Prescription monitoring of anti-hypertensive drug utilisation at the Panjab University Health Centre in India

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ABSTRACT

Introduction: The present pilot study was conducted in order to establish the drug-prescribing trend of anti-hypertensive agents at the Panjab University Health Centre in India.

Methods: A pilot study of six-month duration was conducted at the Panjab University Health Centre. The information was collected from the patients attending the outpatient department through a random sample method. World Health Organisation-based prescription-auditing proforma was used for data collection.

Results: This study revealed that most of the male patients were on monotherapy (60 percent). In the monotherapy category, four classes of drugs were used. These were calcium channel blockers (48.1 percent), beta-blockers (46.2 percent), ACE inhibitors (3.9 percent) and diuretics (1.9 percent). Among monotherapy drugs, calcium channel blockers were prescribed most whereas diuretics were least used. Among those who were treated with drug combinations, 92.1% received two drugs and 7.9 percent received three drugs. In combination therapy, a two-drug combination consisting of beta-blockers and calcium channel blockers was given to the majority of the patients. Overall, 57.8 percent patients were treated with a single anti-hypertensive drug and 42.2 percent were treated with anti-hypertensive drug combinations.

Conclusion: The present study represents the current prescribing trend for anti-hypertensive agents and it highlights certain shortcomings in the existing prescribing practice. There is a considerable scope for improvement, particularly the under-utilisation of diuretics in the present prescribing pattern of anti-hypertensive drugs.

Keywords: anti-hypertensive drugs, drug utilisation, hypertension, prescribing pattern, prescription monitoring

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INTRODUCTION

Hypertension is one of the major chronic diseases resulting in high mortality and morbidity in today's world[1,2]. Socio-economic, behavioral, and nutritional and public health issues have also led to increase in cardiovascular disease (CVD) throughout the world. A plethora of new drugs are now available, and the quality of life for these patients has altered for the better. A number of drugs in various combinations[3-5] are generally used for effective long-term management. Therefore, drug utilisation studies, which evaluate, 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[6,7].

The present prescription monitoring study for anti-hypertensive drugs was undertaken in the outpatient department (OPD) of Panjab University Health Centre. A pilot study was conducted in order to establish the current trend of drug prescribing of anti-hypertensive drugs at Panjab University Health Center (PUHC). This kind of medical audit highlights the lacunae in the present prescribing practice of physicians and help in improving the patient health care further.

METHODS

The PUHC, also named as Bhai Ghanayia Ji, caters to the health needs of a campus community consisting of students, faculty, non-teaching and administrative staff and their family members, numbering about 25,000 people. The PUHC is located centrally on the Panjab University Campus, Sector 14, and Chandigarh. The medical staff of the health centre includes one chief medical officer (CMO), seven physicians, part-time specialists, dentist, physiotherapist, seven pharmacists, three nurses, one clerk, and other supporting staff.

The pilot study was started at PUHC after getting official consent of the CMO to collect the information from the patients attending the OPD through a chance random sample method. The protocol (proforma) was prepared as per World Health Organisation (WHO) – based guidelines[8] (Appendix I) and the institutional ethical committee (IEC) of Panjab University approved it. At the initial stage, with the exception of the CMO,

Appendix I

PRESCRIPTION MONITORING PROFORMA

Patient Demographics

Name: _____ Age: _____ Sex: _____

Occupation: _____

Socio-economic parameter: _____

Diseases diagnosed: _____

Investigations done: _____

Duration of disease: _____

Drug prescribed					
Name/Type	**Ind/Com**	**Dose/Freq/Dur**	**Dosage form**	**Generic/Brand**	**Drug Disp Y/N**

Patient care indicators

A. Average dispensing time

Adequate labeling: _____

Instruction (O/W): _____

B. Patient knowledge on medication

Awareness: _____

Patient compliance: _____

Prescriber's

Name: _____

Qualification: _____ Date: _____

doctors were not informed regarding the study protocol in order to assess the current prescribing trend and dispensing practice. The patients who co-operated were interviewed and information collected through patient counseling and self-observation in a semi-structured coded proforma. There was no criterion of fixed dates for prescription refilling of chronically-ill patients during the study period. However, the majority of such patients usually visit on the first or second week of every month. Most of the audit was therefore conducted during the first two weeks of every month, from September 2002 to February 2003.

Information was collected from chronically-ill patients who visited PUHC, such as those suffering from hypertension, only by using their individual health cards. Generally, the physician writes the prescription on the prescription card after examining the patients, and the pharmacist dispenses the medication after registering the prescribed medication in the record register. Those cards, which included anti-hypertensive drugs, were audited, and analysed category-wise. Further, we also tried to segregate the patients based on the socio-economic criteria. Patients were categorised into three categories. Gardeners, security guards, white-washers and peons were recorded as grade III employees, clerical staff as grade II employees, and teachers or people in administration were grade I employees.

Patients with any stage of hypertension only were included in the study. Those who suffered either from ischaemic heart disease, congestive cardiac failure, dysrrhythmias or diabetes, or had other co-morbidities such as asthma and peptic ulcer diseases were excluded. These patients were not new, usually had a history of hypertension for a long time, and usually consulted the physicians on fixed dates (first two weeks of each month) in each month, as their prescriptions were refilled on a monthly basis and also to reduce the rush during OPD timing.

The following drugs were dispensed from PUHC for hypertension as per the approved drug list available in the health centre: β-blockers (i.e. atenolol), calcium channel blockers (i.e. amlodipine, immediate- and sustained-release nifedipine, immediate-release diltiazem), and angiotensin-converting enzyme (ACE) inhibitors (i.e. enalapril).

RESULTS

During the whole study period, a total of 161 prescriptions were monitored, of which 71 were excluded as per the exclusion criteria. The remaining 90 had uncomplicated

Table I. Demographic characteristics of hypertensive patients undergoing monotherapy and combination therapy.

Age groups (in years)	Male n=35	Female n=55	All patients n=90
30-39	1 (2.9%)	3 (5.6%)	4 (4.4%)
40-49	6 (17.1%)	18 (32.7%)	24 (26.7%)
50-59	10 (28.6%)	20 (36.4%)	30 (33.3%)
60-69	15 (42.9%)	9 (16.4%)	24 (26.7%)
70-79	2 (5.7%)	5 (9.1%)	7 (7.8%)
80-89	1 (2.9%)	0 (0.0%)	1 (1.1%)
Mean age (years)	59	54.1	56
Range (years)	30-89	30-79	30-89
Monotherapy	21 (60%)	31 (56.4%)	52 (57.8%)
Combina tion	14 (40%)	24 (43.6%)	38 (42.2%)

n: number of patients

Table II. Monotherapy and combination therapy of hypertensive patients.

Drug therapy	Monotherapy vs. combination therapy (%)	Combination therapy (%)
Monotherapy (n=52)	57.8%	–
Two-drug combination (n=35)	38.9%	92.1%
Three-drug combination (n=3)	3.3%	7.9%

n: number of prescriptions.

Table III. Anti-hypertensive two-drug combination therapy among male and female patients.

Combination therapy two-drug regimens	Male no. (%)	Female no. (%)	Total no. (%)
B+C	13 (100%)	19 (86.4%)	32 (91.4%)
B+D	0 (0%)	1 (4.6%)	1 (2.9%)
B+A	0 (0%)	1 (4.6%)	1 (2.9%)
D+C	0 (0%)	1 (4.6%)	1 (2.9%)
Total n(%)	13 (100%)	22 (100%)	35 (100%)

Key: A:ACE inhibitor; B: β-blocker; C: calcium channel blocker; D: diuretic.

Table IV. Monotherapy and overall utilisation in hypertensive patients.

Anti-hypertensive drugs	Monotherapy frequency (%)	Overall drug utilization* frequency (%)
Calcium channel blockers	25 (48.1%)	61 (67.8%)
β-blockers	24 (46.2%)	61 (67.8%)
ACE inhibitors	2 (3.9%)	5 (5.6%)
Diuretics	1 (1.9%)	4 (4.4%)
Total	52 (100%)	131 (145.6%)**

* Overall drug utiltisation included both monotherapy and combination therapy.
** Total exceeds 100%, since the average patient received more than one drug.

hypertension (38.9% were males and 61.1% were females). The demographic and medical characteristics of 90 hypertensive patients are presented in Table I. The socioeconomic status of hypertensive patients showed that 12 (13.3%) males and 12 (13.3%) females were grade I employees, 17 (18.9%) males and 34 (37.8%) females were grade II, and 6 (6.7%) males and 9 (10%) females were grade III employees.

The percentage and corresponding number of patients who received either monotherapy or combination therapy i.e. two or three drug regimens, is shown in Table II. Overall, 57.8% patients were treated with a single anti-hypertensive drug, and 42.2% were treated with anti-hypertensive drug combinations. Among those who were treated with drug combinations, 92.1% received two drugs and 7.9% received a regimen of three drugs.

We observed that four different two-drug anti-hypertensive combinations were prescribed to hypertensive patients (Table III), namely: a β-blocker with a calcium channel blocker (91.4%), a β-blocker with a diuretic (2.9%), a β-blocker with an ACE inhibitor (2.9%), and a diuretic with a calcium channel blocker. The β-blocker with a calcium channel blocker was the most frequently-prescribed two-drug combination in both genders and was more frequently used in males (100%) than in females (86.4%).

Table IV presents the prescription pattern and rate of anti-hypertensive drugs prescribed for hypertensive patients, both as monotherapy and overall utilisation (monotherapy and combination therapy). Among the monotherapy category, only four classes of drugs were used, namely: calcium channel blockers (48.1%), β-blockers (46.2%), ACE inhibitors (3.9%) and diuretics (1.9%). In the overall utilisation pattern, calcium channel blockers (amlodipine and nifedipine; 67.8%) and β-blockers (atenolol; 67.8%) were both the most frequently prescribed classes, followed by ACE inhibitors (enalapril and ramipril; 5.6%) and diuretics (triamtrene and benzthiazide combination "Ditide", chlorthalidone and indapamide; 4.4%).

DISCUSSION

A prescription-based survey is considered to be one of the most effective methods to assess and evaluate the prescribing attitude of physicians[9] and dispensing practice of pharmacists. It is also important to consider the recommendations of international bodies on hypertension that help to improve prescribing practice of the physicians and ultimately, the clinical standards. A continuous supervision is therefore required through such kinds of systematic audit, that provide feedback from the physician and help to promote rational use of drugs. The present study observed that hypertension was more prevalent in females than in males. Monotherapy and combination therapy were both more used in females at rates of 56.4% and 43.6%, respectively. These results supported the work of Hansson et al that showed blood pressure could be adequately controlled with the help of combination therapy[3]. Furthermore, combination therapy seems to be a rational approach to reduce the cardiovascular mortality[10].

The present study revealed that calcium channel blockers were the drugs of choice for hypertensive patients as a single drug therapy and overall utilisation, followed by β-blockers which were less prescribed as a monotherapy but had similar overall drug utilisation as calcium channel blockers (Table IV). Diuretics are

generally recommended as first-line therapy for treatment of hypertension (JNC V; JNC VI). Utilisation of diuretics in the present study was 1.9% as monotherapy, and overall utilisation was 4.4%. Lesser use of diuretics in the present study may be due to adverse effect of diuretics on glucose homeostasis and lipid profile[11]. The efficacy of ACE inhibitors on blood pressure was reported to be marked in patients with an activated renin-angiotensin-aldosterone system[12]. This study showed that overall drug utilisation of ACE inhibitors was 5.6%, with 3.9% as monotherapy, which was lesser in number as compared to other drugs such as calcium channel and β-blockers (Table IV).

Earlier studies also suggested that an ideal combination must include anti-hypertensives drugs possessing complementary modes of action that provide a synergistic anti-hypertensive effect without any significant adverse effects, at low doses. Further more, the anti-hypertensive drug combination therapy should be able to minimise or counteract the reflex compensatory mechanisms that often limit the fall in blood pressure[13]. In the present study, two-drug combinations were mostly prescribed (92.1%, Table II), followed by three-drug combinations (7.9%). In two-drug combinations, a β-blocker with a calcium channel blocker were most often prescribed (91.4%, Table III), followed by a β–blocker with a diuretic (2.9%) or ACE inhibitor (2.9%). A β-blocker with a calcium channel blocker was prescribed more in females than males. The more likely reason for this gender difference may be related to the adverse effect of β-blockers on sexual function in men[14].

The two-drug regimen, i.e. atenolol and amlodipine combination, was most often prescribed. In this form of combination and in addition to its favourable complementary synergistic effects, β-blockers tend to blunt the troublesome complementary reflex tachycardia induced by the short-acting dihydropyridine (DHP) class of calcium channel blockers. The latter may additionally counteract any peripheral vasoconstriction caused by the former. Their combined efficacy has been confirmed[3,15,16] without causing adverse drug interaction or poor tolerability. The fixed combination of β-blocker and calcium channel blocker provides efficiency and tolerability in the treatment of arterial hypertension[17].

Data on the socioeconomic status showed that grade II employees suffered more from hypertension than grade I and III females (37.78%) as compared to males (18.89%). This was followed by grade I employees, both males and females, which constituted 13.1% and 13.1%, respectively. There is therefore an urgent need to create awareness among class II employees for effective management of the problem and their prevention. Pharmacists play an important role in educating the patient about the drugs and dosages schedule. It was noticed that pharmacists who distribute the medicines did not give adequate written or oral instructions. However, most of the hypertensive patients were aware of their dosing schedule but not about the nature of the drugs that they were taking.

In conclusion, based on the baseline data and lacunae in the present prescribing practice, such as under-utilisation of diuretics and inadequate oral instructions by pharmacists, an intervention study is warranted to further improve the current prescribing trend in the management of hypertension.

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