

Adherence of Primary Health Care Physicians to Hypertension Management Guidelines in Aljouf Region of Saudi Arabia

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Abstract

Introduction: Hypertension affects more than one-third of the world population and is a common public health problem. Primary health care physician's (PHCP's) adherence to the hypertension management guidelines constitutes an essential step for controlling hypertension.

Purpose: The present study examines the adherence practices of PHCPs to hypertension management guidelines using Joint National Committee's Seventh Report (JNC-7) on hypertension guidelines in Aljouf region of Kingdom of Saudi Arabia.

Methods: This cross-sectional descriptive survey covered physicians in PHC setting in Aljouf region of Saudi Arabia. Each physician received a survey package containing a letter of introduction, consent form, and questionnaire. The questionnaire comprised three parts; Part-1 related to demographic data, Part-2 included physician's knowledge and practice regarding hypertension management guidelines, and Part-3 assessed the physicians' choice of anti-hypertensive drug class in co-morbid conditions. Data analysis was carried out using Statistical Package for Social Sciences Version 17 software.

Results: The use of variable sized cuff was practiced by 93% of PHCPs and 80% correctly recorded the blood pressure. The majority of the physicians (80%) followed JNC-7 guidelines for managing patients with hypertension. Nearly all (98%) physicians were interested to involve the family in management of hypertensive patients and 92% encouraged screening programs for hypertension. The mean percentage of correct answers regarding the drug to use and the drug to avoid in selected co-morbid conditions was 55.3%.

Conclusion: Contrary to the earlier literature on non-adherence of PHCPs to hypertension management guidelines, our study observed that the majority of them adhere the JNC-7 guidelines for hypertension in Aljouf region of Saudi Arabia. The study showed a lack of knowledge among PHCPs in managing hypertension in patients with the co-morbid condition.

Key words: Blood pressure, Guidelines, Hypertension, Knowledge, Primary health care physicians

INTRODUCTION

Hypertension is considered one of the common public health problems worldwide and it is a major risk factor for

stroke, myocardial infarction (MI), vascular disease, and chronic kidney disease.¹⁻³ Hypertension affects more than one-third of the world population.^{4,5} Hypertension affects approximately 21% of all Saudis aged between 18 and 64 years.⁶ By the year 2025, it is expected that hypertension will increase by 80% in developing countries and 24% in developed countries.⁵

Appropriate control and early diagnosis of hypertension are the key to prevent and lower the risk of associated complications such as renal disease, stroke, and heart disease.⁷⁻¹⁰ Hypertension is one of the major modifiable

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risk factors for cardiovascular disease (CVD) and a leading cause of premature deaths and disability-adjusted life years.^{11,12} CVD risk can be reduced ultimately by strategies designed to lower blood pressure (BP).^{13,14}

Different guidelines have been proposed from time to time to increase the number of patients with controlled BP. These recommendations have proved their cost-effectiveness in several worldwide studies.¹⁵ It is a well-established fact that poor disease control is largely related to the poor patient compliance to medical advice and medications.^{16,17} However, the other important aspect of the same problem is the physician's adherence to evidence-based management of hypertension, but, unfortunately, this has not been studied adequately.¹⁸

Two National Multistage Surveys reviewed 10,735/4758 Saudis showed that 15.2-25.5% and 40.6% of Saudis were hypertensive or borderline hypertensive, respectively. 44.7-57.8% of them were undiagnosed. Although 71.8-78.9% of hypertensive patients were reported taking medication, 37-45% of them had their BP controlled.^{19,20}

Although there are no well-established methodologies to assess physician's adherence to guidelines for management of hypertension, a substantial number of studies that have been done have found that physicians do not adhere to the recommended guidelines - as reflected on the poor control of hypertension.¹⁹⁻²² Many studies have shown the lack of detailed knowledge of hypertension guidelines by the physicians and prescription of more expensive drugs without evidence of efficacy.²³⁻²⁵ Therefore, health care providers must focus on evidence-based, cost-effective treatment and follow recommended guidelines while prescribing anti-hypertensive treatment.²³

Although Ministry of Health (MOH) of Kingdom of Saudi Arabia (KSA) with Saudi Hypertension Management Society had published guidelines for the management of arterial hypertension in the year 2011, we chose to study adherence to the earlier Joint National Committee's Seventh Report (JNC-7) guideline. This is because in a pilot study awareness with the 2011 guidelines was minimal, possibly because of inadequate training and dissemination in a narrow time frame.²⁶ The importance to access the adherence to hypertensive guidelines becomes even more important viewing the large number of health center visits by the patients reaching 1,268,432 patients in the year 2011 according to Saudi MOH website, where 95% of them are Saudi Nationals. Our cross-sectional descriptive survey was directed to investigate adherence practices of primary health care physicians (PHCPs) to the use of clinical practice guidelines in Aljouf region of KSA.

METHODS

Design, Study Population, and Setting

Aljouf region of Saudi Arabia is divided into three sub-regions as Sakaka, Domat Al-jindal, and Taberjal. Primary Health Care (PHC) is provided through a network of 33 primary health centers distributed in these sub-regions proportionate to their population. This cross-sectional descriptive survey was conducted between May 2012 and April 2013 covering all physicians in PHC setting of Aljouf region. The Ethical Committee College of Medicine; Aljouf University approved the study protocol.

Data Collection

Questionnaire used in the present study was adopted from another published study by Ernst in Pretoria in South Africa (2005).²² Faculty of Community Medicine revised the questionnaire. The questionnaire was pretested on a group of physicians, and necessary modifications were made, and this group of physicians was excluded in the final analysis.

Inclusion and Exclusion Criteria

All the PHCPs working in the region at the time of the study were included; physicians who were on leave or on night shifts were excluded.

Each physician received a survey package containing a letter of introduction regarding the importance of this survey and a consent form for his willingness to participate in this study with an approval letter of General Directorate of Health Affairs. Consent form included the purpose of the study, confidentiality, voluntary involvement, and contact information in case of queries. The questionnaire was in English and comprised three parts. Part-1 was related to demographic data of the physician (age, gender, nationality, qualification, and years in practice in health system of KSA), Part-2 included physician's knowledge and practice regarding hypertension management guidelines using JNC-7, and Part-3 assessed the physicians' choice of anti-hypertensive drug class in specific short clinical scenarios of common health conditions. In each of the questions relating to selected scenarios (Part-3 of questionnaire), the participant was asked to name his/her most prescribed drug of choice and the drug to be avoided in these situations.

Third-year medical students of Aljouf University collected the data. To ensure uniformity in data collection, proper training was imparted to the students. When the questionnaire was distributed to the physicians, the student sat with the physician in the same room to prevent any effort to get information from any source. Physicians were also assured verbally that the information will be anonymous and kept confidential.

Data Analysis

Data analysis was carried out using Statistical Package for Social Sciences Version 17 software. Data are shown as numbers, percentages, mean, range, and standard deviation.

RESULTS

Table 1 presents demographic characteristics of the study population. A total of 59 physicians voluntarily participated in the study that included 42 males and 13 females; gender was missing in four responses. Response rate was cent percent. The mean age was 38 ± 7 years (range 23-56 years). About half (49%) of the physicians were Egyptians and the other nationalities included; Sudanese 20%, Indian 14%, Syrian 5%, Pakistani 5%, and Nigerian 2%. Two-third (66%) of participants have only MBCH qualification, higher qualification included diploma (15%), master degree (9%), board (5%), and doctorate (3%). 44% of participants were practicing medicine in KSA for 6-10 years.

Table 2 presents physician's opinion regarding various aspects of hypertension. All the PHCPs were aware that

Table 1: Demographic characteristic of PHCPs in Aljouf province participated in the study (n=59 physicians working in 33 PHCs)

| Characteristics | n (%) |
|-------------------|---------|
| Gender | |
| Male | 42 (71) |
| Female | 13 (22) |
| Missing | 4 (7) |
| Age (in years) | |
| Mean | 38±7 |
| Range | 23-56 |
| Nationality | |
| Egyptians | 29 (49) |
| Sudanese | 12 (20) |
| Indians | 8 (14) |
| Syrians | 3 (5) |
| Pakistani | 3 (5) |
| Nigerians | 1 (2) |
| Missing | 3 (5) |
| Qualification | |
| MBCH | 39 (66) |
| Diploma | 9 (15) |
| Masters | 5 (9) |
| Board | 3 (5) |
| Doctorate | 2 (3) |
| Missing | 1 (2) |
| Years of practice | |
| <5 | 10 (17) |
| 6-10 | 26 (44) |
| 11-15 | 16 (27) |
| 16-20 | 6 (10) |
| >20 | 1 (2) |

Percentages have been rounded up to the nearest digit. PHCPs: Primary health care physicians

hypertension is a common health problem in Saudi Arabia and that there should be more attention paid to hypertensive patients. Similarly, 98% of participants were interested to involve the family in management of hypertensive patients and agreed that advices on lifestyle modification must be provided to hypertensive patients during counseling. 85% of physicians in PHC centers agree that PHCs play a major role in managing hypertension, while 15% did not.

Eighty one (81%) expressed their comfort in dealing with hypertensive patients compared to 19% who were not comfortable. Of all, 92% encourage screening program for hypertension, and 80% reported that they were trained adequately to manage hypertensive patients, whereas 20% reported that they were not well trained. 83% reported that hypertension leads to patient's excessive anxiety and concern.

Table 3 presents the knowledge and practice of JNC 7 guidelines by PHCP. The majority of the physicians 88% followed JNC-7 guidelines for the measurement of hypertension with respect to position. The use of variable sized cuff was practiced by 93% of physicians. 81% of physicians correctly recorded the systolic BP among non-diabetic patients. Correct recording of diastolic BP was practiced by 80% of physicians among diabetic and non-diabetic patients. 60% of physicians take three readings before labeling the patient as a case of hypertension. The overall (mean of correct answers) adherence of PHCPs to JNC-7 guidelines was found to be 80%.

Regular health education was imparted by 80% of physicians. 27% of physicians were prescribing two or more drugs to a new case of hypertension.

Four to five cases of hypertension were referred to specialist care during the last year. 48% of patients were referred because of their co-morbid health condition, 24% believed that a specialist should treat hypertension; 22% were referred because of patient's request and patient's financial reason account for 4% of the referrals.

Anti-hypertensive Treatment in Co-morbid Conditions

Table 4 present's physician's choice of anti-hypertensive drugs in selected clinical scenarios. For the given scenarios, the physicians had to write the drug of choice and the drug to be avoided for each scenario.

Scenario-1: Hypertension of pregnancy

71% of the respondents correctly chose a central acting alpha-2 agonist as the drug to use and the same percentage of physicians chose a correct drug to be avoided.

Table 2: Opinion of participated PHC physicians regarding hypertension as a health problem in Aljouf province

| Variable | Yes n (%) | No n (%) |
|---|-----------|----------|
| Hypertension is a common health problem in the province | 59 (100) | Nil |
| Are you interested to involve the family in the management of a patient with hypertension? | 58 (98) | 1 (2) |
| More attention should be paid to hypertensive patients | 58 (98) | 1 (2) |
| During counseling of patients with hypertension, do you think lifestyle modification should be offered to all patients? | 58 (98) | 1 (2) |
| Physicians in primary health care centers are capable of playing a major role in management of hypertension | 50 (85) | 9 (15) |
| Are you comfortable in dealing with hypertensive patients? | 48 (81) | 11 (19) |
| Screening programs for hypertension are favorable to improve early care of hypertensive patients | 54 (92) | 5 (8) |
| Are you trained adequately to manage patients with hypertension? | 47 (80) | 11 (20) |
| Hypertension causes patients excessive anxiety and concern | 49 (83) | 10 (17) |

Percentages have been rounded up to the nearest digit. PHC: Primary health care

Table 3: BP measurement and management of a new case of hypertension

| Variable | N (%) |
|---|---------|
| Patient's position during measurement | |
| Sitting position only ¹ | 7 (12) |
| Sitting and sometimes other positions ² | 52 (88) |
| Cuff size of sphygmomanometer | |
| One size for all patients ¹ | 4 (7) |
| Variable sizes for different patients ² | 55 (93) |
| Diastolic blood pressure is recorded at | |
| Korotkoff sound phase 4 ¹ | 12 (20) |
| Korotkoff sound phase 5 ² | 47 (80) |
| Diagnosis of hypertension among non-diabetics | |
| ≥140 mmHg ² | 48 (81) |
| ≥90 mmHg ² | 46 (80) |
| Diagnosis of hypertension among diabetics | |
| ≥130 mmHg ² | 41 (69) |
| ≥80 mmHg ² | 47 (80) |
| Number of repeated measurement of BP for definitive diagnosis | |
| 1 time | 1 (2) |
| 2 times | 3 (6) |
| 3 times ² | 40 (60) |
| 4 times | 15 (25) |
| Giving health education to the patients about hypertension | |
| Always | 48 (80) |
| Often | 7 (12) |
| Sometimes | 4 (8) |
| Types of hypertensive drugs prescribed to new hypertensive patients | |
| One | 42 (71) |
| Two | 14 (24) |
| >Two | 2 (3) |

¹Not consistent with JNC7, ²Consistent with JNC7, Note: Percentages have been rounded up to the nearest digit, BP: Blood pressure

Scenario-2: Hypertension in bronchial asthma

Potassium-sparing drugs or thiazide was correctly selected as the drug of choice by 44% of the respondents in treating a patient with severe persistent bronchial asthma and 74% correctly chose the drug to be avoided.

Scenario-3: Hypertension in bronchial renal artery stenosis

Most respondents 68% chose the correct drug to use and 44% correctly chose the drug to be avoided among patients with bilateral renal artery stenosis.

Scenario-4: Hypertension in diabetes

Most respondents 80% correctly chose angiotensin converting enzyme (ACE) inhibitors as the drug of choice in patient with diabetic nephropathy and 29% correctly chose the drug to be avoided.

Scenario-5: Hypertension with old MI

In treating a patient with old MI 75% of the respondents correctly chose the drug to use and 22% correctly avoided the contraindicative drug.

Scenario-6: Hypertension with sexual dysfunction

An ACE inhibitor was correctly selected by 59% of the respondents as the treatment choice in a 45-year-old patient with sexual dysfunction while 56% correctly avoided the contraindicated drug.

Scenario-7: Hypertension with peripheral artery disease

For a patient with peripheral vascular disease, 46% chose dihydropyridine calcium channel blockers as drug to use and 51% chose β -blockers as drug to avoid.

Scenario-8: Hypertension with gout

77% of respondents correctly prescribed drug to use and 59% of them chose thiazide, furosemide as drug to avoid correctly in treating patient with gout.

The mean percentage of correct answers regarding both (drug to use and drug to avoid) among selected case scenarios was 55.3%.

DISCUSSION

Hypertension is considered one of the common public health problems worldwide, and it is a major risk factor for stroke, MI, vascular disease, and chronic kidney disease. Different guidelines have been proposed from time to time to increase the number of patients with controlled BP. These recommendations have proved their cost-effectiveness in several worldwide studies.¹⁵ Our cross-sectional descriptive survey was directed to investigate

Table 4: Prescribed initial oral anti-hypertensive drug in each proposed clinical scenarios

| S. No | Scenario | Correctly prescribed the drug of choice | N (%) | Correctly avoided the drug | N (%) |
|----------------|---|---|-----------|-------------------------------|-----------|
| 1 | A 24-week pregnant woman with pre-existing chronic hypertension | Methyldopa | 42 (71.2) | ACE inhibitors, ARB, thiazide | 42 (71.2) |
| 2 | A 45-year-old patient with severe persistent bronchial asthma | Potassium-sparing diuretics, thiazide | 26 (44) | βBs | 44 (74.6) |
| 3 | A 65-year-old patient with bilateral renal artery stenosis | Not specific | 40 (67.8) | ACE inhibitors, ARB | 26 (44) |
| 4 | A 50-year-old patient with diabetic nephropathy | ACE inhibitors, ARB | 47 (79.7) | Thiazide, βBs | 17 (28.8) |
| 5 | A 55-year-old patient with old myocardial infarction | ACE inhibitors, ARB, βBs, long-acting DHP (CCB) | 44 (74.6) | Short-acting DHP (CCB) | 13 (22) |
| 6 | A 45-year-old patient with sexual dysfunction | ACE inhibitors, ARB | 35 (59) | Thiazide, βBs, alpha-agonist | 33 (55.9) |
| 7 | A 45-year-old patient with peripheral vascular disease | DHP (CCB) | 27 (45.8) | βBs | 30 (50.8) |
| 8 | A 56-year-old male patient with gout | No specific drug recommended | 45 (76) | Thiazide, furosemide | 35 (59) |
| Mean % correct | | | 62.7 | | 47.8 |

ACE: Angiotensin converting enzyme, ARB: Angiotensin receptor blocker, βBs: Beta-blockers, DHP: Dihydropyridine, CCB: Calcium channel blockers

adherence practices of PHCPs to the use of clinical practice guidelines in Aljouf region of KSA.

A total of 59 physicians voluntarily participated in the study with a mean age was 38 ± 7 years (range 23-56 years). 95% of surveyed physicians were non-Saudis, almost half (49%) of the physicians were Egyptians, and 66% of participants have only MBCH qualification (Table 1). Al-Gelban *et al.*, in their study in Aseer region of Saudi Arabia, found that most of the physicians were non-Saudi (98.1%), males (80.7%), aged 31-50 years (78.3%), and their the highest qualification was MBBS (89.4%).²⁷

Hypertension Awareness among PHCPs

All the participated physicians were aware that hypertension is a common health problem in Saudi Arabia and 85% of physicians in PHC centers were capable of managing hypertension, and most of them thought that they were trained adequately to manage patients with hypertension. 83% reported that hypertension leads to patient's excessive anxiety and concern (Table 2).

98% of PHC physicians had the interest to involve the family in management of patient with hypertension particularly for lifestyle modification (Table 2). Al-Gelban *et al.* also found that the great majority of PHC physicians advice regarding lifestyle modification, including weight reduction (98.8%), sodium restriction (97.5%), physical exercise (96.3%), and behavioral improvement (87.6%).²⁷ Adedeji *et al.*, in their study, found that the adherence to lifestyle modification/non-drug treatment recommendations was low for physical activity (31.2%), dietary modification (46.5%), and advice on stopping/reduction of alcohol intake (34.5%) and stopping smoking (47.2%).²⁸

We found that 92% of physicians suggested screening programs for hypertension were favorable to improve

early care of hypertensive patients (Table 2). Adedeji *et al.*, in their study, found adherence to screening for major cardiovascular risk factors was high for diabetes mellitus (99.2%), moderate for smoking (53.5%), low for obesity (6.1%), dyslipidemias (36.9%), and abdominal obesity (6.2%).²⁸ Al-Gelban *et al.* also found that the great majority of PHC physicians inquired about cardiovascular risk factors.²⁷

Physician's Adherence to Hypertension Management Guidelines using JNC-7

In our study, the overall (mean of correct answers) adherence of PHCPs to JNC-7 guidelines was found to be 80%. In contrast, a study done by Ernst showed that general practitioners in private practice and primary health care physicians in the three academic hospitals in Pretoria did not adhere to the hypertension guidelines suggested by the JNC-6 report.²² Adedeji *et al.* in their study also found overall adherence of doctors to treatment guidelines for hypertension to be low (51.9%) while applying South African Hypertension Guidelines 2006.²⁸ Al-Gelban *et al.*, in their study, found that the PHC physicians did not fully adhere to all JNC-7 hypertension guidelines.²⁷ The reason for high adherence in our study could be due to availability of better facilities at primary health centers *vis-à-vis.* to infrastructure and other logistics needed to manage hypertension. In our study, 32% physicians were having a higher qualification that might have increased the knowledge and affected the attitude of other doctors during their monthly meetings. Furthermore, almost all PHCPs are expatriates working in the KSA hence need to adhere the guidelines for continuity of service.

In our study, the use of variable sized cuff was practiced by 93% of physicians and 80% correctly recorded the BP. 60% of physicians took three readings before labeling the patient as a case of hypertension. Correct recording of

diastolic BP was practiced by 80% of physicians among diabetic and non-diabetic patients (Table 3). Similar results were obtained by Adedeji *et al.*, in their study, where they found adherence to measurement aspects of the guidelines of hypertension was high (99.8%).²⁸ Al-Gelban *et al.*, in their study, found variable cuff sizes for different patients were used by 56.5% of the participants, while 74.8% correctly recorded the diastolic BP at Korotkoff sound, Phase-5. They found that diastolic hypertension was correctly reported by 81.4% among non-diabetics and only by 17.1% among diabetics.²⁷

In our study, regular health education was imparted by 80% of physicians. 27% of physicians were prescribing two or more drugs to a new case of hypertension (Table 3).

Four to five of hypertension cases were referred to specialist care monthly during the last year. 48% of patients were referred because of their health condition, 24% believed that a specialist should treat hypertension, 22% were referred because of patient's request and patient's financial reason account for 4% of the referrals. Adedeji *et al.* found adherence to the ongoing care aspect was high for referral (78.6%), but adherence to discussion of review date was low (5.3%).²⁸

Selected Common Clinical Case Scenarios

The choice of anti-hypertensive treatment by the physicians in different scenarios, such as pregnancy, bronchial asthma, bilateral renal artery stenosis, diabetic nephropathy, old MI, sexual dysfunction, peripheral vascular disease, and gout, was evaluated in our study. The mean percentage of correct answers regarding both (drug to use and drug to avoid) was 55.3%. Similar results were found by Adedeji *et al.* in their study, which showed average adherence to drug/treatment review/adjustment to be 52.2%²⁸ and also by Ardery *et al.* who found 55.9% adherence.¹⁸

Most respondents 79.7% correctly chose ACE inhibitors as the drug of choice in patients with diabetic nephropathy and 28.8% correctly identified the drug to be avoided. Ernst, in his study, found that more than 80% of the participants prescribe ACE inhibitors to patients with diabetic nephropathy.²²

In our study, while treating a patient with old MI, 74.6% of the respondents correctly chose the drug to use and 22% identified the drug to be avoided. Ernst, in his study, found that only 62.5% of all respondents chose beta-blockers as the drug of choice.²²

The overall mean percentage, for selected clinical scenarios, of correctly prescribing a drug was 63% and drugs to be avoided was 47%.

CONCLUSION

Contrary to the earlier literature on non-adherence of PHCPs to disease management guidelines including hypertension management guidelines, our study observed that the majority of PHCPs adhere the JNC-7 guidelines for hypertension in Aljouf region of Saudi Arabia. The only concern being a lack of knowledge regarding integrated management of hypertension in patients with the co-morbid condition. The survey suggested that overall adherence of PHCPs to JNC-7 guidelines was fairly good (80%); future training of PHCPs should focus on integrated management of hypertensive patients with the co-morbid condition.

LIMITATIONS

The study focuses only on adherence of PHCPs to hypertension management guidelines; however, the aspect of patient's compliance evidenced by the proportion of hypertensive cases with adequate control remains to be seen.

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