



Published in final edited form as:

Expert Rev Cardiovasc Ther. 2012 November ; 10(11): 1375–1380. doi:10.1586/erc.12.138.

Enhancing adherence of antihypertensive regimens in hypertensive African–Americans: current and future prospects

Lisa M Lewis^{*1}, Chinwe Ogedegbe², and Gbenga Ogedegbe³

¹ School of Nursing, University of Pennsylvania, 418 Curie Boulevard, Philadelphia, PA 19104-4217, USA

² Research, Emergency Trauma Department, Hackensack University Medical Center, 30 Prospect Avenue, Hackensack, NJ 07601, USA

³ School of Medicine, New York University, 227 East 30th Floor 6 Room 633, New York, NY, USA

Abstract

Patient adherence to antihypertensive medication is an important strategy for blood pressure control in hypertensive patients. However, rates of antihypertensive medication adherence among hypertensive African–Americans are unacceptably low. This article examines the current understanding of patient, clinical, provider and healthcare system factors associated with medication adherence in hypertensive African–Americans. Studies demonstrated that patient and clinical factors, such as self-efficacy and depression, are consistently associated with medication adherence in hypertensive African–Americans patients. Provider communication shows promise as a correlate of medication adherence, but more research on provider and healthcare system factors are still needed. The authors recommend that interventions targeted at increasing medication adherence among hypertensive African–Americans focus on self-efficacy. It is also imperative that clinicians screen hypertensive patients for depression and treat, if necessary.

Keywords

African–American; cardiovascular; disparities; hypertension; medication adherence

Hypertension is a silent killer that causes a disproportionate mortality and morbidity among African–Americans in the USA each year. At 41.4%, the prevalence of hypertension in African–Americans is the highest of any population in the USA [1]. Furthermore, African–Americans develop hypertension at a younger age and are less likely to have their blood pressure (BP) under control compared with their white counterparts [1]. Consequently, when compared with Whites, hypertensive African–Americans have a 30% greater rate of nonfatal stroke, an 80% greater rate of fatal stroke and a 420% greater rate of end-stage renal disease [1]. As a result, about 8000 preventable and excess deaths occur among hypertensive

* Author for correspondence: Tel.: +1 215 898 0828, Fax: +1 215 573 9193, lisml@nursing.upenn.edu.

Financial & competing interests disclosure

The authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

No writing assistance was utilized in the production of this manuscript.

African-Americans yearly [2]. Hence, hypertension is one of the major contributors to the disparities in mortality seen between Whites and African-Americans [3]. Thus, interventions targeted at improving BP control in African-Americans are a viable solution to decreasing the racial gap in mortality between African-Americans and Whites.

An important strategy to increase BP control is patient adherence to antihypertensive medication [4]. Hypertensive patients who do not adhere to their medication regimens as prescribed are at increased risk for disease progression, increased hospitalizations and emergency department (ED) utilization, premature disability and death [5–7]. Poor adherence to prescribed antihypertensive medications is also associated with increased healthcare costs [5]. The prevalence of poor adherence to antihypertensive medications ranges from 43 to 78% [8], with approximately 50% of hypertensive patients discontinuing the use of their medications after 1 year [9]. Given that adherence rates are lower for African-Americans when compared with Whites [10–15], it is of particular relevance to identify factors that are associated with antihypertensive medication adherence.

The purpose of this article is to summarize the current understanding of factors believed to be associated with medication adherence in hypertensive African-Americans. We conducted a systematic computer search of studies that examined factors associated with medication adherence among hypertensive African-Americans. We excluded studies if antihypertensive medication adherence was not either the primary or secondary outcome variable and focused on African-Americans for several reasons. Most of the studies examining factors associated with antihypertensive medication adherence have been conducted with African-Americans/Blacks born in the USA. As such, the literature does not pertain to Blacks born outside of the USA. In addition, while African-Americans and Blacks from other countries may share a common ancestry, they differ in terms of migration, history, sociocultural backgrounds and geographic origin. These unique ethnocultural orientations greatly influence conceptualizations of health and illness [16]. As such, the authors feel that the paper should be specific to American-born Blacks whom they will refer to as African-Americans. In this paper, the authors summarize the racial disparities in medication adherence between African-Americans and Whites; provide an overview of the current understanding of factors associated with medication adherence in hypertensive African-American patients; and the authors provide some guidance about interventions that can be used to enhance medication adherence in hypertensive African-American patients.

Racial disparities in adherence to prescribed antihypertensive medications

Several studies have documented racial disparities in magnitude of medication adherence in patients with hypertension; African-Americans have worse adherence rates when compared with their White counterparts. In one cross-sectional study that assessed medication adherence in African-American and White patients at a Veterans Affairs (VA) healthcare system using self-report, Bosworth *et al.* found that African-American veterans were 81% more likely to be nonadherent when compared with White veterans [10]. Studies that used more objective measures of medication adherence, such as pharmacy refill, confirmed lower adherence rates for hypertensive African-Americans compared with Whites. For example, Charles *et al.* reported a lower adherence rate for African-Americans compared with Whites

(59.9 vs 74.1%) among more than 5000 veterans who were followed in a VA healthcare system [11]. And, in a retrospective cohort study using two national databases of the VA, medication adherence (also measured using pharmacy refill data) was significantly lower among African-Americans compared with Whites (64.5 vs 76.7%) [17]. Similar findings were also reported in another VA study that examined medication adherence using pharmacy refills as a measure of adherence and where African-Americans were 92% less likely to be adherent than Whites [15]. It is important to note that not only are rates of adherence lower for hypertensive African-Americans, but that these rates are lower in healthcare settings such as the VA, where access to care is generally equal regardless of race or income.

Current healthcare practice focuses on increasing hypertension awareness and education for their patients. Although improvement of hypertension-related knowledge is an important strategy for increasing medication adherence, this strategy is not enough to sustain adherence over time. Indeed, studies suggest that knowledge deficits are not the primary factor responsible for poor medication adherence among African-Americans with hypertension [18,19]. These patients are typically able to correctly describe the health benefits associated with adequate medication adherence. Thus, it appears that African-Americans have adequate knowledge of the public health messages highlighting the significance of hypertension in the African-American community. A complex set of patient, provider and healthcare system factors may be the source of the adherence problem in hypertensive African-American patients.

Patient & clinical factors associated with medication adherence in hypertensive African-Americans

Patient-related factors represent the attitudes and beliefs associated with medication adherence among hypertensive patients [20]. An important patient-related factor that is well documented among hypertensive patients is self-efficacy, or the level of confidence a patient has in his/her ability to adhere to their medications. This construct is consistently associated with medication adherence in hypertensive African-American patients [18,21–23]. Clinically, patients have reported that their self-efficacy is an important concern when negotiating barriers associated with their adherence [18,22]. In a cross-sectional study with 70 hypertensive African-American patients, Braverman and Dedier reported that self-efficacy was associated with an objective measure of medication adherence (electronic monitoring [EM]; $r = 0.285$; $p < 0.03$) [21]. Schoenthaler *et al* examined the relationship among self-efficacy, depression and medication adherence in 167 hypertensive African-Americans followed in primary-care clinics and found that increased self-efficacy was associated with better adherence [23]. Results of their study indicated that medication adherence scores (lower scores indicated better adherence) would decrease by 23% for every one unit increase in self-efficacy ($\beta = -0.23$; $p = 0.010$). Validated self-report questionnaires were used to measure self-efficacy in these studies.

Social support, another patient-related factor, does not appear to be consistently associated with medication adherence in hypertensive African-Americans. In some studies, hypertensive African-Americans reported that social support helped them to remain

adherent to antihypertensives [18,22,24,25]. However, others report that social support is not associated with medication adherence in hypertensive African-Americans [21,26,27]. One study examined the relationship between medication adherence, sociodemographic, clinical and cognitive characteristics among 70 urban hypertensive African-Americans [21]. Using an electronic cap to measure medication adherence, Braverman and Dedier found that social support was not associated with medication adherence. Similar findings were reported by other investigators using self-report measures of medication adherence [26,27].

Depression, a clinical factor, is common in patients with chronic diseases and often undertreated [28,29]. Yet, its effect on medication adherence among hypertensive African-Americans is well documented in the literature [12,23,29,30]. For example, a cross-sectional study conducted by Kim *et al.* reported that depression was significantly associated with worse medication adherence among 190 hypertensive African-American men [29]. In a cross-sectional study, Schoenthaler *et al.* confirmed these findings in 439 hypertensive African-Americans followed in community-based practices and reported that for every unit increase in depression scores, medication adherence decreased by 18% ($\beta = -0.18$; $p = 0.001$) [30]. And, among 2180 older adults with hypertension, Krousel-Wood *et al.* have also reported that African-Americans with depressive symptoms are significantly more likely to report low medication adherence compared with those without depressive symptoms (34 vs 15.5%, respectively) [12]. Schoenthaler *et al.* confirmed these findings longitudinally and reported that depression was significantly correlated with poorer medication adherence over 3 months among 167 hypertensive African-Americans ($\beta = -0.008$; $p = 0.023$) [23]. Validated self-report questionnaires were used to measure depression in these studies.

Generally, demographic factors, such as gender, income and education level do not consistently predict or correlate with medication adherence in hypertensive African-Americans. However, age appears to be associated with medication adherence in hypertensive African-Americans [30–33]. In particular, there is a trend toward younger hypertensive African-Americans being less adherent to their medication regimens. For example, one cross-sectional study of 202 hospitalized patients reported that being younger was significantly associated with nonadherence (adjusted OR: 1.03; 95% CI: 1.00–1.06) [33]. In another cross-sectional study of 439 primary-care patients with poorly controlled hypertension, younger age was significantly associated with worse adherence ($\beta = -0.018$; $p = 0.001$) [30]. Hekler *et al.* reported that older age was associated with better medication adherence (OR: 1.07; 95% CI: 1.01–1.13) in their study of adherence behaviors among 102 hypertensive African-Americans followed in primary care clinics [31]. These findings were confirmed in the study of medication adherence factors by Lagu *et al.* among 327 hypertensive African-American primary-care patients on Medicaid [32]. Specifically, being younger was significantly associated with 42% lower odds of filling an antihypertensive prescription.

Provider & healthcare system correlates of medication adherence in hypertensive African–Americans

Provider factors include the quality of provider–patient communication [20]. Clinical encounters with healthcare providers are important to patients [22,24,25,34]. The authors examined three studies reporting that African–American hypertensive patients who perceived their provider communication as empathetic, and collaborative were more likely to adhere to their antihypertensive medication regimen [27,30,35]. For example, one cross-sectional study investigated barriers to adherence in 202 racially diverse older hypertensive adults [27]. Patient–provider barriers were found to be common among these patients and were significantly associated with self-reported adherence (adjusted OR: 32; 95% CI: 0.12–0.84). In a cross-sectional study, the authors examined the effect of provider communication on medication adherence among 439 hypertensive African–Americans with poorly controlled hypertension followed in community-based healthcare practices [30]. Results of this study demonstrated that more than half of patients reported that their provider's communication was noncollaborative and that for every unit increase in the provider communication score (lower scores are indicative of more collaborative communication), medication adherence was reduced by 11% ($\beta = -0.11$; $p = 0.03$). Martin *et al.* confirmed these findings in a cross-sectional study that examined the association between provider factors and medication nonadherence in 434 primarily African–American (94.8%) hypertensive patients [35]. Findings of this study demonstrated that the majority of the patients (70%) were uncomfortable questioning their healthcare provider about their health and that nonadherent patients were more likely than adherent patients to report discomfort in questioning their healthcare providers about their health (74 vs 63%; $p = 0.02$).

Healthcare system factors are those related to how patient care is delivered [20]. It is considered separately from provider factors because it includes the regulatory climate under which healthcare systems operate. Studies examining healthcare system factors and medication adherence in hypertensive African–Americans are scant. The authors found only one study that examined the relationship between healthcare system factors and medication adherence in hypertensive patients. In that study, Turner *et al.* investigated logistical barriers, such as awareness of Medicare Part D prescription drug-coverage plan, and medication adherence [27]. Indeed, patients who were not aware of the Medicare Part D coverage plan were 50% less likely to be adherent than those who were aware. Furthermore, adherence was reduced by 30% for each additional logistical barrier to medication adherence.

Discussion

While the literature has identified some encouraging findings about the factors that may contribute to medication adherence, the authors hesitate to make definitive conclusions because these studies have several important limitations that must be taken into account. The first concern is that these studies are largely cross-sectional and qualitative in nature, making it difficult to assess the dynamic relationship between adherence and patient, clinical, provider and healthcare system factors. In a review of the 18 studies, the authors found that

11 studies were cross-sectional, six studies were qualitative and one study was longitudinal. Given the chronic nature of hypertension and the multidimensional nature of medication adherence, more longitudinal studies are needed to determine whether or not factors that are associated with medication adherence remain so over time. A second limitation of these studies is that medication adherence was primarily measured using self-reporting rather than more objective measures, such as EM. Specifically, only one study used EM. This is important to note because EM is regarded as the accepted 'gold standard' of measuring medication adherence [36]. Although EM may not be practical in the clinical setting, the authors do recommend that future research studies incorporate EM to explore factors associated with medication adherence in hypertensive African-Americans. We also note that many of the studies of adherence in hypertensive African-Americans have been conducted on homogenous samples of African-Americans. In particular, studies have been conducted with low-income populations and may be the primary explanation for why demographic factors may not be associated with medication adherence in this hypertensive population. Undeniably, the lack of heterogeneity limits the generalizability of the findings. There is a pressing need to conduct studies with more heterogeneous samples of hypertensive African-Americans. Finally, unquestionably absent from the medication adherence literature are studies examining factors, such as perceived discrimination and mistrust of healthcare providers and their influence on medication adherence. Both are considered to be potential barriers to health-seeking behavior among African-American patients [18,36–40] and warrant investigation into their relationships with medication adherence.

Conclusion

Enhancing medication adherence in hypertensive African-Americans is challenging because poor adherence is a multi factorial problem. A small but growing body of literature has helped to identify some medication adherence factors that may be useful in providing care to this particular patient population. Most of the studies conducted have examined patient and clinical factors. Patient and clinical factors that seem to be consistently associated with adherence are self-efficacy and depression. Patients who have increased self-efficacy are more likely to be adherent to their antihypertensive medication. Studies also consistently demonstrated that patients who have depressive symptoms are more likely to have poor medication adherence. Social support, while believed to be an important factor associated with patient adherence, has not proven to be associated with medication adherence in African-Americans who are diagnosed with hypertension. Less research has been conducted examining provider and healthcare system factors. However, the evidence is promising for provider factors. In particular, patients who perceive their providers' communication as empathetic and collaborative are more likely to be adherent to their antihypertensive regimen. Healthcare system factors are still very much understudied making it difficult to draw conclusions about their association with medication adherence among hypertensive African-Americans.

Expert commentary & five-year view

Current evidence suggests that modifiable factors such as self-efficacy and provider communication should be the foci of health-care interventions targeted at improving

medication adherence in hypertensive African–Americans. We believe that multidisciplinary teams are essential to deliver these interventions because of the multidimensional nature of medication adherence. For example, self-efficacy coaching interventions directed toward increasing medication adherence could be delivered using a collaborative effort among physicians, nurses and social workers. Interventions to promote an increase in medical institutions efforts to train healthcare providers in more collaborative methods of communication are also warranted.

Healthcare providers should also consider depression as a potential barrier to medication adherence among hypertensive African–Americans. Depression is common in patients with chronic diseases [28,29]. Although rates of depression between African–Americans and Whites have been reported as similar, the clinical severity of depression is markedly higher among African–Americans [41]. Furthermore, depression is typically undertreated among African–Americans when compared with Whites [42,43]. For healthcare providers who encounter patients with poor medication adherence, it is important to consider screening them for depression and treating, if necessary. Moreover, interventions are needed to increase the training of healthcare providers in their ability to identify and understand the consequences of comorbid depression among hypertensive African–Americans.

Although additional data from future longitudinal studies with more heterogeneous samples of hypertensive African–Americans and objective measures of medication adherence are needed, we do not expect that these studies will be published within the next 5 years. Some interventions that target patient factors have shown promise in improving medication adherence outcomes [44–46]. Translation of the findings from these studies into primary-care practices has only now begun to emerge. Self-monitoring with a home BP monitor may also be effective in improving adherence to antihypertensive medications [47]. However, the long-term impact of home monitoring has not yet been assessed. In a recent study we conducted, we demonstrated that positive-affect induction and self-affirmation led to significant improvement in medication adherence among hypertensive African–American patients [48]. Finally, an area of opportunity that has been less studied is the development of interventions targeted at improving medication adherence in minority patients who present to the ED for care. Patients with low or moderate adherence had higher age- and sex-adjusted odds of cardiovascular related hospitalizations and ED visits [49]. Similarly, there is ample evidence to suggest that patients without health insurance often present to the ED with complications of uncontrolled hypertension, and work by Shea *et al.* suggest that the rates of medication adherence in these patients are often abysmal [33]. Thus, interventions targeted at improving medication adherence in ED settings will go a long way in mitigating the negative impact of poor access to care on complications of hypertension. Given that the use of our EDs for urgent and emergent care of hypertension, lack of a primary-care physician and non-adherence to drug treatment for hypertension are associated [33], it is important for future interventions to consider the ED as a venue for implementing medication-adherence interventions. Such interventions to improve adherence are an important part of prevention of hypertension emergency, hypertension urgency and uncontrolled hypertension cases in the ED.

Acknowledgments

L Lewis was supported in part by NIH/NINR 1 R01 NR013491 01A1. G Ogedegbe was supported in part by NIH/NHLBI 1 K24 HL111315 01.

References

Papers of special note have been highlighted as:

- of interest
- of considerable interest
- 1••. Roger VL, Go AS, Lloyd-Jones DM, et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics – 2011 update: a report from the American Heart Association. *Circulation*. 2011; 123(4):e18–e209. [PubMed: 21160056] [Provides the most up to date cardiovascular disease statistics.]
- 2•. Fiscella K, Holt K. Racial disparity in hypertension control: tallying the death toll. *Ann. Fam. Med.* 2008; 6(6):497–502. [PubMed: 19001301] [Provides information on the financial costs associated with racial disparities in hypertension.]
- 3. Wong MD, Shapiro MF, Boscardin WJ, Ettner SL. Contribution of major diseases to disparities in mortality. *N. Engl. J. Med.* 2002; 347(20):1585–1592. [PubMed: 12432046]
- 4. IOM. A Population-Based Policy and Systems Change Approach to Prevent and Control Hypertension. The National Academies Press; Washington, DC: 2010.
- 5. Dragomir A, Côté R, Roy L, et al. Impact of adherence to antihypertensive agents on clinical outcomes and hospitalization costs. *Med. Care*. 2010; 48(5):418–425. [PubMed: 20393367]
- 6. Elliott WJ. Improving outcomes in hypertensive patients: focus on adherence and persistence with antihypertensive therapy. *J. Clin. Hypertens. (Greenwich)*. 2009; 11(7):376–382. [PubMed: 19583634]
- 7. Roebuck MC, Liberman JN, Gemmill-Toyama M, Brennan TA. Medication adherence leads to lower health care use and costs despite increased drug spending. *Health Aff. (Millwood)*. 2011; 30(1):91–99. [PubMed: 21209444]
- 8. Osterberg L, Blaschke T. Adherence to medication. *N. Engl. J. Med.* 2005; 353(5):487–497. [PubMed: 16079372]
- 9. Sabate, E. Adherence to Long-Term Therapies: Evidence for Action. World Health Organization; Geneva, Switzerland: 2003.
- 10. Bosworth HB, Dudley T, Olsen MK, et al. Racial differences in blood pressure control: potential explanatory factors. *Am. J. Med.* 2006; 119(1):70.e79–70.e15. [PubMed: 16431192]
- 11. Charles H, Good CB, Hanusa BH, Chang CC, Whittle J. Racial differences in adherence to cardiac medications. *J. Natl Med. Assoc.* 2003; 95(1):17–27. [PubMed: 12656446]
- 12. Krousel-Wood MA, Muntner P, Joyce CJ, et al. Adverse effects of complementary and alternative medicine on antihypertensive medication adherence: findings from the cohort study of medication adherence among older adults. *J. Am. Geriatr. Soc.* 2010; 58(1):54–61. [PubMed: 20122040]
- 13. Ndumele CD, Shaykevich S, Williams D, Hicks LS. Disparities in adherence to hypertensive care in urban ambulatory settings. *J. Health Care Poor Underserved*. 2010; 21(1):132–143. [PubMed: 20173260]
- 14. Shaya FT, Du D, Gbarayor CM, Frech-Tamas F, Lau H, Weir MR. Predictors of compliance with antihypertensive therapy in a high-risk medicaid population. *J. Natl Med. Assoc.* 2009; 101(1):34–39. [PubMed: 19245070]
- 15. Siegel D, Lopez J, Meier J. Antihypertensive medication adherence in the Department of Veterans Affairs. *Am. J. Med.* 2007; 120(1):26–32. [PubMed: 17208076]
- 16. Nazroo J, Jackson J, Karlsen S, Torres M. The Black diaspora and health inequalities in the US and England: does where you go and how you get there make a difference? *Sociol. Health Illn.* 2007; 29(6):811–830. [PubMed: 17986017]

17. Poon I, Lal LS, Ford ME, Braun UK. Racial/ethnic disparities in medication use among veterans with hypertension and dementia: a national cohort study. *Ann. Pharmacother.* 2009; 43(2):185–193. [PubMed: 19193586]
18. Lewis LM, Askie P, Randleman S, Shelton-Dunston B. Medication adherence beliefs of community-dwelling hypertensive African-Americans. *J. Cardiovasc. Nurs.* 2010; 25(3):199–206. [PubMed: 20386242]
19. Martins D, Gor D, Teklehaimanot S, Norris K. High blood pressure knowledge in an urban African-American community. *Ethn. Dis.* 2001; 11(1):90–96. [PubMed: 11289257]
20. Institute of Medicine. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care.* The National Academies Press; Washington, DC: 2002.
21. Braverman J, Dedier J. Predictors of medication adherence for African-American patients diagnosed with hypertension. *Ethn. Dis.* 2009; 19(4):396–400. [PubMed: 20073139]
22. Ogedegbe G, Harrison M, Robbins L, Mancuso CA, Allegrante JP. Barriers and facilitators of medication adherence in hypertensive African Americans: a qualitative study. *Ethn. Dis.* 2004; 14(1):3–12. [PubMed: 15002917]
23. Schoenthaler A, Ogedegbe G, Allegrante JP. Self-efficacy mediates the relationship between depressive symptoms and medication adherence among hypertensive African Americans. *Health Educ. Behav.* 2009; 36(1):127–137. [PubMed: 18077654]
24. Fongwa MN, Evangelista LS, Hays RD, et al. Adherence treatment factors in hypertensive African-American women. *Vasc. Health Risk Manag.* 2008; 4(1):157–166. [PubMed: 18629350]
25. Rose LE, Kim MT, Dennison CR, Hill MN. The contexts of adherence for African-Americans with high blood pressure. *J. Adv. Nurs.* 2000; 32(3):587–594. [PubMed: 11012800]
26. Hill MN, Bone LR, Kim MT, Miller DJ, Dennison CR, Levine DM. Barriers to hypertension care and control in young urban black men. *Am. J. Hypertens.* 1999; 12(10 Pt 1):951–958. [PubMed: 10560780]
27. Turner BJ, Hollenbeak C, Weiner MG, Ten Have T, Roberts C. Barriers to adherence and hypertension control in a racially diverse representative sample of elderly primary care patients. *Pharmacoepidemiol. Drug Saf.* 2009; 18(8):672–681. [PubMed: 19479901]
28. Bogner HR, Cary MS, Bruce ML, et al. The role of medical comorbidity in outcome of major depression in primary care: the PROSPECT study. *Am. J. Geriatr. Psychiatry.* 2005; 13(10):861–868. [PubMed: 16223964]
29. Kim MT, Han HR, Hill MN, Rose L, Roary M. Depression, substance use, adherence behaviors, and blood pressure in urban hypertensive black men. *Ann. Behav. Med.* 2003; 26(1):24–31. [PubMed: 12867351]
30. Schoenthaler A, Chaplin WF, Allegrante JP, et al. Provider communication effects medication adherence in hypertensive African-Americans. *Patient Educ. Couns.* 2009; 75(2):185–191. [PubMed: 19013740]
31. Hekler EB, Lambert J, Leventhal E, Leventhal H, Jahn E, Contrada RJ. Commonsense illness beliefs, adherence behaviors, and hypertension control among African-Americans. *J. Behav. Med.* 2008; 31(5):391–400. [PubMed: 18618236]
32. Lagu T, Weiner MG, Eachus S, Tang SS, Schwartz JS, Turner BJ. Effect of patient comorbidities on filling of antihypertensive prescriptions. *Am. J. Manag. Care.* 2009; 15(1):24–30. [PubMed: 19146361]
33. 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(12):1607–1612. [PubMed: 1456334]
34. Lukoschek P. African-Americans' beliefs and attitudes regarding hypertension and its treatment: a qualitative study. *J. Health Care Poor Underserved.* 2003; 14(4):566–587. [PubMed: 14619556]
35. Martin MY, Kohler C, Kim YI, et al. Taking less than prescribed: medication nonadherence and provider-patient relationships in lower-income, rural minority adults with hypertension. *J. Clin. Hypertens. (Greenwich).* 2010; 12(9):706–713. [PubMed: 20883231]
36. Trivedi AN, Ayanian JZ. Perceived discrimination and use of preventive health services. *J. Gen. Intern. Med.* 2006; 21(6):553–558. [PubMed: 16808735]

37. Brondolo E, Libby DJ, Denton EG, et al. Racism and ambulatory blood pressure in a community sample. *Psychosom. Med.* 2008; 70(1):49–56. [PubMed: 18158368]
38. Lewis TT, Barnes LL, Bienias JL, Lackland DT, Evans DA, Mendes de Leon CF. Perceived discrimination and blood pressure in older African–American and white adults. *J. Gerontol. A Biol. Sci. Med. Sci.* 2009; 64(9):1002–1008. [PubMed: 19429703]
39. Peters RM. Racism and hypertension among African–Americans. *West. J. Nurs. Res.* 2004; 26(6): 612–631. [PubMed: 15359074]
40. Roberts CB, Vines AI, Kaufman JS, James SA. Cross-sectional association between perceived discrimination and hypertension in African–American men and women: the Pitt County Study. *Am. J. Epidemiol.* 2008; 167(5):624–632. [PubMed: 18083714]
41. Williams DR, González HM, Neighbors H, et al. Prevalence and distribution of major depressive disorder in African–Americans, Caribbean blacks, and non-Hispanic whites: results from the National Survey of American Life. *Arch. Gen. Psychiatry.* 2007; 64(3):305–315. [PubMed: 17339519]
42. Bailey RK, Blackmon HL, Stevens FL. Major depressive disorder in the African–American population: meeting the challenges of stigma, misdiagnosis, and treatment disparities. *J. Natl Med. Assoc.* 2009; 101(11):1084–1089. [PubMed: 19998635]
43. Miranda J, Cooper LA. Disparities in care for depression among primary care patients. *J. Gen. Intern. Med.* 2004; 19(2):120–126. [PubMed: 15009791]
44. Krousel-Wood M, Hyre A, Muntner P, Morisky D. Methods to improve medication adherence in patients with hypertension: current status and future directions. *Curr. Opin. Cardiol.* 2005; 20(4): 296–300. [PubMed: 15956826]
45. 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(10):1137–1143. [PubMed: 18654123]
46. Schroeder K, Fahey T, Ebrahim S. How can we improve adherence to blood pressure-lowering medication in ambulatory care? Systematic review of randomized controlled trials. *Arch. Intern. Med.* 2004; 164(7):722–732. [PubMed: 15078641]
- 47••. Odedosu T, Schoenthaler A, Vieira DL, Agyemang C, Ogedegbe G. Overcoming barriers to hypertension control in African–Americans. *Cleve. Clin. J. Med.* 2012; 79(1):46–56. [PubMed: 22219234] [Provides a comprehensive review of current evidence for interventions to improve blood pressure control among hypertensive African–Americans.]
48. Ogedegbe GO, Boutin-Foster C, Wells MT, et al. A randomized controlled trial of positive-affect intervention and medication adherence in hypertensive African Americans. *Arch. Intern. Med.* 2012; 172(4):322–326. [PubMed: 22269592]
49. Pittman DG, Tao Z, Chen W, Stettin GD. Antihypertensive medication adherence and subsequent healthcare utilization and costs. *Am. J. Manag. Care.* 2010; 16(8):568–576. [PubMed: 20712390]

Key issues

- Hypertension disproportionately affects African–Americans and is a major contributor to the disparities in mortality seen between African–Americans and Whites.
- Antihypertensive medication is part of a comprehensive approach to controlling blood pressure but rates of medication adherence are low for African–American patients diagnosed with hypertension.
- There is an immense need to understand the factors associated with medication adherence for hypertensive African–Americans in order to develop effective interventions to increase their adherence rate.
- Patient and clinical factors that are consistently associated with medication adherence in the literature are self-efficacy and depression.
- Provider communication, a provider factor, shows promise as a medication-adherence factor for hypertensive African–Americans.
- Studies investigating provider and healthcare system correlates are lacking.
- Current studies are methodologically limited and there is a need for more longitudinal studies and studies measuring medication adherence objectively.
- Screening and treating hypertensive African–Americans for depression is imperative.
- Interventions targeted increasing self-efficacy in hypertensive African–Americans are recommended for improving medication adherence in this patient population.