



## INTERNATIONAL JOURNAL OF PHARMACEUTICAL RESEARCH AND BIO-SCIENCE

### SCREENING OF PRESCRIPTIONS IN PATIENTS OF TYPE-2 DIABETES MELLITUS IN A TERTIARY CARE TEACHING HOSPITAL

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Accepted Date: 22/02/2014; Published Date: 27/02/2014

**Abstract:** The objective of our study was to assess the pattern of prescribing prescriptions and cost analysis among the diabetic patients attending the medicine outpatient department of SAIMS Medical College and Hospital, Indore Madhya Pradesh. After taking permission from the Institutional Ethical Committee, prescriptions of 457 patients attending the medicine outpatient department of SAIMS Medical College and Hospital, Indore , were noted and demographic profile, commonly prescribed drugs as per Anatomical Therapeutic Chemical Classification (ATC) and WHO core indicators were assessed after taking written informed consent from the patients. 457 prescription records were assessed, out of which, 235 (51.42%) were males and 222 (48.57%) were females . Most of the patients were in the age group of 51-60 both for males (48.51%) and for females (49.09%) . Hypertension (83%) was the most common comorbid condition found. Average number of drugs per prescription was 5.2(2379/457). Drugs on WHO EML were 1168 while on NLEM were 1211. Drugs prescribed by generic names were 548/2379 (23.03%) which is less than that prescribed by their brand names 1831/2379(76.96%). Average cost per prescription was INR 372. Drugs prescribed as fixed dose combinations were 452. Metformin (A10BA02 =31.72%) was the most commonly prescribed antidiabetic drugs followed by glimepiride(A10BB12=18.6%). Glimepiride + Metformin combination was most frequently prescribed.

**Keywords:** Drug utilization studies, Diabetes , ATC code.



PAPER-QR CODE

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Access Online On:

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How to Cite This Article:

P Sharma, IJPRBS, 2014; Volume 3(1): 401-409

## INTRODUCTION

Diabetes is one of the leading cause of morbidity and mortality and can lead to a number of microvascular and macrovascular disorders. It results due to loss of beta cell function and needs early addition of glucose lowering strategies.<sup>[1][2]</sup> Diabetes mellitus is a chronic disorder which is associated with increased morbidity and mortality .According to WHO, 31.7 million of Indian population was affected by diabetes in 2000 , which can increase upto 79.4 million by the year 2030.<sup>[3][4]</sup> Type 2 diabetes can be controlled by proper adherence of the patient to therapy and for this drug utilization studies play a very important role.<sup>[5]</sup> According to WHO , Drug utilization research was defined as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences.<sup>[6][7][8][9]</sup> The aim of present study is to evaluate the drug utilization pattern and cost analysis among diabetic patients. The sociodemographic characteristics, morbidity pattern, associated comorbidities, commonly prescribed medications according to the WHO-ATC/DDD classification and rationality of the prescription among the diabetic patients has been described.

## MATERIALS AND METHODS:

A prospective, observational , cross sectional study was done among the diabetic patients attending the medicine outpatient department of SAIMS Medical College and Hospital, Indore, Madhya Pradesh and demographic profile, commonly prescribed drugs as per Anatomical Therapeutic Chemical Classification (ATC) and WHO core indicators were assessed .The study was conducted after getting approval from the institutional ethical committee and written informed consent from the patients.

### Study period:

The study was done for a period of six months from September 2013 to February 2013 in SAIMS Hospital.

### Inclusion criteria:

Type-2 Diabetic patients attending medicine OPD of SAIMS medical college were included.

### Exclusion criteria:

Patients having provisional diagnosis other than type-2 diabetes and patients with gestational diabetes were excluded from the study.

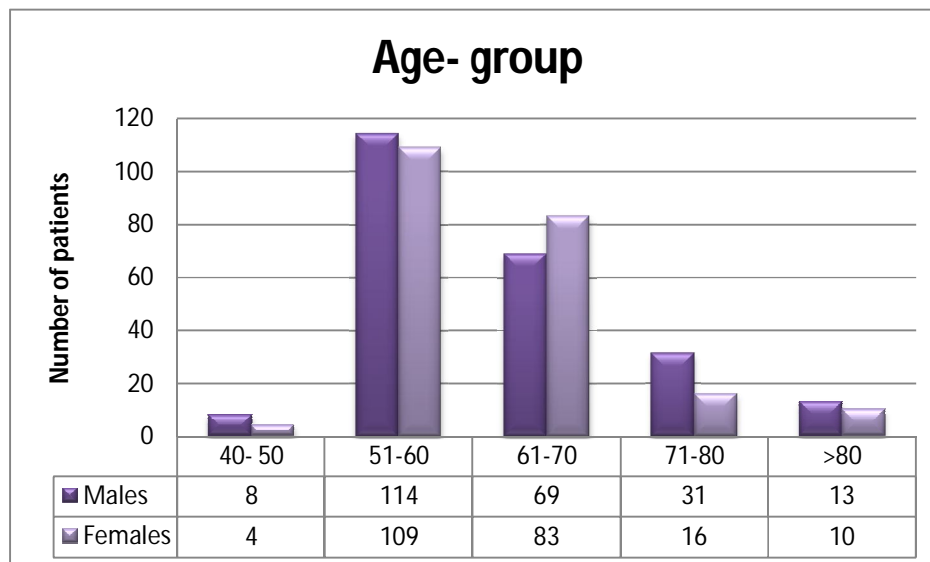
Statistical analysis:

The data was subjected to descriptive analysis using Microsoft Excel. Drugs were classified according to the WHO ATC classification and verified by WHO EML (Essential Medicine List) as well as NLEM (National List of Essential Medicines) 2011. Different parameters were given as percentage.<sup>[8][9]</sup>

### RESULTS AND DISCUSSION:

457 prescription records were assessed, out of which, 235 (51.42%) were males and 222 (48.57%) were females. Most of the patients were in the age group of 51-60 both for males (48.51%) and for females (49.09%) as depicted in figure-1.

Fig-1: Age distribution among patients.



Sociodemographic characteristics of patients has been elaborated in table-1.

Table-1: Sociodemographic characteristics of the patients.

| Sociodemographic parameters | Characteristic group  | Number of Males patients | Number of Females patients |
|-----------------------------|-----------------------|--------------------------|----------------------------|
| Age                         | 40-50                 | 8(3.4%)                  | 4(1.8%)                    |
|                             | 51-60                 | 114(48.51%)              | 109(49.09%)                |
|                             | 61-70                 | 69(29.36%)               | 83(37.38%)                 |
|                             | 71-80                 | 31(13.19%)               | 16(7.20%)                  |
|                             | >80                   | 13(5.5%)                 | 10(4.50%)                  |
| Literacy                    | Illiterate            | 35(14.89%)               | 20(9%)                     |
|                             | Upto 10 <sup>th</sup> | 11(4.68%)                | 33(14.86%)                 |
|                             | Upto 12 <sup>th</sup> | 30(12.76%)               | 96(43.24%)                 |
|                             | Graduation            | 119(50.63%)              | 64(28.82%)                 |
|                             | Postgraduation        | 40(25.53%)               | 9(4.05%)                   |
| Socioeconomic status        | Lower middle class    | 85(36.17%)               | 109(49.09%)                |
|                             | Middle class          | 129(54.89%)              | 67(30.18%)                 |
|                             | Upper middle class    | 21(8.93%)                | 46(20.72%)                 |
| Employment                  | Working               | 134(57.02%)              | 24(10.81%)                 |
|                             | Not working           | 101(42.97%)              | 198(89.18%)                |
| Status of living            | Living alone          | 74(31.48%)               | 35(15.76%)                 |
|                             | Living with family    | 161(68.51%)              | 187(84.23%)                |

In our study male preponderance was seen which is in accordance with previous studies .<sup>[10][11][12]</sup> But almost equal number of males and females were reported in another study.<sup>[13]</sup> Female preponderance was reported by M A Kumar et al 2011 in Tamil Nadu.<sup>[22]</sup>

Hypertension (83%) was the most common comorbid condition followed by coronary artery disease(75%) in our study. These results corroborates with findings of other studies done on diabetic population.<sup>[10][13][14][15]</sup> Diabetic neuropathy and diabetic foot were also found to be prevalent among the patients.

Family history of diabetes mellitus was reported by 56% of patients which is in accordance with a study done by Acharya KG et al 2013.<sup>[13]</sup> and Kannan et al 2011 also support our finding .<sup>[16]</sup>

Metformin (A10BA02 =31.72%) was the most commonly prescribed antidiabetic agent followed by glimepiride(A10BB12=18.6%) .We could compare this result with previous studies.<sup>[13]</sup> Similar findings are reported by Das P et al 2011 et al in a study done in Nepal.<sup>[21]</sup>

In contradiction to this result, Abidi et al reported Insulin as the most commonly prescribed antidiabetic agent as monotherapy during hospital stay of the patients.<sup>[10]</sup> ACE –inhibitors, thiazide diuretics, beta blockers, calcium channel blockers, aspirin , statins and other drugs were also prescribed to the patients because of existing comorbid conditions.

Utilization of antidiabetic drugs in type -2 diabetes patients according to WHO-ATC coding system<sup>[17][18]</sup> has been shown in table-2.

Table-2: Utilization of antidiabetic drugs in type -2 diabetes patients.

| Pharmacological class of the drug( ATC CODE) | Name of drug                      | WHO-CODE individual drug | ATC of drug | No. of patients | Percentage of patients |
|--|-----------------------------------|--------------------------|-------------|-----------------|------------------------|
| Biguanides (A10BA)                           | Metformin                         | A10BA02                  |             | 145             | 31.72%                 |
| Sulphonylureas (A10BB)                       | Glimepiride                       | A10BB12                  |             | 85              | 18.6%                  |
|  | Glibenclamide                     | A10BB01                  |             | 57              | 12.47%                 |
| Alpha- glucosidase inhibitors(A10BF)         | Voglibose                         | A10BF03                  |             | 49              | 10.72%                 |
|  | Pioglitazone                      | A10BG03                  |             | 39              | 8.53%                  |
| Insulin (A10A)                               | Human insulin (Short acting)      | A10AB01                  |             | 21              | 4.59%                  |
|  | Pre mixed insulin (human mixtard) | A10AD30                  |             | 20              | 4.37%                  |
|  | Long acting insulin(detemir)      | A10AE30                  |             | 16              | 3.50%                  |
| Dipeptidyl peptidase-4 inhibitors(A10BH)     | Sitagliptin                       | A10BH01                  |             | 14              | 3.06%                  |
|  | Vildagliptin                      | A10BH02                  |             | 11              | 2.40%                  |

Glimepiride + Metformin combination was most frequently prescribed followed by Pioglitazone + Metformin. Hypoglycemia was the most commonly found ADR of hypoglycemic drugs.

Total 457 prescriptions were studied and WHO core indicators were assessed as explained in table-3.

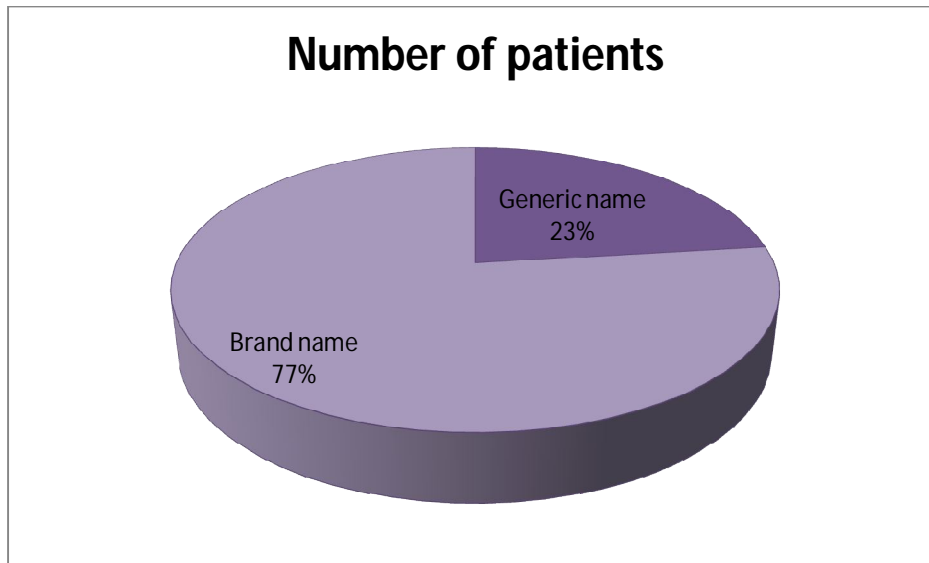
Table-3: Elaborates WHO core indicators.

| Core indicators                                | Result            |
|--|-------------------|
| Total number of drugs                          | 2379              |
| Total antidiabetic drugs                       | 1265              |
| Total number of drugs per prescription         | 5.2(2379/457)     |
| Drugs on WHO EML                               | 1168              |
| Drugs on NLEM 2011                             | 1211              |
| Drugs prescribed as fixed dose combinations    | 452/2379(19%)     |
| Total encounters having injectable formulation | 327/2379(13.74%)  |
| Drugs prescribed by generic name               | 548/2379(23.03%)  |
| Drugs prescribed by brand name                 | 1831/2379(76.96%) |

Average number of drugs per prescription was 5.2(2379/457) which shows polypharmacy and can lead to potential drug-drug interactions.. Drugs on WHO EML<sup>[19]</sup> were 1168 (49.09%) while on NLEM<sup>[20]</sup> were 1211(50.90%) which is almost same which is similar to a study done in which the drugs from essential drug list were 48.21%.<sup>[22]</sup>

Drugs prescribed by generic names were 548/2379 (23.03%) which is less than that prescribed by their brand names 1831/2379(76.96%) as illustrated in figure-2. Drugs prescribed as fixed dose combinations were 452. Average cost per prescription was 372 INR.

Fig-2: Distribution of generic name and brand name of drugs.



#### CONCLUSION:

Although life style and diet management plays a very crucial role in controlling diabetes but antidiabetic drugs cannot be neglected. Hence drug utilization studies and rational prescribing are of utmost importance in this field. Our study have tried to fill this gap.

#### LIST OF ABBREVIATIONS:

- ❖ ATC- Anatomical Therapeutic Chemical classification of drugs
- ❖ DDD- Defined daily dose
- ❖ EML- Essential Medicine List
- ❖ NLEM- National List of Essential Medicines
- ❖ OPD- Outpatient Department
- ❖ WHO- World Health Organization
- ❖ ADR-Adverse drug reactions.

**SOURCE OF SUPPORT:** Nil.

#### ACKNOWLEDGEMENTS

The authors would like to thank Dr. Motiwale for their valuable support throughout the study.

**CONFLICTS OF INTEREST:**

The authors declare that they have no competing interests.

**FUNDING:**

Not applicable

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