



Research Article

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“Are JNC 8 guidelines well known and perceived by the prescribers for the treatment of hypertension in Pakistan? A cross-sectional study”

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ABSTRACT

Objective: The main objective of the study was to assess the knowledge and perceptions of prescribers regarding adherence to JNC 8 for the treatment of hypertension in the 2 major cities of Pakistan: Islamabad (the national capital) and Rawalpindi (its twin city). **Methodology:** A semi-structured questionnaire designed with the help of JNC 8 was distributed to a random sample of 385 prescribers. The data were collected, computed and analyzed using SPSS, version 16 program and descriptive analysis was conducted. Kruskal–Wallis and Mann–Whitney tests ($P \leq 0.05$) were used to compare the knowledge scores of prescribers about standard guidelines by profession, length of experience, type of health-care facility, gender, sector and city. **Results:** The median score for overall knowledge of prescribers regarding JNC 8 was 21 (range 14-28). More than half of the respondents (69.1 %) highlighted the absence of STGs on treatment of hypertension in the health care facilities. Prescribers were aware about the correct dosage regimen for captopril (48 %), losartan (60%), atenolol (67.3 %), amlodipine (41.8 %) and hydrochlorothiazide (68.8 %) as according to JNC 8 for initial management of hypertension. **Conclusion:** The results of the present study concluded that the knowledge of prescribers working in public and private healthcare facilities regarding JNC 8 guidelines for the management of hypertension was not adequate but they had positive perceptions towards adherence to these guidelines linked to their availability in their healthcare facilities.

Keywords: Hypertension, JNC 8, Knowledge, Perceptions, Pakistan.

INTRODUCTION

Several guidelines are available globally for the screening, diagnosis, treatment and control of hypertension. A good agreement between these guidelines generally with slight discrepancies in some areas such as target blood pressure ranges in elderly has been reported [1]. However, all these available international guidelines are largely based on pursuing the same goals and are similar in their effectiveness with respect to outcomes [2]. One of the most popular guidelines for the treatment of hypertension, JNC 7 by the National High Blood Pressure Education Program, aims to provide an evidence-based approach to the prevention and management of hypertension [3]. These guidelines were updated as JNC 8 in 2014, including evidences providing more accurate measures of quality for the treatment of patients with hypertension. Algorithms are included in JNC 8 which will be more useful and can be easily adopted by the busy clinicians in their routine practices [4].

Despite the fact that effective pharmacological treatments for the management and control of blood pressure are available, the rate of uncontrolled blood pressure remains high worldwide[1]. Emphasizing the importance of adherence to evidence-based guidelines for treatment of hypertension can result in substantial savings in prescription costs for hypertensive patients [5]. Data obtained from various studies on existing guidelines for the treatment of hypertension revealed variations among adherence due to different barriers. An inverse association was found between adherence to the JNC-7 guidelines and hypertension prevalence revealing the importance of lifestyle modification for the prevention and management of hypertension in Korea [6]. Knowledge and adherence to JNC 7 guidelines among nursing home patients in a study conducted in United States was found to be low [7]. Although, physicians fairly complied with international guidelines for the management of hypertension, however lifestyle modifications were not recommended to the hypertensive patients in Nigeria[8]. Evidence-based NICE guidelines for the management of hypertension were also not followed in a relatively large proportion of patients in a study conducted in United Kingdom [9]. Data obtained from Sweden suggested that higher blood pressure levels than recommended in guidelines were accepted by general practitioners but old age was identified as an important barrier to adherence to the guidelines [10]. A significantly lower adherence to European guidelines was detected in Cypriot physicians, although they were aware of guidelines and agreed on their implementation in their routine practices while treating hypertension[11]. Poor knowledge, health service factors and lack of training regarding prevention and control of hypertension were identified as major difficulties in poor diagnosis and management of hypertension in China and Zimbabwe [12, 13]. An urgent need for continuous education and training of health workers on diagnosis and management of hypertension, availability of guidelines, adequate number of digital sphygmomanometers and drug supply was highlighted [12].

The prevalence of hypertension is alarmingly increasing among Pakistani population since the last decade[14]. Incorrect BP cut offs for diagnosis of hypertension in patients and lack of adherence to standard treatment guidelines are contributing towards high prevalence and poor control of the disease in the country [15]. Extensive work has been done in developed countries like USA regarding adherence of prescribers to STGs and barriers to adherence which has led to improved control of hypertension in these countries. On the other hand, in most of the developing countries including Pakistan limited data is available in this regard. Knowing the percentage of prescribers adhering and familiar with these guidelines can help in planning strategies to improve rational drug use and thus can assist in a better control of hypertension in the country. Thus, the present study has been designed to assess the knowledge and perceptions of prescribers regarding adherence to JNC 8 for treatment of hypertension in the 2 major cities of Pakistan: Islamabad (the national capital) and Rawalpindi (its twin city).

Methodology

Study design

A descriptive, cross-sectional study design was used to evaluate the knowledge and perceptions of prescribers regarding adherence to JNC 8 for treatment of hypertension in 2 major cities of Pakistan: Islamabad (the national capital) and Rawalpindi (its twin city). Approval was obtained for the study from the Ethical Committee of Hamdard University. Moreover in Pakistan, questionnaire-based studies do not need any Ministry of Health endorsement. Despite that, prior information was sent to the Ministry of Health, Government of Pakistan for the execution of this research among prescribers practicing in the twin cities. Beside this, approval for the data collection was also taken from MS of the respective hospitals.

Sampling of facilities and respondents

This study was conducted from June to August 2015. The study population included prescribers from Islamabad and Rawalpindi. Calculations of sample size were performed using Raosoft sample size calculator to determine the size of sample that represents the population of registered prescribers [15]. Considering the current population of

registered prescribers ($N = 5615$), a sample size of 385 was required to achieve 95% confidence level with 5% margin of error. A sample of 385 prescribers was selected randomly from the 2 cities. The prescribers were contacted and given an explanation of the purpose of the study and their verbal consent to participate in the study was obtained. None of the prescribers refused to participate in the study.

Study tool

A questionnaire was developed through focus group discussions by using the JNC 8 for treatment of hypertension as a reference. Two focus group discussions were carried out at different time intervals with 4 different groups of experts including clinicians, specialists, physicians and doctors from academia. Each group comprised 3–4 participants for the development, finalization, face and content validity of the data collection tool. Pilot testing was carried out on 38 prescribers (10%) of the total sample size before execution of the final study. A Cronbach alpha value of 0.823 confirmed the reliability and internal consistency of the questionnaire.

The questionnaire comprised of 5 sections. The first section included information regarding prescriber's demographic characteristics: gender, city, sector (public/private), type of health facility, profession and years of experience. In the second section, perceptions of prescribers regarding current treatment practices for hypertension in the country were explored. In the third section the perceptions of prescribers regarding contributing factors towards lack of adherence to STGs were investigated, including patient-related factors, availability and accessibility of the guidelines for reference, prescriber's experience/personal preference and lack of guideline enforcement. Sections 2 and 3 of the questionnaire included a set of statements in which respondents were asked to indicate their level of agreement using a 5-point Likert scale where 1 = strongly disagree, 2 = disagree; 3 = neutral, 4 = agree and 5 = strongly agree was used. In the fourth section, the knowledge of prescribers regarding standard treatment goals and drugs regimens for management of hypertension according to JNC 8 was assessed. Responses were assigned as 1 = yes/correct and 2 = no/incorrect. The composite score range was 14-28 and a lower score indicated better knowledge. In the last section, the perceptions of prescribers regarding the effectiveness of life style modification in control and management of hypertension in Pakistan were explored.

Data collection& analysis

Two teams, one in each city, with 10 data collectors in each team, were trained by the group of experts including the principal investigator. The questionnaire was hand-delivered to prescribers by the data collectors. Informed and verbal consent for participation was taken from the respondents. Respondents were assured about the confidentiality of information verbally and were shown an undertaking signed by the principal investigator. The questionnaire was self-completed by the prescribers and was collected from them on the same day. The data were computed and analyzed using SPSS, version 16 program and descriptive analysis was conducted. The results of each item in the questionnaire were reported as percentages and frequencies. Kruskal–Wallis test ($P \leq 0.05$) was used to compare the knowledge scores of prescribers regarding standard treatment goals and drugs regimens for management of hypertension according to JNC 8 by profession, length of experience and type of health-care facility, and Mann–Whitney test ($P \leq 0.05$) was used to compare the knowledge of prescribers by gender, sector and city.

Results

Out of 385 prescribers, 58.2% were male while 41.8 % were female. Half of the total prescribers (53.7%) were working in the public sector while 46.3% were from the private sector. A total of 56.4% were working in tertiary health-care facilities (providing specialized health care in large research and teaching hospitals), 9.3% in secondary health-care facilities (Tehsil headquarters and district headquarter hospitals), 2% in basic health units (providing primary health care services including health protection and promotion services) and 32.3% were from private clinics. Of the total prescribers 20.8% were house officers, 47.5% medical officers, 10.9 % specialists and 20.8% general practitioners. Regarding the experience of the prescribers, 25.9% had working experience of < 1 year, 51.7% had 1–5 years, 12.5% had 6–10 years and 9.9% had > 10 years (Table 1).

Table 1 Background characteristics of the sample of prescribers (*n* = 385)

Variable	n (%)
Gender	
Male	224 (58.2)
Female	(41.8)
Sector	
Public	207 (53.7)
Private	178 (46.3)
City	
Islamabad	197 (51.2)
Rawalpindi	188 (48.8)
Type of health facility	
Tertiary hospital	217 (56.4)
Secondary hospital	36 (9.3)
Basic health unit	8 (2.0)
Private clinic	124 (32.3)
Profession	
House officer	80 (20.8)
Medical officer	183 (47.5)
Specialist	42 (10.9)
General practitioner	80 (20.8)
Experience (years)	
< 1	100 (25.9)
1–5	199 (51.7)
6–10	48 (12.5)
> 10	38 (9.9)

The results highlighted that 75.8% of the prescribers were satisfied with the currently available anti-hypertensive drugs and 83.8% strongly believed that understanding of cultural beliefs and individual attitudes of patients by clinician can help in improving adherence to antihypertensive therapy. More than half of the respondents (69.1%) highlighted the absence of STGs on treatment of hypertension in the health care facilities. Majority of prescribers

(92.3 %) agreed that there was need for more educational programs to increase knowledge and awareness about the available treatment guidelines for hypertension (Table 2).

Table 2 Prescribers' opinions regarding management of hypertension in Pakistan

Item	Prescribers' opinions (n = 385)		
	Strongly agree + agree n (%)	Neutral (%)	Strongly disagree + disagree n (%)
Hypertension is well controlled with currently available antihypertensive treatment in Pakistan	292 (75.8)	56 (14.6)	37 (9.6)
Do you think guidelines on treatment of hypertension are available in the health care facilities of Pakistan?	119 (30.9)	0	266 (69.1)
Do you think that an understanding of cultural beliefs and individual attitudes of patients by clinician can help in improving adherence to antihypertensive therapy?	323 (83.8)	52 (13.6)	10 (2.6)
Is there a need for more educational programs to increase knowledge & awareness on the available guidelines regarding treatment of hypertension?	355 (92.3)	19 (4.9)	11 (2.8)

A majority of prescribers were of the view that patient-related factors (87.5%), availability of STGs for reference (88.3%), lack of awareness of prescribers regarding STGs (85.4%), prescribers' experience (82.3%) and lack of enforcement of STGs (81.1%) were the main factors contributing towards lack of adherence to STGs in the management of hypertension in Pakistan (Table 3).

Table 3 Prescribers' perceptions about factors affecting adherence to standard treatment guidelines (STGs) in management of hypertension in Pakistan

Factor	Prescribers' opinions (n = 385)		
	Strongly agree + agree n (%)	Neutral (%)	Strongly disagree + disagree n (%)
Patient related factors	337 (87.5)	36 (9.3)	12 (3.2)
Availability & accessibility of the guidelines for reference	340 (88.3)	31 (8.1)	14 (3.6)
Lack of awareness on guideline availability	329 (85.4)	40 (10.4)	16 (4.2)
Prescribers experience/ personal preference	317 (82.3)	39 (10.2)	29 (7.5)
Lack of guidelines enforcement	312 (81.1)	41 (10.6)	32 (8.3)

The correct treatment goals for management of hypertension stated in JNC8 known by the prescribers were: 39.4 % of the prescribers knew correct BP goal for treating hypertensive patient above 60 years, 39.8 % knew correct BP goal for treating hypertensive patient below 60 years, 43.8 % knew correct BP goal for treating hypertensive patient of any age having CKD/diabetes or both, 72.7 % knew role of combination of ACEIs/ARBs and diuretics/CCBs in treating stage 1 hypertension without any compelling indications while 50.1 % knew regarding role of CCBs in managing hypertension in patients for recurrent stroke prevention. On the other hand, prescribers were aware about the correct dosage regimen for captopril (48 %), losartan (60%), atenolol (67.3 %), amlodipine (41.8 %) and hydrochlorothiazide (68.8 %) according to JNC 8 for initial management of hypertension (Table 4).

Table 4 Prescribers' knowledge about standard treatment goals and regimens according to JNC 8 for treatment of hypertension

Drugs	Public (n = 207)		Private (n = 178)		Total (n = 385)	
	Correct n (%)	Incorrect n (%)	Correct n (%)	Incorrect n (%)	Correct n (%)	Incorrect n (%)
Standard treatment goals and drugs regimen for the management of hypertension according to JNC 8						
The goal for BP while treating hypertensive patients below 60 years (having no diabetes or CKD) is considered <130/80mmHg.	85 (41)	122 (59)	68 (38.2)	110 (61.8)	153 (39.8)	232 (60.2)
<130/80mmHg is considered the appropriate goal for BP for patients having 60 years of age or above from general population	91 (43.9)	116 (56.1)	61 (34.2)	117 (65.8)	152 (39.4)	233 (60.6)
<150/90mmHg is considered the appropriate goal for BP for patients (of any age) having CKD or diabetes or both	92 (44.4)	115 (55.6)	77 (43.2)	101 (56.8)	169 (43.8)	216 (56.2)
A combination of ACEIs/ARBs and diuretics/CCBs is considered useful in treating stage 1 hypertension without any compelling indications (e.g. heart failure, CKD, diabetes etc.)	127 (61.3)	80 (38.7)	131 (73.5)	47 (26.5)	258 (67)	127 (33)
A combination of ACEIs/ARBs and diuretics is considered useful in treating stage 2 hypertension without any compelling indications (e.g. heart failure, CKD, diabetes)	137 (66.1)	70 (33.9)	143 (80.3)	35 (19.7)	280 (72.7)	105 (27.3)
Thiazide diuretics have been considered helpful currently in managing hypertension in patients of heart failure.	128 (61.8)	79 (38.2)	126 (70.7)	52 (29.3)	254 (65.9)	131 (34.1)
Thiazide diuretics have been considered helpful currently in managing hypertension in patients with history of MI.	137 (66.1)	70 (33.9)	98 (55)	80 (45)	235 (61)	150 (39)
Thiazide diuretics are considered helpful currently in managing hypertension in patients with CKD.	90 (43.4)	117 (56.6)	60 (33.7)	118 (66.3)	150 (38.9)	235 (61.1)
CCBs are considered helpful currently in managing hypertension in patients for	114 (55)	93 (45)	79 (44.3)	99 (55.7)	193 (50.1)	192 (49.9)

recurrent stroke prevention.						
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Table 4 Prescribers' knowledge about standard treatment goals and regimens according to JNC 8 for treatment of hypertension(Continued)

The composite scores for knowledge were taken into account when assessing the knowledge of prescribers for the standard treatment goals and drugs regimen for the management of hypertension according to JNC 8. The median score for overall knowledge of prescribers regarding the goals and treatment regimen was 21 (range 14-28).

Captopril : initial dose 50mg, target dose 150-200mg in 2 divided doses per day	92 (44.4)	115 (55.6)	93 (52.2)	85 (47.8)	185 (48)	200 (52)
Losartan : initial dose 50mg, target dose 100mg in 1-2 divided doses per day	116 (56)	91 (44)	115 (64.6)	63 (35.4)	231 (60)	154 (40)
Atenolol : initial dose 25-50mg, target dose 100 mg in a single daily dose	140 (67.6)	67 (32.4)	119 (66.8)	59 (33.2)	259 (67.3)	126 (32.7)
Amlodipine : initial dose 10mg, target dose 50mg in a single daily dose	94 (45.4)	113 (54.6)	67 (37.6)	111 (62.4)	161 (41.8)	224 (58.2)
Hydrochlorothiazide : initial dose 12.5-25mg, target dose 25-100mg in 1-2 divided doses per day	146 (70.5)	61 (29.5)	119 (66.8)	59 (33.2)	265 (68.8)	120 (31.2)

Significant differences ($P < 0.05$) were found among the knowledge scores of prescribers having different professions and levels of experience. Prescribers working as specialists and having an experience of more than ten years had significantly better knowledge. While no significant differences ($P < 0.05$) were found between the genders, sector, cities and locations (Table 5).

Table 5 Comparison of prescribers' knowledge scores standard treatment goals and drugs regimens according to JNC 8 for treatment of hypertension by demographic characteristics

Variable	Knowledge Score			
	n	Median knowledge score (14-28)	Test Statistics	P-value
Gender				
Male	224	21	16690.50 ^a	0.234
Female	161	21		
Sector				
Public	207	20.5	17730.50 ^a	0.519
Private	178	21		
City				
Islamabad	197	21	17805.0 ^a	0.508
Rawalpindi	188	21		
Location	217	20.5		
Tertiary	36	21	3.290 ^b	0.349
Secondary	8	21		
Primary	124	21		
Clinic				
Profession				
House Officer	80	21	11.253 ^b	0.01
Medical Officer	183	21		
Specialist	42	20		
GP	80	21		
Experience (years)	100			
< 1	199	21	7.026 ^b	0.05
1-5	48	21		

6-10	38	21
> 10		20

a. Mann-Whitney test; b. Kruskal-Wallis test.

Prescriber's opinions regarding effectiveness of different ways of life style modification were: moderation of alcohol consumption (76.8 %), weight reduction (87.5 %), dietary sodium reduction (82 %), DASH eating plan (81.8 %), aerobic physical activity (84.9 %) and all of them (91.1%) (Table 6).

Table 6 Prescribers' opinions regarding diet modification in Pakistan

Factor	Prescribers' opinions (n = 385)		
	Strongly agree + agree n (%)	Neutral (%)	Strongly disagree + disagree n (%)
Moderation of alcohol consumption	296 (76.8)	65 (16.8)	24 (6.4)
Weight reduction	337 (87.5)	32 (8.3)	16 (4.2)
Dietary sodium reduction	316 (82)	44 (11.4)	25 (6.6)
DASH eating plan	315 (81.8)	56 (14.5)	14 (3.7)
Aerobic physical activity	327 (84.9)	38 (9.8)	20 (5.3)
All of them	351 (91.1)	30 (7.7)	4 (1.2)

Discussion

Clinicians overestimate their adherence to hypertension guidelines and the commonly identified barrier towards their successful implementation is inadequate knowledge of prescribers regarding the availability of these guidelines. The results of the present study are quite disappointing as they showed that more than half of the prescribers working in either public or private healthcare facilities were not aware of the JNC 8 guidelines. They did not have adequate knowledge regarding correct treatment goals and drugs regimen recommended in JNC 8 for management of hypertension. The findings revealed that more than fifty percent of the prescribers were not aware of correct BP goal for treating hypertensive patient above 60 years, below 60 years and patient of any age having CKD/diabetes or both. The results are in line with another study conducted in Pakistan which reported incorrect BP cut offs for diagnosis of hypertension in patients of 60 years above and below while appropriate therapy for hypertension in the was initiated only by less than forty percent of GPs [15]. The results of the present study showed that majority of prescribers considered patient-related factors, availability of STGs for reference, lack of awareness of prescribers regarding STGs, prescribers' experience and lack of enforcement of STGs as the main factors contributing towards lack of adherence to STGs in the management of hypertension in Pakistan. Similarly patients' clinical characteristics, poor knowledge and adherence of prescribers to practice protocols, financial issues, absence of effective computer system and unavailability of guidelines were attributed as major barriers towards the appropriate implementation of guidelines in the management of hypertension [16, 17].

The results of the current study reported that although most of the prescribers were satisfied with the current treatment of hypertension in the country but still strongly believed that understanding of cultural beliefs and individual attitudes of patients by clinician can help in improving adherence to antihypertensive therapy. Similar findings were reported in other studies which highlighted that understanding patient' beliefs about hypertension can increase patient satisfaction, trust, improve communication and patients' healthcare outcomes[18, 19]. Most of the prescribers in the current study knew and agreed with the effective role of combination of ACEIs/ARBs and diuretics/CCBs in treating stage 1 and II hypertension without any compelling indications. Similarly the use of fixed combination therapy was reported efficacious, relatively safe and cost-effective in decreasing BP in most of the patients suffering with essential hypertension [20]. Most of the prescribers in the present study agreed and were aware of effectiveness of thiazide diuretics in managing hypertension in patients of heart failure, history of MI or CKD. The use of diuretic was anticipated to be efficacious and cost effective for patients with history of MI or CKD [21]. Only half of the prescribers in the current study agreed and were aware of the role of CCBs in managing hypertension in patients for recurrent stroke prevention. Mean reductions in both systolic and diastolic blood pressures were reported in patients on calcium channel blocker monotherapy for prevention of stroke [22]. The results of the present study showed inadequate knowledge of the prescribers regarding JNC 8 guidelines for management of hypertension. No differences among the knowledge of different genders of prescribers, working in different sectors, cities and healthcare facilities were reported. However, were found among the knowledge scores of prescribers having different professions and levels of experience. Prescribers working as specialists and having an experience of more than ten years had significantly better knowledge. The results are in line with the findings of several other studies[7, 11, 12, 23]. The current study findings showed that nearly all of the prescriber's agreed moderation of alcohol consumption; weight reduction, dietary sodium reduction, DASH eating plan and aerobic physical activity are effective life style modifications in management of hypertension. However, weight reduction was considered most effective by the prescribers among all of these ways. The results are in line with the findings of another study which reported that multiple lifestyle changes including weight management, DASH diet, reduced sodium intake and exercise can lower BP and reduce cardiovascular disease risk in hypertensive patients [24].

The results of the present study highlighted that absence of STGs on treatment of hypertension in the health care facilities. Nearly all of them underscored the need for more training programs to increase knowledge and awareness about the available treatment guidelines for hypertension. Similarly poor knowledge of prescribers regarding STG's and need for training on these guidelines was highlighted in a study conducted in Zimbabwe [13].

Conclusion

The results of the present study concluded that the knowledge of prescribers working in public and private healthcare facilities regarding JNC 8 guidelines for the management of hypertension was not adequate but they had positive perceptions towards adherence to these guidelines linked to their availability in their healthcare facilities. This highlights the need for collaborative working of all the stakeholders to devise national standard treatment guidelines for the management of hypertension suitable to the country dynamics based on the evidence provided in JNC 8. An appropriate mechanism for dissemination of the guidelines to all the public and private practitioners and decision support system with prompted reminders to improve provider compliance with these guidelines can help to control hypertension in Pakistan.

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