

## Original Research Article

# Evaluation of anti-diabetic prescriptions at Tripura medical college and Dr. BRAM teaching hospital: a cross-sectional study

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## ABSTRACT

**Background:** Diabetes mellitus (DM) is a chronic disease which requires lifelong treatment. The management of type 1 DM depends mainly on insulin, whereas the oral anti-diabetic drugs (OADs) are the first line treatment for type 2 DM. Rational use of the drugs in populations can be effectively studied by analysing the prescription pattern. As there are limited numbers of studies carried out on drug utilization in diabetic patients in North Eastern region of India, authors planned to carry out this study in a tertiary care set up of this region.

**Methods:** A cross-sectional study was carried out in Medicine OPD of Tripura Medical College and Dr. BRAM Teaching Hospital for a period of two months with the objectives of prescription pattern evaluation and the cost of anti-diabetic agents. Drug use pattern of antidiabetics, WHO core prescribing indicators and percentage of cost variation were analysed.

**Results:** A total of 120 prescriptions were analysed during the study period. Metformin was the most commonly prescribed drug. The average cost of therapy per prescription per week was Rs. 94.54. Only 19.43% of the antidiabetics were prescribed from the essential drug list.

**Conclusions:** The cost of prescription can be reduced by choosing the generic drugs without changing its quality and also by choosing drugs from essential drug list.

**Keywords:** Antidiabetic agents, Diabetes mellitus, Generic medicines, Prescription Pattern

## INTRODUCTION

Diabetes, according to WHO, is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces.<sup>1</sup> Six percent of the world population is affected by diabetes mellitus (DM) which is a chronic metabolic disorder.<sup>2</sup> A survey on Indian population shows that 4% of the adults suffered from DM in the year 2000 and it is expected to rise to 6% by the year 2025.<sup>3</sup>

The management of type 1 DM depends mainly on insulin, whereas the oral anti-diabetic drugs (OADs) are the first line treatment for type 2 DM.<sup>4</sup> Complications due

to hyperglycemia in DM can be prevented by using rational use of OADs and insulin.<sup>5</sup>

Rational use of the drugs in populations can be effectively studied by analyzing the prescription pattern in a given population. Drug utilization studies is an invaluable investigational resource to study pharmacoepidemiology, pharmacovigilance, Pharmacoeconomics and pharmacogenetics.<sup>6</sup> The World Health Organization (WHO) has formulated a set of “core drug use indicators” for improvement in the rational drug use in the outpatient practice. It includes the prescribing indicators, the patient care indicators and the facility indicators.<sup>7</sup> DM is a chronic morbid condition which

requires lifelong treatment. So, the cost of anti-diabetic drug is the major deciding factor for the patients' compliance. There exists a wide range of variation in the prices of drugs marketed in India and other countries of the world. Percentage cost variation is an effective tool to find out the difference between the various brands prescribed by prescriber in the same setting.<sup>8</sup>

There are limited numbers of studies carried out on drug utilization in diabetic patients in North Eastern region of India. So, authors planned to carry out drug utilization study in diabetic patients attending the medicine outpatient department (OPD) in Tripura Medical College and Dr B.R.A.M. Teaching Hospital (TMC), a tertiary health care set up in North East India. The objective of the present endeavor was to study the prescription pattern of anti-diabetic agents and to estimate the cost of anti-diabetic agents.

## METHODS

A cross-sectional study was carried out in Medicine OPD of Tripura Medical College and Dr B.R.A.M. Teaching Hospital for a period of two months (01/04/2018 to 31/05/2018). All the diabetic patients attending medicine OPD were enrolled in the study after explaining the aim of the study

### Inclusion criteria

Patients receiving any of the anti-diabetic drugs were included in the study irrespective of their gender.

### Exclusion criteria

- Patients who were pregnant
- And having insufficient data or records.

All the demographic data and complete prescriptions were collected on pre-designed case record form.

To study prescription pattern, following "WHO Core prescribing indicators" were used.<sup>7</sup>

- Average number of drugs per encounter.
- Percentage of drugs prescribed by generic name.
- Average number of anti-diabetics per encounter.
- Percentage of anti-diabetics prescribed by generic name.
- Percentage of anti-diabetics prescribed from essential drugs list.
- Percentage of anti-diabetics prescribed as fixed dose combinations.
- Percentage of most common antidiabetic prescribed.
- Percentage of encounters with an antibiotic prescribed.
- Percentage of encounters with an injection prescribed.

- Average cost of anti-diabetics per prescription per week.

Generic name of the drugs and price were obtained from CIMS (current index of medical specialties) and Indian drug review (IDR).<sup>9,10</sup> Authors calculated the percentage cost variation which is an indicator of prescriber's behavior. The difference in the maximum and minimum price of the same drug manufactured by different pharmaceutical companies was calculated. The drugs being manufactured by only one company or being manufactured by different companies however, in different strengths were excluded.

Percentage cost variation was calculated using the following formula:

$$\text{Percentage cost variation} = \frac{(\text{Cost of highest priced brand} - \text{Cost of lowest priced brand}) \times 100}{\text{Cost of lowest priced brand}}$$

Cost of lowest priced brand

Prior approval of Institutional ethics committee was obtained for the study. Written informed consent was obtained from each patient. Data was stored and analyzed with strict confidentiality, identity of the patients was not disclosed

## RESULTS

A total of 120 prescriptions were collected and analyzed during the study period. Drug use pattern of antidiabetic drugs is shown in Table 1. Among the oral antidiabetic agents, metformin was the most commonly prescribed drug (27.5%). Most commonly used drug combination was glimepiride and metformin which is 27.5% of all prescriptions. Triple drug combinations were used in 2.5% of patients. Insulin was prescribed in 52.5% of the patients.

**Table 1: Drug use pattern of antidiabetic drugs.**

Name of drug	Number of prescriptions (%)
Metformin	33 (27.5%)
Glipizide	06 (5%)
Glimepiride	03 (2.5%)
Glimepiride + metformin	33 (27.5%)
Glipizide + metformin	03 (2.5%)
Gliclazide + metformin	03 (2.5%)
Voglibose	03 (2.5%)
Teneligliptin	03 (2.5%)
Teneligliptin + metformin	03 (2.5%)
Vildagliptin + metformin	03 (2.5%)
Glimepiride + metformin + voglibose	03 (2.5%)
Insulin	63 (52.5%)

Percentage of cost variation of antidiabetic drugs is shown in Table 2. In this maximum cost variation was for insulin glargine which was 109.12% and minimum cost variation (1.52%) was seen with metformin. Glimepiride 1mg + metformin 500mg combination showed cost variation of 20.16% followed by glimepiride 2mg + metformin 1000mg (14.58%) and glimepiride 2mg + metformin 500mg (11.38%). Combination of regular insulin and isophane insulin (30:70) had a cost variation of 3.19% and cost variation for regular insulin was 3.11%.

**Table 2: Percentage cost variation of antidiabetics.**

Drugs	% Cost variation
Regular insulin + isophane insulin (30:70)	3.19%
Glargine	109.12%
Regular insulin	3.11%
Metformin SR 500	1.52%
Glimepiride (1) + metformin (500)	20.16%
Glimepiride (2) + metformin (500)	11.38%
Glimepiride (2) + metformin (1000)	14.58%

WHO core prescribing indicators are shown in Table 3. The average number of drugs per encounter was 4.375. The average number of antidiabetics per encounter was 1.425. The average cost of therapy per prescription per week was Rs. 94.54. 19.43% of the antidiabetics were prescribed from the essential drug list. There were no prescriptions of antidiabetics by generic name. The percentage of encounters with an injection and antibiotic were 35% and 5% respectively.

**Table 3: WHO core prescribing indicators.**

Core indicators	Value
Average number of drugs per encounter	4.375
Average number of antidiabetics per encounter	1.425
Percentage of antidiabetics prescribed by generic name	0
Percentage of encounters with an antibiotic	5%
Percentage of encounters with an injection	35%
Percentage of antidiabetics prescribed from essential drug list	19.43%
Average antidiabetic cost/prescription/week	Rs. 94.54

## DISCUSSION

In present study most commonly used drug group was insulin which was contrary to the finding of other studies.<sup>11-14</sup> Metformin was the most commonly prescribed individual OAD (27.5%) which is similar to the findings of several studies.<sup>15-20</sup> In this study glimepiride and metformin combination was most commonly prescribed which is comparable to the findings of other studies.<sup>21,22</sup> Triple drug combination of

OADs were less commonly prescribed which is comparable to that of Baby N et al.<sup>23</sup> Newer OADs like DPP4 inhibitors were less commonly prescribed which is comparable with the findings of Agarwal et al.<sup>15</sup>

Authors calculated the percentage cost variation for different brands prescribed to the patients. Metformin had the least percentage cost variation i.e. 1.52 which is contrary to the finding of Acharya et al, who found that percentage cost variation for metformin was 123.08.<sup>11</sup> Glargine had highest percentage cost variation i.e. 109.<sup>12</sup> This finding suggests that total cost of treatment can be reduced drastically by using the cheapest brand of glargine.

In this study average number of drugs per encounter was 4.375 which is higher than the findings of Das P et al, who found that mean drugs prescribed per patient was 1.83.<sup>22</sup> Average number of antidiabetic drugs per prescription was 1.425 which was similar to other studies.<sup>11,13,2</sup> Authors have observed that no drugs were prescribed by generic name. This may be due to less sensitization programme for physicians on generic medicines. In a study conducted by Baby N et al, it was found that 2.33% of the drugs were prescribed by generic name.<sup>23</sup>

In this study very less number of antidiabetics (19.43%) were prescribed from essential drug list which is contrary to the findings of Acharya et al, who found that 45.23% were prescribed from EDL of India.<sup>11</sup> Cost of antidiabetic therapy per month was Rs. 405 which is lower as compared to the study conducted by Kanan et al, who found that the cost of antidiabetic therapy per month was Rs. 783.<sup>2</sup> Authors have found that antibiotics were prescribed in 5% of prescriptions which is comparable with the findings of Kumar R et al, who observed that antibiotics were prescribed in 5.75% cases.<sup>24</sup>

## CONCLUSION

In this study insulin was the most commonly used drug. Metformin was the most commonly prescribed oral antidiabetic drug. Glimepiride and metformin combination were prescribed commonly. In this study cost of drugs per prescription was found to be lower than other studies. The cost of prescription can be further reduced by choosing the most economic generic drugs without changing its quality and also by choosing drugs from essential drug list.

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