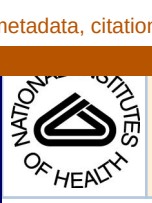



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# Antihypertensive Medication Non-Adherence in Black Men: Direct and Mediating Effects of Depressive Symptoms, Psychosocial Stressors and Substance Use

**Crystal W. Cené, MD, MPH**,
University of North Carolina at Chapel Hill, Division of General Internal Medicine, 5039 Old Clinic Building, CB #7110, Chapel Hill, NC 27599-7110, Telephone: 919-966-2276 ext. 230, Fax: 919-966-2274

**Cheryl R. Dennison, PhD, RN**,
Johns Hopkins University, School of Nursing, 525 N. Wolfe Street, Rm 527, Baltimore, MD 21205, Phone: 443-287-4174, Fax: 410-955-7463

**Wizdom Powell Hammond, PhD, MPH, MS**,
University of North Carolina at Chapel Hill, Gillings School of Global Public Health 334B Rosenau Hall, CB #7440, Chapel Hill, NC 27599-7440, Phone: 919-962-9802, Fax: 919-966-2921

**David Levine, MD, ScD, MPH**,
Johns Hopkins University, General Internal Medicine, 720 Rutland Avenue, Ross Research Building 971, Baltimore, Maryland 21205, Phone: 410-614-4577, Fax: 410-614-5593

**Lee R. Bone, MPH, RN**, and
Johns Hopkins University, School of Public Health, 615 N. Wolfe Street Baltimore, MD 21205 Phone: 410-955-6887, Fax: 410-955-0863

**Martha N. Hill, PhD, RN**
Johns Hopkins University, School of Nursing, 525 N. Wolfe Street, Baltimore, Md. 21205, Phone: 410-955-7544, Fax: 410-955-4890

Crystal W. Cené: ccene@med.unc.edu; Cheryl R. Dennison: cdennison@son.jhmi.edu; Wizdom Powell Hammond: wizdomp@email.unc.edu; David Levine: dlevine@jhmi.edu; Lee R. Bone: lbone@jhsph.edu; Martha N. Hill: mnhill@son.jhmi.edu

## Abstract

Correspondence to: Crystal W. Cené, ccene@med.unc.edu.

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Black men suffer disproportionately from hypertension (HTN). Antihypertensive medication non-adherence is a major contributor to poor blood pressure control, yet few studies consider how psychosocial functioning may impact Black men's medication adherence. We examined direct and mediating pathways between depressive symptoms, psychosocial stressors, and substance use on antihypertensive medication non-adherence in 196 Black men enrolled in a clinical trial to improve HTN care and control. We found that greater depressive symptoms was associated with more medication non-adherence (β= 0.05, SE 0.01; p<.001). None of the psychosocial stressor variables were associated with antihypertensive medication non-adherence. Alcohol misuse was associated with more medication non-adherence (β=0.81, SE 0.26; p<.01), but it did not mediate the association between depressive symptoms and medication non-adherence. Clinicians should consider screening for depressive symptoms and alcohol misuse if patients are found to be non-adherent and should treat or refer patients to appropriate resources to address those issues.

**Keywords**

Medication Adherence; Hypertension; Black men; Psychosocial factors

Hypertension (HTN) accounts for half the excess CVD mortality observed in Blacks.[1] Black men have a higher HTN prevalence, poorer blood pressure (BP) control, higher death rates due to HTN and more hypertension-related complications than non-Hispanic Whites (Whites) or Hispanics, [2, 3] even though the prevalence of BP control is improving.[4] Suboptimal antihypertensive medication adherence contributes to worse BP control and cardiovascular outcomes. Black men's antihypertensive medication adherence is especially poor[5, 6] and reasons for their non-adherence are not fully known.[7] Few studies consider how psychosocial functioning may impact Black men's medication adherence.

Findings from a five-year randomized clinical trial designed to improve HTN care and control among Black men with uncontrolled BP living in low socioeconomic status (SES) environments in Baltimore, Maryland, provide important background on the same study population that we report on in the current manuscript. In the parent study, researchers randomized men to a more intensive educational/behavioral/pharmacological intervention delivered by a team consisting of a nurse practitioner, community health worker, and a physician *versus* a less intensive education and referral intervention.[8–10] Researchers found a trend towards improved anti-hypertensive medication adherence in both intervention groups; however, of concern was the fact that at five-year follow-up, 17% of the men in the study had died, with 36% of those deaths due to narcotic or alcohol withdrawal. Another analysis of the same study population found that depression was significantly associated with poor antihypertensive medication adherence and with alcohol use. [11] Although these researchers examined relationships between depressive symptoms, substance use and antihypertensive medication non-adherence and found that depression was associated with worse medication adherence in bivariate analyses, they did not report results from multivariate analyses nor did they test mediating pathways of this association.[11]

Many urban-residing Black men face psychosocial stressors (e.g., living in impoverished violent and crime-ridden neighborhoods, homelessness) [1213] that can precipitate and sustain

depression and adversely impact medication adherence.[14, 15] These stressors and the coping behaviors (e.g., substance use) [16, 17] some men engage in to mitigate chronic stressors may adversely impact their medication adherence. This raised the question, which we wanted to explore further, of whether substance misuse in this population is a risk for worse medication adherence. To address limitations of previous studies, we examine direct and mediating pathways between depressive symptoms, psychosocial stressors, and substance use (both alcohol misuse and illicit drug use) on antihypertensive medication adherence in a sample of hypertensive Black men enrolled in a five-year clinical trial. Such research is critical to development of interventions to improve antihypertensive medication adherence in hypertensive Black men.

## Methods

### Study design and population

We conducted a repeated measures analysis on a sample drawn from a single-site five-year randomized clinical trial of 309 hypertensive Black men aged 21 and 54 years (at baseline: mean age 41 years; > 60% had a high school diploma or equivalent; 27% were employed either part- or full-time; 71% reported an annual income of <$10,000; 49% did not have a regular doctor for high blood pressure treatment; 64% reported a history of incarceration; 45% had a positive urine screen for illicit drugs; mean systolic BP 146mmHg, and mean diastolic BP 99mmHg). Hill et al. provide additional information on the rationale for the parent study.[8] The trial compared the effectiveness of a more intensive to a less intensive educational/behavioral/pharmacological intervention on HTN care and control.[9, 10] Briefly, the more intensive intervention group received comprehensive HTN care, including education by a nurse practitioner (NP)/community health worker (CHW)/physician (MD) team. Visits with the NP occurred every one to three months at the Outpatient General Clinical Research Center (OPD-GCRC). The NP made therapeutic decisions including medication titration according to guideline-based protocol recommendations outlined in the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VI).[18] The CHW made at least 1 annual home visit to each participant and provided participants with need-based referrals to social services, job training, and housing. The MD was available for consultation with the NP at the time of NP visits. The study team addressed barriers to care and free antihypertensive medication was offered to participants; however, not all men received medication (e.g. men who had insurance coverage which paid for their medications). Men in the less intensive group received referral to community HTN care sources. Men in both groups were called and reminded of the importance of BP control every 6 months and were seen at the (OPD-GCRC) annually for 5 years to collect data on study outcomes.

For the current analysis, the analytic sample included only clinical trial participants who attended annual study visits from months 24–60 and had their antihypertensive medication adherence assessed (Figure 1). Anti-hypertensive medication non-adherence was only assessed in men who reported being prescribed anti-hypertensive medication at each time period. We excluded data on anti-hypertensive medication non-adherence from baseline and month 12 visits because the psychosocial predictor variables of interest were not assessed at

those times. For this analysis, we combined the more and less intensive intervention groups, but consider intervention assignment as an effect modifier of the associations under study for some analyses.

## Data collection

Staff interviewed participants to collect sociodemographic and behavioral risk factors. We measured each of the variables below at 24, 36, 48 and 60 months.

**Outcome—**We assessed antihypertensive medication adherence using the Hill-Bone Compliance Scale, Medication Taking subscale, which was developed in and validated for adult African American urban populations.[19] This nine-item subscale uses a four-point Likert response format to assess frequency of the following BP medication taking behaviors: forgetting to take medication, deciding not to take medication, forgetting to get prescriptions filled, running out of medication, skipping medication, missing medication when feeling sick, missing medication when feeling better, taking someone else's medication, and missing medication due to carelessness. The scale items were summed, resulting in a range of possible scores of 9–36, with *higher* scores indicating *worse* medication adherence. Given the inverse relationship between score and adherence, we hereafter refer to the outcome as antihypertensive medication "non-adherence." *Depressive symptoms*. We used the Center for Epidemiologic Studies Depression (CES-D) scale to measure frequency of depressive symptoms.[20] CES-D is a 20-item self-reported questionnaire which uses a four-point Likert response format to measure the following depressive symptoms within a one-week time frame: depressed mood, guilt or worthlessness, psychomotor retardation, loss of appetite, and sleep disturbances. CES-D is a widely used screening tool with established reliability and validity in Black populations.[21] CES-D scores range from 0–60, with higher scores indicating increased frequency and number of depressive symptoms. A score of 16 or greater is indicative of depressive symptoms and has been validated with DSM-III criteria for clinical depression.

**Psychosocial stressors—**We developed a checklist for this study, which was adapted from the Holmes and Rahe social readjustment rating questionnaire[22] and further modified based on field testing with members of the target group. For this checklist, participants' reported the occurrence of five specific stressors: difficulty finding a place to live, being a victim of a violent act, being involved in a major/minor law violation, getting arrested or held in jail, and separating from a spouse or partner. Participants indicated which of these stressors they experienced during the six months preceding each follow-up visit (yes/no). We analyzed each stressor individually as a dichotomous variable and also examined the total number of stressors in aggregate.

**Alcohol misuse—**Assessed with the question: "Have you ever had an alcohol-related problem?" (yes/no).

**Illicit drug use:** Assessed using a standard urine screen for cocaine, opiates, barbiturates, cannabinoids and/or benzodiazepines by Quest Diagnostics which detected drug use occurred within the past 72 hours. The variable was dichotomized: 0=negative, 1=positive.

**Background variables—**Guided by stress and coping[23] and behavioral models, [24] we adjusted for the following variables hypothesized or shown to be associated with antihypertensive medication adherence.

**Demographic characteristics:** Assessed at each time period using items from the National Health Interview Survey.[25] Marital status (married vs. not married), employment status (employed vs. unemployed), income (<$10,000 vs. ≥$10,000 annually) and who pays for medications (private insurance vs. public insurance vs. other- including self, family, or physician/nurse practitioner provided medication samples). Age and highest educational level reported at baseline were included in the statistical models.

**Systolic and diastolic blood pressure:** Measured by trained staff at the OPD-GCRC who were blinded to group assignment, using an appropriately sized cuff after the participant was seated for 5 minutes. Three BP measurements were obtained at 1-min intervals with a Hawksley random zero sphygmomanometer.[26] The second and third BP measurements were averaged.

**Tobacco use:** Assessed by self-report of current smoking (1=current smoker, 0 =nonsmoker).

**Usual source of care:** Assessed by asking participants if they had a regular provider for HTN care (yes/no).

**Self-rated health:** Assessed with the question, “Compared to other people your age, how would you rate your health?” Scored based on a four-point Likert response from 1=poor to 4=excellent.

**Intervention assignment:** More *vs*. less intensive intervention groups.

## Statistical analyses

Given the longitudinal nature of these data and the fact that there were drop-outs and losses to follow-up from the clinical trial participants from which our sample was drawn,[8–10] we modeled whether the probability of missing outcome data was related to the following baseline variables: age, educational level, marital status, who pays for medications, employment, month, and intervention assignment. This analyses therefore controlled for biases that are not associated with the experimental manipulations that may affect the probability of missingness (e.g. whether due to drop out or death). We could not assess whether missingness was associated with any variables that were not obtained at baseline (e.g., depression, alcohol misuse). The probability of missing data was significantly related to month (p=.05) and marital status (.04). Therefore, we used a weighted estimating equation approach.[27] In this approach, each person-visit was weighted inversely proportional to their probability of being observed. We then conducted repeated measures analyses with Weighted Generalized Estimating Equations using PROC GENMOD (SAS 9.2) examining psychosocial and behavioral predictors of antihypertensive medication non-adherence at each study period from 24 to 60 months. We built a series of models: the first modeled the relationships between the background variables and antihypertensive medication non-

adherence. Subsequent models were then built with the addition of the following independent variables: depressive symptoms (model 2); psychosocial stressors (model 3); alcohol misuse (model 4); illicit drug use (model 5) and depressive symptoms, psychosocial stressors, alcohol misuse and illicit drug use (model 6). For independent variables that were found to be significantly associated with antihypertensive medication non-adherence, we examined whether those associations were moderated by intervention group. To this end, we conducted separate models testing the main and interaction effects on antihypertensive medication non-adherence between intervention group and the variable of interest.[28]

We conducted mediation analyses using hierarchical Generalized Estimating Equations (SAS PROC GENMOD) according to the mediational analytic framework described by Baron and Kenny to determine whether alcohol misuse mediates the association between depressive symptoms and medication non-adherence.[28] In this approach, mediation exists when four conditions are met: (a) the predictor variable (i.e., depressive symptoms) is significantly related to the outcome variable (antihypertensive medication non-adherence), (b) the hypothesized mediator (i.e., alcohol misuse) is significantly related to the predictor variable, (c) the mediator is significantly related to the outcome, and (d) the relationship between the predictor and the outcome variables is significantly reduced when controlling for the mediator. We ran four regression models to estimate the relative effect size using unstandardized beta coefficients (β) needed to satisfy the four mediation criteria. We formally tested mediation effect using Sobel's mediation test.[29]

## Results

### Sample characteristics by study period

Sample sizes from months 24, 36, 48 and 60 were 196, 177, 166 and 151, respectively. Table 1 displays sample characteristics across study periods. Briefly, the mean highest educational level was about 11 years, about 20% were married, and the majority did not have insurance to cover their medications. About half of sample had good self-rated health; most were current smokers and approximately 40–50% had a positive urine screen for illicit drugs. Mean systolic and diastolic BP over time was about 141mmHg and 90mmHg. Over the study period, between 26–32% had depressive symptoms and 20–24% endorsed ever having had an alcohol-related problem.

### Effects of time on antihypertensive medication non-adherence

The mean (SD) anti-hypertensive medication non-adherence scores at months 24, 36, 48 and 60 were 11.1 (2.6), 10.6 (2.2), 11.7 (3.3), and 11.7 (2.9), respectively (**see** Figure 2). Given the possible range in medication non-adherence scores of 9–27, these scores indicate generally low medication non-adherence (i.e., good adherence). Compared with month 24, there was significantly less medication non-adherence at 36 months (β= −0.37, SE 0.16; p=0.02) and more non-adherence at 48 (β= 0.64, SE 0.22; p<0.01).

### Main effects of depressive symptoms, psychosocial stressors, alcohol misuse and illicit drug use on antihypertensive medication non-adherence

Of the background variables examined, only study period and intervention assignment were significantly related to antihypertensive medication non-adherence (Table 2, model 1). After adjustment for background variables, greater depressive symptoms was associated with more non-adherence (β= 0.05, SE 0.01; p<.001) (Table 2, model 2). None of the psychosocial stressor variables were associated with antihypertensive medication non-adherence (Table 2, model 3), although there was a trend towards more non-adherence for men who were separated from a spouse or partner (β=0.85, SE 0.47; p=.07). Of note, there was a significant correlation between the number of psychosocial stressors and the total depressive symptom score (Pearson's correlation coefficient= 0.23; p<.0001). Answering "yes" to ever having had an "alcohol-related problem" was associated with more medication non-adherence (β=0.81, SE 0.26; p<.01) than answering in the negative (Table 2, model 4). Illicit drug use was not significantly associated with worse medication non-adherence (Table 2, model 5). When we include depressive symptom, psychosocial stressors, alcohol misuse, and illicit drug use in the same multivariate model to assess their independent associations with antihypertensive medication non-adherence (Table 2, model 6), depressive symptoms and alcohol misuse remain significantly associated with medication non-adherence.

### Mediation and effect modification

Alcohol misuse did not mediate the association between depressive symptoms and antihypertensive medication non-adherence (β for condition "a" 0.06, p<.001; β for condition "d" 0.05, p<.001) (**see** Figure 3). Since neither illicit drug use nor psychosocial stressors were significantly associated with antihypertensive medication non-adherence, they did not meet criteria to be considered mediators of the association between depressive symptoms and medication non-adherence. There was evidence of effect modification by intervention group on the relationship between reporting having had an alcohol-related problem and antihypertensive medication non-adherence (β for interaction of intervention group x alcohol-related problem was 1.56, SE 0.55, p < .01 (**see** Figure 4). Among men in the less intensive group, those who reported having an alcohol-related problem were more non-adherent than those who did not report an alcohol-related problem (p < .01). In contrast, among men in the more intensive group, levels of antihypertensive medication non-adherence did not differ as a function of their history of ever having an alcohol-related problem (Figure 4).

## Discussion

We examined direct and mediating pathways between depressive symptoms, psychosocial stressors, and substance use (both alcohol misuse and illicit drug use) on antihypertensive medication non-adherence in a sample of hypertensive Black men enrolled in a clinical trial to improve HBP care and control. As hypothesized, we found that more depressive symptoms and alcohol misuse were associated with more antihypertensive medication non-adherence over a three-year period. Alcohol misuse did not mediate the association between depressive symptoms and medication non-adherence. Contrary to our hypothesis, neither psychosocial stressors nor illicit drug use were significantly related to antihypertensive

medication non-adherence and therefore neither were mediators of the association between depressive symptoms and antihypertensive medication non-adherence. Overall, self-reported antihypertensive medication non-adherence scores varied over time.

Our finding that more depressive symptoms were associated with antihypertensive medication non-adherence is consistent with results from other studies.[7, 30–36] While this finding is not novel, our study makes a unique contribution to the literature for several reasons. By using a prospective design we were able to document the consistency of this association over time. Further, our work highlights the chronicity of depressive symptoms and their effects on antihypertensive medication non-adherence in Black men specifically. This is important since other studies had an under-representation of Black men[30, 31] or primarily targeted older adults.[32]

Our work supports findings from at least one other study which showed an association between alcohol misuse and antihypertensive medication non-adherence. [37] However, we did not find that alcohol misuse mediates the association between depressive symptoms and medication non-adherence. Kim *et al*. examined relationships between depressive symptoms, alcohol misuse, and antihypertensive medication non-adherence using the same study population as the current study, but they did not specifically examine alcohol misuse as a mediator. [25] Because we did not find any other studies which examined the relationships between depressive symptoms, alcohol misuse, and *antihypertensive* medication non-adherence, we cannot compare our findings with previous research. The mechanisms by which depressive symptoms affect medication adherence are unclear and likely complex. Some potential mechanisms include decreased self-care, decrements in memory and cognition, intentional self-harm and reduced self-efficacy. Future studies should assess other potential mediating factors in hypertensive Black men, to guide intervention development.

We found that the effect of alcohol misuse on antihypertensive medication non-adherence differs by intervention group. Among men in the less intensive group, those who reported ever having an alcohol-related problem were more non-adherent than those who did not report an alcohol-related problem. The interaction between alcohol misuse and intervention group might explain why we failed to find a significant mediation effect for alcohol misuse on the association between depressive symptoms and medication non-adherence. It is possible that alcohol misuse interacts with depressive symptoms to adversely affect antihypertensive medication adherence *only* among men with fewer resources and sources of positive support (i.e., men in the less intensive intervention group). Men in the more intensive group may have had other resources, even in the face of depressive symptoms, which helped to combat the potentially negative impact of alcohol misuse on their ability to adhere to their antihypertensive medications.

Our study has limitations. First, we used self-reported to assess antihypertensive medication non-adherence. Although some studies demonstrate moderate to strong concordance between self-reported medication adherence and pharmacy refill data,[38, 39] other studies have shown that self-reported adherence does not correlate well with objective measures. Furthermore, there was little variability in antihypertensive medication non-adherence

scores. The lack of spread in this variable may make it difficult to identify significant correlations with other variables and may bias our findings towards the null. Future studies should assess antihypertensive medication non-adherence both subjectively and objectively. Second, since our analysis started at month 24, we did not examine associations between the predictor variables of interest and medication non-adherence at baseline. It is also possible that the intervention itself may have changed the level of some of our predictor variables (e.g., depressive symptoms, psychosocial stressors). Third, we did not use a validated questionnaire, such as the Alcohol Use Disorder Identification Test-Consumption (AUDIT-C)[40] to assess alcohol misuse. Our single item question, "have you ever had an alcohol-related problem" does not differentiate individuals along the spectrum from "risky drinking" to "alcohol abuse and dependency." Our question is a proxy for alcohol misuse which assesses *any* history of alcohol misuse rather than *current* alcohol misuse, which would be more appropriate and closely related to current medication non-adherence. Fourth, we used a non-validated measure of psychosocial stressors and limited response options to yes/no for each life event. While our approach may have reduced respondent burden, it may have resulted in measurement error and an inability to detect statistically significant associations. Finally, the external validity of our findings may be limited since our sample included Black men of relatively low socio-economic status who resided in Baltimore and were enrolled in a clinical trial.

Despite these limitations, our study has strengths. It was theoretically grounded and we empirically tested direct and mediating mechanisms for the known association between depressive symptoms and antihypertensive medication non-adherence. Further, we examined this clinically important issue in a sample of Black men – a highly underrepresented population in research. We screened for the presence of depressive symptoms using a validated instrument. Finally, we used a prospective design which allowed us to examine antihypertensive medication non-adherence and psychosocial factors over time.

Our study has important implications for clinical practice and research. The findings extend our understanding of psychosocial factors that might limit the effectiveness of HTN treatment by interfering with medication adherence in a high-risk population of Black men. Given the strong and persistent association of depressive symptoms and alcohol misuse with antihypertensive medication non-adherence, clinicians should consider routine and ongoing screening for depressive symptoms and alcohol misuse in hypertensive Black men who are non-adherent with their antihypertensive medications. Clinicians and researchers interested in improving HTN control and cardiovascular outcomes through better medication adherence should continue to investigate and intervene upon the myriad psychosocial factors operant in the lives of Black men which adversely impacts their ability to adhere to therapy. Future research should examine whether identifying and treating depression and alcohol misuse disorders in Black men improves medication adherence and ultimately BP control and cardiovascular outcomes.

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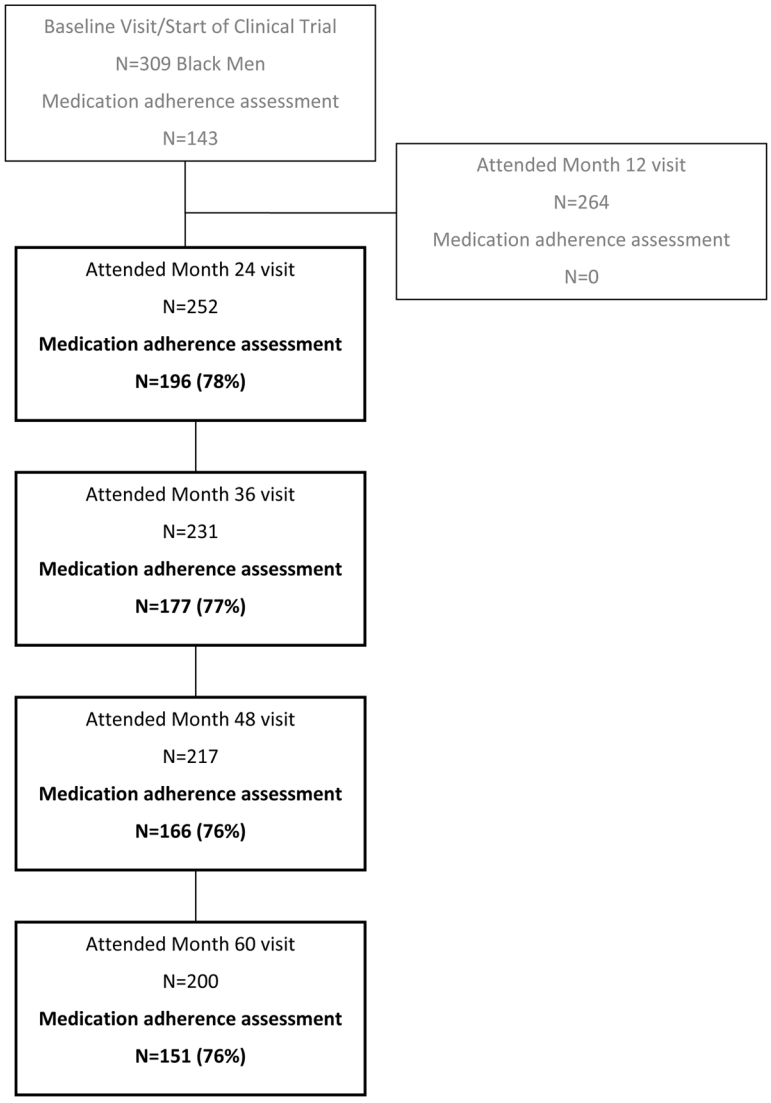


**Figure 1.**

Study participant attendance and outcome assessment by study period. Study follow-up rates account for the numbers of men who were: decreased (n= 18,34,44,53), incarcerated (n=14,21,21,24), had moved out-of-state (n=6,5,6,9) or were in a long-term care facility (n=1,2,2,2) at 24, 36, 48 and 60 months, respectively.

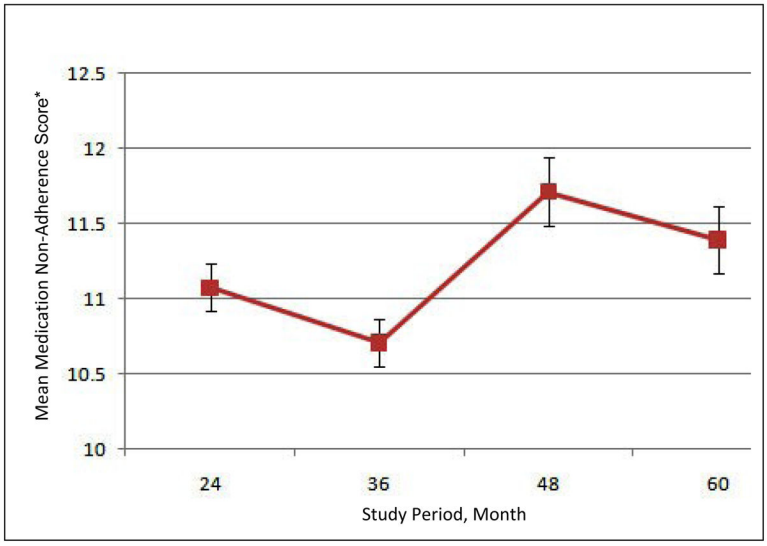


**Figure 2.**

Mean adherence score using Hill-Bone Compliance Scale, Medication Taking subscale over study period *Lower scores indicate better medication adherence

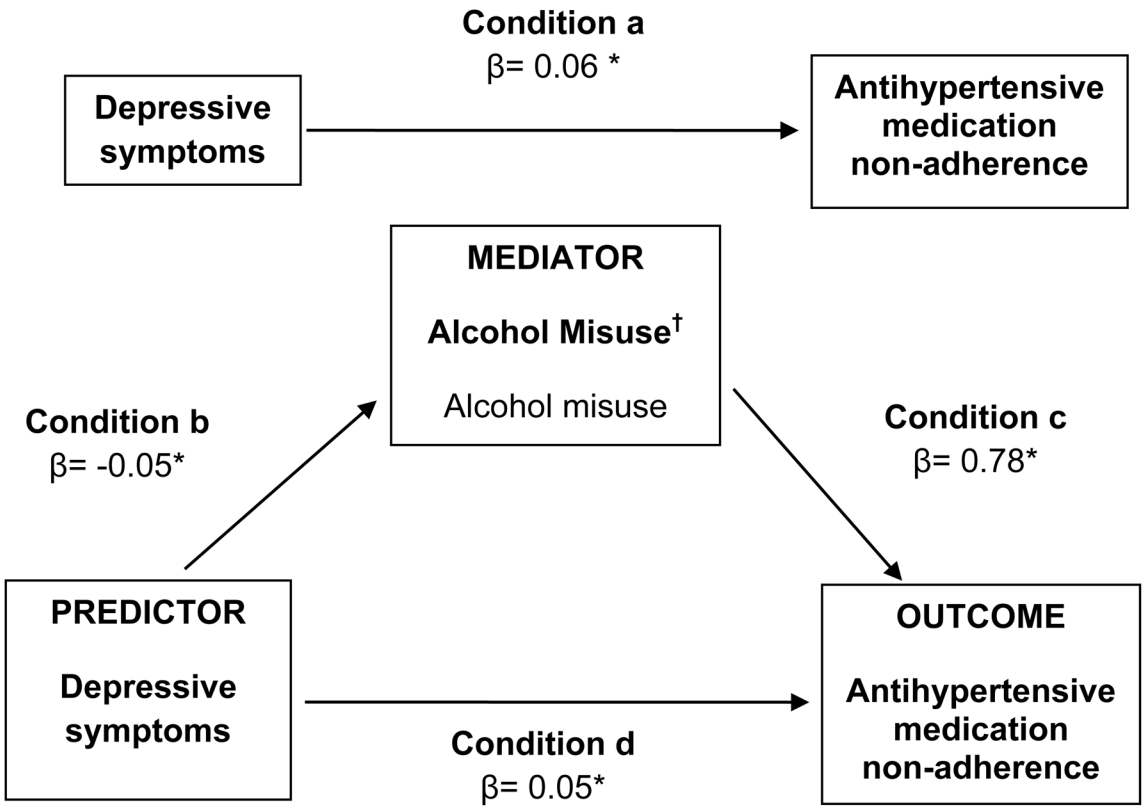


**Figure 3.**
Mediational model showing both the direct and the mediated pathways by which depressive symptoms influence antihypertensive medication non-adherence.

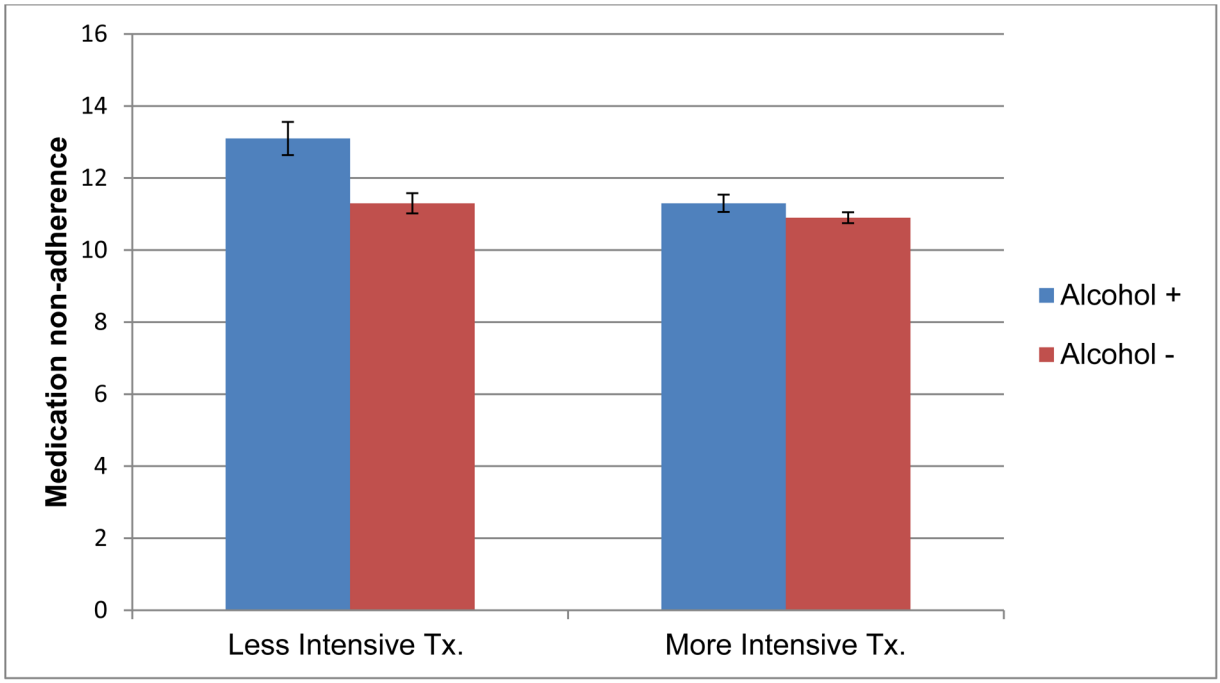


**Figure 4.**
Effect modification by intervention group of association between alcohol misuse and antihypertensive medication non-adherence

## Table 1

Sample Characteristics By Study Period

| Characteristic | Sample mean ± SD or N (%) | | | |
|---|---|---|---|---|
| | Month 24 (N=196) | Month 36 (N=177) | Month 48 (N=166) | Month 60 (N=151) |
| **Background/control variables** | | | | |
| Age (yrs) | 41.7 ± 5.6 | 42.3 ± 5.4 | 42.0 ± 5.6 | 41.9± 5.6 |
| Education (yrs) | 11.4 ± 2.0 | 11.4± 2.2 | 11.6± 2.2 | 11.6± 2.0 |
| Currently married (vs. not married) | 37 (19) | 36 (20) | 35 (21) | 34 (23) |
| Systolic BP, mmHg | 142.7±19.2 | 140.9±21.3 | 140.1±21.0 | 141.8±23.5 |
| Diastolic BP, mmHg | 87.9 ± 12.5 | 89.8±14.1 | 91.0±13.8 | 93.4±16.0 |
| Who pays for medications | | | | |
| Private | 39 (20) | 36 (20) | 30 (18) | 27 (18) |
| Public | 43 (22) | 37 (21) | 27 (16) | 21 (14) |
| Other (including self, family, or samples provided by MD or NP) | 113 (58) | 103 (59) | 108 (65) | 101 (68) |
| Self-rated health | | | | |
| Poor | 12 (6) | 7 (4) | 8 (5) | 7 (5) |
| Fair | 51 (6) | 44 (26) | 41 (25) | 36 (24) |
| Good | 91 (48) | 86 (50) | 78 (48) | 71 (48) |
| Excellent | 37 (19) | 35 (20) | 34 (21) | 33 (22) |
| Current smoker (vs. non-smoker) | 138 (73) | 118 (67) | 109 (66) | 95 (63) |
| Urine screen positive for Illicit drugs | 90 (49) | 75 (43) | 67 (41) | 56 (39) |
| **Depressive symptoms** | | | | |
| CES-D score | 10.9 ± 8.1 | 11.4± 9.4 | 10.9± 9.5 | 12.7± 11.5 |
| CES-D ≥ 16 | 54 (28) | 46 (26) | 43 (26) | 48 (32) |
| **Psychosocial stressors (in past 6 months)** | | | | |
| Victim of violent act | 15 (8) | 0 (0) | 10 (6) | 8 (5) |
| Major or minor law violation | 13 (7) | 6 (3) | 12 (7) | 10 (7) |
| Arrested or held in jail | 16 (8) | 6 (3) | 14 (8) | 9 (6) |
| Difficulty finding a place to live | 14 (7) | 6 (3) | 20 (12) | 14 (9) |
| Separated spouse or partner | 13 (5) | 12 (5) | 31 (14) | 20 (10) |
| Employed (vs. unemployed) | 71 (36) | 68 (38) | 61 (37) | 64 (42) |
| **Alcohol Misuse** | | | | |
| Ever had an alcohol-related problem (vs. not) | 39 (20) | 37 (21) | 40 (24) | 36 (24) |

## Table 2

Linear association between Independent Variables and Antihypertensive Medication Non- adherence

| | Beta coefficient (β) | SE | P value |
|---|---|---|---|
| **Model 1: Background characteristics*** | | | |
| Month 24 | Ref | Ref | Ref |
| Month 36 | −0.28 | 0.16 | 0.07 |
| Month 48 | 0.69 | 0.23 | <0.01 |
| Month 60 | 0.29 | 0.21 | 0.15 |
| Less intensive intervention group | Ref | Ref | Ref |
| More intensive intervention group | −0.73 | 0.32 | 0.02 |
| **Model 2: Depressive symptoms†** | | | |
| Depression score | 0.05 | 0.01 | <0.001 |
| **Model 3: Psychosocial stressors†** | | | |
| Victim of a violent act within past 6 months | −0.50 | 0.39 | 0.21 |
| Major or minor law violation within past 6 months | 0.17 | 0.41 | 0.69 |
| Been arrested or held in jail within past 6 months | 0.22 | 0.43 | 0.60 |
| Difficulty finding a place to live within past 6 months | 0.31 | 0.40 | 0.43 |
| Separated from spouse or partner within past 6 months | 0.85 | 0.47 | 0.07 |
| **Model 4: Alcohol Misuse†** | | | |
| Answered “yes” to ever having had an “alcohol-related problem” | 0.81 | 0.26 | <0.01 |
| **Model 5: Negative urine screen for illicit drugs** | 0.04 | 0.20 | 0.84 |
| **Model 6: Depressive symptoms, Psychosocial stressors Alcohol misuse, and Illicit drug use†** | | | |
| Depression score | 0.04 | 0.01 | <0.001 |
| Victim of a violent act within past 6 months | −0.71 | 0.41 | 0.09 |
| Major or minor law violation within past 6 months | −0.09 | 0.40 | 0.82 |
| Been arrested or held in jail within past 6 months | 0.21 | 0.43 | 0.62 |
| Difficulty finding a place to live within past 6 months | 0.22 | 0.41 | 0.58 |
| Separated from spouse or partner within past 6 months | 0.85 | 0.45 | 0.06 |
| Alcohol Misuse | 0.70 | 0.27 | 0.01 |
| Negative urine screen for illicit drugs | 0.10 | 0.20 | 0.60 |

*None of the following other background characteristics that we adjusted for were significantly associated with hypertension medication non-adherence at p<0.10 level: age, education, who pays for medications, marital status, systolic BP, diastolic BP, current smoking, and self-rated health

†Adjusted for background characteristics