ORIGINAL ARTICLE

Prescribing Patterns in Type 2 Diabetes Mellitus Outpatients at a Tertiary Care Centre in Jaipur, India

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Abstract

Background: Over the last few years, an unexpected increase in the prevalence of diabetes in India have been witnessed. The present study was planned to analyse prescribing patterns of anti-hyperglycaemic drugs and assess the influence of Chief Minister's Free Drug Scheme in Rajasthan, India. It aimed to evaluate, monitor and if possible, suggest modifications in prescribing practices to make medical care rational and also to assist minimising adverse drug reactions (ADRs).

Methods: This was a cross-sectional, observational study carried out for a 12-month period. A total 400 known patients of type 2 diabetes mellitus (T2DM) from endocrinology outdoor of SMS Medical College Hospital (a tertiary care hospital in Jaipur, Rajasthan, India) were recruited and their prescriptions were analysed using the World Health Organization (WHO) prescribing indicators.

Results: Most commonly observed age group was of 40-50 years (mean age 53.76 ± 8.84), with a male preponderance (57.5 %). Among them, 67.5 % of patients were found to be obese (mean BMI 29.79 ± 3.26). All anti-hyperglycaemic were prescribed in their generic names only. Metformin was the most frequently prescribed anti-hyperglycaemic agent. Among the fixed dose combinations, the most common was that of glimepiride and metformin (40.75 %), while most prescribed add on anti-hyperglycaemic was teneligliptin (51.5 %), followed by pioglitazone (30.5 %). A total of 53.25 % of these patients received insulin along with oral anti-hyperglycaemic agents.

Conclusion: The anti-hyperglycaemic agent prescribing among endocrinology outpatients at tertiary care hospital in Jaipur was found to be satisfactory.

Key words: Glimepiride; Metformin; Teneligliptin; WHO prescribing indicators.

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Introduction

According to the World Health Organization (WHO), "Diabetes is a chronic, metabolic disease characterised by elevated levels of blood glucose (or blood sugar), which over time leads to serious damage to the heart, blood vessels, eyes, kidneys and nerves. The most common type is type 2 diabetes mellitus (T2DM), which affect mainly adults. This occurs when the body becomes resistant to insulin or doesn't make enough insulin."[1]

Glucose regulation is mainly done by two hormones insulin and glucagon secreted by pancreas and this regulation gets interrupted in diabetes mellitus.[2] According to global report of WHO, in October 2018, 72.9 (8.8 %) million people in India were living with diabetes in 2017.[3] And this has increased to 77 million in 2019 according to International Diabetes Federation report, 2019.[4]

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The initial treatment strategies are mainly based on the severity and type of diabetes. The subsequent addition of anti-hyperglycaemic and other agents would depend on the co-morbid conditions of the patient. For the management of T2DM, both the pharmacological approach, in form of anti-hyperglycaemic agents and non-pharmacological approach, in the form of lifestyle modifications (diet, exercise, reduced alcohol and smoking cessation) are applied.[5]

Rational use of medications in such chronic conditions can prevent the complications and suffering.[6] It is a complex issue with a goal that is difficult to achieve, it is defined as: "Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time and at the lowest cost to them and their community".[7]

Multiple reasons have been observed behind the persistence of disease and suffering which include improperly prescribed, dispensed and sold medications, failure of patients to take the medications as advised and failure of access to the essential drug list (EDL). Thus, it is necessary to identify irrational prescribing patterns.[8] The WHO defines drug utilisation as "The marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences." The WHO has also formulated a set of "core prescribing indicators" for improvement in the rational drug use. It includes the prescribing indicators, the patient care indicators and the facility indicators.[9, 10]

Therefore, this study was planned to analyse the prescribing patterns of anti-hyperglycaemic agents among the outpatients of endocrinology department of SMS Medical College Hospital, Jaipur. This study was aimed to evaluate, monitor and if possible, suggest modifications in prescribing practices to make medical care rational and also to assist in minimising adverse drug reactions (ADRs).

Methods

Study design and sample size determination

It was a cross-sectional, observational study which was carried out in the outpatients of endo-crinology department of SMS Medical College Hospital (a tertiary care hospital in Jaipur) after taking permission from the research review board of the institute (protocol No 36600 dated 10/07/2018). The sample size for the study was calculated at 95 % Confidence Level expecting 50 % adherence (maximum variance) to the treatment of type 2 diabetes mellitus (T2DM) in endocrinology department. At the precision (relative allowable error) of 10 %, a minimum of 400 patients of T2DM were recruited as sample size.

Data collection and statistical analysis

A total 400 known cases of diabetes in age group of 40 to 70 years, irrespective of their co-morbid status were recruited and the data in the form of socio-demographic profile, personal history and WHO core indicators were collected in a predesigned study forms. Data collected was tabulated and analysed using descriptive statistical tools (mean ± standard deviation and percentage). Chi-square test was used for categorical data. The data were analysed using SPSS for Windows (version 16.0 Chicago, SPSS Inc.) with the statistical significance evaluated using two-sided P value at a 5 % level of significance.

WHO Core Indicators

The drug data obtained was assessed for "Prescribing Indicators" by the WHO.[10]

i. Average number of drugs per encounter = Total number of drugs prescribed / Number of medication charts.
ii. Percentage of drugs prescribed by generic name = Number of generic drugs prescribed / Total number of drugs × 100.
iii. Percentage of patient medications charts with antibiotics prescribed = Total number of charts with antibiotics prescribed / Total number of charts.
iv. Percentage of patient medications charts with injections prescribed = Total number of charts with injections / Total number of charts.

Percentage of drugs prescribed from Essential Drug List of Rajasthan[11] = Total number of drugs from EDL / Total number of all drugs prescribed × 100.

Results

Out of the 400 patients, 57.5 % were men and 42.5 % were women. The recruited patients in this study were between 40-70 years of age. Mean age was found to be 53.76 ± 8.84 years.

A total 39.56 %, out of the 230 men gave history of current alcohol intake while 17.3 % stated that they have quit alcohol. Rest denied any history of alcohol intake. Similarly, 35.21 % of men were currently smokers, while 28.69 % men said that they have quit smoking. Rest said they have never smoked. All the women denied any intake of alcohol and/or smoking, although, tobacco chewing history was present in 33.5 % of the women and 52 % of men. Smokers were asked about their number of cigarettes smoked per day, it was more than 5 cigarettes a day in 76.5 % of smokers and less in the rest. Out of the total patients, 67.5 % were found to be obese (BMI ≥ 30), 24.5 % patients were overweight and only 8 % had normal weight (Table 1).

Table 1: Distribution of patients with diabetes mellitus type 2 according to body mass index

BMI (in kg/m^2)	Men	Women	p value*
18.5 - 24.9	24	8	
25 - 29.9	58	40	0.085
≥ 30	148	122	
Total	230	170	
Mean ± SD	29.79 ± 3.26		

* p value calculated using Chi square test

WHO core indicators were assessed after seeing their prescriptions and they gave results as below (Table 2).

Table 2: Estimated WHO Core Prescribing Indicators

|	
Number of prescription analysed	400
Average number of drugs per encounter (Mean ± SD)	4.58 ± 1.8
Percentage of encounter with antibiotics prescribed (%)	4
Percentage of encounter with an injection prescribed (%)	53.25
Percentage of drugs prescribed by generic name (%)	100
Percentage of drugs prescribed from Rajasthan Essential Drug List 2019 (%)	94

Individual drug distribution

Most commonly prescribed anti-hyperglycaemic agent was metformin, prescribed in 154 patients. Metformin was also prescribed in fixed dose combinations with glimepiride, gliclazide and teneligliptin in 163, 59 and 24 patients respectively (Figure 1).
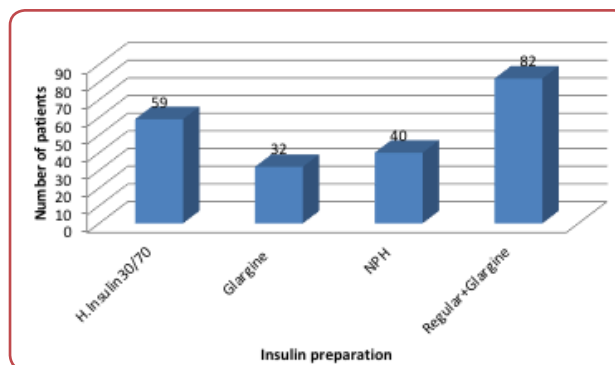
In patients with poor glycaemic control other add-on anti-hyperglycaemic drugs were also prescribed. Teneligliptin was prescribed in a total of
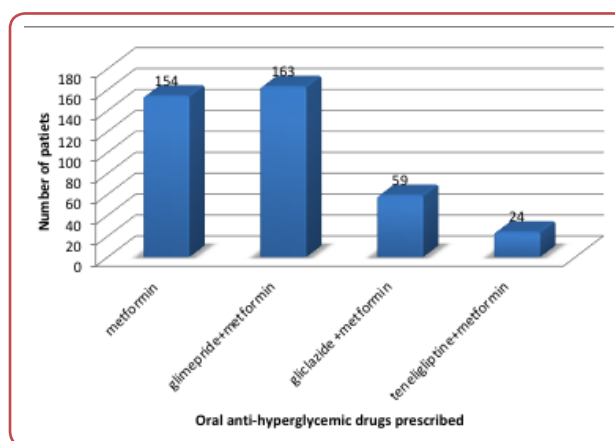
Figure 1: Distribution of patients according to oral anti-hyperglycaemic drug prescribed
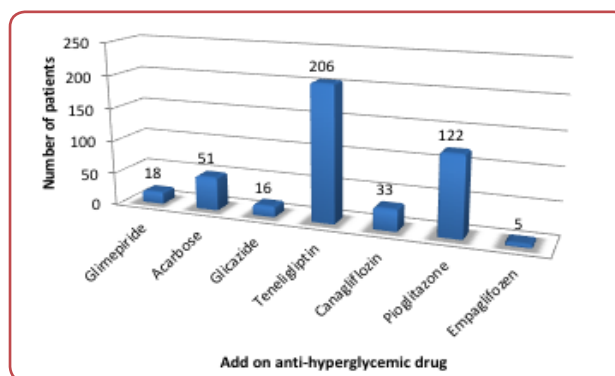
Figure 2: Distribution of patients according to add on anti-hyperglycaemic drugs prescribed

Figure 3: Distribution of patients according to insulin preparations prescribed
NPH: Neutral protamine Hagedorn insulin;

206 patients as an add-on drug with either fixed dose combination or with metformin. Second most common as an add-on was pioglitazone in 122 patients. Acarbose, glimepiride, gliclazide, canagliflozin and empagliflozin were prescribed in 51, 18, 13, 33, 5 patients respectively (Figure 2).

Along with oral anti-hyperglycaemic agents human insulin was prescribed in 59 patients (Figure 3).

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Conclusion

> The anti-hyperglycaemic agent prescribing among endocrinology outpatients at tertiary care hospital in Jaipur was found to be satisfactory. The average number of drugs per prescription was found to be 4.58. This seems to be justified as a chronic disease like diabetes mellitus is associated with comorbidities and deteriorates over time might require multiple drugs for its management. The most common add on drug was teneligliptin. Antibiotics were prescribed to only 4 % patients, which seemed judicious. Patients were also taught about the importance of lifestyle modifications and diet. This is also in accordance with the American Diabetes Association (ADA) recommendations. Adherence to lifestyle and dietary modifications will not only improve glycaemic control but will also help in reducing the long term complications of diabetes mellitus.

Limitations

The sample was not random and could have been a potential source of bias. The inherent limitations of a cross-sectional study cannot be ignored. Indeed, only prospective studies can demonstrate a causal association between the determinants and uncontrolled T2DM. Besides, the self-reporting of participants could not rule out the possibility of bias in the participant's responses. Glycosylated HbA1c was not recorded but recommended in the study.

Future perspectives

In future, similar studies can be planned in private tertiary care hospital settings. Studies for evaluating defined daily doses (DDD) for anti-hyperglycaemic agents can also be envisaged.

Acknowledgements

Conflict of interest

None.

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