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Research Article

## Drug Utilization Pattern of Anti-Diabetic Medication: A Prospective Observational Study

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### Abstract

**Background:** Diabetes mellitus is a chronic disease and is responsible for the significant morbidity and mortality. It is critical to conduct a drug use research of anti-diabetic medications in order to encourage rational drug use in diabetes.

**Objective:** The purpose of this study was to analyze the pattern of drug use of antidiabetic drugs, as well as the prevalence of diabetes and related risk factors throughout treatment period in our sample group.

**Materials & methods:** This is a prospective observational research involving 200 secondary care hospital in-patients. During a 6-month period, the prescribing pattern was studied and assessed, and drug-related difficulties in subsequent patients were report.

**Results:** Among 200 patients, 111 (55.46%) were male and 89 (44.5%) were female. Subject of age 65-80 (n=73) were observed to be more suspected. Hypertension 130 (61.32%) was the most common risk factors. In 200 cases, the most commonly used therapy was monotherapy in 89 subjects (44.5%) followed by combination therapy 55(27.5%). Insulin 192(54.5%) was most commonly used followed by oral drugs 160 (45.4%). The most usually prescribed monotherapy was metformin, followed by glimepiride, while the most commonly prescribed combination therapy were metformin+glimepiride.

**Conclusion:** Prescribing pattern of drugs in diabetic patients concluded that optimized drug therapy led to minimal ensuing DRPs. A continuous observation and reporting of the prescribing practice of anti-diabetic drugs can help the physicians result in therapeutically effective treatment for the patients.

**Keywords:** Antidiabetics, Drug utilization pattern, Drug related problem, Comorbidities, metformin.

## INTRODUCTION

Diabetes mellitus is a metabolic condition marked by a rise in blood glucose levels in the plasma. Diabetes has a variety of causes, but one of the most common is obesity. Type 1 or type 2 diabetes is the most widely recognized reason.

Type 1 diabetes is caused by the auto-immune destruction of insulin-producing cells (beta cells) in the pancreas, leading to total insulin deficiency, while type 2 diabetes is characterized by insulin resistance and the inability to produce enough insulin to overcome this resistance. Diabetes-specific microvascular consequences such as retinopathy, nephropathy, and neuropathy are caused by chronic hyperglycemia<sup>1</sup>.

The goal of treatment is to alleviate hyperglycemia symptoms while reducing the risk of microvascular and macrovascular consequences. Dietary/lifestyle changes, oral anti-diabetic medications, and injectable therapy are all options for treatment.

Drug use evaluation (DUE) or DU studies is a continuous, regulated, and systematic quality improvement procedure that is specifically designed to-

- A review of drug usage and/or prescription patterns.
- Providing feedback of the results to the clinicians/physicians.
- Development of criteria and standards which gives a description of optimal drug use
- Promoting appropriate use of the drug via education and other interventions or means<sup>2</sup>.

The main aim of DUE is to assess components like to dispense, prescribe, administer, medicine consumption and other such factors. It helps to measure rates of reported ADR's, observe proper use of medications based on the condition, to lower avoidable medication associated death rates and complex regime.

It provides an outline about early identification of signal and unreasonable use of drug. Assessing and differentiating the existing design with measured standards, most obligatory actions can be taken to improve the cancer therapy and reduce noxious effects.

The investigation also includes a review of drug-related issues. Although a possible problem may not reveal itself, if left ignored, it may cause harm to the patient<sup>3</sup>.

In hospitalized patients, DRPs are relatively common and can either progress to morbidity and mortality<sup>4</sup>. Preventing medication-related problems is essential to obtain a good therapeutic outcome and improve quality of life of the patient<sup>5</sup>. More the complex the therapy the higher chances of resulting in either of DRP's like ADR, DI, errors related to medication, non-compliance.

## MATERIALS AND METHODS

The study was a prospective, observational, over a 6-month period. The study was conducted in Vivekananda General Hospital, Deshpande Nagar, Hubballi, where total 200 patients aged above 18 years, attending the diabetic inpatient department (IPD) were included.

### Inclusion criteria

- All the patient, diagnosed with diabetes mellitus.
- Patients who are over the age of 18.
- Patients of both the gender attending inpatient department.

### Exclusion criteria

- Patients under the age of eighteen.

- Patients with incomplete medical records.
- Patients who are not willing to participate in the study.

## RESULT

A total of 200 diabetic patients participated in this study, of which 111 were men and 89 were women. The results concluded those 65-80yrs patient age groups were most affected by diabetes. Among 200 subjects most of them (64subjects) had diabetes for 7- 10 years followed by 51 subjects for the past 6 years (Table 1). Based on the survey conducted, monotherapy (44.5%) was most commonly used compared to combination therapy (27.5%) and Metformin was found to be the most usually prescribed drug, followed by glimepiride. In the case of two-drug therapy, 12.1 percent of the 200 participants received one combination of metformin and glimepiride, followed by metformin and glipizide. Metformin, glimepiride and pioglitazone were the most frequently used three drug therapy. On the basis of distribution of oral dose and insulin dose, insulin is used by 54.5% of the 200 subjects compared to oral dose. Among the insulin therapy, plain insulin (32.5%) was most prominently used (Table 2). The study showed that 61.32 % of them had hypertension along with diabetes followed by other comorbidities like renal disorders, thyroid disorders, and anaemia.

Pharmaceutical care issues were identified in study population (Table 3).

**Table 1: The sociodemographic details of study population (n = 200)**

Patient Characteristics	No. of subjects	Percentage
<b>Gender</b>		
Male	111	55%
Female	89	44%
<b>Age</b>		
18-24	1	0.5
25-34	3	1.5
35-44	20	10
45-54	36	18
55-64	64	32
65-80	73	36.5
>80	3	1.5
<b>Duration of diabetes (years)</b>		
<1	8.5	17
1-3	22	44
4-6	25.5	51
7-10	32	64
>10	12	24
<b>Associated Co-morbidities</b>		
HTN+DM	61.32	130
Cardiac Disease	13.6	29
Renal Disorders	7.5	16
Thyroid Disorders	8	17

**Table 2: Pattern of Oral Hypoglycemic Agents and Insulin used in study population.**

Name of drug	Percentage	No. of drugs
<b>Monotherapy</b>		
Metformin	19.2	68
Glimepiride	3.9	14
Pioglitazone	0.2	1
Vildagliptin	1.13	4
Linagliptin	0.56	2
Tenagliptin	0.56	2
Dapagliflozin	0.2	1
<b>Combination</b>		
Metformin+Glimepiride	12.1	43
Metformin+Gliclazide	0.2	1
Metformin+Sitagliptin	0.84	3
Metformin +Tenagliptin	0.2	1
Metformin+Glipizide	1.98	7
Metformin+Vidagliptin	1.13	4
Metformin+Voglibose	0.56	2
Metformin+Pioglitazone+Glimepiride	0.84	3
Metformin+Voglibose+Glimepiride	0.56	2
<b>Insulin Therapy</b>		
Plain Insulin	32.5	115
H.Mixtard	16.4	58
H. Actrapid	3.68	13
Insulin Glargine	1.41	5
Humilin R	0.2	1

Table 3: Pharmaceutical care issues identified in study population

CAUSES ASSOCIATED WITH DRP	n	%
<b>A Drug/Dose selection</b>		
A.1 Inappropriate Drug selection	19	9.5
A.2 Inappropriate Dosage selection	25	12.5
A.3 More cost-effective Drugs available	21	10.5
A.4 Pharmacokinetics problems	29	14.5
A.5 Synergistic/preventive drug required and not given	26	13
A.6 Deterioration/improvement of disease state	27	13.5
A.7 New symptom or indication revealed	23	11.5
A.8 Manifest side effect, no other cause	25	12.5
<b>B Drug use process</b>		
B.1 Inappropriate timing of administration &/or dosing intervals	10	5
B.2 Drug underused/under administered	8	4
B.3 Drug overused/over administered	7	3.5
B.4 Therapeutic drug level not monitored	0	0
B.5 Drug abused	6	3
B.6 Patient unable to use drug/form as directed	18	9
<b>C Information</b>		
C.1 Instructions for use/ taking not known	18	9
C.2 Patient unaware of reason for drug treatment	22	11
C.3 Patient has difficulties reading patient information form/leaflet	15	7.5
C.4 Patient unable to understand local language	9	4.5
C.5 Lack of communication between Healthcare professionals	8	4
<b>D Patient/psychological</b>		
D.1 The patient forgets to use or take the medication.	12	6
D.2 The patient is concerned about the medications.	19	9.5
D.3 The patient is concerned about a possible adverse effect.	17	8.5
D.4 The patient is unwilling to bear the financial burden.	15	7.5
D.5 Patient does not want to bother the doctor.	13	6.5
D.6 The patient refuses to switch medications.	21	10.5
D.7 Patient who is unwilling to modify his or her way of life	11	5.5
D.8 Burden of Therapy	19	9.5
D.9 Treatment that is not in accordance with Health beliefs	0	0
D.10 The patient consumes food that interacts with the medications.	0	0
<b>E Logistics</b>		
E.1 Prescribe Drug not available	0	0
E.2 Prescribing error	0	0
E.3 Dispensing error	0	0

## DISCUSSION:

Diabetes Mellitus is a chronic disorder and is the 7<sup>th</sup> leading cause of death worldwide. Its prevalence is continuously leading in developed and developing countries and requires a lifelong treatment. A drug use study is the most effective approach for assessing and evaluating a physician's

prescription attitude, and it aids in the sensible use of pharmaceuticals. The prescription trends of Type-2 diabetes patients who visited a secondary care hospital's diabetic IPD were examined in this study. This study included 200 prescriptions from Type-2 diabetes patients. Males are more prone than females to get diabetes, according to the Male to Female Ratio of 111:89. According to the report, diabetes is

more common among senior citizens aged 65 to 80 years old. In the present study, insulin preparations were commonly prescribed in the percentage of 54.5% when compared to oral dose with 45.5% (where Mono Therapy was 26.9% and combination therapy was 18.9%). Metformin was the most widely recommended Oral Hypoglycemic Agent (19.2%), owing to its ability to lower cardiovascular risks. Because it efficiently manages hyperglycemia, metformin and glimepiride (12.1%) is a regularly recommended combination medication. This implies that sulfonylureas and Metformin are the drugs of choice for most doctors when treating Type-2 diabetes. For people with diabetes, co morbidity has been demonstrated to increase health-care consumption and medical-care expenses. In our study most of the patients had hypertension as co morbid condition (61.32%) followed by cardiac disease (13.6%), nephropathy (7.5%), thyroid disorder (8%). Several researches from India and other nations have revealed similar findings about co morbidity in diabetic patients. In a study conducted by Patel et al, Alam et al, Sudha et al, and Jenny L et al, the prevalence of hypertension ranged from 31 to 70 percent.

## CONCLUSION

This study revealed that the most commonly prescribed anti-diabetic medications were oral, however, the use of insulin preparations in the treatment of Type 2 DM is steadily increasing. Metformin was the most commonly prescribed drug followed by glimepiride. In combination therapy the most frequent drugs administered was metformin + glimepiride. Out of insulin therapy, Plain insulin was given more frequently.

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