



OBSERVATIONAL PROSPECTIVE STUDY OF DRUG USE PATTERNS OF ANTIHYPERGLYCEMIC DRUGS IN TERTIARY CARE HOSPITAL

Nikhath Nashee	Pharm D Intern, Hillside College of Pharmacy and Research Centre Bangalore.
Nishath S	Pharm D Intern, Hillside College of Pharmacy and Research Centre Bangalore.
Pooja Rani	Pharm D Intern, Hillside College of Pharmacy and Research Centre Bangalore.
Preethi Jenifer E	Pharm D Intern, Hillside College of Pharmacy and Research Centre Bangalore.
Pushpa V	Pharm D Intern, Hillside College of Pharmacy and Research Centre Bangalore.
Dr. Jesindha K Beyatricks*	Vice Principal, HOD Dept. Of Pharmacy Practice, Hillside College of Pharmacy and Research Centre, Bangalore. *Corresponding Author
Dr. S N Sriharsha	Principal, Professor and Research Director, Hillside College of Pharmacy and Research Centre, Bangalore.

ABSTRACT

Background: In recent decades, India has seen a rapidly escalating epidemic of diabetes, an illness with various aetiologies. India currently has the second-highest prevalence of diabetes worldwide. We want to learn more about the drug use patterns in our study. **Study Method:** A prospective study was conducted on diabetic patients who were seen at the Tertiary Care Teaching Hospital, Department of General Medicine, Bangalore south. A summary of demographic information and drug use patterns has been provided. **Results:** In the current study, we gathered data from 300 patients, 158 of whom were men and 142 of whom were women. There are 292 people with type 2 diabetes and 8 people with type 1 diabetes. Most of the patients had histories spanning 14–20 years, and the majority of them were in the 58–78 age range. The majority of patients were given Metformin Hydrochloride 500mg Sustained Release and Metformin Hydrochloride 500mg Prolonged Release with Glimepiride 2mg. **Conclusion:** The current study aids in identifying prescribing patterns, and its goal is to examine the effectiveness and quality of therapy. With repeated use, metformin hydrochloride 500mg exhibited tolerance. Combinations of Actrapid soluble insulin (40IU), metformin hydrochloride (500mg), insulin glargine (40IU), metformin hydrochloride (500mg), glimepiride (1mg), and voglibose (0.2mg) produced the best results.

KEYWORDS : Antihyperglycemic Drugs, Drug utilization.

INTRODUCTION:

Diabetes is a metabolic condition with numerous aetiologies that is characterised by persistent hyperglycemia and metabolic abnormalities of proteins, carbs, and lipids that lead to either a malfunction in insulin secretion or action, or even both. In order to improve the patient's wellness, the major goals of the therapeutic regimen are to lower mortality, morbidity, regulate symptoms, and slow the progression of the disease. Only the proper medication, dosage, and dosage regimen—used at the proper intervals—can lead to these results. Diabetes outbreaks have dramatically increased in recent decades in India. India currently holds the second-highest prevalence of diabetes in the world.

According to the International Diabetes Federation (IDF), 72.9 million individuals in India are estimated to have diabetes in 2017, and that number is expected to rise to 134.3 million by 2045.

Our study's primary goal is to analyse the drug use patterns in tertiary care teaching hospitals. Since rational drug use requires proper prescription, dispensing, and patient compliance, promoting rational drug use also involves the conduct of all those involved in the prescription, dispensing, and patient use processes.

For people with T2DM, metformin is a first-line medication that is widely accepted. However, since lifestyle changes alone cannot be guaranteed to control blood sugar levels, second-line therapy is often chosen instead.

The use of more expensive, newer medications as well as the rise in diabetes incidence have a substantial financial impact on the healthcare system.

Study Method:

For a period of six months (April 2022–October 2022), an observational prospective study was conducted at tertiary care hospital in Kengeri, Bangalore, 560041 with ethical approval from the relevant hospital IRB. Type 1 and type 2 diabetes are identified in a sample of 300 people.

Patients with co-morbid disorders, patients of either gender, patients older than 18 years old, patients with type 1 and type 2 diabetes are included in the current study and excludes pregnant and breastfeeding women.

The information gathered from the general medicine department was divided into categories based on the patients' gender, age, FBS, RBS, PPBS, HbA1c, BMI, and waist size while they were hospitalised. The drug usage pattern was also examined in accordance with ICMR guidelines.

RESULTS:

Based on the patient's blood glucose levels at discharge and throughout their hospital stay, the objectives were examined. Based on the ICMR standards for monitoring blood glucose levels, the patients' findings were grouped.

Two sections make up the bulk of the analysis:

- Descriptive part

- Inferential part

Descriptive Part:

In our investigation, the patient characteristics were described with the following variables:

- Gender
- Age

Number of Patients

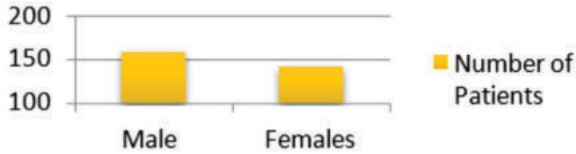


Fig 1 Classification According To Patients' Gender

Number of Patients

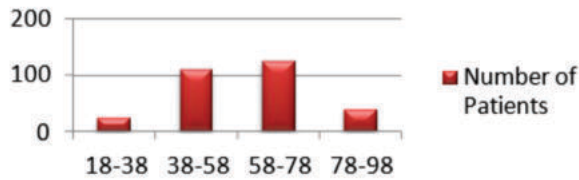


Fig 2 Classification Based On Age Group

Inferential Part:

Based on the patients' blood glucose levels during their hospital stay.

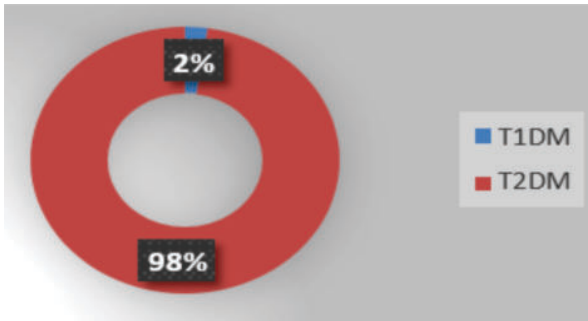


Fig 3 Classification based on the types of Diabetes

Table 1 Classification based on random blood glucose (mg/dl)

Random Blood Glucose (mg/dl) Range	Number of Patients	Percentage
< 100	45	15%
100 - 150	40	13.33%
150 - 200	53	17.67%
200 - 250	57	19%
250 - 300	23	7.66%
300 - 350	20	6.67%
350 - 400	27	9%
> 400	35	11.67%

Table 2 Classification According To Fasting Plasma Glucose (mg/dl)

FASTING PLASMA GLUCOSE (mg/dl) Range	Number of Patients	Percentage
50-100	5	1.6%
100-150	73	24.35%
150-200	72	24%
200-250	45	15%
250-300	40	13.35%
300-350	25	8.35%

350-400	23	7.68%
>400	17	5.67%

Table 3 Classification According To Postprandial Glucose Level (mg/dl)

Postprandial glucose level (mg/dl) Range	Number of Patients	Percentage
<100	25	8.33%
100 - 150	78	26%
150 - 200	50	16.68%
200 - 250	28	9.33%
250 - 300	52	17.33%
300 - 350	30	10%
350 - 400	30	10%
>400	7	2.33%

Table 4 Classification Based On Waist Size: -

WAIST SIZE (cm)		
MALE	>90	56
	<90	102
FEMALE	>80	86
	<80	56

Table 5 Classification Based On HbA1c: -

HbA1c	
<7	96
≥ 7 - <8	124
≥8	80

Table 6 Classification On The Basis Of Drug Use

Sl no.	MEDICATION USED	Number of Patients	Percentage
1	METFORMIN HYDROCHLORIDE SUSTAINED RELEASE	38	12.66%
2	METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE + METFORMIN HYDROCHLORIDE SUSTAINED RELEASE	5	1.67%
3	METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE	50	16.67%
4	ACTRAPID SOLUBLE INSULIN	7	2.33%
5	METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE + ACTRAPID SOLUBLE INSULIN	68	22.66%
5	INSULIN GLARGINE	25	8.33%
6	ACTRAPID SOLUBLE INSULIN + INSULIN GLARGINE	7	2.33%
7	METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE + INSULIN GLARGINE	18	6%
8	METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE + ACTRAPID SOLUBLE INSULIN + INSULIN GLARGINE	2	0.67%

9	GLICLAZIDE	3	1%
10	INSULIN GLARGINE + GLICLAZIDE	5	1.67%
11	DAPAGLIFLOZIN 10mg	8	2.67%
12	VILDAPRIDE 50mg	7	2.33%

13	VILDAPRIDE 50mg +METFORMIN HYDROCHLORIDE 500mg	10	3.33%
14	METFORMIN HYDROCHLORIDE SUSTAINED RELEASE 500mg, GLIMIPIRIDE 1mg AND VOGLIBOSE 0.2mg	15	5%
15	INSULIN LISPRO +METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE	5	1.67%
16	INSULIN LISPRO + ACTRAPID SOLUBLE INSULIN	3	1%
17	SITAGLIPTIN PHOSPHATE AND METFORMIN	2	0.67%
	HYDROCHLORIDE		
18	GLIPIZIDE AND METFORMIN HYDROCHLORIDE	7	2.33%
19	BIPHASIC ISOPHANE INSULIN INJECTION	3	1%
20	BIPHASIC ISOPHANE INSULIN INJECTION +METFORMIN HYDROCHLORIDE PROLONGED RELEASE AND GLIMIPRIDE	2	0.67%
21	TENEGLIPTIN	5	1.67%
22	TENEGLIPTIN + ACTRAPID SOLUBLE INSULIN	2	0.67%
23	VILDAGLIPTIN	3	1%

CONCLUSION:

With a proportion of 22.66%, the most common medications used were metformin hydrochloride 500 mg prolonged release and glimepiride 2 mg + Actrapid soluble insulin 40IU/ml. A combination of 2 mg of glimepiride and 500 mg of metformin hydrochloride with a proportion of 16.67% was employed.

A proportion of 12.66% was used when using the medicine metformin hydrochloride 500mg sustained release. A rate of 8.33% of insulin glargine was used.

Throughout the study, it was discovered that a lack of knowledge about non-pharmacological therapy—healthy eating, regular exercise, blood glucose monitoring, and incorrect medical adherence—led to an increase in blood sugar levels, therefore appropriate counselling must be provided.

All of the medicines used in the trial had good outcomes, fasting plasma glucose levels between 111 and 125 mg/dl, and postprandial glucose levels between 141 and 180 mg/dl.

At the time of discharge, fasting plasma glucose levels (80-110 mg/dl) and postprandial glucose (120-140 mg/dl) exhibited optimal outcomes when Actrapid soluble insulin and Metformin combination, Actrapid and Insulin Glargine, Metformin and Glimepiride, and Voglibose (500/1/0.2mg) were used.

Results from the 500 mg dose of Metformin sustained release were unsatisfactory because of medication tolerance brought up by repeated use.

Abbreviations:

ICMR, T1DM, T2DM, HbA1c, FPG, PPG, RBS, BP, BMI

ICMR – Indian Council of Medical Research T1DM – Type 1 Diabetes

T2DM – Type 2 Diabetes

HbA1c– Glycated Hemoglobin (%) FPG – Fasting Plasma Glucose (mg/dl)

PPG– 2hour Postprandial Glucose (mg/dl) RBS – Random Blood Glucose (mg/dl) BP – Blood Pressure (mmHg)

BMI – Body Mass Index (kg/m²)

REFERENCES:

- Pankaj CK, Satendra SP, Dhananjay P, Kumud R, Rajmangal C, Bhanu P. A prospective study on drug utilization pattern of anti-diabetic drugs in a tertiary care teaching hospital of eastern Uttar Pradesh, India. *Int J Res Med Sci* [Internet]. 2019 Feb. 27 [cited 2023 Feb.25];7(3):669-75. Available from: <https://www.msjonline.org/index.php/ijrms/article/view/5879>
- NICE Clinical guideline-87. Type 2 diabetes. 2014. Available at: http://www.ijopp.org/sites/default/files/10.5530.ijopp_9.4.3_0.pdf.
- Unger J. Current strategies for evaluating, monitoring, and treating type 2 diabetes mellitus. *Am J Med*. 2008 Jun 1;121(6):S3-8.
- Krentz AJ, Bailey CJ. Oral antidiabetic agents: current role in type 2 diabetes mellitus. *Drugs*. 2005;65(3):385-411.
- El-Kaissi S, Sherbeen S. Pharmacological management of type 2 diabetes mellitus: An update. *Curr Diabetes Rev*. 2011;7(6):392-405.
- Diagnostic Criteria. 2005. ICMR Guidelines for Management of Type 2 Diabetes. Available at: <https://www.peertechz.com/articles/assessment-of-prescription-pattern-of-antidiabetic-drugs-in-the-outpatient-department-of-a-tertiary-care-hospital.pdf>.
- Dan LL, Anthony SF, Dennis LK, Stephen LH, Larry JJ, Joseph L. Harrison's Principles of Internal Medicine. Eighteenth edition, McGraw-Hill Medical, New York, United States of America; 2012:2968.
- King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. *Diabetes Care*. 1998 Sep 1;21(9):1414-31.
- Sierra GN. the global pandemic of diabetes; for American journal of diabetes medicine. 2009. Available at: <http://www.ijrpc.com/files/10-01-17/09.pdf>
- IDF Diabetes Atlas, 6th ed. 2013;1-160. Available at: <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/19-atlas-6th-edition.html>.
- Bope ET, Kellerman RD. Conn's Current Therapy 2014. Saunders-Elsevier, Philadelphia, United States of America; 2014;701-704. Available at: http://www.ijopp.org/sites/default/files/10.5530.ijopp_9.4.3_0.pdf
- Richard AH. Diabetes Mellitus/Pathophysiology: Etiologic factors associated with diabetes mellitus. In: Stephen M Setter, John R White. *Textbook of Therapeutics: Drug and Disease Management*. 8th ed. Lippincott Williams and Wilkins-Wolters Kluwer, Philadelphia, United States of America; 2007.
- Baksas I, Lunde PK. National drug policies: the need for drug utilization studies. *Trends Pharmacol Sci*. 1986 Jan 1;7:331-4.
- Fowler MJ. Microvascular and macrovascular complications of diabetes. *Clin Diab*. 2008 Apr 1;26(2):77-82.
- Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New Eng J Med*. 2002 Feb;346(6):393-403.
- Garber AJ, Abrahamson MJ, Barzilay JI, Blonde L, Bloomgarden ZT, Bush MA, et al. AACE/ACE comprehensive diabetes management algorithm 2015. *Endocrine Practice*. 2015 Apr;21(4):438-47.
- American Diabetes Association. Standards of medical care in diabetes-2010. *Diab Care*. 2010 Jan 1;33(Supplement 1):S11-61.
- NICE Clinical guideline-87. Type 2 diabetes. 2014. Available at: http://www.ijopp.org/sites/default/files/10.5530.ijopp_9.4.3_0.pdf.
- Alam MS, Aqil M, Qadry SA, Kapur P, Pillai KK. Utilization pattern of oral hypoglycemic agents for diabetes mellitus type 2 patients attending outpatient department at a University hospital in New Delhi. *Pharmacol Pharm*. 2014;5:636-45.
- Acharya KG, Shah KN, Solanki ND, Rana DA. Evaluation of antidiabetic prescription cost and adherence to treatment guidelines: a prospective, cross-sectional study at a tertiary care teaching hospital. *J Basic Clin Pharm*. 2013;4(4):82-8.
- Agrawal R, Rath B, Saha K, Mohapatra S. Drug utilization pattern of antidiabetic agents in a tertiary care hospital of western Odisha, India *Int J Basic Clin Pharmacol*. 2016 Oct;5(5):2222-6.