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## Prescribing Pattern of Oral Hypoglycemic Agents among the Patients of Tertiary Care Teaching Hospital



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### ABSTRACT

Oral Hypoglycemic Agent: An oral Anti-Diabetic agent commonly used in the treatment of type 2 diabetes mellitus. Oral Hypoglycemic Agents are not prescribed as a substitute for diet and exercise but rather as adjunctive therapy. This study aims to determine the pattern in prescriptions of Oral Hypoglycemic Agents given to patients in a tertiary care teaching hospital. The study included 100 T2DM out-patients aged between 40 to 60 years. Socio-demographic data included mean age, gender, duration of diabetes mellitus and BMI. It is a Prospective Observational Study conducted for six months. Men (51%) formed a higher percentage in the study population. Metformin (49%) was prescribed significantly in more cases than other hyperglycaemic drugs. Glimipride (20%) is the second most common drug prescribed in monotherapy followed by Voglibose (15%), Teneligliptin (9%) and Pioglitazone (7%) in the treatment of T2DM. The combination of Metformin and Glimipride was noticed in 47% of the cases, followed by Glimipride + Voglibose (44%) and Teneligliptin + Metformin (9%). The main impact of the study on clinical practice can be determined as the selection of monotherapy over combinational therapy.

## INTRODUCTION

Diabetes mellitus describes a group of metabolic diseases in which the person has high blood glucose (blood sugar), either because insulin production is inadequate, or because the body's cells do not respond properly to insulin or both. Patients with high blood sugar will typically experience frequent urination (polyuria), they will become increasingly thirsty (polydipsia) and hungry (polyphagia).<sup>[1]</sup>

Diabetes mellitus is classified into three types:

1. Type 1 Diabetes mellitus: the body does not produce insulin. Approximately 10% of all diabetes cases are type 1.
2. Type 2 Diabetes mellitus: the body does not produce enough insulin for proper function. Approximately 90% of all cases of diabetes worldwide are of this type.
3. Gestational Diabetes: This type affects females during pregnancy.<sup>[1]</sup>

Type 2 patients need to eat healthily, be physically active and test their blood glucose. They may also need to take oral medication, and/or insulin to control blood glucose levels. As the risk of cardiovascular disease is much higher for a diabetic, blood pressure and cholesterol levels must be monitored regularly.<sup>[1]</sup>

As smoking might have a serious effect on cardiovascular health, diabetics should stop smoking.<sup>[1]</sup>

Hypoglycemia - Low blood glucose - can have a bad effect on the patient. Hyperglycemia - when blood glucose is too high - it can also have a bad effect on the patient.<sup>[1]</sup>

The vast majority of patients with type 2 diabetes initially had prediabetes. Their blood glucose levels were higher than normal, but not high enough to merit a diabetes diagnosis. The cells in the body are becoming resistant to insulin.<sup>[1]</sup>

Studies have indicated that even at the prediabetes stage, some damage to the circulatory system and the heart may already have occurred.<sup>[1]</sup>

Oral Hypoglycemic Agent: An oral Anti-Diabetic agent commonly used in the treatment of type 2 diabetes mellitus. Oral Hypoglycemic Agents are not prescribed as a substitute for diet

and exercise but rather as adjunctive therapy. An Oral Hypoglycemic Agent cannot be used as monotherapy in patients with type 1 diabetes mellitus since these patients lack sufficient insulin. [1]

### Classification of Oral Hypoglycemic Agents

1. Sulfonylureas First generation (Eg: Acetohexamide, Chlorpropamide, Tolbutamide)  
Second generation (Eg: Glipizide, Glyburide, Glimepride)
2. Meglitinides (Eg: Repaglinide, Nateglinide)
3. Biguanide (Eg: Metformin)
4. Thiazolidinediones (Eg: Rosiglitazone, Pioglitazone)
5. Alpha-glucosidase inhibitors (Eg: Acarbose, Miglitol)
6. DPP<sub>4</sub> Inhibitors (Eg: Sitagliptin)
7. SGLT<sub>2</sub> Inhibitors (Eg: Canagliflozin)<sup>[1]</sup>

The main aim of this study was to find the prescription pattern of Oral Hypoglycemic Agents given to patients in a tertiary care teaching hospital. Objectives were to analyze the correlation factors of the disease, to check the prevalence of disease based on the Duration of Illness and to find the utilization of drugs based on mono and combinational therapy.

### MATERIALS AND METHODS:

**Duration of Study:** The study was conducted for a period of six months (October 2018 to March 2019).

**Study Type:** Prospective Observational Study

**Sample Size:** Sample was calculated using Raosoft sample size calculator with a margin of 5%, confidence level 95% and response distribution 50%.

**Source of Data:** The data about the patients was collected by visiting the outpatient department in a tertiary care teaching hospital.

## Study Criteria

### Inclusion Criteria:

- Patient visiting medicine Outpatient department with a history of Type 2 Diabetes Mellitus or Diagnosed with Type 2 Diabetes Mellitus and prescribed with Oral Hypoglycemic Agents.

### Exclusion Criteria:

- Pregnant subjects & Pediatrics.
- Patients on Insulin.
- Patients not on Oral Hypoglycemic Agents.

**Ethics Approval:** The ethics approval was obtained from Parul University Institutional Ethics Committee for Human Research (PU-IECHR) with approval number PUIECHR/PIMSR/00/081734/1806.

## RESULTS AND DISCUSSION

### RESULTS:

The study involved enrollment of 100 patients from which the following results were obtained.



**Table No. 1: Correlation Factors**

<b>Table 1.1: Gender wise Distribution</b>		
<b>Gender</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Male	51	51%
Female	49	49%

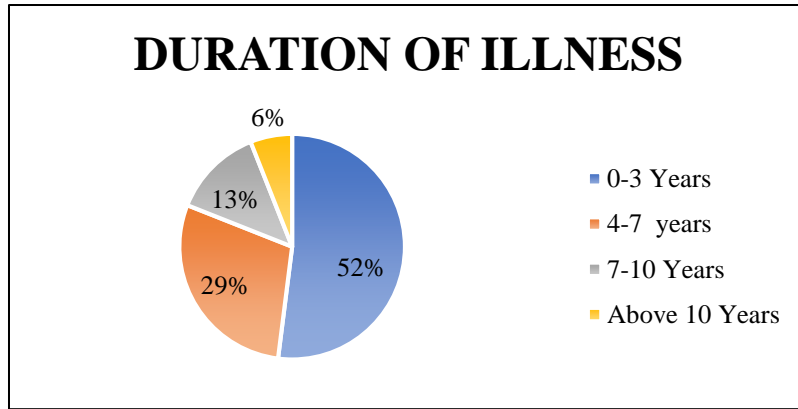
<b>Table No. 1.2: Age-wise Distribution</b>		
<b>Age (yrs)</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Below 40	8	8%
41-45	7	7%
46-50	15	15%
51-55	11	11%
56-60	22	22%
Above 60	37	37%

<b>Table No. 1.3: Distribution based on BMI</b>		
<b>Category</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Underweight	1	1%
Normal	35	35%
Overweight	64	64%

51% Male and 49% Female gender-wise distribution were found.

During the study out of 100 patients 37% patients were above the age of 60 years, 22% patients were between 56-60 years, 15% patients were between 46-50 years, 11% patients were between 51-55 years, 8% patients were found to be below the age of 40 years, 7% patients were between the age of 41-45 years.

The study revealed that 64% of patients were Overweight, 35% of patients were Normal and 1% of patients were Underweight according to Body Mass Index.



**Figure No. 1: Duration of Illness**

Duration of diseases plays a vital role in patients' health and medications, during our study 52% patients had T2DM for 0-3 years, 30% patients carried illness for 7-10 years, 29% patients had the illness for 4-7 years, 30% patients carried illness for 7-10 years and 6% patients suffered more than 10 years.



**Table No. 2: Utilization of Drugs**

<b>Name of Drugs (Monotherapy)</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Metformin	76	57%
Glimepiride	29	22%
Teneligliptin	7	5%
Voglibose	16	12%
Pioglitazone	6	4%

<b>Name of Drugs (Combinational Therapy)</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Glimipride + Voglibose + Metformin	1	4%
Metformin + Glimipride	13	49%
Teneligliptin + Metformin	3	10%
Glipizide + Metformin	1	3%
Voglibose + Glimipride	10	35%
Glimipride + Metformin + Pioglitazone	1	3%

<b>Name of Drug (Monotherapy)</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Metformin	81	49%
Glimepiride	34	20%
Voglibose	25	15%
Teneligliptin	15	9%
Pioglitazone	11	7%

<b>Name of Drugs (Combinational Therapy)</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
Glimipride + Voglibose	15	44%
Metformin + Glimipride	16	47%
Teneligliptin + Metformin	3	9%

Various patients had a history of monotherapy drugs in which Metformin was prescribed to 57% patients, Glimipride was prescribed to 22%, Voglibose was prescribed to 12% patients, Teneligliptin was prescribed to 5% patients and 4% patients were prescribed with Pioglitazone.

During the study patients also carried the history of combinational therapy which consist of 49% with Metformin + Glimipride, 35% with Voglibose + Glimipride, 10% with Teneligliptin

+ Metformin, 4% with Glimipride + Voglibose + Metformin, 3% with Glipizide + Metformin and 3% with Glimipride + Metformin + Pioglitazone.

49% of patients were prescribed with Metformin, 20% of patients were prescribed with Glimipride, 15% of patients were prescribed with Voglibose, 9% of patients were prescribed with Teneligliptin and 7% of patients were prescribed with pioglitazone, as current monotherapy of OHA..

47% of patients were prescribed with Metformin + Glimipride, 44% were prescribed Glimipride + Voglibose, and 9% were prescribed Teneligliptin + Metformin as current combinational therapy.

## DISCUSSION

In this study, a total of 100 prescriptions were followed among 100 prescriptions. The gender ratio, males (51%) and females (49%), was similar to various studies like studies by Sharma S, Chopra SC, Sharma DK, Singla J, Kapoor V<sup>[6]</sup>, etc.

In this study, the incidence of type-2 DM in an age group of above 60 years was in majority as much as (37%), and the incidence of diseases was lesser in the age group of 41-45 years (7%). and it was a different study conducted by John L J et. al<sup>[5]</sup> etc.

The maximum number of patients were enrolled were overweight (64%), and the study also reflected the duration of illness of the patients which were found to be (52%) in 0-3 years with minimum numbers of years and the maximum duration was about (6%) in above 10 years, which was a similar study done by Joglekar N. Joglekar P<sup>[2]</sup>, etc.

In this study, the majority of patients were prescribed monotherapy which was about (70%) as combinational therapy (12%), which is similar to a study conducted by Brahmhatt S V et. al<sup>[4]</sup>, etc.

In the prescription, the metformin was prescribed to the majority as monotherapy (49%) as compared to other oral hypoglycemic agents, and it was a similar study conducted by Joglekar N. Joglekar P<sup>[2]</sup>, etc.



Metformin and Glimepiride combination (47%) were the most common class of drug users among the various oral combinational Anti-Diabetics prescribed which is similar to the study conducted by Kannan et. al<sup>[3]</sup>,etc.

## CONCLUSION

The current study gives an overview of the drug utilization of oral hypoglycemic agents Metformin was prescribed to patients and other oral hypoglycemic agents were prescribed in patients in the outpatient department. Metformin + Glimipride was prescribed to patients as compared to other oral combinational therapy. In this study, the maximum number of patients was found in the age ratio between above 60 years followed by a duration of illness with 0-3 years which included newly detected T2DM and overweight patients were found more according to their body mass index ratio. During the study, it was found that the monotherapy was utilized more in the current and history of therapy.

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## CONFLICTS OF INTEREST

All authors have no Conflicts of Interest to declare concerning the publication of this manuscript.






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