

## Original article :

# Study of Evaluation of Drug Utilization Patterns Among Diabetics at a Tertiary Care Centre

Mohammed Taher Ali

Associate Professor, Department of Pharmacology, Malabar Medical College Hospital & Research Centre, Modakkallur, Kerala, India.

**Corresponding Author:** Dr. Mohammed Taher Ali, Associate Professor, Department of Pharmacology, Malabar Medical College Hospital & Research Centre, Modakkallur, Kerala, India.

---

### Abstract

**Background:** Diabetes mellitus is a group of chronic metabolic conditions, all of which are characterized by elevated blood glucose levels resulting from the body's inability to produce insulin or resistance to insulin action, or both. The development of new classes of blood glucose-lowering medications to supplement the older therapies, such as lifestyle-directed interventions, insulin, sulfonylureas, and metformin, has increased the number of treatment options available for type 2 diabetes. Hence, the present study was conducted for assessing drug utilization Patterns among diabetes mellitus patients in a tertiary care hospital.

**Materials & Methods:** A total of 500 type 2 diabetic patients were screened during the study period. All the patients were in the age range of 40 to 70 years. Patients with presence of type 1 diabetes or below the age range of 40 years were excluded from the present study. A Questionnaires was framed and was given to all the participants. Duration of diabetes and other medical details were recorded separately. A Performa was made and drug prescribing pattern of all the patients was recorded. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software.

**Results:** Mean age of the patients was 51.5 years. Metformin was the most commonly prescribed drug followed by sulfonylureas. Next to get prescribed was Thiazolidinediones (pioglitazone) and Insulin. Most commonly prescribed doses of metformin were 1000 mg followed by 850 mg. Most commonly therapy was two-drug therapy followed by triple drug therapy and single drug therapy.

**Conclusion:** Metformin is the most commonly prescribed drug, both in the form of double therapy and monotherapy.

**Keywords:** Diabetes, Mellitus, Drug.

---

### INTRODUCTION

Diabetes mellitus is a group of chronic metabolic conditions, all of which are characterized by elevated blood glucose levels resulting from the body's inability to produce insulin or resistance to insulin action, or both.<sup>1, 2</sup> This group of conditions can be subdivided into 4 clinically distinct types: type 1, which results from autoimmune beta-cell destruction in the pancreas and is characterized by a complete lack of insulin production; type 2, which develops when

there is an abnormal increased resistance to the action of insulin and the body cannot produce enough insulin to overcome the resistance; gestational diabetes, which is a form of glucose intolerance that affects some women during pregnancy; and a group of other types of diabetes caused by specific genetic defects of beta-cell function or insulin action, diseases of the pancreas, or drugs or chemicals.<sup>1- 3</sup>

Symptoms of marked hyperglycemia include polyuria, polydipsia, weight loss, sometimes with

polyphagia, and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Acute, life-threatening consequences of uncontrolled diabetes are hyperglycemia with ketoacidosis or the nonketotic hyperosmolar syndrome. Long-term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputations, and Charcot joints; and autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction.<sup>4-6</sup>

The development of new classes of blood glucose-lowering medications to supplement the older therapies, such as lifestyle-directed interventions, insulin, sulfonylureas, and metformin, has increased the number of treatment options available for type 2 diabetes. Whether used alone or in combination with other blood glucose-lowering interventions, the increased number of choices available to practitioners and patients has heightened uncertainty regarding the most appropriate

means of treating this widespread disease. Although numerous reviews on the management of type 2 diabetes have been published in recent years, practitioners are often left without a clear pathway of therapy to follow.<sup>7-9</sup> Hence; the present study was conducted for assessing drug utilization patterns among diabetes mellitus patients in a tertiary care centre.

**MATERIALS AND METHODS**

The The present study was conducted for assessing drug utilization patterns among diabetes mellitus patients in a tertiary care centre. A total of 500 type 2 diabetic patients were screened during the study period. All the patients were in the age range of 40 to 70 years. Patients with presence of type 1 diabetes or below the age range of 40 years were excluded from the present study. A Questionaries was framed and was given to all the participants. Duration of diabetes and other medical details were recorded separately. A Performa was made and drug prescribing pattern of all the patients was recorded. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

**Table 1: Demographics and clinical data**

| Variable                          | Number     | Percentage |
|-----------------------------------|------------|------------|
| Mean age (years)                  | 51.5 years |            |
| Males                             | 321        | 64.2       |
| Females                           | 179        | 35.8       |
| Rural residence                   | 302        | 60.4       |
| Urban residence                   | 198        | 39.6       |
| Mean duration of diabetes (years) | 9.3 years  |            |

**Table 2: Drug prescribing pattern**

| Drug                              | Number | Percentage |
|-----------------------------------|--------|------------|
| Metformin                         | 402    | 80.4       |
| Sulfonylureas                     | 312    | 62.4       |
| Thiazolidinediones (pioglitazone) | 56     | 11.2       |
| Insulin                           | 43     | 8.6        |
| Others                            | 60     | 12         |

**Table 3: Different doses of metformin**

| Doses of metformin | Number | Percentage |
|--------------------|--------|------------|
| 500 mg             | 40     | 20         |
| 850 mg             | 82     | 41         |
| 1000 mg            | 301    | 60.2       |
| 1500 mg            | 30     | 6          |
| 2000 mg            | 37     | 7.4        |

**Table 4: Prescription pattern on the basis of combination therapy**

| Combination therapy | Number | Percentage |
|---------------------|--------|------------|
| Single drug therapy | 88     | 17.6       |
| Two-drug therapy    | 315    | 63         |
| Triple drug therapy | 97     | 19.4       |
| Total               | 500    | 100        |

## RESULTS

The mean age of the patients was 51.5 years. 64.2 percent of the patients were males while the remaining were females. 60.4 percent of the patients were of rural residence while the remaining were of urban residence. Mean duration of diabetes was 9.3 years. Metformin was the most commonly prescribed drug followed by sulfonylureas. Next to get prescribed was Thiazolidinediones (pioglitazone) and Insulin. Most commonly prescribed doses of metformin were 1000 mg followed by 850 mg. Most commonly therapy was two-drug therapy followed by triple drug therapy and single drug therapy.

## DISCUSSION

Diabetes is a major public health problem that is approaching epidemic proportions globally. Worldwide, the prevalence of chronic, noncommunicable diseases is increasing at an alarming rate. About 18 million people die every year from cardiovascular disease, for which diabetes and hypertension are major predisposing factors. Today, more than 1.7

billion adults worldwide are overweight, and 312 million of them are obese. In addition, at least 155 million children worldwide are overweight or obese. A diabetes epidemic is underway. According to an estimate of International Diabetes Federation comparative prevalence of Diabetes during 2007 is 8.0 % and likely to increase to 7.3% by 2025. Number of people with diabetes is 246 million (with 46% of all those affected in the 40–59 age group) and likely to increase to 380 m by 2025.<sup>8-11</sup>

In 1997 and 2003, The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus recognized an intermediate group of individuals whose glucose levels, although not meeting criteria for diabetes, are nevertheless too high to be considered normal. This group was defined as having impaired fasting glucose (IFG) (FPG levels of 100 mg/dl [5.6 mmol/l] to 125 mg/dl [6.9 mmol/l]) or impaired glucose tolerance (IGT) (2-h OGTT values of 140 mg/dl [7.8 mmol/l] to 199 mg/dl [11.0 mmol/l]).<sup>4,12</sup>

The goals of pharmacologic therapy are to reduce symptoms of hyperglycemia and the long - term

complications of diabetes. Glycemic control is known to reduce the risk for microvascular complications, including retinopathy and neuropathy. The risk for death from cardiovascular disease is increased in adults with type 2 diabetes; however, it is unclear whether intensive glycemic control reduces that risk. To make well-informed choices among the options for achieving glucose control, clinicians and patients need comprehensive information about the effectiveness and safety of therapies, with attention to patient-relevant outcomes.<sup>13</sup>

Mean age of the patients was 51.5 years. 64.2 percent of the patients were males while the remaining were females. 60.4 percent of the patients were of rural residence while the remaining were of urban residence. Mean duration of diabetes was 9.3 years. Metformin was the most commonly prescribed drug followed by sulfonylureas. Next to get prescribed was Thiazolidinediones (pioglitazone) and Insulin. Most commonly prescribed doses of metformin were 1000 mg followed by 850 mg. Most commonly therapy was two-drug therapy followed by triple drug therapy and single drug therapy. Our results were in concordance with the results obtained by previous authors who also reported similar findings. In a previous study conducted by Sultana G et al, authors determined the drug utilization patterns in type 2 diabetic patients on oral hypoglycemic agents in the Medicine Outpatient Department (OPD) and Inpatient Department (IPD) of Majeedia Hospital, a teaching hospital of Hamdard University, New Delhi. Patients with established type 2 diabetes (n = 218) visiting the OPD and IPD were interviewed using a structured questionnaire during the period January-May 2006. A majority of the type 2 diabetic patients in this setting were treated with multiple antidiabetic drug therapy. The most commonly

prescribed antidiabetic drug class was biguanides (metformin) followed by sulphonylureas (glimepiride), thiazolidinediones (pioglitazone), insulin and alpha-glucosidase inhibitors (miglitol). As monotherapy insulin was the most common choice followed by metformin. The most prevalent multiple therapy was a three-drug combination of glimepiride + metformin + pioglitazone. More than half of the type 2 diabetic patients showed poor adherence (compliance) to the prescribed therapy. Their study strongly highlighted the need for patient education or counselling on use of antidiabetic and concomitant drugs, monitoring of blood glucose and glycosylated haemoglobin (HbA1c) levels, diet control, and correction of diabetic complications.<sup>14</sup>

Yusuff KB et al described the pattern of antidiabetic drug prescribing; ascertain the level of glycemic control, adherence with prescribed antidiabetic medications, and diabetes self management practices among patients with type-2 diabetes. Oral Hypoglycemic Agents (OHA) were prescribed for 86% (171) of cohorts while insulin and OHA was prescribed in 14% (29). Only 20% of non-adherent patients claimed disclosure to physicians during consultation. The identified factors for non-disclosure were lack of privacy during consultation (58%); and short consultation time (42%). The knowledge and practice of critical components of diabetes self-management behaviours were generally low among the cohort studied. However, it was significantly higher among patient judged adherent with their prescribed anti-diabetic medications ( $P < 0.05$ ). Majority of patients with type 2 diabetes in an ambulatory tertiary care setting in Nigeria are managed with OHA combinations, mainly glibenclamide and metformin.<sup>15</sup> Yurgin N et al, examined patterns of antidiabetic treatment among individuals with type 2 diabetes in Germany and investigated potential differences in attainment of

glycemic control associated with the use of specific antidiabetic regimens. More than half (52.7%) of patients did not attain the HbA(1c) target. There were significant differences between patients attaining the HbA(1c) target and receipt of specific antidiabetic medications ( $P < 0.001$ ). Patients treated with insulin monotherapy or oral plus insulin combination therapy were least likely to reach the HbA(1c) target (26.4% and 22.9%, respectively, attained glycemic control; both,  $P < 0.001$ ). Only 179

(31.9%) of 562 patients treated with oral combination therapy achieved the HbA(1c) target ( $P < 0.001$ ). Over half of these German patients with type 2 diabetes failed to attain the HbA(1c) target for glycemic control.<sup>16</sup>

## CONCLUSION

Metformin is the most commonly prescribed drug, both in the form of double therapy and monotherapy.

## REFERENCES

1. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2006;29:S43–S48.
2. Centers for Disease Control and Prevention. National Diabetes Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2005. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2005. Available at: [http://www.cdc.gov/diabetes/pubs/pdf/ndfs\\_2005.pdf](http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdf) Accessed May 29, 2008.
3. Benjamin SM, Valdez R, Geiss LS, et al. Estimated number of adults with prediabetes in the US in 2000: opportunities for prevention. *Diabetes Care*. 2003;26:645–649.
4. Genuth S, Alberti KG, Bennett P, Buse J, Defronzo R, Kahn R et al. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus Follow-up report on the diagnosis of diabetes mellitus. *Diabetes Care* 2003; 26: 3160– 3167.
5. Carpenter MW, Coustan DR: Criteria for screening tests for gestational diabetes. *Am J Obstet Gynecol* 144:768–773, 1982.
6. O'Sullivan JB, Mahan CM: Criteria for the oral glucose tolerance test in pregnancy. *Diabetes* 13:278, 1964.
7. Nathan DM: Initial management of glycemia in type 2 diabetes mellitus. *N Engl J Med* 347:1342–1349, 2002.
8. Sheehan MT: Current therapeutic options in type 2 diabetes mellitus: a practical approach. *Clin Med Res* 1:189–200, 2003.
9. Inzucchi SE: Oral antihyperglycemic therapy for type 2 diabetes. *JAMA* 287:360–372, 2002.
10. Diabetes Atlas. third edition. International Diabetes Federation; 2006.
11. Pan X, Li g, Hu Y, Wang J, Yang W, An Z. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Qing IGT and Diabetes Study. *Diabetes Care*. 1997;20:537–544.
12. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care* 1997; 20: 1183– 1197.

13. Bennett WL, Maruthur NM, Singh S, et al. Comparative effectiveness and safety of medications for type 2 diabetes: an update including new drugs and 2-drug combinations [published correction appears in *Ann Intern Med*. 2011 Jul 5;155(1):67-8]. *Ann Intern Med*. 2011;154(9):602-613. doi:10.7326/0003-4819-154-9-201105030-00336
14. Sultana G, Kapur P, Aqil M, Alam MS, Pillai KK. Drug utilization of oral hypoglycemic agents in a university teaching hospital in India. *J Clin Pharm Ther*. 2010;35:267–277.
15. Yusuff KB, Obe O, Joseph BY. Adherence to anti-diabetic drug therapy and self management practices among type-2 diabetics in Nigeria. *Pharm World Sci*. 2008;30(6):876-883. doi:10.1007/s11096-008-9243-2
16. Yurgin N, Secnik K, Lage MJ. Antidiabetic prescriptions and glyceimic control in German patients with type 2 diabetes mellitus: a retrospective database study. *Clin Ther*. 2007;29(2):316-325. doi:10.1016/j.clinthera.2007.02.012