



Clinical Implications and Limitations of JNC7 in HTN Management and Recommendations for JNC8

Youness R. Karodeh¹, Ivan Edafiogho², Bisrat Hailemeskel³, Joseph R. Ofosu⁴ & Pradeep K. Karla

¹ Associate Professor, Director of Non-traditional Doctor of Pharmacy Degree Program, College of Pharmacy, Howard University, Washington, DC 20059, USA

² Associate Professor, Faculty of Pharmacy, Kuwait University, PO Box 24923, Safat 13110, Kuwait

³ Associate Professor, College of Pharmacy, Howard University, Washington, DC 20059, USA

⁴ Dean, School of Pharmacy, Saint Joseph College, Hartford, Connecticut 06103, USA

⁵ Assistant Professor, Department of Pharmaceutical Sciences, College of Pharmacy, Howard University, Washington, DC 20059, USA

Citation: Youness R. Karodeh*, Ivan Edafiogho, Bisrat Hailemeskel, Joseph R. Ofosu & Pradeep K. Karla. **Clinical Implications and Limitations of JNC7 in HTN Management and Recommendations for JNC8.** Archives of Pharmacy Practice. 2011; 2(3) pp 84-89.

Hypertension (HTN) is the persistent elevation of arterial blood pressure, and if untreated, it leads to coronary heart disease (CHD) and target organ disease (TOD).⁵ HTN is the most common primary diagnosis in the United States, affecting over 52 million Americans.⁶ The prevalence of HTN increases with age, is more common among African Americans, and is more common among men. Since 2003, the current practice guidelines for the evaluation and management of HTN in the United States have been made available by the National Heart, Lung, and Blood Institute. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, or JNC 7, revised previous recommendations. The practice guidelines were necessitated by the findings of many observational studies and clinical trials dealing with HTN; the need for useful, clear and concise clinical guidelines; the JNC's consensus that a simplified classification of blood pressure (BP) was necessary; and a realization that clinicians were not using previous guidelines very much.¹⁻⁴ The pharmacist can play an important role in the detection and management of HTN. To appropriately provide pharmaceutical care, pharmacists must be knowledgeable about HTN,

particularly its detection and treatment. Measurement of BP and review of all medications, including herbal remedies and other over-the-counter (OTC) medications, are integral parts of pharmaceutical care.⁷ Pharmacists are encouraged to help the medical profession identify people who have elevated BP so that these patients can be treated appropriately.¹ The care of a patient with undetected or poorly controlled HTN requires consultation with the patient's physician.⁸⁻⁹ Also, a significant number of antihypertensive medications have undesired side effects that require assessment and potential intervention by pharmacists. In the current communication, JNC 7 report was evaluated for clinical implications, limitations, practice guidelines of clinicians with emphasis on the role of Pharmacist in early intervention and patient counseling for effective HTN management.

Key words

Clinical Implications of JNC7, Role of Pharmacist, JNC7 Limitations, Recommendations for JNC8

Manuscript History

Article Received on: 10th May 2011

Revised on: 3rd July, 2011

Approved for Publication: 15th July, 2011

Corresponding Author

Youness R. Karodeh, Pharm.D

R.Ph. Associate Professor, Director of Non-traditional Doctor of Pharmacy Degree Program, College of Pharmacy, Howard University, Washington, DC 20059, USA Fax: 202-806-4636.

Email: ykarodeh@howard.edu

Discussion

For people older than 50 years of age, systolic blood pressure (SBP) greater than 140 mm Hg is considered a much more important risk factor for cardiovascular disease (CVD) than is elevated diastolic blood pressure (DBP).^{13,14} JNC 7 introduced a category called "prehypertensive" to describe people with SBP of 120 to 139 mm Hg or a DBP of 80 to 89 mm Hg. People with preHTN are at increased risk of progressing to HTN and require health-promoting lifestyle modifications to prevent CVD.^{15,16} The definition of preHTN and prognosis of future HTN diagnosis is not clearly defined in JNC7. Also, the role of pharmacists and non-primary health care providers in effective patient counseling is not defined in JNC7. Writing Group of the American Society of Hypertension (WG-ASH) recommends broader definition of HTN with consideration to family history, risk factors and clinical markers. The JNC 7 report reduced the number of categories of HTN to only two. However, WG-ASH suggested changes to JNC7 classification taking CVD risk factors in consideration.

Suggested classification for JNC8 based on WG-ASH recommendations is represented as table 1.¹⁷

JNC7 indicates that diagnosis of hypertension is by proper BP measurement. BP readings should be taken for all patients on at least an annual basis.¹⁸ However, WG-ASH committee suggest that, "Elevated blood pressure in isolation represents only a partial understanding of hypertension. Hypertension is associated with many measurable cardiovascular indicators beyond blood pressure measurements."¹⁷ The etiology of HTN may be classified as essential (primary), or secondary. Most cases (90-95%) of HTN are essential, and may arise from genetic and exogenous factors. Secondary HTN has identifiable causes such as renovascular disease, pheochromocytoma, Cushing's syndrome, hyperaldosteronism, coarctation of the aorta, and certain medications. Therefore, secondary HTN can be resolved by treating underlying causes.¹⁹ However, WG-ASH recommendations impart high significance to "Pre-Hypertension" category of JNC7 and suggests treatment to "early signs of vascular disease" based on evaluation of risk factors. HTN is the most common primary diagnosis in the United States, accounting for more than 35 million health care visits per year.¹⁻³ Additionally, 30 percent of people with HTN are unaware that they have the condition. Only 59 percent of patients with HTN are being treated for their condition, and 34 percent have their BP controlled at levels consistent with JNC 7 guidelines.¹ This makes it obvious that clinical pharmacists encounter many patients with undetected or poorly controlled HTN, requiring medical consultation and intervention. Failure to detect severe elevations of BP can result in stroke or myocardial infarction. JNC7 recommendations, in current format do not elaborate the role of Pharmacist in counseling undiagnosed people with risk factors and educating HTN patients on medication adherence. In most pharmacy settings, the pharmaceutical issues will involve disease state education of the patient, lifestyle modifications including physical activity, weight loss, reduced salt intake, healthy diets to reduce HTN, reducing other CHD risk factors, efficacy of drugs in reaching target BP, tolerability of the drugs, compliance of the patient, and cost of therapy.¹⁹

Need For Continuous Update of Practice Guidelines in Treatment of HTN:

Although HTN treatment is a success story,²⁰ the practice of pharmacy is dynamic, and there is an urgent need to update the practice guidelines of JNC 7 to cater for a high efficiency in the treatment of HTN.

(i) Adherence to practice guidelines is frequently used as a measure of quality of care,²¹ and accurate characterization of adherence rests on evaluation of varied components of HTN care, and the use of validated performance measures, and BP outcomes.

(ii) Analysis of recent papers in HTN revealed that differences in central aortic BP as compared to peripheral (brachial) BP in the arm may explain outcome differences in similar clinical trials.^{22,23}

(iii) Implementing the JNC7 guidelines in treating HTN has resulted in desired outcomes.²⁴ Pharmacists providing academic detailing to physicians resulted in significant increases in patients receiving appropriate treatment. In addition, the patients who received clinical services from

pharmacists showed significant improvement in patient adherence and reaching goal BP. The intervention of a clinical pharmacist improved BP control, quality of life, and patient compliance.

(iv) The treatment strategies for pulmonary arterial hypertension (PAH) appears to be lacking in JNC 7 report. However, the American college of Chest Physicians (ACCP) have issued the ACCP evidence-based clinical practice guidelines.²⁵ The hemodynamic definition of PAH is a mean pulmonary artery pressure > 25 mm Hg; with a pulmonary capillary wedge pressure < 15 mm Hg, both measured at rest by right-heart catheterization.²⁵ PAH can lead to right ventricular failure and death.²⁶ Therapy of PAH is divided into medical and surgical components.²⁵ The surgical therapies are restricted to heart-lung transplantation, pulmonary thromboendarterectomy, and atrial septostomy. The medical therapies include endothelin receptor antagonists, IV epoprostenol, SC treprostinil, inhaled iloprost, beraprost, and phosphodiesterase-5 inhibitor such as sildenafil.^{25,26}

(v) There are clinicians who support and use the current JNC 7 guidelines;^{27,28} those who are not happy with the implementation;^{29,30} and those who advocate radical changes to the practice guidelines with a view to improving care.³¹⁻³⁴

A flow chart representing the broad clinical implications of JNC7, its potential limitations and suggestions for JNC8 is presented as figure 1.

Conclusion

This communication summarizes the JNC 7 report dealing with clinical implications in treatment of HTN, limitations of JNC7 and recommendations for JNC8. The ultimate goal of anti-hypertensive therapy is the reduction of cardiovascular and renal morbidity and mortality. A more aggressive prevention-oriented approach to the treatment of HTN is required. A clear definition of HTN, with emphasis on pre-hypertension in combination with clinical markers / risk factors to detect early vascular damage and initiate therapy is required in JNC8. Further, JNC8 treatment guidelines should incorporate PAH though, changes in pharmaceutical care management that are suggested by JNC 7, it is likely that clinical pharmacists will encounter more complications of hypertensive therapy among their patients and will necessitate greater interaction and consultation with other health care professionals. JNC8 guidelines should define the expanded role of clinical pharmacists in programs for evaluating, monitoring, and treating patients with HTN can result in improved adherence to therapy and established treatment guidelines. JNC8 may also include a defined strategy for pharmacist to interact / collaborate with physicians about medications and design effective formularies in effectively managing patients with HTN.

References

1. U.S. Department of Health and Human Services; National Institutes of Health; National Heart, Lung, and Blood Institute, National High Blood Pressure Education Program. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7). Available at: "www.nhlbi.nih.gov/guidelines/hypertension/index.htm". Accessed March 30, 2011.
2. Chobanian AV, Bakris GL, Black HR, et al.; National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension* 2003;42:1206-52.
3. Chobanian AV, Bakris GL, Black HR, et al.; National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; National High Blood Pressure Education Program Coordinating Committee. The Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC7 report (published correction appears in *JAMA*;290[2]:197). *JAMA* 2003;289:2560-72.
4. Sisson SD, Rastegar D, Rice TN, Prokopowicz G, et al. Physician familiarity with diagnosis and management of hypertension according to JNC 7 guidelines. *J Clin Hypertens (Greenwich)* 2006;8(5):344-50.
5. Oparil S, Zaman MA, Calhoun DA. Pathogenesis of hypertension. *Ann Intern Med* 2003;139:761-778.
6. Hajjar I, Kotchen TA. Trends in prevalence, awareness, treatment, and control of hypertension in the United States, 1988-2000. *JAMA* 2003;290(2):199-206. Dubois RW, Dean BB. Evolution of clinical practice guidelines: evidence supporting expanded use of medicines. *Dis Manag* 2006;9(4):210-23.
9. Klibanski A. Case 36-2006: A pregnant woman with new hypertension. *New Engl J Med* 2007;356(9):966-968.
10. Miller ER 3rd, John ML. New high blood pressure guidelines create new at-risk classification: changes in blood pressure classification by JNC 7. *J Cardiovasc Nurs* 2004;19(6):367-71.
13. Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension: final results of the Systolic Hypertension in the Elderly Program (SHEP). SHEP Cooperative Research Group. *JAMA* 1991;265:3255-64.
14. Kostis JB, Davis BR, Cutler J, et al. Prevention of heart failure by antihypertensive drug treatment in older persons with isolated systolic hypertension. SHEP Cooperative Research Group. *JAMA* 1997;278:212-6.
15. Lewington S, Clarke R, Qizilbash N, Peto R, Collins R; Prospective Studies Collaboration. Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies (published correction appears in *Lancet* 2003;361:1060). *Lancet* 2002;360(9349):1903-13.
16. Vasan RS, Larson MG, Leip EP, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. *N Engl J Med* 2001;345:1291-7.
17. Brooks L. New Definition of Hypertension Proposed. *Medscape* 2005 (Online).
18. Ogden LG, He J, Lydick E, Whelton PK. Long-term absolute benefit of lowering blood pressure in hypertensive patients according to the JNC VI risk stratification. *Hypertension* 2000;35:539-43.
19. Carter BL, Saseen JJ. Hypertension (Chapter 12). In: Dipiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM, eds. *Pharmacotherapy: A Pathophysiological Approach*, 5th ed. New York, NY: McGraw-Hill; 2002: 157-60.
20. Moser M. Hypertension treatment – a success study. *J Clin Hypertens* 2006;8(5):313-4.
21. Milchak JL, Carter BL, James PA, et al. Measuring adherence to practice guidelines for the management of hypertension: an evaluation of the literature. *Hypertension* 2004;44(5):602-8.
22. Bloch MJ, Basile J. Analysis of recent papers in hypertension. *J Clin Hypertens* 2006;8(5):376-80.
23. Meurin P. The ASCOT trial: clarifying the role of ACE inhibition in the reduction of cardiovascular events in patients with hypertension. *Am J Cardiovasc Drugs* 2006;6(5):327-34.
24. Carter BL. Implementing the new guidelines for hypertension: JNC 7, ADA, WHO-ISH. *J Manag Care Pharm* 2004;10(5 Suppl A):S18-25.
25. Rubin LJ. Executive Summary. Diagnosis and management of pulmonary arterial hypertension: ACCP evidence-based clinical practice guidelines. *Chest* 2004;126:4S-6S.
26. Lee SH, Rubin LJ. Current treatment strategies for pulmonary arterial hypertension. *J Intern Med* 2005;258(3):199-215.
27. Retta TM, Randall OS. Hypertension and concomitant diseases: a guide for evidence-based therapy. *J Natl Med Assoc* 2004;96(4):450-60.
28. Andrade SE, Gurwitz JH, Field TS, et al. Hypertension management: the care gap between clinical guidelines and clinical practice. *Am J Manag Care* 2004;10(7 Pt 2):481-6.
29. Wang L. Physician-related barriers to hypertension management. *Med Princ Pract* 2004;13(5):282-5.
30. Chan AS, Coleman RW, Martins SB, et al. Evaluating provider adherence in a trial of a guideline-based decision support system for hypertension. *Medinfo* 2004;11(pt 1):125-9.
31. Borzecki AM, Beriowitz DR. Management of hypertension and diabetes: treatment goals, drug choices, current practice, and strategies for improving care. *Curr Hypertens Rep* 2005;7(6):439-49.
32. Horning KK, Hoehns JD, Doucette WR. Adherence to clinical practice guidelines for 7 chronic conditions in

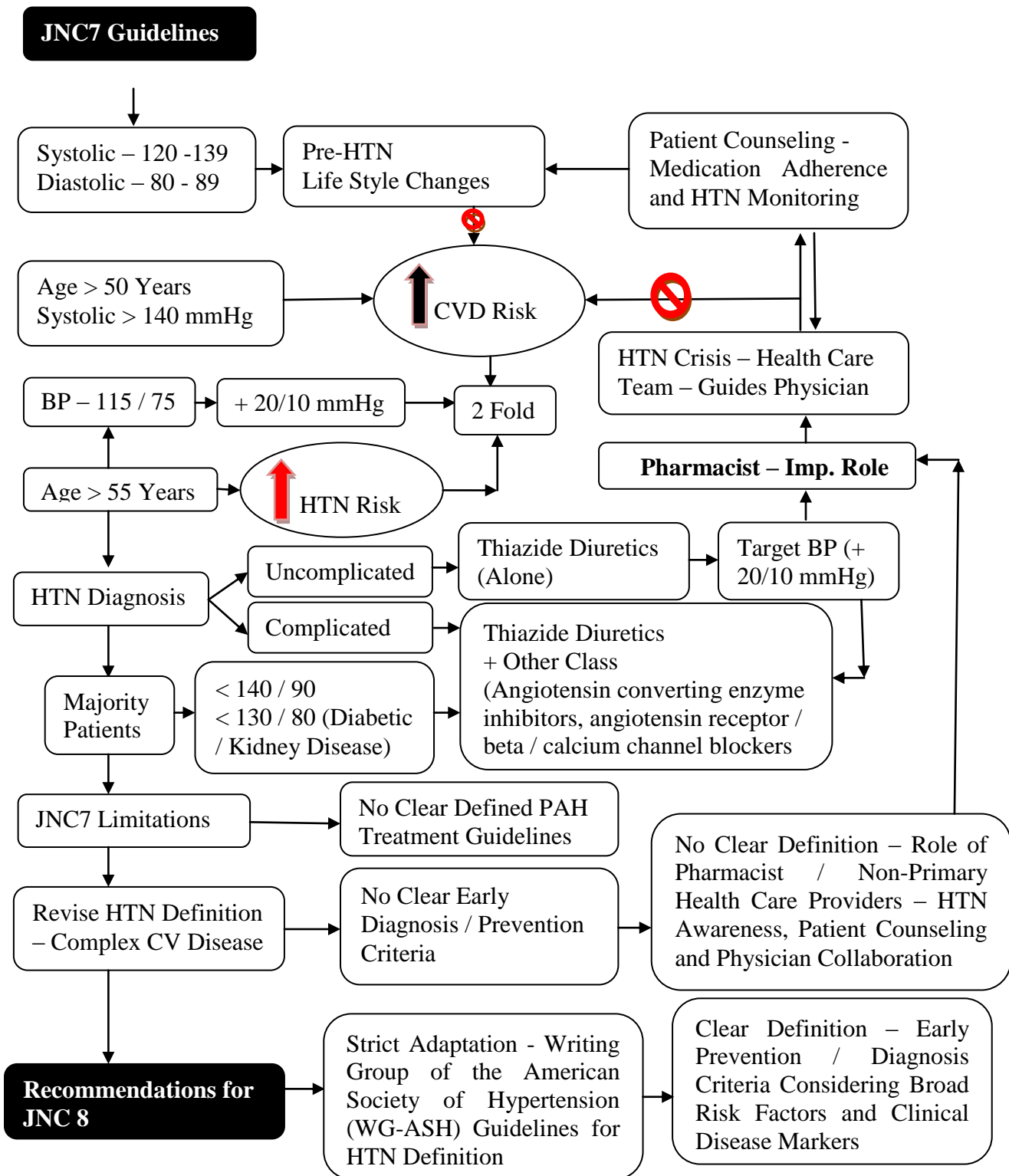
long-term patients who received pharmacist disease management services versus traditional drug regimen review. *J Manag Care Pharm* 2007 13(1):28-36.

33. Volpe M, Alderman MH, Furberg CD, et al. Beyond hypertension toward guideline for cardiovascular risk reduction. *Am J Hypertens* 2004;17(11 Pt 1):1068-74.
 34. Skelding PC, Majumdar SR, Kleinman K, et al. Clinical and nonclinical correlates of adherence to prescribing guidelines for hypertension in a large managed care organization. *J Clin Hypertens (Greenwich)* 2006;8(6):414-9.
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Table 1. WG-ASH Blood Pressure Categories Compared With JNC VI and JNC 7 (Adapted without modification from Ref:17)

JNC VI	JNC 7	WG-ASH	SBP (mm/Hg)		DBP (mm/Hg)
Optimal	Normal	Normal	< 120	and	< 80
	Prehypertension	Or Hypertension	120-139	or	80-89
Normal		Stage 1	< 130	and	< 85
High-normal			130-139	or	85-89
Hypertension	Hypertension				
Stage 1	Stage 1	Stage 1 or	140-159	or	90-99
	Stage 2	Stage 2	≥ 160	or	≥ 100
Stage 2		Stage 3	160-179	or	100-109
Stage 3			≥ 180	or	≥ 110

Figure 1: Flow Chart of Clinical Implications, Limitations of JNC-7 and Significant Role of Pharmacist



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