CME CREDIT ***EDUCATIONAL OBJECTIVE:*** Readers will think about strategies to improve hypertension control in African American patients

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Overcoming barriers to hypertension control in African Americans

ABSTRACT

Barriers to blood pressure control exist at the patient, physician, and system levels. We review the current evidence for interventions that target patient- and physician-related barriers, such as patient education, home blood pressure monitoring, and computerized decision-support systems for physicians, and we emphasize the need for more studies that address the effectiveness of these interventions in African American patients.

KEY POINTS

Rates of cardiovascular disease and related death are disparately high in African Americans.

Ways to improve how physicians manage blood pressure in this patient population may include chart audit with feedback, a computerized clinical decision-support system, and keeping up-to-date with treatment guidelines. However, more data are needed to determine the effectiveness of these interventions.

A novel method of health education is the use of narrative communication—ie, storytelling. Culturally appropriate storytelling may allow patients to identify with a story as it relates to their own lives.

A team-based approach to blood pressure control that involves nurses, pharmacists, and physician assistants should be emphasized, even though studies that have shown positive results did not focus specifically on African Americans.

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HIGH BLOOD PRESSURE takes a devastating toll on African Americans. Better control can go a long way to closing the "mortality gap" between African Americans and white Americans. But which strategies are best to address this complex problem?

In this report, we review the evidence on practice-based approaches to improving blood pressure control, from new styles of patient education to home blood pressure monitoring, focusing on studies in African Americans (**TABLE 1**).[1–11]

BETTER CONTROL IS NEEDED

Better control of hypertension is certainly needed. In the United States, African Americans have disparately high rates of cardiovascular disease and death from cardiovascular disease.[12] (In this review, "African American" refers to non-Hispanic blacks, and "whites" refers to non-Hispanic whites.) According to the National Health and Nutrition Examination Survey (NHANES), from 1988 to 2008 the overall age-adjusted prevalence of hypertension in African Americans was 40%, vs 30% in whites.[13] Partly because of this, African Americans have worse hypertension-related outcomes, including higher rates of fatal stroke, heart disease, end-stage kidney disease, and death compared with whites.[14–18] Thus, hypertension is the single most common contributor to the mortality gap between African Americans and white Americans.[19]

Fortunately, clinical research has shown that better control of blood pressure produces cardiovascular benefits in African Americans.[20] To date, however, the primary care

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treatment of hypertension in African Americans is suboptimal due to patient-related factors, to physician practice factors, and also to barriers in the health care system (TABLE 2).[21–23]

PATIENT-RELATED BARRIERS

Patient-related barriers[24–40] include:

- Poor knowledge about hypertension and its consequences[31,32]
- Poor adherence to drug therapy (a major factor,[24–26] as African Americans have poorer adherence rates than whites,[27–29] which may explain some of the racial disparity in blood pressure control[30])
- False health beliefs[34–37]
- Inability to change one's lifestyle
- Side effects of antihypertensive drugs[32]
- Unrealistic expectations of treatment (eg, a cure[33])
- Demographic factors (eg, socioeconomic status, educational level, age, sex).[24,38–40]

Perhaps the most salient and easily modifiable of these factors are patients' reluctance to modify their lifestyle and their misconceptions about the causes, treatment, and prevention of hypertension. Patients whose beliefs are discordant with traditional biomedical concepts of hypertension have poorer blood pressure control than those whose beliefs are concordant.[41] This may be more relevant to African Americans, since they are known to have cultural health beliefs that differ from those of Western culture (eg, that hypertension is a curable rather than a chronic illness, and that hypertension is a disease of nerves that often affects the blood and clogs the arteries).[42]

PHYSICIAN-RELATED BARRIERS

Barriers to effective blood pressure control at the physician level[43–48] include:

- Nonadherence to treatment guidelines[44]
- Failure to intensify the regimen if goals are not met[45]
- Failure to emphasize therapeutic lifestyle changes.[43,46–48]

When primary care physicians do not follow evidence-based guidelines, the reason may be that they are not aware of them or that they do not understand them. In a national survey of 1,029 physicians that was designed to explore how well physicians know the indications for specific antihypertensive drugs and how closely their opinions and practice agreed with national guidelines, only 37.3% correctly answered all of the knowledge-related questions.[49]

Other reasons for nonadherence are that physicians may disagree with the guidelines, may not be able to follow the guidelines, may not believe that following them will achieve the desired effect, or may have no motivation to change their practice.[50]

Whatever the reason, Hyman et al[51] reported that as many as 30% of physicians did not recommend treatment for patients with diastolic blood pressures of 90 to 100 mm Hg, and a higher proportion did not treat patients with systolic blood pressures of 140 to 160 mm Hg.

BARRIERS IN HEALTH CARE SYSTEMS

Although health care systems present barriers to optimal blood pressure control,[20,27,31,52] there is evidence that most cases of uncontrolled hypertension occur in patients with good access to care.[32,53,54] For example, an NHANES study[53] suggested that most patients with uncontrolled hypertension had in fact seen a physician on average at least three times in the previous year. And this may be more pervasive in African Americans: one survey found hypertension was uncontrolled in 75% of hypertensive African American patients despite free access to care, free medications, and regular follow-up visits.[41]

Not all physicians recommend lifestyle modifications to their patients with hypertension

Thus, the most significant barriers to blood pressure control appear to be patient-related and physician-related.

INTERVENTIONS AIMED AT PATIENTS

The most common approaches to improving blood pressure control at the patient level, regardless of race, are patient education,[55–61] home blood pressure monitoring,[62–67] and behavioral counseling to address misconceptions about hypertension,[68] to improve adherence to drug therapy,[69–73] and to encourage lifestyle modifications.[74–78]

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TABLE 1

Practice-based studies of hypertension control in African Americans

AUTHORS (YEAR)	INTERVENTIONS AND CONTROL	% AFRICAN AMERICAN	IMPROVEMENT IN BLOOD PRESSURE
Houston et al[3] (2011)	Three DVDs that contained patient stories Usual care[a]	100	11.21 mm Hg systolic ($P = .012$) 6.43 mm Hg diastolic ($P = .012$)
Bosworth et al[4] (2009)	Behavioral intervention Home monitoring intervention Home monitoring and behavioral intervention Usual care	49	3.9 mm Hg systolic ($P = .010$) 2.2 mm Hg diastolic ($P = .009$)[b]
Svetkey et al[9] (2009)	Physician intervention Patient intervention Physician and patient intervention combined Usual care	37	9.7 mm Hg systolic ($P = .0072$) 5.4 mm Hg diastolic ($P < .05$)[c]
Hicks et al[6] (2008)	Computerized decision support Usual care	33	No
Ogedegbe et al[2] (2008)	Motivational interviewing counseling Usual care	100	No[d]
Carter et al[10] (2009)	Clinical pharmacist intervention Usual care	26	20.7 mm Hg systolic ($P < .05$) 9.7 mm Hg diastolic
Hunt et al[11] (2008)	Pharmacy practitioners intervention Usual care	Not reported	6 mm Hg systolic ($P = .007$) 3 mm Hg diastolic ($P = .003$)
Artinian et al[5] (2007)	Usual care plus home monitoring Usual care	100	7.5 mm Hg systolic ($P = .04$)[e]
Roumie et al[8] (2006)	Provider education Provider education and alert Provider education, alert, and patient education	Not reported	16 mm Hg systolic ($P = .012$)[f]
Levine et al[1] (2003)	More intensive vs less intensive	100	No[g]
Montgomery et al[7] (2000)	Computer-based clinical decision support system plus cardiovascular risk chart Cardiovascular risk chart alone Usual care[h]	Not reported	4.6 mm Hg systolic ($P = .02$)[i]

[a]DVD interventions were delivered at baseline, 3 months, and 6 months.
[b]Statistical significance was seen with the combination of home monitoring and behavioral intervention.
[c]In the combined physician and patient intervention group and also in the patient intervention group alone. The largest impact was with the combined patient-physician intervention, which is reported above.
[d]Motivational interviewing counseling led to maintenance of drug adherence over time; there was a nonsignificant trend toward a net reduction in systolic pressure in favor of motivational counseling.
[e]Follow-up reported at 12 months. The significance was seen only in systolic blood pressure.
[f]The significance was seen in the patients whose providers were randomized to patient education group.
[g]Both groups had a significant decrease in mean systolic and diastolic pressures and a significant increase in the percentage of individuals with controlled high blood pressure. No difference between the levels of intervention.
[h]This represent the primary follow-up. Although primary follow-ups were done at 6 and 12 months, only data at 12 months were reported.
[i]Statistical significance was seen only with the risk-chart group only. The significance was seen only in systolic blood pressure.

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Patient education

Patient education can improve blood pressure control.[58,79–82] Its aims are to increase patients' understanding of the disease[83] and to encourage them to be more active in their own care.[80,84,85]

Patient education has a moderate effect on blood pressure control. The average proportion of patients whose hypertension was under control in community-based trials of various interventions ranged from 60% to 70%, compared with 38% to 46% with usual care.[56,80,81]

However, these strategies largely did not address misconceptions patients have about hypertension. This issue is especially critical in African Americans, who may have different perceptions of hypertension and different expectations for care[41]: beliefs that hypertension is "curable," not chronic, and that medication is needed only for hypertension-related symptoms may translate to poorer rates of medication adherence.

Levine et al[1] evaluated the efficacy of home visits by trained community health advisory board workers in a neighborhood in Baltimore, MD, with a high prevalence of hypertension. Participants were randomized to receive either one visit or five visits during the 40-month study period. Both groups had a statistically significant reduction in blood pressure, and in both groups the proportion of patients with adequate blood pressure control increased significantly. The results support the use of a practice- and community-based partnership to improve blood pressure control in African American patients.

Ogedegbe et al[2] randomized 190 hypertensive African American patients to receive usual care or quarterly counseling sessions that used motivational interviewing focused on medication adherence. The counseled patients stayed adherent to their medications, whereas adherence declined significantly in those receiving usual care. This effect was associated with a modest, nonsignificant trend toward a net reduction in systolic blood pressure with motivational interviewing.

A novel method of health education is the use of narrative communication—ie, storytelling. It has a good amount of evidence to support it, as culturally appropriate storytelling may allow patients to identify with a story as it relates to their own lives.[86–89] Examples of educational storytelling include:

- A woman with hypertension discussing what it means to have high blood pressure, and the benefits of controlling it, such as living long enough to see her grandchildren grow up
- A man discussing the importance of involving family and friends to help control blood pressure, and how dietary modifications can be made to ensure that salt alternatives are used when the family does the cooking.

Storytelling should be done in a culturally appropriate context. For example, storytellers should have the same background as the patient (ie, similar socioeconomic status and ethnic background): patients are more likely to be influenced if they identify with the storyteller and imagine themselves in a similar situation.

Houston et al[3] randomized 299 hypertensive African Americans to view either three DVDs that featured patients with hypertension or three "attention-control DVDs" on topics not related to hypertension. The intervention group's DVDs focused on storytelling and "learning more." In the storytelling section, patients told personal stories about what it meant to have hypertension and gave advice on how to best interact with health care

TABLE 2

Barriers to blood pressure control

Patient-related barriers
Poor adherence to drug therapy
Lack of knowledge about hypertension
Inability to engage in lifestyle changes
Health beliefs
Medication side effects

Physician-related barriers
Nonadherence to treatment guidelines
Failure to emphasize lifestyle modifications
Clinical inertia: failure to titrate antihypertensive regimen

Barriers in health care systems
Lack of access to care
High cost of medications
Absence of clinical decision support systems
High copayments

The most significant barriers to blood pressure control appear to be patient-related and physician-related

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providers and methods to improve medication adherence. A "learning more" section focused on what high blood pressure is, addressed therapeutic lifestyle changes, and encouraged patients to communicate with their health care providers. The patients who viewed the patient narratives had significantly lower blood pressure at 3 months than those assigned to usual care. Although blood pressure subsequently increased in both groups, the benefits of the intervention still existed at the end of follow-up.

Important to note about two of the above three studies[1,3] is that the interventions were done by people other than physicians, thus emphasizing the importance of a team approach to blood pressure control.

Behavioral counseling

The effectiveness of lifestyle modifications such as diet, weight loss, and physical activity in preventing and treating hypertension is well established.[74–78] For example:

- In the Dietary Approaches to Stop Hypertension (DASH) trial,[76] a healthy diet lowered blood pressure about as much as single drugs do, particularly in African Americans.
- The Trial of Nonpharmacologic Interventions in the Elderly (TONE)[74] showed that exercise can lower blood pressure in obese hypertensive patients.
- The PREMIER trial (Lifestyle Interventions for Blood Pressure Control)[75] showed that a single brief counseling session could produce substantial decreases in blood pressure in patients with stage 1 hypertension or high-normal blood pressure.

Given the consequences of uncontrolled hypertension in African Americans, patient education is extremely important

Unfortunately, these results have been hard to translate into primary care practice, especially for African American patients. Several studies have evaluated the impact of lifestyle interventions on blood pressure control in primary care practices with a large population of African American patients.

Bosworth et al,[4] in a study of a practice in which almost half the patients were African American, randomized patients to receive usual care, nurse-administered tailored behavioral telephone counseling, home blood pressure monitoring, or home monitoring plus tailored behavioral telephone counseling. The combination of home monitoring and tailored behavioral telephone counseling led to a statistically significant improvement at 24 months compared with baseline.

Home blood pressure monitoring

The effectiveness of self-monitoring in improving blood pressure control is also well documented.[62,63,65–67,90–95]

Pickering et al[62] studied patients with poorly controlled hypertension in a managed-care setting and found a reduction of 7 mm Hg systolic and 5 mm Hg diastolic pressure after 3 to 6 months of home monitoring compared with usual care.

Mengden et al,[94] in a similar study, found average blood pressure reductions at 6 months of 19.3/11.9 mm Hg in the home-monitoring group vs 10.6/8.8 mm Hg in the usual-care group.

The effect of home blood pressure monitoring may be greater in African Americans.

Rogers et al[93] found it to be more effective at lowering blood pressure than usual care in a group of 121 patients with poorly controlled hypertension followed in primary care practices, and these reductions were twice as large in African American patients than in white patients.[93]

Bondmass,[92] in a study of 33 African American patients with poorly controlled hypertension, reported a 53% control rate within 4 weeks of home monitoring. All patients in the study had uncontrolled blood pressure at baseline (> 140/90 mm Hg).

Artinian et al[5] evaluated the effect of nurse-managed telemonitoring on blood pressure control vs enhanced usual care. All participants were African American. The monitored group had a significantly greater reduction in systolic pressure at 12 months compared with those who received enhanced usual care.

PHYSICIAN-LEVEL INTERVENTIONS

Most interventions to improve how physicians manage patients with hypertension are designed to improve adherence to treatment guidelines. In most cases, these interventions are based on continuous quality improvement and disease management concepts such as

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physician education and academic detailing, reminders, feedback on performance measures, and risk-assessment tools.[96,97]

Physician education

Interest is increasing in physician educational interventions for blood pressure control.[24,98]

Inui et al,[99] in an early study in a primary care practice, found that patients of physicians who received tutorials on hypertension management were more compliant with their drug regimens and had better blood pressure control than patients of physicians in the control group.

Jennett et al,[100] in a similar randomized clinical trial, found that physicians who participated in an education activity were more adherent to treatment guidelines at 6 and 12 months compared with those who did not participate.

Maue et al[101] showed that rates of blood pressure control improved from 41% to 52% after a 6-month educational intervention for physicians in a managed-care setting.

Tu et al[102] reviewed 12 studies in which seven different physician educational interventions were used either alone or in combination and concluded that physician education improves compliance with guidelines for managing hypertension.

Unfortunately, these studies did not report outcomes separately for African American and white patients.

Hicks et al[6] found that disease management approaches that target physicians whose patients with hypertension are mostly African American did not yield clinically relevant improvement in these patients, and that minority patients were significantly less likely to have their blood pressure controlled at the end of the study compared with their non-Hispanic white counterparts.

Feedback to providers

Several studies have shown that, given reminders and feedback systems, physicians will change their practice.[103–106]

Mashru and Lant[104] combined chart audits and physician education in primary care practices and found they improved physician performance measures such as accuracy of diagnosis, number of patients who received cardiovascular risk assessment, and number of patients whose treatment was based on clinical laboratory assessments.

Feedback takes many forms but consists mostly of computerized information[107] or peer-to-peer academic detailing with opinion leaders.[108–110]

Dickinson et al,[106] for instance, showed that computer-generated listings of patients' blood pressures combined with a physician education program on clinical management of hypertension led to increased knowledge and better follow-up on their patients.

Again, however, these studies did not distinguish between African American and white patients, which makes it difficult to judge whether or not these approaches work differently for physicians with a large proportion of African American patients.

Computerized decision-support systems

Computerized decision-support systems have proliferated in primary care practices.[111]

McAlister et al[103] found that general practitioners randomized to manage hypertension with the assistance of a computer obtained better outcomes than with usual care.

Montgomery and Fahey,[107] in a systematic review, found improved blood pressure control in two of the three trials that compared computer-generated feedback reports and reminders to usual care. Specifically, 51% of patients whose physicians received reminders either had controlled blood pressure or were at least receiving treatment vs 33% in the control group at 12 months. This difference was even higher at 24 months.

The effectiveness of lifestyle changes in preventing and treating hypertension is well established

Montgomery et al[7] later randomized primary care practices to use a computer-based decision-support system and a cardiovascular risk chart, the risk chart alone, or to continue as usual. Results indicated no reduction in cardiovascular risk in the computer-system or the chart-only group, whereas patients in the chart-only group had a significant reduction in systolic pressure and were prescribed more cardiovascular drugs. This study indicates that use of a computerized decision-support system is not superior to chart review and audit feedback alone.

Evidence that computerized decision systems improve blood pressure control in Afri-

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can Americans is scant. However, when one looks at the evidence from studies of African Americans, the outcomes do not seem to differ between African American and white patients.

Hicks et al[6] examined the effectiveness of computerized decision support in improving hypertension care in a racially diverse population. Physicians were randomized to receive computerized decision support or to provide usual care without computerized support. Both groups improved significantly in prescribing appropriate drugs but not in overall blood pressure control. Furthermore, the study showed no reduction in racial disparities of care and blood pressure control.

A potential explanation for the lack of improvement in blood pressure was that the intervention dealt with making sure the appropriate drugs were prescribed rather than making sure physicians also appropriately intensified antihypertensive management when necessary.

INTERVENTIONS TARGETING PATIENTS AND PHYSICIANS

Physician feedback consists mainly of computerized information and peer-to-peer academic detailing with opinion leaders

Several studies have targeted both patient and physician-level barriers to blood pressure control in practice-based settings.

Roumie et al[8] randomized physicians to one of three intervention groups:

- "Provider education" consisting of an e-mail message with a Web-based link to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7)
- Provider education plus a computer alert with information about their patient's blood pressure
- Provider education, a computer alert, and patient education (ie, patients received a letter encouraging adherence to drug therapy, changing their lifestyle, and talking with their doctor about their blood pressure).

Patients whose providers were randomized to the third group had better blood pressure control. The report did not differentiate African American vs white patients. The data, however, did show the effectiveness of adding patient education to provider education to improve blood pressure control.

Bosworth et al,[112] in a study in which 40% of patients were African American, randomized patients to usual care or to bimonthly nurse-delivered behavioral telephone counseling. They also randomized providers either to receive computer-generated decision support designed to improve adherence to guidelines or to receive no support.

There were no significant differences in rates of blood pressure control in the intervention groups compared with a control group. Although differences in blood pressure control between groups were not significant, patients randomized to behavioral intervention had significantly better blood pressure control at the 24-month follow-up than at baseline.

Svetkey et al[9] evaluated the effects of physician intervention, patient intervention, and physician intervention plus patient intervention compared with control on systolic blood pressure at 6 months. They found that an intensive behavioral lifestyle intervention led to a significant reduction in systolic pressure at 6 months. By itself, the physician intervention did not have a meaningful effect, but patients in the combined physician-and-patient-intervention group experienced the greatest reduction (9.7 ± 12.7 mm Hg).

It takes a team

Physicians should not be the only focus in helping patients achieve blood pressure control. Although physician and patient factors need to be addressed to improve blood pressure control in African Americans, emphasis should also be placed on interdisciplinary, team-based care utilizing health care providers such as nurses, physician assistants, and pharmacists. Team-based care has been shown to have the greatest impact of all the strategies for improving blood pressure control.[113] There is a good amount of evidence involving interventions with a focus on health care providers other than physicians, although the data lack a sufficient focus on African Americans.

Carter et al,[10] in a randomized controlled trial in which 26.3% of the patients were African American, found that an intervention consisting of clinical pharmacists giving physicians drug therapy recommendations based on

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national guidelines resulted in a significantly lower blood pressure compared with a control group: the mean reduction was 20.7/9.7 mm Hg in the intervention group vs 6.8/4.5 mm Hg in the control group.

Carter et al[114] performed a meta-analysis of 37 studies and found that two strategies led to a significant reduction in blood pressure: a pharmacist-led intervention with treatment recommendations to physicians resulted in a systolic pressure reduction of 9.30 mm Hg; and nurse-led interventions resulted in a systolic pressure reduction of 4.80 mm Hg. Again, many of the studies cited in this meta-analysis lacked a focus on African Americans.

Hunt et al[11] conducted a randomized controlled trial in which pharmacists actively participated in the management of blood pressure. They were involved with every aspect of care, including reviewing medications and adverse drug reactions, assessing lifestyle behaviors and barriers to adherence, making dosing adjustments, and adding medications. Patients randomized to the intervention group achieved significantly lower systolic and diastolic pressures (137/75 vs 143/78 mm Hg in the control group). However, information about race was not included.

The above studies are just a few out of a large body of evidence demonstrating the value of team-based care to improve blood pressure control. It has yet to be determined whether these models can improve blood pressure control specifically in African Americans, since so many of these trials lacked a focus on this group. Promising is an ongoing randomized prospective trial by Carter et al[115] evaluating a model of collaboration between physicians and pharmacists, with a focus on patients in underrepresented minorities.

SO WHAT WORKS?

Although there is a growing body of literature on interventions to try to reduce disparities in hypertension and blood pressure control between African Americans and whites, only a few randomized controlled trials have focused on African Americans, and several have not reported their results.[116] So the question remains: How should we interpret the available data, which are aggregated across racial groups, and put it into practice when caring for hypertensive African American patients?

Patient education. In trying to overcome patient-related barriers, emphasis should be on patient education, in particular addressing misconceptions about hypertension and promoting adherence to antihypertensive therapy. This is evident from the narrative storytelling intervention by Houston et al.[3] Although this is the first study of its kind, this strategy may be something to consider if future studies replicate these findings. Culturally appropriate storytelling may allow patients to identify with the stories as they relate to their own personal lives. It can be an effective way to address patient education and change behaviors.

Self-monitoring with a home blood pressure monitor has also proven effective in the management of hypertension in African Americans. Indeed, the few studies that reported findings in African Americans showed impressive reductions in blood pressure. The benefits of home monitoring are well documented, and the effect on physician-related barriers such as clinical inertia are also quite impressive.[117] However, most of these studies did not assess the long-term impact or cost-effectiveness of home monitoring on blood pressure control.

Studies confirming the value of a team approach to blood pressure control have not focused specifically on African Americans

Behavioral counseling. Although we have good evidence of the effectiveness of behavioral counseling, whether this is sustained long-term has been less studied in African Americans. Thus, while interventions that targeted African Americans have reported impressive reductions in blood pressure, the effect tends to be greatest during the first few months of implementation, with the benefits disappearing over time.

Physician-related interventions. With regard to physician-level interventions, research has focused on physician education, utilizing alerts and computerized clinical decision-support systems. Evidence is scant on whether the use of computerized systems results in improves hypertension care in African Americans. However, a closer look at the data from studies that report outcomes in African American and white patients shows that the results do not seem to differ between these groups. Still, there is insufficient information about the im-

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pact on hypertensive African Americans.[6]

Strategies that address both patient- and physician-related barriers can improve overall blood pressure control; however, there is a lack of data comparing outcomes in hypertensive African Americans with those of whites, making it difficult to know if this would be an effective strategy in African American patients alone.

More studies needed that focus on African Americans

Developing interventions to improve blood pressure control in African Americans should be an ongoing priority for research if we intend to address racial disparities in cardiovascular disease. Although it is reassuring that there is a growing body of evidence and research with this focus,[118–121] more research is needed to determine effective strategies that address barriers related to physician practice and to the health care system overall as they relate to blood pressure control in African Americans. More importantly, these strategies should also emphasize a team-based approach that includes nurses, pharmacists, and physician assistants. Developing targeted interventions for hypertensive African Americans will help reduce disparities in the rates of cardiovascular illness and death in this patient population.

REFERENCES

1. **Levine DM, Bone LR, Hill MN, et al**. The effectiveness of a community/academic health center partnership in decreasing the level of blood pressure in an urban African-American population. Ethn Dis 2003; 13:354–361.
2. **Ogedegbe G, Chaplin W, Schoenthaler A, et al**. A practice-based trial of motivational interviewing and adherence in hypertensive African Americans. Am J Hypertens 2008; 21:1137–1143.
3. **Houston TK, Allison JJ, Sussman M, et al**. Culturally appropriate storytelling to improve blood pressure: a randomized trial. Ann Intern Med 2011; 154:77–84.
4. **Bosworth HB, Olsen MK, Grubber JM, et al**. Two self-management interventions to improve hypertension control: a randomized trial. Ann Intern Med 2009; 151:687–695.
5. **Artinian NT, Flack JM, Nordstrom CK, et al**. Effects of nurse-managed telemonitoring on blood pressure at 12-month follow-up among urban African Americans. Nurs Res 2007; 56:312–322.
6. **Hicks LS, Sequist TD, Ayanian JZ, et al**. Impact of computerized decision support on blood pressure management and control: a randomized controlled trial. J Gen Intern Med 2008; 23:429–441.
7. **Montgomery AA, Fahey T, Peters TJ, MacIntosh C, Sharp DJ**. Evaluation of computer based clinical decision support system and risk chart for management of hypertension in primary care: randomised controlled trial. BMJ 2000; 320:686–690.
8. **Roumie CL, Elasy TA, Greevy R, et al**. Improving blood pressure control through provider education, provider alerts, and patient education: a cluster randomized trial. Ann Intern Med 2006; 145:165–175.
9. **Svetkey LP, Pollak KI, Yancy WS Jr, et al**. Hypertension improvement project: randomized trial of quality improvement for physicians and lifestyle modification for patients. Hypertension 2009; 54:1226–1233.
10. **Carter BL, Ardery G, Dawson JD, et al**. Physician and pharmacist collaboration to improve blood pressure control. Arch Intern Med 2009; 169:1996–2002.
11. **Hunt JS, Siemienczuk J, Pape G, et al**. A randomized controlled trial of team-based care: impact of physician-pharmacist collaboration on uncontrolled hypertension. J Gen Intern Med 2008; 23:1966–1972.
12. US Department of Health and Human Services: Office of Disease Prevention and Health Promotion—Healthy People 2010. Nasnewsletter 2000; 15:3.
13. **Egan BM, Zhao Y, Axon RN**. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. JAMA 2010; 303:2043–2050.
14. **US Centers for Disease Control and Prevention**. Age-specific excess deaths associated with stroke among racial/ethnic minority populations–United States, 1997. JAMA 2000; 283:2382–2383.
15. **Giles WH, Kittner SJ, Hebel JR, Losonczy KG, Sherwin RW**. Determinants of black-white differences in the risk of cerebral infarction. The National Health and Nutrition Examination Survey Epidemiologic Follow-up Study. Arch Intern Med 1995; 155:1319–1324.
16. **Klag MJ, Whelton PK, Randall BL, Neaton JD, Brancati FL, Stamler J**. End-stage renal disease in African-American and white men. 16-year MRFIT findings. JAMA 1997; 277:1293–1298.
17. **Pavlik VN, Hyman DJ, Vallbona C, Toronjo C, Louis K**. Hypertension awareness and control in an inner-city African-American sample. J Hum Hypertens 1997; 11:277–283.
18. **Roger VL, Go AS, Lloyd-Jones DM, et al**. Heart Disease and Stroke Statistics—2011 Update: A Report From the American Heart Association. Circulation Feb 1;123(4):e18-e209.
19. **Chobanian AV, Bakris GL, Black HR, et al; 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; 42:1206–1252.
20. **Bone LR, Hill MN, Stallings R, et al**. Community health survey in an urban African-American neighborhood: distribution and correlates of elevated blood pressure. Ethn Dis 2000; 10:87–95.
21. **Weber MA**. Strategies for improving blood pressure control. Am J Hypertens 1998; 11:897–899.
22. **Hill MN, Sutton BS**. Barriers to hypertension care and control. Curr Hypertens Rep 2000; 2:445–450.
23. **Alderman MH**. Barriers to blood pressure control. Am J Hypertens 1999; 12:1268–1269.
24. **Chobanian AV**. Control of hypertension—an important national priority. N Engl J Med 2001; 345:534–535.
25. **Miller NH, Hill M, Kottke T, Ockene IS**. The multilevel compliance challenge: recommendations for a call to action. A statement for healthcare professionals. Circulation 1997; 95:1085–1090.
26. **Sackett DL, Snow JC**. The magnitude of compliance and noncompliance. In: Haynes RB, Taylor DW, Sackett DL, eds. Compliance in Health Care. Baltimore, MD: John Hopkins University Press; 1979:11-22.
27. **Shea S, Misra D, Ehrlich MH, Field L, Francis CK**. Correlates of nonadherence to hypertension treatment in an inner-city minority population. Am J Public Health 1992; 82:1607–1612.
28. **Kirscht JP, Rosenstock IM**. Patient adherence to antihypertensive medical regimens. J Community Health.1977; 3:115–124.
29. **Hershey JC, Morton BG, Davis JB, Reichgott MJ**. Patient compliance with antihypertensive medication. Am J Public Health 1980; 70:1081–1089.
30. **Bosworth HB, Powers B, Grubber JM, et al**. Racial differences in blood pressure control: potential explanatory factors. J Gen Intern Med 2008; 23:692–698.
31. **Douglas JG, Ferdinand KC, Bakris GL, Sowers JR**. Barriers to blood pressure control in African Americans. Overcoming obstacles is

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challenging, but target goals can be attained. Postgrad Med 2002; 112:51–52, 55, 59–62 passim.

32. **Knight EL, Bohn RL, Wang PS, Glynn RJ, Mogun H, Avorn J**. Predictors of uncontrolled hypertension in ambulatory patients. Hypertension 2001; 38:809–814.
33. **Ogedegbe G, Mancuso CA, Allegrante JP**. Expectations of blood pressure management in hypertensive African-American patients: a qualitative study. J Natl Med Assoc 2004; 96:442–449.
34. **Blumhagen D**. Hypertension: a folk illness with a medical name. Cult Med Psychiatry 1980; 4:197–224.
35. **Meyer D, Leventhal H, Gutmann M**. Common-sense models of illness: the example of hypertension. Health Psychol 1985; 4:115–135.
36. **Nelson EC, Stason WB, Neutra RR, Solomon HS, McArdle PJ**. Impact of patient perceptions on compliance with treatment for hypertension. Med Care 1978; 16:893–906.
37. **Heurtin-Roberts S**. 'High-pertension'—the uses of a chronic folk illness for personal adaptation. Soc Sci Med 1993; 37:285–294.
38. **Lang T**. Social and economic factors as obstacles to blood pressure control. Am J Hypertens 1998; 11:900–902.
39. **Lang T**. Factors that appear as obstacles to the control of high blood pressure. Ethn Dis 2000; 10:125–130.
40. **Stamler R, Shipley M, Elliott P, Dyer A, Sans S, Stamler J**. Higher blood pressure in adults with less education. Some explanations from INTERSALT. Hypertension 1992; 19:237–241.
41. **Heurtin-Roberts S, Reisin E**. The relation of culturally influenced lay models of hypertension to compliance with treatment. Am J Hypertens 1992; 5:787–792.
42. **Snow LF**. Folk medical beliefs and their implications for care of patients. A review bases on studies among black Americans. Ann Intern Med 1974; 81:82–96.
43. **Hicks LS, Shaykevich S, Bates DW, Ayanian JZ**. Determinants of racial/ethnic differences in blood pressure management among hypertensive patients. BMC Cardiovasc Disord 2005; 5:16.
44. **Mehta SS, Wilcox CS, Schulman KA**. Treatment of hypertension in patients with comorbidities: results from the study of hypertensive prescribing practices (SHyPP). Am J Hypertens 1999; 12:333–340.
45. **Ballard DJ, Strogatz DS, Wagner EH, et al**. Hypertension control in a rural southern community: medical care process and dropping out. Am J Prev Med 1988; 4:133–139.
46. **Hajjar I, Miller K, Hirth V**. Age-related bias in the management of hypertension: a national survey of physicians' opinions on hypertension in elderly adults. J Gerontol A Biol Sci Med Sci 2002; 57:M487–M491.
47. **McAlister FA, Laupacis A, Teo KK, Hamilton PG, Montague TJ**. A survey of clinician attitudes and management practices in hypertension. J Hum Hypertens 1997; 11:413–419.
48. **Trilling JS, Froom J**. The urgent need to improve hypertension care. Arch Fam Med 2000; 9:794–801.
49. **Huse DM, Roht LH, Alpert JS, Hartz SC**. Physicians' knowledge, attitudes, and practice of pharmacologic treatment of hypertension. Ann Pharmacother 2001; 35:1173–1179.
50. **Cabana MD, Rand CS, Powe NR, et al**. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA 1999; 282:1458–1465.
51. **Hyman DJ, Pavlik VN, Vallbona C**. Physician role in lack of awareness and control of hypertension. J Clin Hypertens (Greenwich) 2000; 2:324–330.
52. **Morley Kotchen J, Walker WE, Kotchen TA**. Rationale for a community approach to hypertension control among inner city minority populations. Heart Dis Stroke 1994; 3:61–62.
53. **Hyman DJ, Pavlik VN**. Characteristics of patients with uncontrolled hypertension in the United States. N Engl J Med 2001; 345:479–486.
54. **Lang T**. Factors that appear as obstacles to the control of high blood pressure. Ethn Dis 2000; 10:125–130.
55. **Pierce JP, Watson DS, Knights S, Gliddon T, Williams S, Watson R**. A controlled trial of health education in the physician's office. Prev Med 1984; 13:185–194.
56. **Morisky DE, DeMuth NM, Field-Fass M, Green LW, Levine DM**. Evaluation of family health education to build social support for long-term control of high blood pressure. Health Educ Q 1985; 12:35–50.
57. **Lorgelly P, Siatis I, Brooks A, et al**. Is ambulatory blood pressure monitoring cost-effective in the routine surveillance of treated hypertensive patients in primary care? Br J Gen Pract 2003; 53:794–796.
58. **Green LW, Levine DM, Wolle J, Deeds S**. Development of randomized patient education experiments with urban poor hypertensives. Patient Couns Health Educ 1979; 1:106–111.
59. **Gruesser M, Hartmann P, Schlottmann N, Lohmann FW, Sawicki PT, Joergens V**. Structured patient education for out-patients with hypertension in general practice: a model project in Germany. J Hum Hypertens 1997; 11:501–506.
60. **Mühlhauser I, Sawicki PT, Didjurgeit U, Jörgens V, Trampisch HJ, Berger M**. Evaluation of a structured treatment and teaching programme on hypertension in general practice. Clin Exp Hypertens 1993; 15:125–142.
61. **Roca B, Nadal E, Rovira RE, Valls S, Lapuebla C, Lloría N**. Usefulness of a hypertension education program. South Med J 2003; 96:1133–1137.
62. **Pickering TG, Gerin W, Holland JK**. Home blood pressure teletransmission for better diagnosis and treatment. Curr Hypertens Rep 1999; 1:489–494.
63. **Yarows SA, Julius S, Pickering TG**. Home blood pressure monitoring. Arch Intern Med 2000; 160:1251–1257.
64. **Haynes RB, Sackett DL, Gibson ES, et al**. Improvement of medication compliance in uncontrolled hypertension. Lancet 1976; 1:1265–1268.
65. **Johnson AL, Taylor DW, Sackett DL, Dunnett CW, Shimizu AG**. Self-recording of blood pressure in the management of hypertension. Can Med Assoc J 1978; 119:1034–1039.
66. **Carnahan JE, Nugent CA**. The effects of self-monitoring by patients on the control of hypertension. Am J Med Sci 1975; 269:69–73.
67. **Stahl SM, Kelley CR, Neill PJ, Grim CE, Mamlin J**. Effects of home blood pressure measurement on long-term BP control. Am J Public Health 1984; 74:704–709.
68. **Boulware LE, Daumit GL, Frick KD, Minkovitz CS, Lawrence RS, Powe NR**. An evidence-based review of patient-centered behavioral interventions for hypertension. Am J Prev Med 2001; 21:221–232.
69. **Haynes RB, Mattson ME, Engebretson TO Jr**. Patient compliance to prescribed antihypertensive medication regimens: a report to the National Heart, Lung, and Blood institute. Bethesda, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, 1980. NIH publication 81-2102.
70. **Burke LE, Dunbar-Jacob JM, Hill MN**. Compliance with cardiovascular disease prevention strategies: a review of the research. Ann Behav Med 1997; 19:239–263.
71. **Dunbar-Jacob J, Dwyer K, Dunning EJ**. Compliance with antihypertensive regimen: a review of the research in the 1980s. Ann Behav Med 1991; 13:31–39.
72. **Haynes RB, Montague P, Oliver T, McKibbon KA, Brouwers MC, Kanani R**. Interventions for helping patients to follow prescriptions for medications. Cochrane Database Syst Rev 2000; (2):CD000011.
73. **Roter DL, Hall JA, Merisca R, Nordstrom B, Cretin D, Svarstad B**. Effectiveness of interventions to improve patient compliance: a meta-analysis. Med Care 1998; 36:1138–1161.
74. **Appel LJ, Espeland MA, Easter L, Wilson AC, Folmar S, Lacy CR**. Effects of reduced sodium intake on hypertension control in older individuals: results from the Trial of Nonpharmacologic Interventions in the Elderly (TONE). Arch Intern Med 2001; 161:685–693.
75. **Appel LJ, Champagne CM, Harsha DW, et al; Writing Group of the PREMIER Collaborative Research Group**. Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial. JAMA 2003; 289:2083–2093.
76. **Appel LJ, Moore TJ, Obarzanek E, et al**. A clinical trial of the effects of dietary patterns on blood pressure. DASH Collaborative Research Group. N Engl J Med 1997; 336:1117–1124.
77. **Moore TJ, Conlin PR, Ard J, Svetkey LP**. DASH (Dietary Approaches to Stop Hypertension) diet is effective treatment for stage 1 isolated systolic hypertension. Hypertension 2001; 38:155–158.
78. **Stevens VJ, Obarzanek E, Cook NR, et al; Trials for the Hypertension Prevention Research Group**. Long-term weight loss and changes in blood pressure: results of the Trials of Hypertension Prevention, phase II. Ann Intern Med 2001; 134:1–11.

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79. **Sawicki PT, Mühlhauser I, Didjurgeit U, Berger M**. Improvement of hypertension care by a structured treatment and teaching programme. J Hum Hypertens 1993; 7:571–573.
80. **Morisky DE, Bowler MH, Finlay JS**. An educational and behavioral approach toward increasing patient activation in hypertension management. J Community Health 1982; 7:171–182.
81. **Levine DM, Green LW, Deeds SG, Chwalow J, Russell RP, Finlay J**. Health education for hypertensive patients. JAMA 1979; 241:1700–1703.
82. **Iso H, Shimamoto T, Yokota K, Sankai T, Jacobs DR Jr, Komachi Y**. Community-based education classes for hypertension control. A 1.5-year randomized controlled trial. Hypertension 1996; 27:968–974.
83. **Cuspidi C, Sampieri L, Macca G, et al**. Improvement of patients' knowledge by a single educational meeting on hypertension. J Hum Hypertens 2001; 15:57–61.
84. **Nessman DG, Carnahan JE, Nugent CA**. Increasing compliance. Patient-operated hypertension groups. Arch Intern Med 1980; 140:1427–1430.
85. **Casasanta L, Patel S**. Outcomes of an educational component of a disease management program for hypertension. Manag Care Interface 1999; 12:70–73.
86. **McAdams DP**. The Stories We Live By: Personal Myths and the Making of the Self. New York NY: The Guilford Press; 1993.
87. **Bruner J**. Acts of Meaning. Cambridge, MA: Harvard Univ Pr; 1990.
88. **Slater MD, Rouner D**. Entertainment—education and elaboration likelihood: Understanding the processing of narrative persuasion. Commun Theory 2002; 12:173–191.
89. **Dal CS, Zanna MP, Fong GT**. Narrative persuasion and overcoming resistance. In: Knowles ES, Linn J, eds. Resistance and Persuasion. Mahwah, NJ: Lawrence Erlbaum Assoc; 2004:175–191.
90. **Artinian NT, Washington OG, Templin TN**. Effects of home telemonitoring and community-based monitoring on blood pressure control in urban African Americans: a pilot study. Heart Lung 2001; 30:191–199.
91. **Bailey B, Carney SL, Gillies AA, Smith AJ**. Antihypertensive drug treatment: a comparison of usual care with self blood pressure measurement. J Hum Hypertens 1999; 13:147–150.
92. **Bondmass M**. The effect of home monitoring and telemanagement on blood pressure control among African Americans. Telemed J 2000; 6:15–23.
93. **Rogers MA, Small D, Buchan DA, et al**. Home monitoring service improves mean arterial pressure in patients with essential hypertension. A randomized, controlled trial. Ann Intern Med 2001; 134:1024–1032.
94. **Mengden T, Uen S, Baulmann J, Vetter H**. Significance of blood pressure self-measurement as compared with office blood pressure measurement and ambulatory 24-hour blood pressure measurement in pharmacological studies. Blood Press Monit 2003; 8:169–172.
95. **Friedman RH, Kazis LE, Jette A, et al**. A telecommunications system for monitoring and counseling patients with hypertension. Impact on medication adherence and blood pressure control. Am J Hypertens 1996; 9:285–292.
96. **Oxman AD, Thomson MA, Davis DA, Haynes RB**. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. CMAJ 1995; 153:1423–1431.
97. **Wensing M, van der Weijden T, Grol R**. Implementing guidelines and innovations in general practice: which interventions are effective? Br J Gen Pract 1998; 48:991–997.
98. **Davis DA, Thomson MA, Oxman AD, Haynes RB**. Changing physician performance. A systematic review of the effect of continuing medical education strategies. JAMA 1995; 274:700–705.
99. **Inui TS, Yourtee EL, Williamson JW**. Improved outcomes in hypertension after physician tutorials. A controlled trial. Ann Intern Med 1976; 84:646–651.
100. **Jennett PA, Wilson TW, Hayton RC, Mainprize GW, Laxdal OE**. Desirable behaviours in the office management of hypertension addressed through continuing medical education. Can J Public Health 1989; 80:359–362.
101. **Maue SK, Rivo ML, Weiss B, Farrelly EW, Brower-Stenger S**. Effect of a primary care physician-focused, population-based approach to blood pressure control. Fam Med 2002; 34:508–513.
102. **Tu K, Davis D**. Can we alter physician behavior by educational methods? Lessons learned from studies of the management and follow-up of hypertension. J Contin Educ Health Prof 2002; 22:11–22.
103. **McAlister NH, Covvey HD, Tong C, Lee A, Wigle ED**. Randomised controlled trial of computer assisted management of hypertension in primary care. Br Med J (Clin Res Ed) 1986; 293:670–674.
104. **Mashru M, Lant A**. Interpractice audit of diagnosis and management of hypertension in primary care: educational intervention and review of medical records. BMJ 1997; 314:942–946.
105. **Degoulet P, Menard J, Berger C, Plouin PF, Devries C, Hirel JC**. Hypertension management: the computer as a participant. Am J Med 1980; 68:559–567.
106. **Dickinson JC, Warshaw GA, Gehlbach SH, Bobula JA, Muhlbaier LH, Parkerson GR Jr**. Improving hypertension control: impact of computer feedback and physician education. Med Care 1981; 19:843–854.
107. **Montgomery AA, Fahey T**. A systematic review of the use of computers in the management of hypertension. J Epidemiol Community Health 1998; 52:520–525.
108. **Coleman MT, Lott JA, Sharma S**. Use of continuous quality improvement to identify barriers in the management of hypertension. Am J Med Qual 2000; 15:72–77.
109. **Goldberg HI, Wagner EH, Fihn SD, et al**. A randomized controlled trial of CQI teams and academic detailing: can they alter compliance with guidelines? Jt Comm J Qual Improv 1998; 24:130–142.
110. **Horowitz CR, Goldberg HI, Martin DP, et al**. Conducting a randomized controlled trial of CQI and academic detailing to implement clinical guidelines. Jt Comm J Qual Improv 1996; 22:734–750.
111. **Johnson B, McNair D, Kailasam K, et al**. Discern—an integrated prospective decision support system. Proc Annu Symp Comput Appl Med Care 1994; 969.
112. **Bosworth HB, Olsen MK, Dudley T, et al**. Patient education and provider decision support to control blood pressure in primary care: a cluster randomized trial. Am Heart J 2009; 157:450–456.
113. **Walsh JM, McDonald KM, Shojania KG, et al**. Quality improvement strategies for hypertension management: a systematic review. Med Care 2006; 44:646–657.
114. **Carter BL, Rogers M, Daly J, Zheng S, James PA**. The potency of team-based care interventions for hypertension: a meta-analysis. Arch Intern Med 2009; 169:1748–1755.
115. **Carter BL, Clarke W, Ardery G, et al; Collaboration Among Pharmacists Physicians To Improve Outcomes Now (CAPTION) Trial Investigators**. A cluster-randomized effectiveness trial of a physician-pharmacist collaborative model to improve blood pressure control. Circ Cardiovasc Qual Outcomes 2010; 3:418–423.
116. **Einhorn PT**. National heart, lung, and blood institute-initiated program "interventions to improve hypertension control rates in African Americans": background and implementation. Circ Cardiovasc Qual Outcomes 2009; 2:236–240.
117. **Agarwal R, Bills JE, Hecht TJ, Light RP**. Role of home blood pressure monitoring in overcoming therapeutic inertia and improving hypertension control: a systematic review and meta-analysis. Hypertension 2011; 57:29–38.
118. **Bosworth HB, Olsen MK, Neary A, et al**. Take Control of Your Blood Pressure (TCYB) study: a multifactorial tailored behavioral and educational intervention for achieving blood pressure control. Patient Educ Couns 2008; 70:338–347.
119. **Bosworth HB, Olsen MK, Goldstein MK, et al**. The veterans' study to improve the control of hypertension (V-STITCH): design and methodology. Contemp Clin Trials 2005; 26:155–168.
120. **Ogedegbe G, Tobin JN, Fernandez S, et al**. Counseling African Americans to Control Hypertension (CAATCH) trial: a multi-level intervention to improve blood pressure control in hypertensive blacks. Circ Cardiovasc Qual Outcomes 2009; 2:249–256.
121. **Bosworth HB, Almirall D, Weiner BJ, et al**. The implementation of a translational study involving a primary care based behavioral program to improve blood pressure control: The HTN-IMPROVE study protocol (01295). Implement Sci 2010; 5:54.

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