose	50, 100 mg tab	2	0.77

Table 3: Age & Sex wise distribution of Insulin

Insulin preparation	31-40 yrs		41-50yrs		51-60yrs		61-70		>70yrs		total
	M	F	M	F	M	F	M	F	M	F	
Human mixtard 30/70 penfil	06	08	04	01	03	02	03	02	01		30
NPH(isophane)pen	-	-	02	01	02	01	-	-	-		06
Human regular Insulin (Actrapid penfil)	02	03	02	01	-	01	-	-	-		10
Insulin Glargine pen	-	-	-	-	02	-	-	-	-		02

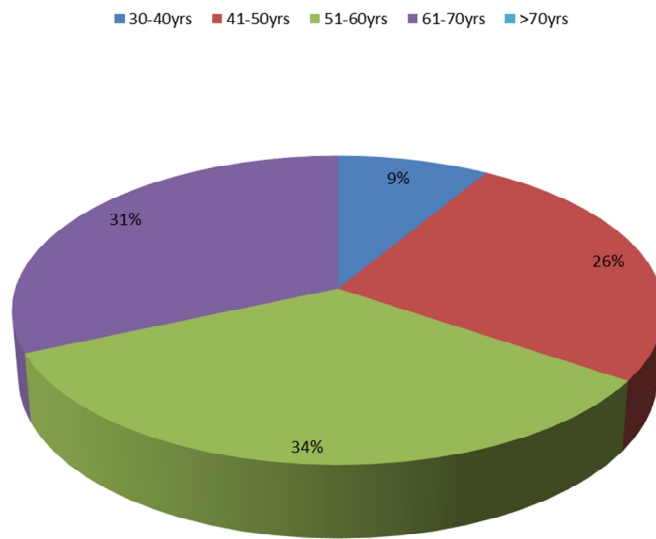


Figure 1: Age group wise distributive pattern of diabetes

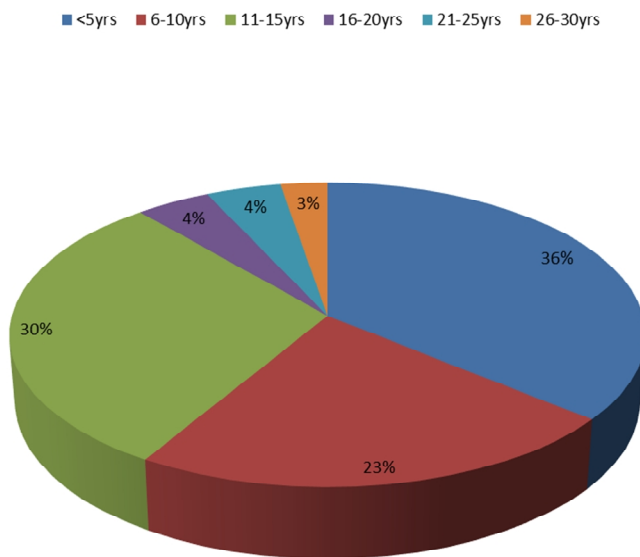
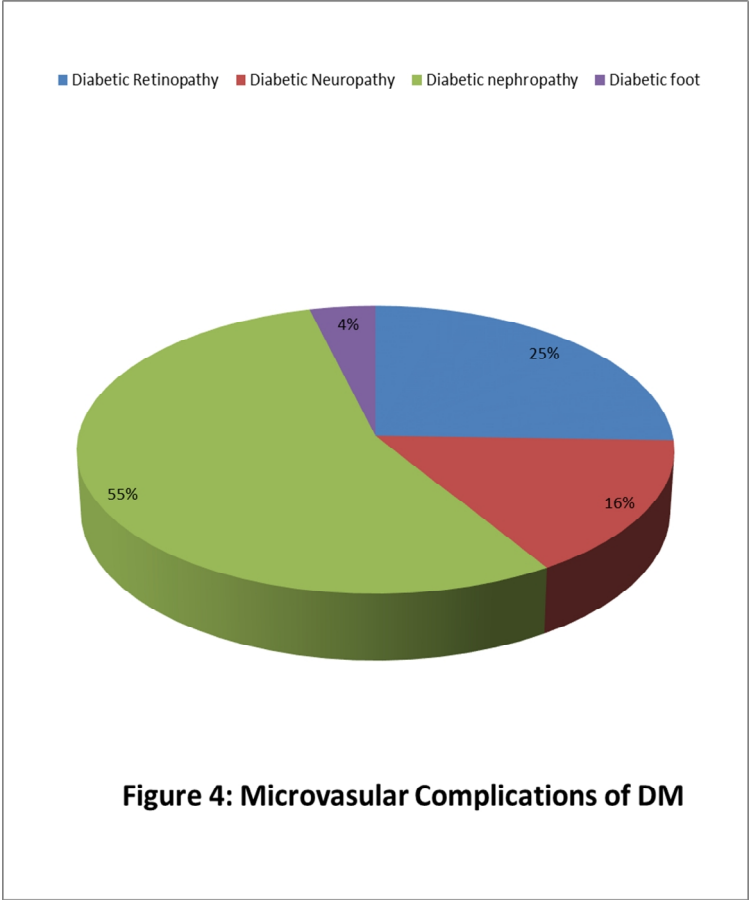
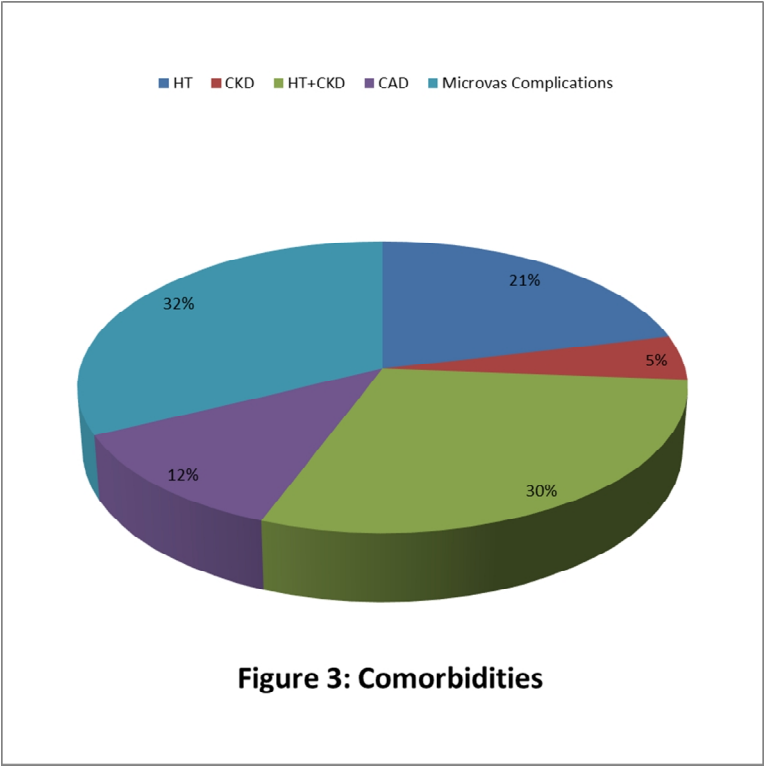


Figure 2: Duration of diabetes



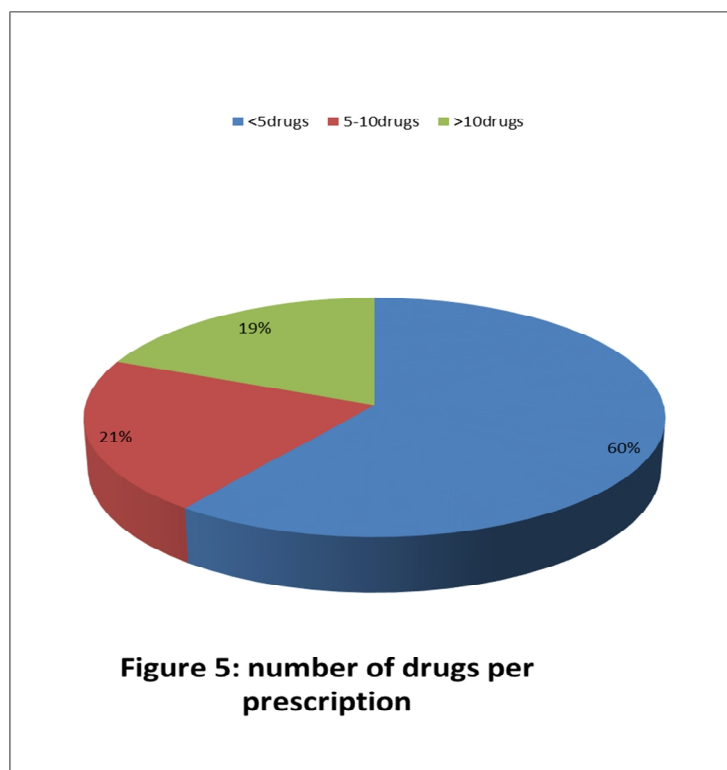


Figure 5: number of drugs per prescription

RESULTS

97.84% of patients had type 2 diabetes & 2.15% had type 1 diabetes. Mean age of type 2 diabetes was 57.36 ± 8.80 while that of type 1 was 31.50 ± 1.29 . All patients with type 1 reported family history of diabetes whereas family history was present in 42% of type 2 diabetes.

Demographic details

Among 186 prescriptions for diabetes, 54.83% were for men and 45.16% were for women, indicating that men predominated over women. The greatest number were in the age group of 51-60 yrs followed by 61-70 yrs, 41-50 yrs, 31-40 yrs and >70 yrs (table I, fig. 1).

Duration of diabetes

Among study population, most of the patients had diabetic history of <5yrs followed by 11-15yrs, 6-10yrs, 16-20yrs, 21-25yrs and 26-30yrs duration (fig. 2).

Comorbidities

Out of 186 patients, 157 had at least one coexisting illness. There were total 208 illnesses in 157 patients. 51 patients have complicated (microvascular) diabetes (Fig. 3& 4).

Number of drugs per prescription

Since indoor patients having multiple problems are involved in the study so, number of drugs per prescription exceeded 10. Number of drugs ranges from 2-13 (Fig. 5).

Category of drugs prescribed

Apart from antidiabetic drugs, prescriptions mainly contained medicines for hypertension, benign prostatic hyperplasia, coronary artery disease, chronic obstructive pulmonary disease, pulmonary tuberculosis and pneumonia. Couple of drugs belonged to other conditions as well.

Class of antidiabetics

Among various antidiabetic medications, Sulfonylurea made the bulk and accounted for 26.74% of prescriptions followed by sulfonylurea & metformin combination i.e. 18.60%, metformin, 17.44%, pioglitazone 13.56 % , insulin alone in

12.79% and insulin in combination with other oral antidiabetic drugs accounted for 5.81%. Other drugs and their combinations also contributed but to lesser extent (Table II).

Type of insulin therapy

Among various insulin preparations, human mixtard (30/70) insulin was prescribed to most of the patients (62.5%) followed by human regular insulin (20.83%), NPH (12.5%) and insulin glargine (4.16%) (Table III).

Insulin along with oral hypoglycemic drugs was prescribed to 5.81% of prescriptions. Insulin category was mixtard (30/70) & combined drugs were sulfonylurea, metformin & pioglitazone.

DISCUSSION

Diabetes being a chronic metabolic disorder requires lifelong management. Though nonpharmacological treatment like diet management & exercise play a vital role in controlling blood sugar levels but drug treatment becomes indispensable in majority of patients. The present study is a type of drug utilization study. A drug utilization review is the evaluation of drug use in given health care against predetermined criteria & standards to assess the appropriateness of drug therapy⁹.

In this study, we found a higher incidence of diabetes in elderly patients with a high incidence in age group 51-60 years. This finding is in accordance with similar study conducted by Upadhyay et al¹⁰. Mean age of patients came out to be 57.36 ± 8.80 yrs while it was 56.9 ± 12.55 yrs in an isolated study in Nepal¹⁰ and 60.5 ± 12.8 yrs in another study¹¹.

Average number of drugs per prescription was 5.97 in our study because of polypharmacy in diabetic patients. Sulfonylureas were the most commonly prescribed antidiabetics that was in line with other studies too^{12,13,14}. Among sulfonylureas glimepiride was most commonly prescribed followed by glipizide. This finding was in contrast

to other investigators who found metformin to be most commonly prescribed medication^{10,15,16}. Mean age of patients in this study was on higher side i.e. 57.36 ± 8.80 years, this may be one of the reasons of less prescribing metformin as it is not given in declining renal function¹⁶. Among combination therapy, sulfonylurea and metformin was most commonly prescribed in this study like in other studies also¹³ followed by combinations of glimepiride & pioglitazone or combination of glimepiride, pioglitazone and metformin therapy. Pioglitazone alone was also prescribed to sizable number (13.56%) of prescriptions. Few prescriptions contained sitagliptine and acarbose also. Lisha et al.,¹⁷ observed combination of metformin & sitagliptine to be most commonly prescribed.

Duration of diabetes plays an important role in patients with long duration. Tight glycemic control results in lesser incidence of complications but complication like retinopathy is related to duration of diabetes and not its severity. In our study, majority of prescriptions (36%) had diabetic duration of <5yrs, same finding was also concluded by Upadhyay et al¹⁰.

Cardiovascular complications were detected in 11.82% of prescriptions & they were treated by various other drugs like nitrates, antiplatelet drugs etc. Microvascular complications were present in 31.7%. Prescriptions contained multiple drugs that accounted for higher cost per prescription, increased risk of side effects, drug interactions & noncompliance. Drug interactions especially β blockers with sulfonylurea and insulin. β blockers are known to mask symptoms of hypoglycemia attenuating the effects of oral hypoglycemic agents. ACE inhibitors cause hypoglycemia¹⁸. Risk of severe hypoglycemia should be explained to patients on both the drugs.

In type 1 & uncontrolled type 2 diabetes, insulin was prescribed. The Collaborative Drug Therapy Management Service showed that the introduction of insulin or dose adjustment in patients with diabetes type 2 improves glycemic control in patients with Hb A1C levels >9¹⁹. Insulin was used in 12.79% of prescriptions in this study that was in close accordance with an isolated study from Brazil where insulin use was 11.4%.

No gender based differences were noted in drug prescribing pattern in this study like in few other studies also^{13,17}.


CONCLUSION

The present study concluded sulfonylurea to be most commonly prescribed drug in this Institute followed by combination of sulfonylurea & metformin. Among insulin therapy, human mixtard 30/70 penfil was most commonly prescribed preparation followed by human actrapid (regular) insulin. Incidence of polypharmacy was high in diabetic patients accounting for high cost, drug interactions & noncompliance. Utilization pattern of antidiabetic

medications shows no significant difference in both the genders.

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