National Journal of Physiology, Pharmacy and Pharmacology

RESEARCH ARTICLE

Study on prescribing pattern and rational use of antidiabetic drugs in elderly patients with type 2 diabetes mellitus in tertiary care hospital

Pushpa V H[1], Nagesh H N[2], Ramesh H S[3]

[1]Department of Pharmacology, JSS Medical College, JSS Academy of Higher Education and Research, Mysuru, Karnataka, India, [2]Department of Pharmacology, Akash Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India, [3]Department of Pharmacology, Mandya Institute of Medical Sciences, Mandya, Karnataka, India

Correspondence to: Nagesh H N, E-mail: nagu728@gmail.com

Received: May 17, 2020; **Accepted:** June 10, 2020

ABSTRACT

Background: Type 2 diabetes mellitus (DM) is one of the most common diseases in the elderly. Due to the presence of comorbid conditions, geriatric patients are usually on more than 1 drug and hence this vulnerable population requires frequent monitoring. Drug utilization studies could provide feedback to prescribers and promote rational drug use. **Aims and Objectives:** This study aims to analyze the drug prescribing pattern and rational use of antidiabetic drugs in geriatric age group with type 2 DMs. **Materials and Methods:** A prospective, cross-sectional, observational study was conducted from January 2017 to June 2018 in the geriatric Medicine Department at JSS Medical College and Hospital, Mysuru. Prescriptions were collected from geriatric diabetic patients and were analyzed for prescribing pattern and rational use of antidiabetic drugs. The data were subjected to suitable descriptive and inferential statistical analysis, using Microsoft Excel and SPSS Version 23.0. **Results:** Out of 500 prescriptions analyzed, 706 antidiabetic drugs were prescribed, 90% were oral, 8.31% were injectable, and 1.69% were received both routes. Average number of antidiabetic drugs prescribed per prescription was 0.7. The most commonly prescribed oral hypoglycemic drug was metformin (66%), which was in combination with other antidiabetic drugs and alone. Drugs prescribed by generic name accounted for 18.9% and drugs from essential drug list were 41.78%. **Conclusion:** The study showed that metformin was predominantly prescribed oral antidiabetic drug both as monotherapy and combination therapy. Prescribing drugs by brand name were high and from essential drug list were low. Number of drugs prescribed per prescription was decreased which is a welcome sign and needs to be encouraged.

KEY WORDS: Diabetes Mellitus; Geriatric Age Group; Antidiabetic Drugs; Rational Drug Use; Essential Drugs; Fixed-Dose Combination

INTRODUCTION

Diabetes mellitus (DM) is a group of syndromes characterized by hyperglycemia, altered metabolism of lipids, carbohydrates, and proteins and an increased risk of complications from vascular disease. It is associated with multiple hormone dysregulation, pro-inflammatory state, and excessive oxidative stress.[1]

DM in the elderly is emerging as one of the most important public health problems of the 21st century. Although increase in both the prevalence and incidence of type 2 DM has occurred globally, they have been dramatic in societies with economic transition, in newly industrialized countries and in developing countries, especially among the elderly.[2]

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2020.10.05138202010062020	

Type 2 DM in geriatric group is significant and the intensity of the treatment in this age group is uncertain. The prevalence of DM increases with age and peaks at 60–69 years of age, and thus, this population should be cared in India to avoid complications due to DM.

The American Diabetic Association and California Healthcare Foundation/American Geriatrics Society panel on improving care for elders with DM have recommended treatment goals for older patients. These goals are based on factors such as life expectancy, functional states, and comorbidities such as hypertension and dyslipidemia. Because of comorbidities, geriatric patients are on polypharmacy, which leads to unintended therapeutic outcome.[3] Hence, frequent monitoring and special care are needed to avoid further complications in this age group. Drug utilization studies could provide feedback to prescribers and promote rational drug use.

In this study, an attempt has been made to describe the current prescribing pattern and rational use of antidiabetic drugs in geriatric age group.

Objectives

The objectives of the study were as follows:

1. To analyze the drug prescribing pattern of antidiabetic drugs in geriatric age group with type 2 DM.
2. To evaluate these prescriptions, for the rational use of antidiabetic drugs.

MATERIALS AND METHODS

A prospective, cross-sectional, observational study was conducted from January 2017 to June 2018 in the geriatric Department of Medicine at JSS Medical College and Hospital, Mysuru. After obtaining Institutional Ethical Committee clearance, type 2 DM patients above 60 years of either gender, with or without complications and comorbid conditions, were included in the study.

Patients having type 2 DM receiving treatment from other systems of medicine such as Ayurveda, homeopathy, and not willing for informed consent were excluded from the study.

After obtaining informed consent, the sociodemographic data and prescriptions were collected from geriatric diabetic patients and were analyzed for prescribing pattern and rational use of antidiabetic drugs. The following parameters were analyzed: Average number of antidiabetic drugs per prescription, percentage of different class of antidiabetic drug prescribed, commonest class and type of antidiabetic drugs prescribed, and percentage of antidiabetic drugs prescribed from essential drug list (WHO and Indian National Essential Drug List).[4,5]

The study data were subjected to suitable descriptive and inferential statistical analysis using Microsoft Excel and SPSS Version 23.0, with $P < 0.05$ which was considered to be statistically significant. Chi-square test was used for categorical data to test for the association and the data were expressed in terms of the actual number, mean, and percentages.

RESULTS

Five hundred (n = 500) geriatric patients, diagnosed to have type 2 diabetes, were analyzed. Out of which, 48% (n = 240) were male and 52% (n = 260) were female patients and 58% were aged between 60 and 69 years. About 56% of geriatric patients showed <5 years of duration of diabetes and hypertension was seen as the most common comorbid condition in about 56% geriatric patients [Table 1].

In 500 prescriptions studied, total number of drugs prescribed was 706 and average number of drugs prescribed per prescription was 0.7 [Table 2].

In this study, oral hypoglycemic agents were the most common class of antidiabetic drugs prescribed among which, metformin (30.59%) was the most commonly prescribed drug followed by sulfonylureas (25.08%) [Figure 1]. In this study, fixed-dose combination (FDC) accounted for 16%, of the total drugs prescribed among which combination of metformin, glimepiride, and voglibose (17.1%) was prescribed commonly followed by metformin, pioglitazone, and glimepiride (15.3%) and metformin with vildagliptin (15.3%) [Figure 2].

Table 1: The sociodemographic details of studied patients (n=500)

Characteristics	Frequency (%)
Age (years)	
60–64	124 (24.8)
65–69	166 (33.2)
70–74	73 (14.6)
75–79	74 (14.8)
80+	63 (12.6)
Gender	
Male	240 (48)
Female	260 (52)
Distribution of cases according to the illness	
Diabetics	160 (32)
Diabetics+Hypertension	200 (40)
Diabetics+Hypertension+Hypertriglyceridemia	80 (16)
Diabetics+ Hypertriglyceridemia	60 (12)
Duration of diabetes (years)	
<5	280 (56)
6–10	170 (34)
11–15	35 (7)
>15	15 (3)

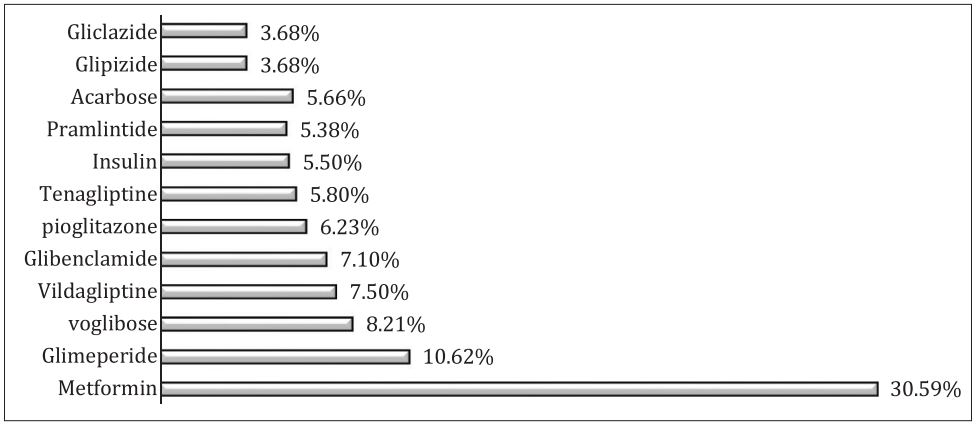

Figure 1: Different antidiabetic drugs prescribed among the studied prescriptions (*n* = 500)

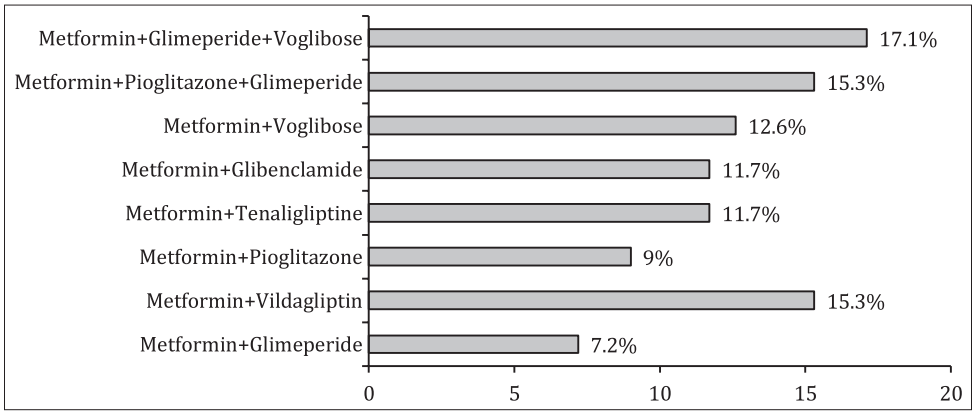

Figure 2: Distribution of fixed drug combinations among the studied prescriptions (*n* = 500)

Table 2: Prescribing indicators among the studied prescriptions (*n*=500)

Parameter	Number (%)
Total number of drugs prescribed	706
Average number of drugs prescribed per prescription	0.7
Number of prescriptions with monotherapy	335 (47.45)
Number of prescriptions with polytherapy	371 (52.5)
Number of drugs prescribed from the WHO essential drug list	295 (41.78)
Number of drugs prescribed by generic name	134 (18.9)
Number of FDCs	111 (16)
Number of prescriptions with parenteral preparations (insulin and pramlintide injections)	70 (10)
Number of prescriptions with oral preparations	636 (90)

FDC: Fixed-dose combination

DISCUSSION

The number of people with DMs is increasing due to population growth, aging, urbanization, increasing prevalence of obesity, and physical inactivity. Surveys were generally performed in the middle-aged population and data were limited at younger and older ages.[6,7]

A prescription-based survey is considered to be one of the most effective methods to assess and evaluate the prescribing pattern and rational use of drugs. In this study, an attempt has been made to describe the antidiabetic drug therapy and rational use of drugs in geriatric patients diagnosed to have type II DMs.

Hypertension was the most common comorbidity in patients with Type 2 DM seen in a study[8] and this study supports the same as it constituted 56% of patients with hypertension.

In this study, we have analyzed 500 prescriptions of geriatric patients, in which total number of antidiabetic drugs prescribed was 706 and average number of antidiabetic drugs prescribed per prescription was 0.7, when compared to the previous studies which recorded 1.95,[9] 2.60,[10] 3.03,[11] and 4.07[12] from various specialty clinics in India. The lower number of drugs prescribed is a welcome sign and needs to be encouraged, as it may lead to increase in compliance, lower cost of therapy, and finally decreased risk of drug interactions.

It was observed that the inclination to brand name prescription was more. Drugs prescribed by generic name accounted for 18.9% and drugs from essential drug list were 41.78%. Percentage of generics and drug use from the essential drug list was low when compared to that of Sutharson *et al*. study.[13]

Our study showed that 90% of patients received oral hypoglycemic medications and 10% received injections. Hence, more number of geriatric patients was on oral hypoglycemic drugs than on injections.

Few studies showed that metformin alone or in combination was the most frequently prescribed drugs and glimepiride was the most commonly prescribed second-generation sulfonylurea drug.[14] The present study supports the same, metformin constituted 66% which was prescribed alone or in combination with other oral hypoglycemic drugs or insulin. This reflects that metformin is still the choice of most physicians in the treatment of Type 2 diabetes in geriatric patients.

The study showed, prescriptions with monotherapy were more which constitute 47.45% and indirectly indicate that more number of geriatric patients blood sugar was under control with single drug.

FDCs which were encountered during this study were 16% among the total drugs prescribed. Metformin, glimepiride, and voglibose (17.1%) were most commonly prescribed, followed by metformin, glimepiride, and pioglitazone (15.3%) and then metformin with vildagliptin (15.3%). This showed that FDCs of oral hypoglycemic drugs prescribed by the physicians were increasing.

The study strongly highlights the domination of OHA therapy with the usage of less number of drugs from essential drug list and more number of drugs prescribed in brand names. Hence, there is a need to further improve the prescription of the drugs from essential drug list and by generic name as it would lead to rational use of drugs.

CONCLUSION

In geriatric patients, metformin was predominantly prescribed oral antidiabetic drug both as monotherapy as well as combination therapy. Glimepiride, metformin, and voglibose were the most commonly prescribed FDC. Prescribing drugs by brand name were high and from essential drug list were low. Hence, prescribing drugs by generic name and drugs from essential drug list have to be encouraged. Number of drugs prescribed per prescription was decreased which was a welcome sign and needs to be encouraged.

REFERENCES

1. Brunton L, Chabner B, Knollman B. Goodman and Gilman's. The Pharmacological Basis of Therapeutics. 12th ed., Vol. 1. Oxford: Oxford University Press; 2006. p. 1493-4.
2. Huang ES, Sachs GA, Chin MH. Implications of new geriatric care guidelines for the assessment of quality of care in older patients. Med Care 2006;44:373-7.
3. Chester BG. Polypharmacy in elderly patients with Diabetes. Diabetes Spectrum 2002;15:240-8.
4. National List of Essential Medicines of India 2011. Ministry of Health and Family Welfare, Government of India. Available from: http://www.pharmaceuticals.gov.in/NLEM.pdf. [Last accessed on 2012 Jan 10].
5. World Health Organization Essential Medicine List. Geneva: World Health Organization; 2011. Available from: http://www.whqlibdoc.who.int/hq/2011/a95053_eng.pdf. [Last accessed on 2012 Jan 10].
6. Kesadev JD, Short KR, Nair KS. Diabetes in old age: An emerging Epidemic. J Assoc Physicians India 2003;51:1083-94.
7. Chelliah A, Burge MR. Hypoglycemia in elderly patients with DM. Causes and Strategies for prevention. Drugs Aging 2001;21:511-30.
8. Paul WL, Katzung BG. Rational prescribing and Prescription writing. In: Bertram GK, Susan BM, Anthony JT, editors. Basic and Clinical Pharmacology. 11th ed. New York: McGraw Hill; 2009. p. 1127-36.
9. Biswas NR, Jindal S, Siddiquei MM, Maini R. Patterns of prescription and drug use in ophthalmology in a tertiary hospital in Delhi. Br J Clin Pharmacol 2001;51:267-79.
10. Biswas NR, Biswas RS, Pal PS, Jain SK, Malhotra SP, Gupta A, *et al*. Patterns of prescriptions and drug use in two tertiary hospitals in Delhi. Indian J Physiol Pharrnacol 2000;44:109-12.
11. Nishandar TB, Kale AS, Pise HN. Drug utilization pattern in geriatric patients attending outpatient department at rural tertiary care hospital in maharastra. Asian J Pharm Clin Res 2017;10:314-6.
12. Ramachandran G, Rohith V, Topno I. Evaluation of prescribing pattern of anti-diabetic drugs using WHO prescribing indicators in a tertiary care hospital in Puducherry: A cross-sectional study. Pharm Innov J 2015;4:76-80.
13. Hermansen K, Mortensen LS, Hermansen M. Combining insulins with oral antidiabeticagents: Effect on hyperglycemic control, markers of cardiovascular risk and disease. Vasc Health Risk Manag 2008;4:561-74.
14. Sora ML, Jane G, Kelly IQ, William AA, Brent LK. Manitoba care project: Examining trends in diabetes therapy prescribing patterns in Manitoba. Can J Diabetes 2006;30:248-55.

How to cite this article: Pushpa VH, Nagesh HN, Ramesh HS. Study on prescribing pattern and rational use of antidiabetic drugs in elderly patients with type 2 diabetes mellitus in tertiary care hospital. Natl J Physiol Pharm Pharmacol 2020;10(10):825-828.

Source of Support: Nil, Conflicts of Interest: None declared.