

## Investigation of Outpatients Prescribing Pattern of Antidiabetic Drugs in Type -2 Diabetic Patients- A Study Conducted At A Tertiary Care Hospital

Mani goel<sup>1</sup>, Neelam Rawat

<sup>1</sup>(Department of Pharmacology, L.L.R.M Medical College, Meerut, India)

<sup>2</sup>(Department of Microbiology, Shri Mahant Inderesh Hospitals, Dehradun, India)

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**Abstract:** Recent Study in the tertiary hospital in North India showed that Prevalence of Diabetes Mellitus Type -2 is on the increase. To Evaluate the Utilization of Oral hypoglycaemic drugs in Diabetic Type-2, the study was conducted on Patients with established type 2 diabetes (n=360) visiting Out Patient Department. Patients were interviewed and the data obtained was tabulated in Microsoft Excel. In the present study the maximum number of patients suffering from Type 2 DM (51.2%) were males, from age group of 51-60 years. The prevalence of co-morbidities in Diabetic Patients Suffering from Hypertension was 30.56%. Sulphonylureas were the most prescribed oral Hypoglycaemics in 53.2% patients and the combination of Sulphonylureas and Biguanides was most prescribed combination in 33.3% patients. Cardiovascular drugs were the second most prescribed class 49.5% in hypertensive patients. During study, 3.6% were Average drugs prescribed, 72.5% were generic prescription, 98.6% drugs were from National Essential Drug list, 1.7% were antibiotics and 7.9% were Injections. Our study showed that the approach of treatment is initiation of therapy with lifestyle modifications followed by oral anti diabetics or their combinations. It is suggested that Self Monitoring of Blood Glucose (SMBG) should be promoted in Indian diabetic patients for glycemetic control.

**Keywords:** Diabetes Mellitus Type -2, oral Hypoglycaemics,

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### I. Introduction

Diabetes mellitus is defined as a heterogeneous metabolic disorder characterised by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism[1]. The high blood sugar level in the body may produce the symptoms of polyuria, polydipsia and polyphagia[2]. The prevalence of this disease across the world was estimated to be 2.8% in 2000 and 4.4 % in 2030. The number of people affected with diabetes is projected to increase from 172 million in 2000 to 366 million in 2030 [3,4].

Type-2 diabetes is a disease marked by high levels of blood glucose due to the action of insulin and insufficient insulin production. Type-2 diabetes accounts for approximately 90% to 95% of all diagnosed cases of diabetes[5].

It has been seen that diabetic patients also have other co-morbid conditions/complications like Hypertension, CAD, dyslipidemia, neuropathy, nephropathy etc[6]

Since 1995, a dozen orally administered diabetes medications or combination of medications for the management of type-2 diabetes mellitus have been approved by FDA[7]. They play a primary defense function against hyperglycemic events in comparison to insulin therapy[8]. Traditionally in oral hypoglycemic agent therapy, Sulphonyl ureases have always been the agents of first choice, while bisguanides and alpha-glucosidase inhibitors were unpopular[9]. Metformin is approved for use in pediatrics[7]. It is important to treat the diabetic patients wisely to keep in mind all these co-morbid conditions too. In diabetes, the complications can be prevented only if the patient maintains strict glycaemic control[6]. Carrying out a drug utilisation study can provide valuable information to the researchers, policy makers and the drug and therapeutics committee members to determine the drug use pattern[10,11].

Drug utilization research is an eclectic collection of descriptive and analytical methods for the quantification, understanding and evaluation of the processes of prescribing, dispensing, and consumption of medicines, and for the testing of interventions to enhance the quality of these processes[12].

A prescription which is a written advice that mentions drugs and other instructions given to either pharmacist or chemist to dispense the drugs to patients for the proper treatment of disease can provide information like an adequate dose of the drug to be given, its duration and the way it has to be taken[13,14].

Objective of the study is to collect demographic and disease details of diabetes patients, to study the pattern of oral hypoglycemic agents prescribed in type 2 diabetic patients and to assess the awareness of patients about diabetes, its medication and lifestyle modifications.

- This article may helpful for finding out the importance of insulin in type 2 DM.

- This article also shows the relation between diabetes and other co-morbid condition and how the risk increases along with the number of medication.

## II. material and methods

A prospective cross-sectional study was conducted for one year from January 2013 to December 2013 in the outpatient department of medicine in tertiary hospital North India. Proper informed consent was obtained from all patients. There was no monetary benefit given to the patients.

### Criteria for Selection

#### Inclusion Criteria:

- Only newly diagnosed patients of Type 2 diabetes
- Patients of age group 21 to 80 yrs.

#### Exclusion Criteria:

- Patients below 20 years of age.
- Patients above 80 years of age.
- Pregnant females.
- Patients with severe uncontrolled diabetes.
- Patients with mental incompetence.

**Method of Collection of Data:** Patients with established type 2 diabetes (n= 360) visiting the outpatient department were interviewed with Questionnaire. Total of 10 questions were included in the questionnaire, From this data, following results were calculated:

- Age and sex distribution of the diabetic patients.
- Prevalence of Associated Diseases and disorders.
- Prevalence of Diabetic complications.
- Pattern of anti-diabetic drugs prescribed.
- Education and income of the diabetic patients.

### Assessment of Drug use Indicators

The following drug use indicators were assessed according to WHO guidelines on how to investigate drug use in health facilities[3].

**Prescribing indicators:** Average number of drugs per encounter, Percentage of drugs prescribed by generic name, Percentage of encounters with an antibiotic prescribed, Percentage of encounters with an injection prescribed, Percentage of drugs prescribed from essential drug list.

## III. results

Out of the 360 patients enrolled in the study, 184(51.2%) were males and 176(48.8%) were females. Among the study population, the greatest number of patients were 104 (28.89%) from the age group of 51-60 years. [Table 1 and Figure 1] respectively.

Sulphonylureas were the most prescribed oral hypoglycemic agents with n=192(53%) followed by biguanides n=147(40.8%).  $\alpha$ -glucosidase inhibitors were the least prescribed class n=5(1.4%) while meglitinides were not at all prescribed. [Table 2].

The combination of Sulphonylureas and biguanides was the most prescribed combination n=120(33.3%) while the combination of Sulphonylureas and Thiazolidinedione was the least prescribed n=5(1.4%) [Table 3]

[Table-4] Represents the prevalence of co-morbidities with 30.56% of diabetic patients suffering from hypertension (n=110).

[Table-5]Shows the Cardiovascular drugs were the second most prescribed class n= 180(49.5%) after the oral hypoglycemic agents with vitamins at the third place n=167(46.6%).

**Table 1: Age Distribution of Patients.**

Age Distribution of Patients Age group in year	Total no.of patients (n=202)	No.of male	No.of female	Percentage distribution (%)
21-30	28	15	13	7.78
31-40	43	22	21	11.95
41-50	77	32	45	21.38
51-60	104	62	42	28.89
61-70	69	34	35	19.17
> 70	39	19	20	10.83

Figure 1: Frequency and Percentage of gender distribution of study patients.

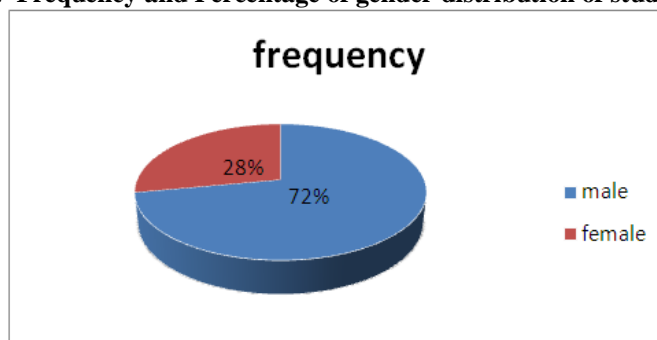


Table: 2 Details of oral antidiabetic drugs prescribed among the study population.

Class Of Drug	Drugs Prescribed	Number of Patients	% of Patients
Sulphonylureas	Glimepiride	99	27.5
	Gliclazide	60	16.5
	Glizipide	19	5.3
	glibenclamide	14	3.9
Biguanides	Metformin	147	40.8
Thiazolidinediones	Pioglitazone	16	4.5
Meglitinide	-	-	-
α-glucosidase inhibitors	Acarbose	5	1.4
<b>Total</b>		<b>360</b>	<b>100</b>

Table: 3 Details of oral antidiabetic drugs combinations prescribed among the study population.

Code	Drug Combinations	Drugs Prescribed	Number	%
1	SU+ Biguanides	Gliclazide+Metformin	120	33.3
2	SU+ Thiazolidinedione	Gliclazide+pioglitazone	5	1.4
3	SU+Biguanides+ Thiazolidinedione	Gliclazide+Metformin+ pioglitazon	35	9.7
4	SU+Biguanides+α-glucosidase inhibitor	Gliclazide+Metformin+ Acarbose	0	0
5	Two different SU		8	2.2

Table 4: Co-morbid Conditions Prevalent in Type-2 Diabetic patients.

Co existing illness	Number of patients (n=360)	Percentage (%)
Hypertension	110	30.56
Hyperlipidemia	77	21.39
Rheumatoid arthritis	11	3.05
Asthma	21	5.80
Gastritis	16	4.40
Cirrhosis	24	6.67
CAD	21	5.80
Angina pectoris	35	9.70
Thyroid problem	15	4.16
Migraine	6	1.67
Renal failure	13	3.60
psychiatric illness	11	3.05

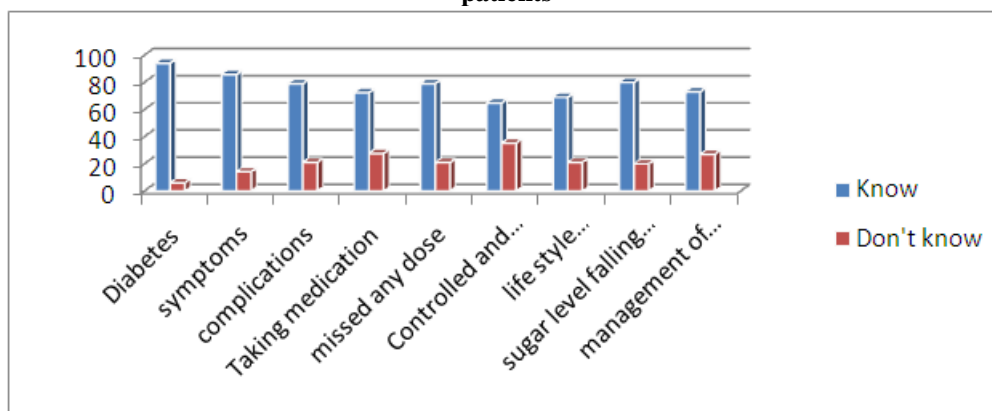
Table 5: Other Drugs Commonly Used in Diabetic Patients

Class of Drugs	Number	Percent
Cardiovascular drugs	180	49.5
Hypolipidaemic agents	35	9.7
Antidepressants	17	4.9
Vitamins	167	46.6

Table 6: Drug use Core indicators data.

Prescribing Indicators Data	%
Average drugs prescribed (n)	3.6
Generics (%)	72.5
Antibiotics (%)	1.7
Injections (%)	7.9
National Essential Drug List (%)	98.6

Figure :2 Graphical representation of awareness of disease, medication and life style modification in patients



### Questionnaire

### IV. Discussion

The studies have been done with specialized physicians, dieticians and other paramedical staff, the prescription, dosage schedule and treatment is in accordance with the current Indian guidelines.

The research on drug utilization in Type 2 DM found the following results:

- Most of the cases had complicated diabetes requiring oral anti- diabetic drugs for control of diabetes.
- Usage of glimepiride has increased compared to the usage of gliclazide, which may be due to less secondary failure rates for glimepride than gliclazide.
- Hypertension was found to be the most common associated disease with Type 2 Diabetics significantly. The other co- morbidities are CAD and dyslipidemia.
- The average number of drugs per prescription was 2.6; it was lower than what had been previously reported in other studies in North India. The low figure probably reflects the fact that 89.3% prescriptions were written for patients who were seen on follow-up basis and therefore the range of drugs prescribed and the number would be low. Polypharmacy has been reported as one of the causes of adverse drug reactions (ADRs)[15].
- Prescribing by generic name allows flexibility of stocking and dispensing various brands of a particular drug that are cheaper than and as effective as proprietary brands. This is the basis of essential drugs list use
- A low percentage of injection utilisation from this study contrasts with the results obtained from other studies in North India.
- Though SMBG is an important part of diabetes management programme, it is not a usual practice among the diabetic patients in the clinic, due to high cost of glucometer and test strips.
- The approach of treatment is initiation of therapy with lifestyle modifications followed by oral anti-diabetes.
- Achieving better glycaemic control is a therapeutic goal for Type 2 DM patients, which can decrease the prevalence complication and thereby improves quality of life and reduces the burden of diabetes.

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