Application of hypertension clinical guidelines among family medicine doctors in primary health care centers in Riyadh City, Saudi Arabia

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ABSTRACT

Background: Effective management of hypertension relies on adherence to evidence-based clinical practice guidelines (CPGs) among healthcare providers. However, adherence to hypertension CPGs and the factors influencing it among primary care physicians in Riyadh, Saudi Arabia, remain poorly understood. **Methodology:** This descriptive cross-sectional study aimed to assess the knowledge, application, and determinants of adherence to hypertension CPGs among primary care physicians working in Prince Sultan Military Medical City (PSMMC) and its affiliated primary health care centers in Riyadh, Saudi Arabia. A comprehensive sample of 211 primary care physicians was enrolled, and data were collected using a self-administered questionnaire covering demographic characteristics, adherence to hypertension CPGs, and barriers to guideline application. Descriptive statistics and appropriate statistical tests were used for data analysis. **Results:** The demographic profile of participants revealed a comprehensive representation of age, marital status, nationality, job title, qualification, and years of practice. The majority of participants demonstrated acceptable levels of knowledge (76.3%) and application (89.1%) of hypertension CPGs. However, barriers related to patient nonadherence to lifestyle modifications and medications were reported, highlighting challenges in implementing guideline recommendations in clinical practice. Significant associations were found between nationality, job title, qualification, and adherence to CPGs, with non-Saudi nationality and junior physicians exhibiting higher rates of unacceptable knowledge and application. Moreover, differences in adherence were observed among physicians following different hypertension CPGs. **Conclusion:** While primary care physicians in Riyadh demonstrate a strong foundation in evidence-based hypertension management, addressing barriers and disparities in adherence to CPGs requires targeted interventions and collaborative efforts. Promoting a culture of evidence-based practice, enhancing patient education and engagement strategies, and fostering collaboration among stakeholders are essential steps toward improving hypertension control and prevention in the region.

Keywords: Application, clinical practice guidelines, family medicine doctors, hypertension, knowledge, primary care

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Introduction

Hypertension is known for being a significant public health issue worldwide, and it is a vital risk factor for many severe health conditions such as cardiovascular diseases, cerebrovascular accidents, chronic kidney disease, dementia, and premature death.[1–4] In addition, hypertension is also known for its enormous impact on medical and human costs that can be reduced with

good blood pressure control.[5] As stated by the WHO, nearly 1.13 billion people worldwide have hypertension.[4] A study done to investigate the global burden of hypertension estimated that in 2000 roughly 26% of the worldwide adult population had hypertension and predicted that by 2025 this percentage will increase to 29%.[6] In Saudi Arabia, a national multistage survey with 10,735 participants was done in 2013 by El Bcheraoui *et al.*[7] to assess the prevalence of hypertension. It found that 15% of Saudis were hypertensive, 40% were borderline hypertensive, and around 56% of hypertensive Saudis were undiagnosed.

Tangible efforts to achieve optimal blood pressure control and to enhance the quality of care for hypertensive patients have entailed the transferring of the best available evidence on hypertension prevention, screening, diagnosis, and management into guidelines for physicians.[8] Clinical practice guidelines (CPGs) intersect the best available research evidence and clinical actions.[9] During the past few decades, international and national institute CPGs on hypertension diagnosis and management have emerged and are continuously updated to achieve the desired quality of care. Such institutional guidelines include the Joint National Committee (JNC),[9,10] National Institute for Health and Care Excellence (NICE),[11] European Society of Hypertension (ESH)/European Society of Cardiology (ESC),[12] American Society of Hypertension/International Society of Hypertension (ASH/ISH),[13] American College of Cardiology/American Heart Association (ACC/AHA),[14] and Saudi Hypertension Management Society (SHMS).[15] Unfortunately, many physicians continue to diagnose and manage hypertension from their experience and preference, notwithstanding these guidelines.[16]

Variable barriers have been identified that affect physicians' adherence to CPGs.[17] Apart from this, lack of awareness of implemented guidelines, unfamiliarity with specific guidelines or not being able to apply them properly, not agreeing with the recommended guidelines, incapability to change the inertia of previous practice, existence of external barriers affecting the application of the recommended guidelines, lack of confidence or self-efficacy to follow guideline recommendations, and lack of outcome expectancy or low beliefs that the recommended guidelines will improve the outcome.[17]

To the best of our knowledge, there are only a few studies that were done in Saudi Arabia, and both were in the southern region of Saudi Arabia.[18,19] Until the time of this study, no studies were done in the central region, particularly Riyadh city. Hence, this study aims to help reach optimal blood pressure control and to improve family medicine practice in the application of hypertension CPGs.

This study holds significant potential benefits for both healthcare practitioners and patients. For practitioners, it provides valuable insights into the current practices of hypertension diagnosis and management in the central region of Saudi Arabia, particularly Riyadh. By identifying barriers to the implementation of CPGs, this research can aid in developing targeted interventions to improve adherence. This, in turn, will enhance the quality of care provided by ensuring that physicians are equipped with the most current and evidence-based approaches to hypertension management. It also highlights areas where additional training, awareness, or system-level changes may be necessary to overcome obstacles in adopting these guidelines. For patients, the study's findings can translate into improved hypertension control and, consequently, a reduction in the associated risks of cardiovascular events, stroke, kidney disease, and premature death. Adherence to CPGs helps ensure that patients receive standardized and effective treatments, minimizing variability in care and enhancing overall health outcomes. Furthermore, increasing physician awareness and utilization of these guidelines can lead to earlier detection of hypertension and more efficient management, which is crucial given the high percentage of undiagnosed cases reported in Saudi Arabia. Ultimately, the study contributes to advancing public health efforts by promoting more consistent and high-quality hypertension care across the region.

Methodology

The study employed a descriptive cross-sectional questionnaire-based design, chosen for its affordability, convenience, and suitability in achieving the study objectives. The duration of the study spanned 12 months. The research was conducted at Prince Sultan Military Medical City (PSMMC) and its affiliated primary health care centers in Riyadh, Saudi Arabia. PSMMC, renowned for its advanced medical facilities and training programs, is a pivotal healthcare institution in the region, particularly for family medicine practice. The inclusion criteria encompassed general practitioners, board-certified and board-eligible family medicine physicians, and family medicine residents across all levels, provided they were employed at PSMMC or its associated primary health care centers. Physicians failing to meet these criteria were excluded from participation.

The target population comprised all 260 primary care physicians registered across the 18 primary health care centers affiliated with PSMMC; thus, a convenience sample was utilized. Ethical considerations were meticulously addressed, with written consent obtained from all participants after a comprehensive explanation of the study's objectives. Participants were assured of confidentiality and granted the autonomy to opt out at any stage of the research process.

Data were collected via self-administered questionnaires dispatched to participants through their official email addresses obtained from the Family Medicine Department at PSMMC. To optimize response rates, emails were disseminated in three waves over 4 months. This questionnaire was designed after thoroughly reviewing the most essential and widely used CPGs for hypertension diagnosis and management, considering the most agreed-upon recommendations from different guidelines (ACC/AHA, NICE, JNC, ASH/ISH, ESC, SHMS). It was then reviewed by three consultants in the Department of Family Medicine at PSMMC for content quality. Following this, a pilot

study involving 20 family medicine physicians was conducted to ensure its reliability.

The questionnaire is made up of five sections. Section A contains the demographic characteristics of the participants, including age, gender, marital status, nationality, job title, and qualification. Section B contains a question about the source of the guidelines used by the participants. Section C contains questions that measure knowledge about hypertension CPGs. Section D contains questions that measure the degree of application of CPGs. Section E contains opinion-based questions about physician-related barriers to hypertension management.

Statistical analysis was conducted using SPSS Pc +27.0 version statistical software. Descriptive statistics, including frequencies, percentages, mean, and standard deviation, were employed to summarize the data. For knowledge assessment, nine questions were used, and each correct answer was coded as 1 point. All questions were rated equally, resulting in a score of 0–9 points. Participants were classified as having an adequate level of knowledge when having 6 points or more in the knowledge set, while having less than 6 points were classified as an inadequate level of knowledge. In addition, six questions were used to assess the application of guidelines; each had a score ranging between 1 (strongly disagree) and 5 (strongly agree). The sum of the answers gave a score ranging between 6 and 30 points, with a score of 22 or more classified as having acceptable application. The Chi-squared test, t-student test, and ANOVA test were used to assess the relation between different variables. Appropriate statistical tests were utilized for quantitative, categorical, and univariate analyses, with a significance level set at $P < 0.05$ and 95% confidence intervals used to denote statistical significance and precision of results.

Results

The demographic characteristics of the participants are summarized in Table 1. A total of 211 primary care physicians were included in the study, with the majority falling within the age range of 20 to under 30 years (51.7%). The distribution across age categories was relatively consistent, with 35.1% aged between 30 and 40 years, followed by 7.6% aged between 40 and 50. A smaller proportion of participants were aged from 50 to under 60 years (4.3%), and 1.4% were aged between 60 and 70 years. Regarding gender, a slightly higher proportion of male participants (56.9%) were represented than females (43.1%). Marital status varied, with 47.4% of participants reporting being single, while 50.7% were married, and a small percentage (1.9%) were divorced.

Regarding nationality, the majority of participants were Saudi nationals (90.5%), while the remaining 9.5% were of non-Saudi nationality. Job titles varied among participants, with residents comprising the largest group (34.6%), followed by senior registrars (28.0%), registrars (16.6%), and consultants (20.9%).

In terms of qualifications, the majority held an MBBS degree (33.2%) or Saudi Board certification (54.0%), while smaller percentages held qualifications such as MRCGP (3.3%), Arab Board (5.7%) or other qualifications (3.8%). When considering years of practice, the largest proportion of participants had less than 5 years of experience (59.2%), followed by 20.4% with 5 to under 10 years of experience, 8.5% with 10 to under 15 years, 3.8% with 15 to under 20 years, and 8.1% with more than 20 years of experience.
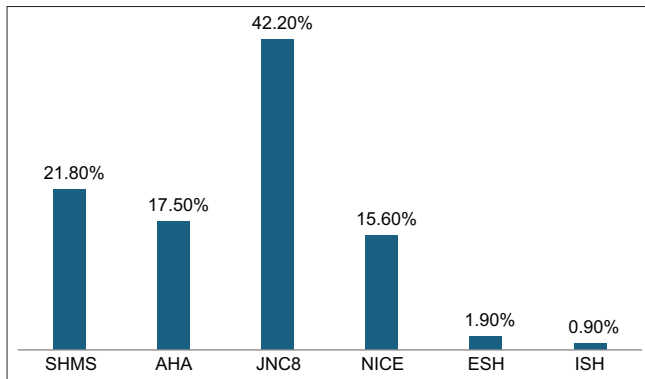
The distribution of hypertension clinical practice guidelines followed by the participants is depicted in Figure 1. Among the surveyed primary care physicians, the Joint National Committee 8 (JNC8) guidelines were the most commonly adhered to, with 42.2% of respondents indicating their utilization. Following closely, the SHMS guidelines were reported by 21.8% of participants. The AHA guidelines were followed by 17.5% of respondents, while the NICE guidelines were cited by 15.6% of participants. A smaller proportion of physicians reported adhering to the ESH guidelines (1.9%) and the ISH guidelines (0.9%).

Table 1: Demographic factors of the participants		
	Count	Column *n* %
Age		
20-<30	109	51.7%
30-<40	74	35.1%
40-<50	16	7.6%
50-<60	9	4.3%
60-70	3	1.4%
Gender		
Male	120	56.9%
Female	91	43.1%
Marital status		
Single	100	47.4%
Married	107	50.7%
Divorced	4	1.9%
Nationality		
Saudi	191	90.5%
Non-Saudi	20	9.5%
Job title		
Resident	73	34.6%
Senior Registrar	59	28.0%
Registrar	35	16.6%
Consultant	44	20.9%
Qualification		
MBBS	70	33.2%
Saudi Board	114	54.0%
MRCGP	7	3.3%
Arab Board	12	5.7%
Other	8	3.8%
Years of practice		
<5 Years	125	59.2%
5-<10 Years	43	20.4%
10-<15 Years	18	8.5%
15-<20 Years	8	3.8%
>20 Years	17	8.1%

Table 2 presents the participants' responses to knowledge-based questions related to hypertension management. For the question regarding the recommended period to wait before measuring blood pressure after consuming caffeine or nicotine, most participants provided correct answers, with 85.3% accurately identifying the recommended waiting period. Similarly, a high proportion of respondents correctly identified the blood pressure value defining hypertension based on office blood pressure (82.0%) and home blood pressure monitoring (63.0%). However, a smaller percentage of participants correctly identified the targeted blood pressure for a hypertensive patient with specific comorbidities, such as diabetes and proteinuria (55.5%). Regarding dietary recommendations, approximately 58.3% of respondents correctly indicated the recommended limit for salt intake in hypertensive patients.

Regarding antihypertensive medications, a substantial majority correctly identified medications to be avoided in pregnant women (92.4%) and preferred medications during pregnancy (79.6%). Similarly, a high proportion correctly identified the preferred antihypertensive medication for patients with chronic kidney disease (90.5%). However, a notable proportion of participants incorrectly identified medications to be avoided in patients with congestive heart failure (47.9%).

Figure 1: Which hypertension clinical practice guidelines are you following?

Figure 2 illustrates the responses of participants regarding the application of hypertension guidelines. When asked about offering ambulatory blood pressure monitoring or home blood pressure monitoring for confirming the diagnosis of hypertension, responses varied, with 49.8% of participants indicating they "Always" offer such monitoring, followed by 23.2% who responded "Usually." In investigating for end-organ damage after confirming the diagnosis of hypertension, the majority of participants (61.1%) reported doing so "Always," while 22.3% responded "Usually." Concerning the calculation of the ASCVD risk score for patients with or suspected to have hypertension, responses were more evenly distributed, with 41.2% indicating they "Always" calculate the score, followed by 31.8% who responded "Usually." When counseling patients about diet and exercise as nonpharmacological treatments for hypertension, the majority of participants (76.8%) reported doing so "Always," followed by 18.5% who responded "Sometimes." Regarding procedural considerations, a substantial majority of participants (54.0%) reported letting their patients rest for 5 minutes before measuring blood pressure, while 23.2% responded "Usually." Similarly, when facing a patient with uncontrolled blood pressure, the majority of participants (75.4%) reported assessing medication and lifestyle adherence before escalating treatment, with 17.5% responding "Usually."

Figure 3 delineates the basic investigations ordered when assessing a patient with newly diagnosed hypertension. The majority of participants indicated ordering a serum creatinine and eGFR test (96.2%), followed by sodium, potassium, and calcium levels (91.5%). Additionally, a significant proportion of participants ordered fasting blood glucose (86.3%), lipid profile (91.9%), and complete blood count (82.5%) tests. Other investigations, such as urinalysis (65.4%) and ECG (80.6%), were also commonly ordered by participants.

Figure 4 depicts the barriers encountered by participants in the application of hypertension CPGs. Concerning nonadherence of patients to lifestyle modifications, the majority of participants (79.1%) agreed that this posed a significant barrier, while a smaller

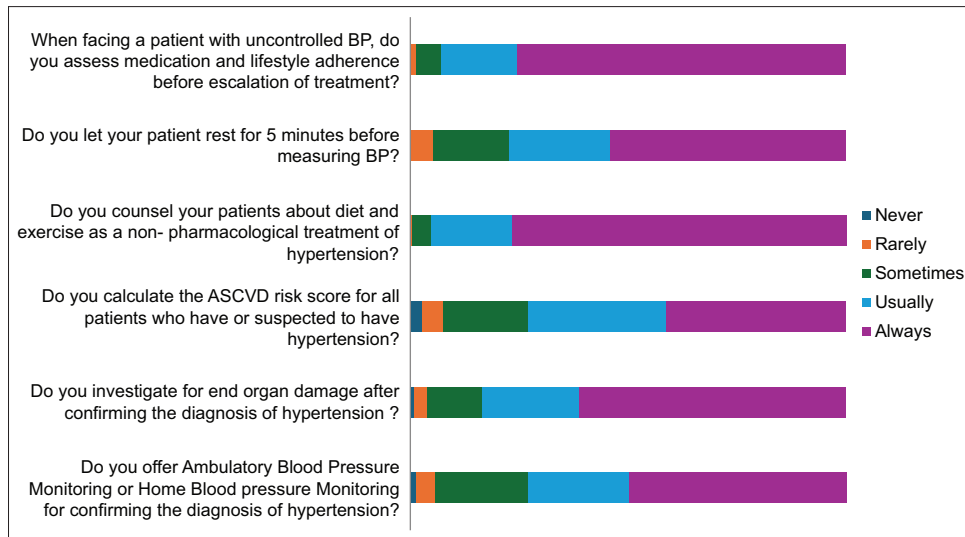| Table 2: Responses of the participants toward knowledge's questions				
	Incorrect answers		**Correct answer**	
	Count	**Row *n* %**	**Count**	**Row *n* %**
What is the recommended period to wait before measuring blood pressure after consumption of caffeine or nicotine?	31	14.7%	180	85.3%
Which of the following blood pressure values defines hypertension based on office BP measurement in adults without comorbidities?	38	18.0%	173	82.0%
Which of the following blood pressure values defines hypertension based on home BP monitoring?	78	37.0%	133	63.0%
Which of the following should be the targeted BP in a 55-year-old hypertensive patient with diabetes and proteinuria?	94	44.5%	117	55.5%
In hypertensive patients, it is recommended to limit salt intake to:	88	41.7%	123	58.3%
Which of the following antihypertensive drugs should be avoided in pregnant women?	16	7.6%	195	92.4%
Which of the following antihypertensive medications is preferred during pregnancy?	43	20.4%	168	79.6%
Which of the following antihypertensive drugs is best for CKD patients?	20	9.5%	191	90.5%
Which of the following antihypertensive drugs should be avoided in patients with congestive heart failure?	101	47.9%	110	52.1%

Figure 2: Responses of the participants toward application of hypertension guidelines
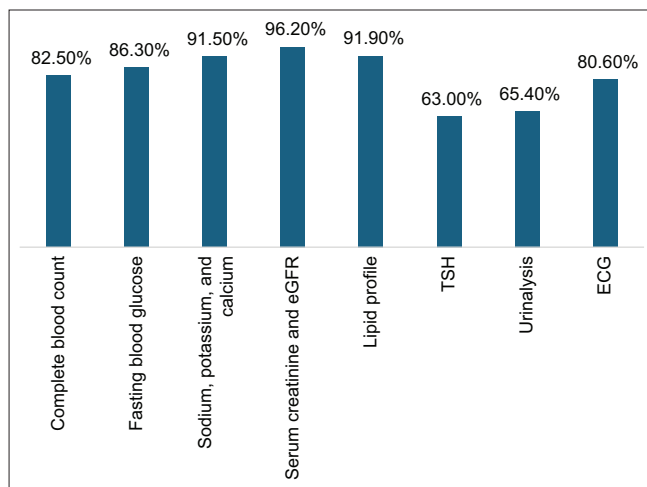

Figure 3: Which of the following basic investigations would you order when assessing a patient a newly diagnosed hypertension

proportion disagreed (3.3%). Similarly, for nonadherence of patients to their medications, a majority (66.4%) agreed it was a barrier, while 10.4% disagreed. Regarding the availability of drugs in the clinic, opinions were more divided, with 40.3% agreeing it was a barrier, 32.7% disagreeing, and 27.0% expressing neutrality. Lack of patients' awareness of the nature of hypertension was considered a barrier by the majority (65.4%), while 8.5% disagreed. Overcrowded clinics and lack of continuity of care were also perceived as barriers by the majority of participants, with 69.2% and 71.1% agreement, respectively.

Figure 5 provides insights into the level of knowledge and application among participants regarding hypertension management. In terms of knowledge, the majority (76.3%) demonstrated an acceptable level, while 23.7% fell into the unacceptable category. Similarly, in terms of application, the vast majority (89.1%) demonstrated acceptable behavior, with only 10.9% falling into the unacceptable category. These findings suggest a generally positive trend in both knowledge and application among the surveyed participants.

Table 3 illustrates the relationship between knowledge and application of hypertension guidelines and various demographic factors among the participants. When considering age groups, there were no statistically significant differences observed in either knowledge ($P = 0.357$) or application ($P = 0.804$) of hypertension guidelines. Similarly, gender did not significantly influence knowledge ($P = 0.426$) or application ($P = 0.193$) of guidelines.

Regarding marital status, no significant differences were found in knowledge ($P = 0.443$) or application ($P = 0.689$) of guidelines. However, nationality showed a significant association with knowledge of guidelines ($P = 0.019$), with non-Saudi participants exhibiting higher rates of unacceptable knowledge. Job title also showed a significant association with application of guidelines ($P = 0.009$), with residents demonstrating higher rates of unacceptable application.

Qualification demonstrated significant associations with application ($P = 0.008$) of guidelines. Notably, participants with qualifications other than MBBS or Saudi Board certification exhibited higher rates of unacceptable application. Years of practice did not show significant associations with either knowledge ($P = 0.947$) or application ($P = 0.331$) of guidelines.

Moreover, reliance on specific hypertension clinical practice guidelines by participants showed significant associations with both knowledge ($P = 0.033$) and application ($P < 0.001$) of the guidelines. For example, participants who reported depending on ESH showed the highest level of acceptable knowledge, followed by JNC8 and AHA (100%, 84.3%, and 81.1%, respectively), while those depending on ISH, ESH, and JNC8 showed the highest level of acceptable application (100%, 100%, and 97.8%, respectively) [Table 3].
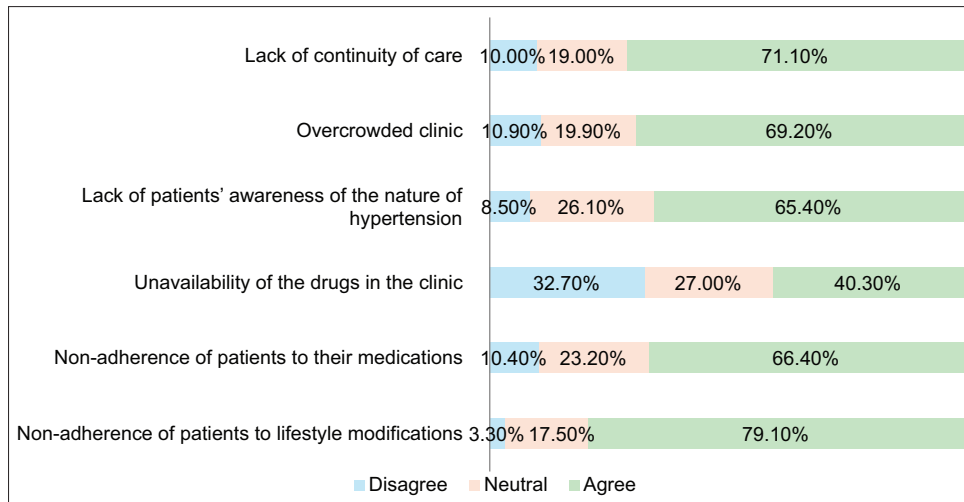
Figure 4: Barriers of hypertension CPG application
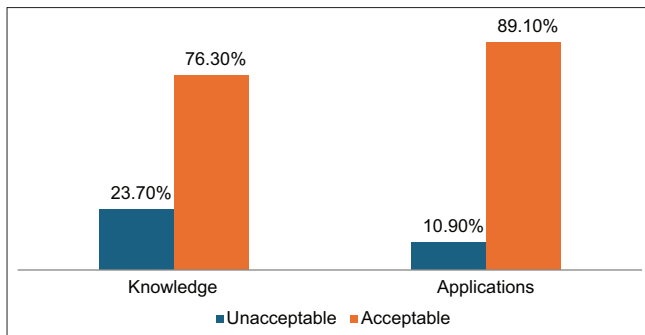
Figure 5: Level of knowledge and applications among the participants

Discussion

The results of this study shed some light on various aspects of hypertension management practices among primary care physicians in the Prince Sultan Military Medical City (PSMMC) and its affiliated primary health care centers in Riyadh, Saudi Arabia. The demographic profile of the participants revealed a comprehensive representation in terms of age, marital status, nationality, job title, qualification, and years of practice. Such diversity may help in understanding the nuanced factors that may influence adherence to CPGs and the application of evidence-based recommendations in real-world clinical settings.

One of the notable findings from this study was the high level of adherence to hypertension CPGs among the surveyed physicians. The majority of participants demonstrated acceptable levels of knowledge and application of guidelines, indicating a strong foundation in evidence-based practice. This finding is consistent with previous research highlighting the importance of CPGs in guiding clinical decision-making and improving patient outcomes.[20] In a previous study conducted in Jazan region, the authors reported that knowledge ranges between 18% and 94% and adherence varied between 2% and 97%.[18] However, a cross-sectional study was done in Aseer region in Saudi Arabia by Al-Gelban *et al.*[19] from November 2006 to January 2007 on a total of 345 physicians

using the JNC7 guidelines, which revealed that there is a lack of detailed knowledge regarding hypertension guidelines and most of the physicians are not adherent to the hypertension guidelines. In America, a study conducted by Ardery *et al.*[21] between February 2004 and October 2004 by reviewing retrospective medical records of 345 patients found that the overall physician's adherence to hypertension guidelines was 53.5%. In North-west Province, South Africa, a study by Adedeji *et al.*[22] published in 2015 reviewing 490 patients' medical records of 29 doctors revealed that the overall adherence to treatment guidelines for hypertension was low (51.9%). In Cyprus, a national prospective observational study was conducted by Theodorou *et al.*[23] between November 2007 and June 2008 by recording physicians' recommendations for a total of 654 patients, revealing that the overall adherence to European guidelines was 70.4%. Moreover, the widespread utilization of multiple CPGs, including those from reputable organizations such as the AHA and the Joint National Committee (JNC8), underscores the commitment of physicians to stay abreast of the latest recommendations in hypertension management.

However, despite the overall positive trend in adherence to CPGs, certain areas of concern were identified. For instance, a notable proportion of participants reported barriers related to patient nonadherence to lifestyle modifications and medications. This finding aligns with existing literature highlighting the challenges healthcare providers face in promoting behavior change and improving treatment adherence among hypertensive patients.[24–26] Addressing these barriers may require multifaceted interventions, including patient education, motivational interviewing, and collaborative care models involving other healthcare professionals.

The association between demographic factors and adherence to hypertension CPGs revealed some interesting insights. Non-Saudi nationality was found to be associated with higher rates of unacceptable knowledge of guidelines. This finding may be influenced by the fact that non-Saudi participants comprised less than 10% of the study's sample, which could have skewed the overall results.

	Knowledge					Application				
	Unacceptable		Acceptable		*P*	Unacceptable		Acceptable		*P*
	Count	Row *n* %	Count	Row *n* %		Count	Row *n* %	Count	Row *n* %	
Age										
20-<30	25	22.9%	84	77.1%	0.357	13	11.9%	96	88.1%	0.804
30-<40	19	25.7%	55	74.3%		8	10.8%	66	89.2%	
40-<50	2	12.5%	14	87.5%		2	12.5%	14	87.5%	
50-<60	2	22.2%	7	77.8%		0	0.0%	9	100.0%	
60-70	2	66.7%	1	33.3%		0	0.0%	3	100.0%	
Gender										
Male	26	21.7%	94	78.3%	0.426	16	13.3%	104	86.7%	0.193
Female	24	26.4%	67	73.6%		7	7.7%	84	92.3%	
Marital status										
Single	24	24.0%	76	76.0%	0.443	10	10.0%	90	90.0%	0.689
Married	24	22.4%	83	77.6%		13	12.1%	94	87.9%	
Divorced	2	50.0%	2	50.0%		0	0.0%	4	100.0%	
Nationality										
Saudi	41	21.5%	150	78.5%	0.019*	19	9.9%	172	90.1%	0.170
Non-Saudi	9	45.0%	11	55.0%		4	20.0%	16	80.0%	
Job title										
Resident	19	26.0%	54	74.0%	0.951	8	11.0%	65	89.0%	0.009*
Senior Registrar	13	22.0%	46	78.0%		2	3.4%	57	96.6%	
Registrar	8	22.9%	27	77.1%		9	25.7%	26	74.3%	
Consultant	10	22.7%	34	77.3%		4	9.1%	40	90.9%	
Qualification										
MBBS	19	27.1%	51	72.9%	0.101	8	11.4%	62	88.6%	0.008*
Saudi Board	21	18.4%	93	81.6%		9	7.9%	105	92.1%	
MRCGP	1	14.3%	6	85.7%		0	0.0%	7	100.0%	
Arab Board	5	41.7%	7	58.3%		5	41.7%	7	58.3%	
Other	4	50.0%	4	50.0%		1	12.5%	7	87.5%	
Years of practice										
<5 Years	30	24.0%	95	76.0%	0.947	14	11.2%	111	88.8%	0.331
5-<10 Years	10	23.3%	33	76.7%		4	9.3%	39	90.7%	
10-<15 Years	5	27.8%	13	72.2%		4	22.2%	14	77.8%	
15-<20 Years	1	12.5%	7	87.5%		1	12.5%	7	87.5%	
>20 Years	4	23.5%	13	76.5%		0	0.0%	17	100.0%	
Which hypertension clinical practice guidelines are you following?										
SHMS	15	32.6%	31	67.4%	0.033*	6	13.0%	40	87.0%	0.000*
AHA	7	18.9%	30	81.1%		4	10.8%	33	89.2%	
JNC8	14	15.7%	75	84.3%		2	2.2%	87	97.8%	
NICE	13	39.4%	20	60.6%		11	33.3%	22	66.7%	
ESH	0	0.0%	4	100.0%		0	0.0%	4	100.0%	
ISH	1	50.0%	1	50.0%		0	0.0%	2	100.0%	

Table 3: Relation between knowledge and application of hypertension guidelines and demographic factors

Additionally, job title and qualification were significantly associated with the application of guidelines, with residents demonstrating higher rates of unacceptable application. This finding underscores the importance of ongoing professional development and mentorship programs to support junior physicians in translating knowledge into practice effectively.[27]

The observed differences in adherence to specific hypertension CPGs warrant further investigation. Participants following SHMS guidelines exhibited higher rates of unacceptable knowledge and application compared to those following JNC8 guidelines. This discrepancy may be attributed to variations in the content,

format, and accessibility of different guidelines, as well as institutional preferences and local healthcare practices. Ensuring alignment between local protocols and international guidelines, as well as promoting standardized approaches to hypertension management, could help mitigate disparities in adherence and improve the quality of care delivered to hypertensive patients.[28]

Moreover, the findings underscore the need for tailored interventions to address barriers to guideline adherence, such as improving access to essential medications, enhancing patient education and engagement strategies, optimizing clinic workflows to reduce overcrowding, and fostering a culture of

continuous quality improvement within healthcare organizations. Collaborative efforts involving healthcare providers, policymakers, and community stakeholders are essential to implement evidence-based interventions and promote a culture of hypertension control and prevention at both individual and population levels.

The research possesses several strengths, including a comprehensive sample size of 211 primary care physicians and diverse demographic representation, which enhances generalizability. A high response rate boosts the reliability and validity of the findings. The study's relevance to practical healthcare, detailed data collection via self-administered questionnaires, and rigorous statistical analysis further fortify its contributions. However, there are notable weaknesses, such as the cross-sectional design limiting causal inference, potential biases from self-reported data, and the focus on a single institution, which may restrict generalizability. Recall bias and limited exploration of barriers to adherence, as well as the absence of longitudinal data, also pose challenges. Despite these limitations, the research sheds light on CPG adherence in primary care settings.

In conclusion, this study offers valuable insights into the knowledge, application, and determinants of adherence to hypertension CPGs among primary care physicians in Riyadh, Saudi Arabia. While the overall adherence to guidelines is commendable, addressing barriers and disparities in adherence requires a multifaceted approach that considers individual, organizational, and systemic factors. By promoting a culture of evidence-based practice and fostering collaboration among stakeholders, healthcare systems can enhance the quality of hypertension care and improve patient outcomes across diverse populations.

Recommendation

- Educational programs for specific groups with reduced knowledge and application levels.
- Audit program for applying clinical practice guidelines.
- Conducting future research to ensure the application of guidelines across various regions and enhance physician awareness of hypertension clinical practice guidelines.

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Conflicts of interest

There are no conflicts of interest.

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