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Research Article

Drug utilization study of antihypertensive drugs in hypertensive diabetic patients in a tertiary care hospital

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ABSTRACT

Background: Diabetes along with hypertension is a very common ailment afflicting millions of people worldwide. The socio-economic stress caused by the morbidity and mortality associated with it is mind boggling. Hence, this study was undertaken to study the utilization of antihypertensive drugs in hypertensive diabetic patients.
Methods: A prospective study was conducted on 100 hypertensive diabetic patients aged between 18 and 90 years of either gender attending Basaveshwar Teaching and General Hospital, Kalaburagi. The data collected were statistically analyzed and presented as counts and percentages.
Results: In our study, we found that majority (63%) were male patients and majority belonged to 51-70 years age group. The majority of the patients were prescribed angiotensin converting enzyme inhibitors (ACEIs) alone (19%), followed by a combination of ACEIs and calcium channel blockers (9%). The generic prescribing was only 23%, and patient's knowledge of correct dosage was 64%.
Conclusion: In this study, it has been observed that the antihypertensives drugs were prescribed rationally, but the generic prescribing was only 23% which is inappropriate prescribing behavior. Hence, physicians should be educated to prescribe drugs in the generic name so that the cost of drugs is reduced.

Keywords: Angiotensin-converting enzyme inhibitors, Antihypertensive, Drug utilization, WHO core indicators

INTRODUCTION

The incidence of hypertension and diabetes mellitus is rising on an alarming rate in the developing countries. In the developing world, the number of people living with diabetes is expected to rise from 366 million in 2011 to 552 million by 2030 which means approximately three new cases every 10 sec or almost 10 million/year.[1]

Hypertension is one of the leading causes of the global burden of disease. Hypertension is the most important modifiable risk factor for coronary heart disease, stroke, congestive heart failure, end-stage renal disease, and peripheral vascular disease.[2]

Drugs play an important role in improving human health and promoting well-being. However, to produce the desired effect, they have to be safe and efficacious and have to be

used rationally.[3] Errors in prescription are not uncommon and could be due to ignorance[4] or inadequate knowledge about the disease[5] and pharmacology of the drugs prescribed.[6]

The drug utilization study helps to evaluate these problems and suggest modifications in prescribing practices of physicians. This practice ensures rational pharmacotherapy and assures quality medical care to the patients.[7] Since hypertension and diabetes mellitus frequently occur together in a patient, this study was undertaken to study the utilization pattern of antihypertensive drugs in hypertensive diabetic patients in a tertiary care hospital.

METHODS

A prospective study was conducted on 100 hypertensive diabetic patients aged between 18 and 90 years of either gender attending Basaveshwar Teaching and General Hospital, Kalaburagi. The duration of this study was 15 months from December 2013 to March 2015.

Once the consultation by the physician is over, the prescriptions were copied, and the patients were interviewed as per the WHO guidelines.

Following (WHO core indicator) drug used indicators were determined:
1. Prescribing indicator
2. Patient care indicator
3. Facility indicator
4. Complimentary indicator.

Ethics committee approval

Prior ethics committee approval was obtained from Institutional Ethics Committee.

Statistical analysis

The data collected were statistically analyzed and presented as counts and percentages.

RESULTS

The majority of the patients in our study were males (63%). Most of the patients were in the age group of 51-60 years. The majority of cases were old cases, which were previously diagnosed. 6-10 drugs were administered in the majority of patients. Most common antihypertensive drug class prescribed was angiotensin converting enzyme inhibitors (ACEIs). The defined daily dose (DDD) of drugs and WHO indicators are presented in Tables 1-5.

DISCUSSION

Diabetes along with hypertension is a very common ailment afflicting millions of people worldwide. The socio-economic stress caused by the morbidity and mortality

Table 1: Age-wise distribution of patients.

Age groups (in years)	Number of patients	Percentage
18-30	1	1
31-40	5	5
41-50	15	15
51-60	34	34
61-70	26	26
71-80	12	12
81-90	7	7

Table 2: Distribution of patients according to average number of drugs administered.

Number of drugs	Number of patients	Percentage
0-5	46	46
6-10	52	52
>11	2	2

Table 3: Distribution of patients according to the drugs administered.

Drug groups	Number of patients	Percentage
ACEIs	19	19
ARBs	7	7
β blockers	7	7
CCBs	7	7
ACEIs+ARBs	3	3
ACEIs + β blockers	5	5
ACEIs+CCBs	9	9
ACEIs+diuretics	7	7
ACEIs+αβ blockers	3	3
ARBs+β blockers	1	1
ARBs+CCBs	5	5
ARBs+diuretics	7	7
β blockers+CCBs	4	4
β blockers+diuretics	1	1
CCBs+diuretics	2	2
CCBs+αβ blockers	1	1
Diuretics+αβ blockers	2	2
ACEIs+ARBs+diuretics	2	2
ACEIs+CCBs+diuretics	4	4
ARBs+β blockers+diuretics	1	1
ARBs+CCBs+diuretics	1	1
ACEIs+diuretics+ CCBs+αβ blockers	1	1
ARBs+ β blockers+ CCBs+diuretics	1	1
Total	100	100

ACEIs: Angiotension converting enzyme inhibitors, ARBs: Angiotension receptor blockers, CCBs: Calcium channel blockers

Table 4: Comparison of DDD obtained from our study with the WHO-DDD.

Name of drug	ATC-code	WHO-DDD (mg)	Obtained DDD (mg)
Enalapril	C09AA02	10	15
Ramipril	C09AA05	2.5	2.6
Perindopril	C09AA04	4	4
Losartan	C09CA01	50	40
Telmisartan	C09CA07	40	26.6
Furosemide	C03CA01	40	72
Atenolol	C07AB03	75	26
Amlodipine	C08CA01	5	14

ATC: Anatomical therapeutic chemical, DDD: Defined daily dose

Table 5: Prescribing indicators.

Prescribing indicators	Data
Average drugs prescribed	6.04
Generic drugs	23%
Prescription of (%)	
Antihypertensives	100
Antimicrobials	12
Antiulcer	74
Injections	32
On essential drug list	94
Duration of antimicrobial treatment (days)	5

Figure 1: Gender wise distribution of patients.
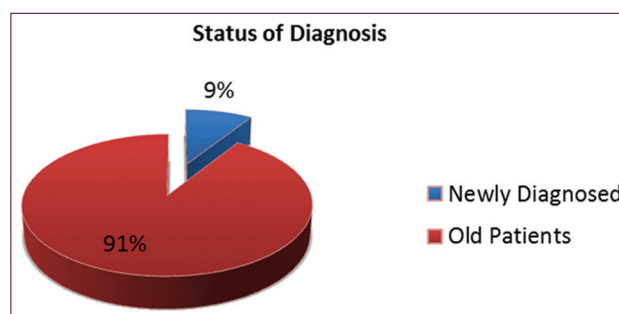
Figure 2: Distribution of patients according to status of diagnosis.

associated with it is mind boggling. Our study aimed to provide a clearer picture regarding the same so as to achieve a better understanding of the disease process, the pharmacotherapeutic and the economic implications involved.[8]

According to our study, a majority of hypertensive-diabetics encountered by us were males (63%) (Figure 1). This reflects the overall higher prevalence of this disease process in the male gender, which in turn can be linked to other factors more common in males such as cigarette smoking, alcohol consumption, strenuous lifestyle, etc.[9]

In our study, we found an overwhelming majority of the patients to be in the age group of 51-60 years (34%) and 61-70 years (26%) (Table 6). This is in concordance with various other studies which implicate this disease process to be linked to late middle age and the elderly age group. Various factors contribute to the development of hypertension and diabetes mellitus in this susceptible age group which have been quoted in many a studies.[10,11]

Figure 2 of our study clearly depicts that a majority of the patients were previously diagnosed (91%), and newly diagnosed cases formed are just 9% of the total population under study. This reflects the better awareness among people and the better tools of diagnosis available to physicians even
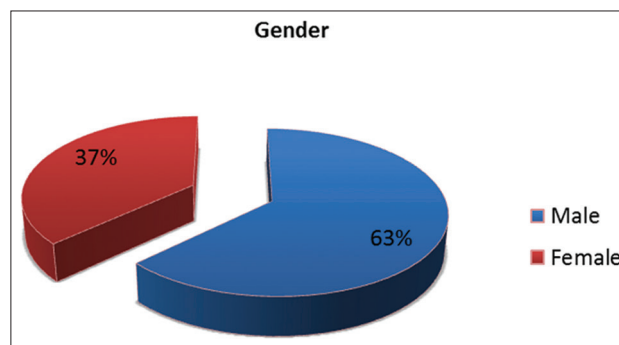
in relatively remote areas. Early identification and treatment of hypertensive-diabetics can vastly reduce the morbidity and mortality associated with the disease process.

According to Table 7 of our study, 46% were prescribed 0-5 drugs on an average per day, and 52% were prescribed 6-10 drugs on an average per day. This reflects the growing trend of current medical practitioners regarding the practice of polypharmacy. This practice needs to be reduced because it can cause economic burden on patients as well as it increases the risk of adverse drug reactions and drug interactions.[12-14]

According to our study, from Table 8 we infer that an overwhelming majority of the patients were prescribed ACEIs alone (19%), among the drug combinations prescribed ACEIs and calcium channel blockers combination was frequently prescribed (9%). This reiterates the view from many studies which state the role of ACEIs as first choice drugs in the treatment of diabetic-hypertensives.[15-17]

Controversial drug combinations include the use of ACEIs and angiotension receptor blockers (ARB) simultaneously. At present, there is conflicting evidence regarding the advisability of combining an ARB with an ACEI in heart failure patients. The Candesartan in Heart Failure Assessment of Reduction in Mortality (additive) and the Valsartan on Heart Failure studies indicate that this combination decreases morbidity and mortality. In contrast, the VALIANT and Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint findings show no added benefits with combination therapy, which was associated with more adverse effects.

Table 6: Patient care indicators.

Patient care indicators	Data
Average consultation time (in minutes)	7.8
Average dispensing time (in minutes)	14.1
Drug dispensed	96%
Adequate knowledge	64%

Table 7: Facility indicator.

Facility indicator	Data
Availability of essential drug list	Yes
Key drugs available	92%

Table 8: Complimentary indicators.

Complimentary indicators	Data
Without drugs with meal plan	0%
Average drug cost (Rs.) prescription	327.52
Drug cost on injection	315.48

Table 1 compares the obtained DDD with the WHO-DDD. Although most of the drugs are prescribed as per WHO-DDD, some drugs showed significant deviation from the WHO-DDD. Drugs such as furosemide (72 mg) and amlodipine (14 mg) exhibited an obtained DDD which is almost twice the WHO-DDD. This represents an indiscriminate use of these drugs in our hospital. However, drugs such as atenolol (26 mg) showed a DDD which was half of the WHO-DDD. This shows the inadequate knowledge of the prescribers regarding the dosage schedule of such drugs.

The main purpose of the DDD system was to provide a tool for presenting drug utilization studies, which would allow the measurement of drug consumption across the therapeutic group.

In our study the generic prescribing was only 23%, which is very less (Table 2). The doctors should be educated to prescribe drugs by generic name so that the cost of drugs is reduced. Patient's knowledge of correct dosage was 64% (Table 3). The doctors and pharmacist should give more time to patient to improve the patient's knowledge about correct dosage. 96% of drug cost was spent on injections which is high but inevitable.

Limitations of the study

The study included small sample size and was conducted in only one center. This can be overcome by conducted study on a larger sample and in multiple centers.

CONCLUSION

In the present study, it has been observed that the antihypertensives drugs were prescribed rationally but the generic prescribing was only 23% which is inappropriate prescribing behavior. Hence, physicians should be educated to prescribe drugs in the generic name so that the cost of drugs is reduced. The rational and cost-effective prescribing can be promoted by periodically conducting drug utilization studies and training doctors regarding the need of rational prescribing by conducting continuing medical education programs.

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