RESEARCH ARTICLE

STUDY OF PRESCRIBING PATTERN IN DIABETES MELLITUS PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL AT DEHRADUN, UTTARAKHAND

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ABSTRACT

Background: Irrational drug prescribing is associated with increased morbidity, mortality and economic burden on the society. Study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribing practice of the prescribers and recommends necessary modifications to achieve rational medical care.

Aims & Objectives: This study was designed to analyze the current prescription patterns of drugs used in the treatment of type 2 diabetes mellitus patients.

Materials and Methods: Present study has been conducted in diabetes mellitus patients by the department of pharmacology in medicine outpatient department at Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun for 6 months. 312 prescriptions were randomly evaluated for prescribing pattern using WHO drug indicators.

Results: A total of 312 prescriptions were analyzed. Mean age was 54.96 ± 0.57 years. Male: Female ratio was 1.04:1. Socio-economic status (SES): Upper 24 (7.69%), Upper Middle 75 (24.04%), Lower Middle 93 (29.81%), Upper Lower 69 (22.11%) and Lower 51 (16.35%). Family history of diabetes mellitus seen in 129 (41.35%) patients and average duration was 7.92±0.37 years. A total of 1242 drugs were prescribed. 666 (53.62%) antidiabetics, 216 (17.39%) antihypertensives, 159 (12.8%) multivitamins, 90 (7.25%) antiplatelets, 42 (3.38%) statins and 360 (5.56%) in miscellaneous category were prescribed. Amongst antidiabetics, the most frequently prescribed drugs were metformin 273 (40.99%), glimepiride 228 (34.23%) followed by pioglitazone 45 (6.76%), acarbose 33 (4.95%), gliclazide 30 (4.5%), sitagliptin 30 (4.5%), glibenclamide 15 (2.25%) and insulin 12 (1.8%). 99.03% oral drugs were prescribed. Numbers of Fixed dose combinations of antidiabetic drugs were 246 (36.93%). 3.98 drugs per prescription were prescribed. 288 (43.24%) antidiabetics were prescribed from National List of Essential Medicines (NLEM), 2011. 100% drugs were prescribed by brand names.

Conclusion: The most commonly prescribed drugs were Metformin and Glimepiride. Rational prescribing can be improved by sensitizing our physicians and providing them with the feedback of the study.

Key Words: Drug Utilization; Irrational Prescribing; Diabetes Mellitus; National List of Essential Medicine

Introduction

Diabetes mellitus is a metabolic disorder with common denominator of hyperglycemia, arising from a variety of pathogenic mechanisms. It has emerged as an epidemic both in the developing and developed countries and shows no signs of regression.[1] Currently, India leads the world with the largest number of diabetic subjects and this is expected to further rise in the coming years.

Given the high prevalence of diabetes in Indians with over 50 million diabetics already, and the numbers expected to increase to 87 million by the year 2030**,** this could place considerable burden on the health budgets of this country.[2] The study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribing practice of the prescribers as well as recommends necessary modifications to achieve rational and cost effective medical care.[3]

Therefore, drug utilization studies, which evaluate and analyse the medical, social and economic outcomes of the drug therapy, are more meaningful, and observe the prescribing attitude of physicians with the aim to provide drugs rationally.[4,5] Keeping all these facts in consideration, the present study was designed to analyze the prescribing patterns of antidiabetic drugs in a tertiary care teaching hospital in Dehradun, Uttarakhand.

Materials and Methods

A prospective drug utilization study was conducted in Type 2 diabetes mellitus patients by the department of Pharmacology in Medicine OPD at Shri Gru Ram Rai Institute of Medical and Health Sciences (SGRRIM & HS), Dehradun for 6 months - between March 2013 and August 2013. Approval of the Institutional Ethics Committee was obtained prior to the commencement of the study. A total of 312 prescriptions were randomly evaluated for prescribing pattern in type 2 diabetes mellitus patients using WHO drug indicators like drug class, dosage form, fixed dose combinations (FDCs), generic and branded drugs and drugs from NLEM 2011.

Results

During the study period, a total of 312 prescriptions

were assessed. 159 (50.96%) were male and 153 (49.04%) were female patients. The mean age of the patients was 54.96±0.57 years. The average duration of diabetes mellitus was 7.92±0.37 years. Family History of diabetes mellitus was present in 129 (41.35%) patients. Socio economic status classification was done as per the Kuppuswamy scale.[6] 24 (7.69%) patients were in upper class, 75 (24.04%) in upper Middle class, 93 (29.81%) in lower middle class, 69 (22.11%) in upper lower class and 51 (16.35%) belonged to lower class (table 1).

Table-1: Demographic Profile

Characteristics		Value
Male		159 (50.96%)
Female		153 (49.04%)
Mean age		54.96 ± 0.57 years
Avenge duration of DM		7.92 ± 0.37 yeas
Family history of DM		129 (41.35%)
Socio-economic status (SES) As per Kuppuswamy's classification scale	Upper	24 (7.69%)
	Upper middle	75 (24.04%)
	Lower middle	93 (29.81%)
	Upper lower	69 (22.11%)
	Lower	51 (16.35%)

Table-2: Drug prescribing pattern

Items	Drugs	N (%)
Drug Groups	Antidiabetic	666 (53.62)
	Antihypertensives	216 (17.39)
	Multivitamins	159 (12L8%)
	Antiplatelet	90 (7.25%)
	Statins	42 (3.38%)
	Miscellaneous category	69 (5.56%)
Antidiabetic drugs	Metformin	273 (40.99%)
	Glimepride	223 (34.23%)
	Pioglitazone	45 (6.76%)
	Acarbose	33 (4.95%)
	Gliclazide	30 (4.5%)
	Sitagliptin	30 (4.5%)
	Glibenclamide	15 (2.25%)
	Insulin	12 (1.80%)
Fixed Dose Combinations (FDCs)	Metformin + Glimepride	183 (74.40%)
	Metformin + Gliclazide	24 (9.76%)
	Metformin + Glimepride + Pioglitazone	24 (9.76%)
	Metformin + Glibenclamide + Pioglitazone	9 (3.44%)
	Metformin+ Pioglitazone	6 (2.44%)
Drag Use Indicators	Average number of drugs / Prescription	3.98
	Average number of Antidiabetic drugs / Prescription prescription	2.13
	% age of antidiabetic drags prescribed by generic name	0%
	% age of injectable antidiabetic prescribed	12/666 (1.8%)
	%age of prescriptions containing antidiabetic FDCs	246/666 (36.93%)
	% age of antidiabetic drags prescribed from NLEM 2011	288/666 (43.24%)
Cost per prescription per day (INR)		18.67

A total of 1242 drugs were prescribed during the study period. 666 (53.62%) antidiabetics, 216 (17.39%) antihypertensives, 159 (12.8%) multivitamins, 90 (7.25%) antiplatelets, 42 (3.38%) statins and 69 (5.56%) miscellaneous drugs were prescribed (table 2).

420 (63.06%) patients were prescribed single drugs and 246 (36.93%) were prescribed fixed dose combinations. 273 (40.99%) were prescribed metformin, 228 (34.23%) were prescribed glimepride, 45 (6.76%) were prescribed pioglitazone, 33 (4.95%) were prescribed acarbose, 30 (4.5%) were prescribed gliclazide, 30 (4.5%) were prescribed sitagliptin, 15 (2.25%) were prescribed glibenclamide, and 12 (1.8%) patients were prescribed Insulin (table 2).

A total of 246 (36.93%) fixed dose combinations were prescribed. Most commonly prescribed FDC was Metformin + Glimepride (183, 74.40%) followed by Metformin + Gliclazide (24, 9.76%), Metformin + Glimepride + Pioglitazone (24, 9.76%), Metfomin + Glibenclamide + Pioglitazone (9, 3.66%) and Metformin + Pioglitazone (6, 2.44%) (table 2).

Average numbers of drugs prescribed per prescription were 3.98. Average numbers of antidiabetics per prescription were 2.13. All drugs were prescribed by their respective brand names. Percentage of injectable antidiabetics was 1.8% (12/666). Total numbers of antidiabetic fixed dose combinations were 246/666 (36.93%). Antidiabetic drugs prescribed from NLEM, 2011 were 288 (43.24%) which included metformin and glibenclamide (table 2). The total cost of all prescriptions for 15 days was INR.87375.60. The average cost per prescription per day was INR. 18.67 (table 2).

Discussion

A prescription based survey is considered to be one of the most effective methods to assess and evaluate the prescribing attitude of the physicians and dispensing practice of the pharmacists.[7] In the present study, the incidence of diabetes was seen in 159 (50.96%) male and 153 (49.04%) female patients. This was comparable with previous study by Guercil et al where men and women were 53.7% and 46.3% respectively.[8]

The mean age of the patients in the present study was 54.96 ± 0.57 years which was lower than previous studies where mean age was 60.9 ± 9.4 years and 58.3 ± 3.3 years indicating earlier age of onset of type 2 diabetes mellitus.[8,9] Average duration of diabetes mellitus in the present study was 7.92 years which was comparable with previous study where average duration was 7.69 years.[8] The association between family history of

diabetes and risk for the disease has been well documented.[10,11] Family history of diabetes mellitus was seen in 129 (41.35%) patients, which was lesser than previous study by Valdez R et al, where 50.7% patients had a positive family history suggesting the role of coexisting factors.[12]

Socio economic status classification was done as per the Kuppuswamy scale.[6] In the present study, 24 (7.69%) patients belonged to upper class, 75 (24.04%) to upper middle class, 93 (29.81%) to lower middle class, 69 (22.11%) to upper lower class and 51 (16.35%) belonged to lower class respectively. This was different from a previous study by Rajesh Rajput et al, where 3.3% belonged to upper class, 19.6% were in upper middle class, 37.7% in lower middle class.[13] As our hospital is a charitable institution and the area nearby is inhabited by people belonging to upper middle and lower middle class, the majority of patients of these particular class approach this hospital, thereby changing our findings.

Amongst antidiabetic medications, metformin was the most commonly prescribed drug which was given in 273 (40.99%) patients followed by glimepride in 228 (34.23%) – 45 (6.76%) had pioglitazone and other drugs. Similar prescribing trend was observed in another study by Vengurlekar S et al where metformin was most commonly prescribed (27%) followed by glimepride (22.60%) and pioglitazone (13.9%). Another study by Dhanaraja et al also shows metformin is the most commonly prescribed oral antidiabetic drug.[14,15] Metformin does not promote weight gain and has beneficial effects on several cardiovascular risk factors. Accordingly, metformin is reported to be regarded as the first drug of choice for most patients with type 2 diabetes mellitus.[16] Our study supported the same conclusion.

A total of 246 (36.93%) fixed dose combinations were prescribed which was consistent with another study by Kumar M A, where 41.1% fixed drug combinations were used.[17] Most common was a combination of metformin and glimepride (183, 74.4%). Vengurlekar et al also showed similar results, which showed a combination of metformin and glimepride as most widely prescribed fixed dose combination.[14] Oral antidiabetics drugs were prescribed in majority of patients (99.03%), which corresponds with the study by Vengurlekar et al, where 95% oral antidiabetics were prescribed.[14]

The total number of drugs prescribed per prescription was 3.98, which was less as compared to the study by Kumar MA et al, where 6.51 drugs were prescribed per prescription.[17] All drugs were prescribed by their respective brand names. This was seen also in the study by Kumar MA et al, which showed the decrease in the trend of prescribing generic drugs. The drugs prescribed from NLEM, 2011 were 288 (43.24%), which was similar to the study by Kumar et al, where 48.21% drugs were prescribed from NLEM, 2011.

Cost of prescription is important in chronic diseases like diabetes. In this study, average prescription cost per day was INR 18.67, which was quite high. Still it was less than another study by Kannan et al where the average prescription cost per day was INR. 26.11.[18] There is a huge scope in reducing the prescription cost by prescribing cheaper alternatives and reducing the number of medications per prescription. However, while choosing cheaper brands, one should keep in mind the quality of the brands.

In the present study the prescribing trend in type 2 diabetes mellitus patients was analyzed. The strength of the present study lied in the fact that besides antidiabetic medications, other medications were also evaluated. The demographic profile included the age, sex, family history, duration of illness and socioeconomic classification according to Kuppuswamy scale. All the prescriptions were analyzed according to WHO core prescribing indicators like drug class, dosage form, fixed dose combinations (FDCs), generic and branded drugs, cost and drugs from NLEM 2011.

LIMITATIONS

Sample size in the present study was small and we might have focused only on the first prescription, this necessarily does not reflect the true clinical situation. We did not record the dose and dosing schedule of the treatment given. We also did not evaluate factors like treatment adherence, concerns of the patients about side effects, and adherence to treatment guidelines while prescribing.

Conclusion

To conclude, most of the prescriptions were rational, but further improvement is needed. Further studies focussed on rationale for choice of drug based on demographic data, economic status, associated conditions and complications would give additional insights into prescribing patterns in diabetes mellitus in India. Rational prescribing requires consideration to dose and

duration as well as interaction with other medications. A therapeutic audit with more parameters of analysis to provide regular feedback to researchers and prescribers may encourage rational prescribing in hypertension.

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