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RESEARCH ARTICLE

A Study of Prescription Pattern and Compliance of Anti-hypertensives with the Treatment Guidelines in Aseer Region; Saudi Arabia

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Abstract: ***Background*:** A prescription study is an effective method to evaluate irrational prescribing practice. Hypertension is one such major chronic disease. Compliance to guidelines like the JNC-8 (Eighth Joint National Committee) and Saudi Hypertension guidelines is highly recommended to prevent future complications.

***Objective*:** We conducted this study to assess prescribing pattern and their compliance with the guidelines in the patients.

***Methods*:** A Retrospective cross-sectional study was carried out for 7 weeks in 2017 in Aseer region, Abha, Saudi Arabia on 122 outpatient prescriptions which were included by Non-probability convenience sampling technique. Data from patients aged above 18 years with any stage of Hypertension with or without Diabetes Mellitus was collected.

***Results*:** It was found that Angiotensin converting enzyme inhibitors were frequently prescribed as monotherapy in patients with Hypertension with or without Diabetes Mellitus which is in compliance to the guidelines. Beta-blockers were most commonly used in 2 and 3 drug therapy of patients with only Hypertension which was not in accordance with the guidelines.

***Conclusion*:** By this it could be concluded that the Prescription pattern of Anti-hypertensive in Aseer Region was in compliance with both the guidelines to a partial extent. Though most of the prescriptions were rational, further improvement was required. Studies that focus on demographic data, economic status, associated conditions and complications would give additional insights into prescribing patterns in hypertension.

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1. INTRODUCTION

1.1. Prescription Pattern

A prescription-based study is known as an effectual and a helpful method to examine the prescribing pattern of the physicians [1].

Irrational prescribing of a drug during the treatment of many diseases is a common practice worldwide; it also results in increased morbidity, mortality and also the economic burden on the society [2].

Hypertension is one of the prime chronic diseases. Over 972 million people in the world suffer from this problem, posing a high risk of mortality and morbidity [3, 4]. In Saudi Arabia also, it has affected a considerable proportion of the popula-

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tion, being one of the prevalent risk factors. The urban population is on par in prevalence with 27.9%, when compared with the rural population with a prevalence of 22.4% [5].

Anti-hypertensive agents should therefore be selected primarily based on their comparative ability to prevent complications like coronary artery disease, congestive heart failure, chronic kidney disease, diabetes mellitus to mention a few [6]. Recommendations of various guidelines are available, which provide algorithms for the treatment as per the stages of hypertension [7]. The purpose of these guidelines is to amalgamate the available scientific evidence and offer guidance to burdened primary care clinicians.

There is a guideline known as the JNC-8 (Eighth Joint National Committee) which has recently released protocols that are evidence-based for the treatment, their goals as well as the drugs used in the management of hypertension in adults and the guideline is to be followed by the physicians all around the world. According to these guidelines, the initial drugs of choice for hypertension are in a sequence of ACE inhibitor (ACEI), Angiotensin receptor blocker (ARB), Thiazide diuretic and then Calcium channel blocker (CCB).

Whereas, there is another guideline which is followed specifically in Saudi Arabia known as "The Saudi Hypertension Guidelines". According to the guidelines, approaches towards the management of hypertensive patients include interventions for treating elevated blood pressure and other cardiovascular risk factors which can be reversible. This can be achieved by lifestyle modifications, in most of the cases, we may need drug therapy. The therapy should be initiated for patients with uncomplicated HTN with any of these agents: THZ-Ds, ACE-Is , CCBs, βBs (for patients < 60 years of age), ARBs .

Bakare OQ *et al*. (2016) and Krishna M (2015) conducted a similar study on the use of anti-hypertensives and concluded that the prescribers followed the JNC-7 guidelines [7, 8].

Whereas a similar study was conducted by Bipin BP *et al*. and Shukrala F, Gabriel T (2015) which stated that their prescribers were not following the JNC-7 guidelines [9, 10]. Whereas a study conducted by Jarari N (2015) stated that there was a need of special attention to the management of hypertension and also recommended to follow standard guidelines for prescribing anti-hypertensives so as to promote their rational use [11].

Taking into consideration the importance of rational medication use and the impact of following the treatment guidelines, the present study was designed to analyze the prescribing patterns of anti-hypertensives and to determine their adherence to the guidelines.

1.2. Aim of the Study

This study basically aims to assess the drug prescribing pattern of antihypertensive agents in patients with only hypertension as well as in patients with both hypertension and diabetes mellitus and check whether the current prescribing pattern of anti-hypertensives is in accordance with JNC-8 (Eighth Joint National Committee) and Saudi hypertension guidelines or not.

2. MATERIALS AND METHODS

2.1. Method of Data Collection

A retrospective cross-sectional observational study was conducted in two different hospitals in Aseer region of Abha, Saudi Arabia. Ethical approval was also obtained to carry out our study.

A sample size of 122 out-patient prescriptions was collected from the patients diagnosed with only hypertension and with hypertension and diabetes mellitus of both the genders. The targeted sample size was calculated by using a Raosoft sample size calculator (http://www.raosoft.com/samplesize.html) with a predetermined margin of error of 5% and a confidence level of 90%. In order to minimize erroneous findings and to increase study reliability, the mínimum target sample size was set at 271. The sample size was based on the inflow of patients to those hospitals and the variance of Aseer región population as mentioned in the annual Health statistic book 2016, published by the Ministry of Health, Saudi Arabia [12]. The targeted subjects were included by the non-probability convenience sampling technique in this study.

2.1.1. Inclusion Criteria

i. Patients of age 18 years and above of both the genders.

ii. Prescriptions with the diagnosis of hypertension alone and with hypertension and diabetes mellitus.

2.1.2. Exclusion Criteria

Pregnant women were excluded from this study.

A specially designed proforma was used for data collection was which constituted of part A: the patient's demographic details (Age, Gender, Ht, Wt), BP, comorbidity and in part B: antihypertensive drugs prescribed in patients diagnosed with hypertension and patients with both hypertension and diabetes mellitus.

The variables taken into consideration were age, gender, patients with comorbidity diabetes mellitus, drug therapy (monotherapy, two-drug combination, three-drug combination).

2.2. Tool of Research

- Medical prescriptions of patients were used to obtain diagnostic, demographic and drug use information.
- An appropriate structured data collection form was used to carry out this study.

This form was comprised of 2 sections;

Section A: It included details about the demographic variables of the subject.

Section B: Antihypertensive drugs prescribed in patients diagnosed with hypertension and patients with both hypertension and diabetes mellitus.

2.3. Method of Data Analysis

A descriptive statistical analysis method was used to calculate the percentage of the antihypertensives as a single-drug therapy, two-drug combination, three-drug combination therapy being used in patients with only hypertension and hypertension and diabetes mellitus by using MS-Excel 2013 and SPSS. A correlation study was carried out to compare the studies which were in accordance with the guidelines.

3. RESULTS

3.1. Gender Wise Distribution of Patients

Out of 122 prescriptions which we collected during our study, males were 71 *i.e* (58%) and females were 51 *i.e* (42%) diagnosed with hypertension alone and hypertension and diabetes mellitus.

3.2. Age-wise Distribution of Patients

In this study, we found that most of the patients belonged to the age-group of 56-65years, followed by the age-group of 66-75 years. We found that very few people belonged to the age-group of more than 96 years. So we could say that HTN was the most prevalent in the age-group of more than 55 years.

3.3. Distribution of Mono-drug Therapy in Patients with only HTN

From this Table (**1**) we can conclude that most of the patients were frequently prescribed with ACEI or CCB in (32%) patients as a choice of drug as a mono drug therapy regimen. Whereas the other drug categories like ARB (16%), and beta-blockers (13%) were prescribed less frequently. The least frequently prescribed drug category in mono-drug therapy was diuretics in (7%) of patients.

3.4. Distribution of Mono-drug Therapy in Patients with HTN + DM

ACEI (52%) were the most frequently prescribed drug as a monotherapy in patients diagnosed with HTN and also had a comorbidity DM followed by CCB (21%), ARB (14%), beta-blockers (10%), whereas THZ-D were least frequently prescribed (3%) as shown in Table (**2**).

3.5. Percentage of 2-drug Regimen Prescribed in Patients with HTN, HTN+DM

This Table (**3**) explained about the antihypertensives used as a 2-drug therapy combination. The most frequently used drugs as 2 drug

Table 1. Distribution of mono drug therapy in patients with only HTN.

Drug Category	Percentage Use (%) of Mono Drug Therapy in Patients with only HTN
Angiotensin converting enzyme inhibitors (ACEI)	32
Calcium channel blockers(CCB)	32
Beta Blockers	13
Angiotensin II receptor blockers (ARBs)	16
Diuretics	7

Table 2. Distribution of mono drug therapy in patients with HTN + DM.

Drug Category	Percentage Use (%) of Mono Drug Therapy in Patients with HTN + DM
Angiotensin-converting enzyme inhibitors (ACEI)	52
Calcium channel blockers(CCB)	21
Beta Blockers	10
Angiotensin II receptor blockers (ARBs)	14
Thiazide Diuretics	3

Table 3. Percentage of 2-drug regimen prescribed in patients with HTN, HTN+DM.

Drug Category	Percentage Use (%) of 2-Drug Regimen Prescribed in Patients with HTN, HTN+DM
ACEI+ ARB	3
ACEI+ Beta blockers	29
ARB+ Beta blockers	7
ARB+ Thiazide Diuretics	19
CCB+ACEI	10
CCB+ARB	7
CCB+ Beta blockers	6
CCB+ Thiazide Diuretics	10
Beta blockers+ Loop diuretics	6
Loop diuretics+ K-sparing diuretics	3

therapy were ACEI+ Beta-blockers (29%). Beta-blockers were the drugs of choice in most of the combinations as well as CCB were mostly used as a combination in 2-drug therapy regimen. The combination of drugs that were prescribed very rarely was CCB+ACEI (3%), diuretics (3%).

3.6. Percentage of 3-drug Regimen Prescribed in Patients with HTN, HTN+DM

It is shown in Table (**4**) he most commonly prescribed drug category of anti-hypertensives used in 3 drug therapy is beta-blockers + ARB along with either THZ-D or CCB (18%). We could notice that

Table 4. Percentage of 3-drug regimen prescribed in patients with HTN, HTN+DM.

Drug Category	Percentage Use (%) of 3-Drug Regimen Prescribed in Patients with HTN, HTN+DM
2 Betablockers + ACEI	4
Betablocker+ ACEI+ THZ-D	13
Betablocker+ ARB+ ACEI	4
Betablocker+ ARB+ THZ-D	18
Betablocker+ THZ-D+ K-sparing diuretics	13
CCB+ ACEI+ THZ-D	9
CCB+ ARB+ THZ-D	13
CCB+ Beta blockers + ACEI	4
CCB+ Beta blockers + ARB	18
CCB+ Beta blockers + Loop diuretics	4

beta-blockers were the most commonly prescribed along with other drug categories in 3-drug regimen followed by CCB.

4. DISCUSSION

In our study, we collected a total of 122 prescriptions of outpatients diagnosed with HTN and HTN+DM.

According to our findings, hypertension and HTN+DM were more prevalent in males than in females, with prevalence increasing with age. This is similar to the study conducted by Jhaj *et al* (2001) and Malhotra *et al*. (2001) in India [13, 14].

ACE-Inhibitors were the most frequently prescribed class of drugs as mono therapy in patients with HTN as well as HTN+DM which clearly shows that the prescribers follow the JNC-8 guidelines as well as Saudi HTN guidelines in case of mono-therapy.

Whereas beta blockers were most commonly used in 2-drug therapy and 3-drug therapy which is not in accordance with both the guidelines.

These results were anomalous to the study conducted by Krishna M *et al*. in 2015 where the most commonly prescribed drug in mono,2-drug and 3 drug therapy was THZ-Diuretics [7].

In patients with HTN + DM, the most commonly prescribed drug in 2-drug and 3-drug therapy class is THZ-Diuretic.

So we could come to a conclusion that JNC-8 guidelines as well as Saudi HTN guidelines were followed in monotherapy but not in 2-drug regimen and 3-drug regimen.

CONCLUSION

After analyzing the study, we conclude that the prescription pattern of anti-hypertensives in Aseer Region of Saudi Arabia is in compliance with the JNC-8(Eighth Joint National Committee) guidelines as well as the Saudi hypertension guidelines to a partial extent only.

Most of the prescriptions were rational, but further improvement is required. In future, studies that focus on the rationale for the choice of the drug based on demographic data, economic status, associated conditions and complications would give additional insights into prescribing patterns in hypertension.

Rational prescribing requires consideration to dose and duration as well as the interaction with other medications.

The principal limitation of our study was that it was conducted on outpatients and was a retrospective study which restricted us in retrieving some more parameters. A therapeutic audit with more parameters of analysis to provide regular feedback to researchers and prescribers may encourage rational prescribing in hypertension.

As per our conclusion, the prescribing patterns in Aseer region need to be improved. Prescribers can be educated by performing seminars, promoting ongoing staff education and training to promote rational prescribing which in turn prevents further complications thus increasing the quality of life of the patients.

LIST OF ABBREVIATIONS

ACEI = Angiotensin Converting enzyme inhibitor

ARB = Angiotensin Receptor blocker

BP = Blood pressure

CCB = Calcium channel blocker

CVR = Cardiovascular risk

DASH = Dietary Approaches to Stop Hypertension

DBP = Diastolic blood pressure

DM = Diabetes Mellitus

HTN = Hypertension

JNC = 8-Eighth Joint National Committee

SBP = Systolic blood pressure

THZ = D-Thiazide Diuretic

βBs = Beta-blockers

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethical approval has been obtained from the research ethics committee, College of Medicine, King Khalid University, Abha, Saudi Arabia. Approval no: (REC # 2017-02-24).

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

The consent for publication was obtained from the patients as well as the institution.

AVAILABILITY OF DATA AND MATERIALS

The authors do not wish to share the data because of confidentiality and legal issues of the Hospital in which the study was carried out in.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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