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# Patient Trust in Physicians and Adoption of Lifestyle Behaviors to Control High Blood Pressure

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## Abstract

**Objective—**To assess the relationship between patients' trust in their physician and self-reported adoption of lifestyle modification behaviors and medication adherence for control of hypertension.

**Methods—**Longitudinal analysis of data from a randomized controlled trial of interventions to enhance hypertensive patients' adherence to medications and recommended lifestyle modifications. Two hundred patients were seen by 41 physicians at 14 urban primary care practices in Baltimore, Maryland, and followed for 12 months.

**Results—**Seventy percent of patients reported complete trust in their physician. In adjusted analyses, patients with complete trust had higher odds of reporting that they were trying to lose weight (OR=2.27, 95% CI=1.38–3.74) than did patients with less than complete trust in their physician. Though not statistically significant, the odds of reporting trying to cut back on salt and engaging in regular exercise were greater in patients with complete trust. We observed no association for reports of medication adherence.

**Conclusion—**Trust in one's physician predicts attempts to lose weight among patients with hypertension, and may contribute to attempts to reduce salt and increase exercise.

**Practice Implications—**Strengthening patient-physician relationships through efforts to enhance trust may be a promising strategy to enhance patients' engagement in healthy lifestyle behaviors for hypertension.

### Keywords

adherence; African-Americans; blood pressure control; hypertension; lifestyle modification; trust



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## 1. Introduction

It is estimated that 1 in 3 adults in the United States have hypertension (1). Hypertension is a major contributor to complications such as stroke, heart disease, and end-stage kidney disease (2). Furthermore, in the United States, the direct and indirect costs of hypertension were estimated at $43.5 billion in 2007 (2). Self-care behaviors such as monitoring blood pressure and adopting lifestyle recommendations are strong predictors of hypertension control (3, 4). Additionally, failure to adhere to antihypertensive medications as prescribed is a major contributor to uncontrolled hypertension (5–10).

*The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC-VII) (3), presented a treatment algorithm for physicians, recommending lifestyle modifications and pharmacologic treatment as effective measures for optimum management of hypertension (3). Lifestyle modifications for hypertensive patients include (1) reducing their weight, (2) eating a healthy diet, (3) consuming no more than 100 mmol/d of sodium, (4) avoiding excessive alcohol consumption, and (5) exercising regularly. The JNC-VII guidelines strongly recommend that physicians prescribe lifestyle modifications to all patients who are pre-hypertensive and hypertensive (3). A recent report found that in combination, weight loss and dietary sodium ($Na^+$) reduction were as effective as single-drug therapy for hypertension control (11). However, nearly a decade after the presentation of the JNC-VII guidelines, and despite the proven efficacy of lifestyle modification and pharmacologic therapy for treatment of hypertension and prevention of its complications, only half of the hypertensive patients in the United States have their blood pressure controlled (3, 12). Several social and economic, therapy-related, healthcare system and physician factors may contribute to the low percentage of patients with controlled blood pressure. Studies suggest that patient attitudes also play a substantial role in their adoption of physician-recommended lifestyle modification and medication adherence (13–16),

### 1.1. Hypertension, obesity, and physical inactivity

Hypertension, obesity, and physical inactivity have been designated as independent risk factors for coronary heart disease; obesity and physical inactivity also worsen hypertension (2, 17). When combining the three independent risk factors, hypertension, obesity and physical inactivity, a person's risk for coronary heart disease is compounded. If hypertension is left untreated, the potential for cardiovascular disease increases substantially. Obesity is a major problem in the U.S., where in 2007–2008, approximately 35.5% of women and 32.2% of men were obese (18, 19). A related, major problem is the rise in physical inactivity. Physical inactivity accounts for 12% of the global burden of myocardial infarction, independent of other cardiovascular disease risk factors such as hypertension and abdominal obesity (20).

### 1.2. Trust

Trust is at the core of building an effective patient-physician relationship (21–24). Trust can be understood as individuals seeing one another as competent, responsible, caring, tactful and ethical (22). Trust also includes other dimensions such as fiduciary responsibility, confidentiality and trustworthiness (25, 26). Within the last decade trust has been used as a way to assess patient-physician relationships (27–30). Trust in one's physician has been linked to improvements in many factors, including patient-physician communication, satisfaction with healthcare, adherence to medical treatments, utilization of health services, continuity of care, self-rated health and blood pressure control (29, 31–36). Higher trust by patients has also been associated with physician-counseling behaviors (37) and with physicians spending more time with their patients. (28). Our interest in the relationship

between trust in physician and medication adherence arose from studies showing lower trust in physicians among African Americans (31, 38) and possible links between distrust and non-adherence in African-American patients (39).

The specified relationship between trust in physicians and patients adopting physician-recommended lifestyle behavior changes has not been explored. Our present study is the first to examine whether patients' trust in their physicians improves patients adoption of physician-recommended lifestyle modifications and medication adherence for hypertension control.

### 1.3. Study objective

The objective of our study was to assess the relationship between patients' trust in their physician and self-report of adoption of physician-recommended lifestyle modification behaviors and medication adherence for hypertension control. We hypothesized that patients who reported high levels of trust in their physicians would report significantly more efforts to engage in physician-recommended lifestyle modification behaviors and significantly better medication adherence for hypertension control than do patients who report lower levels of trust in their physicians. Finally, we hypothesized that the relationship of trust with our outcomes might be modified by the patient's race, such that stronger and more positive relationships might be observed among African Americans than among whites.

## 2. Methods

### 2.1. Study design

We conducted a secondary analysis of longitudinal data collected during the Patient-Physician Partnership study, a randomized trial of behavioral interventions for patients and physicians that aimed to improve patient adherence to physician-recommended lifestyle modifications for hypertension control (40). The study took place in Baltimore, Maryland, USA and involved 50 primary care physicians and 279 patients in 14 urban primary care practices. Details related to physician and patient recruitment, data collection procedures intervention strategies, and trial results have been described previously (40, 41). The study was approved by the Johns Hopkins Institutional Review Board, and all physicians and patients gave signed informed consent for their participation.

The patients and physicians were both randomly assigned to either the intensive or the minimal interventions. Randomized patients received either a coaching intervention from a community health worker (both pre and post-physician appointment and through follow up phone calls), or no such intervention. Regardless of intervention assignment, all patients received a monthly newsletter with health education messages related to cardiovascular disease. Randomized physicians received either a continuing medical education communication skills training program with feedback, or no such training (40). Regardless of randomization assignment group, each physician received a copy of the JNC-VII hypertension treatment guidelines at baseline, and monthly newsletter updates.

### 2.2. Study population and settings

The study sample was drawn from physicians and patients enrolled in the parent study and included patients 18 years of age and older, with hypertension (ICD-9 code 401 within the preceding year), receiving care in urban community health clinics, in Baltimore, which primarily served African-Americans or patients with low socioeconomic status. With the above referenced criteria, and complete baseline questionnaires which included questions about trust in their primary care physician, 200 patients were included in our analysis. Patients were excluded from our analysis if 12-month follow-up data on both outcomes of

interest (see section 2.3 and 2.4 below) were missing; the 200 patients included in the analysis represented 72% of the 279 patients in the parent study. Although 50 physicians were randomized in the parent study, due to withdrawals and lost to follow-up, only 41 of these physicians had patients that enrolled in the study; these 41 primary care physicians were included in our study analysis.

### 2.3. Measures of patient trust

We measured patient trust at baseline and at 12-month follow-up using five questions from the Trust in Physician scale (42); 1) "I trust this doctor to look out for my best interests" (best interests), 2) "I have confidence in this doctor's knowledge and skills" (skills), 3) "I trust [primary care physician's name] to tell me the truth about my health" (truthfulness), 4) "I trust this doctor to keep what I tell him or her confidential" (confidentiality), and 5) "I trust this doctor to put my medical needs above all other considerations when treating my medical problems" (needs). There were 5 possible responses for each question: "completely", "mostly", "somewhat", "a little", and "not at all". Patients were considered to have "complete trust" in their physician if they responded "completely" to all five questions, and to have "less than complete trust" if they responded other than "completely" to at least one question.

### 2.4. Outcome variables

Patient adoption of physician-recommended lifestyle behavior changes and adherence to anti-hypertensive medication were assessed by patient self-report at baseline and 12-month follow-up. The following stem question was used to measure patient intent to adopt physician-recommended lifestyle behavior changes; "In the past 3-months, have you done anything differently to take care of your blood pressure?" The patient was then asked separately about the following three activities; lost weight, cut back on salt, and exercised more. The response categories were "yes" or "no". The question on weight loss was adapted from the 2003–2004 NHANES survey provided by the National Center for Health Statistics (43). The questions related to cutting back on salt and exercising more have not been validated. These questions, however, were constructed based on the JNC VII recommended guidelines on lifestyle modifications for hypertension control and are known to be behaviors that are universal to good health practices (3). We also used a well validated question to examine patient self-report of engaging in "regular exercise such as brisk walking, jogging, bicycling, etc. long enough to work up a sweat" at least three times per week (44). However, this question was only asked at baseline, so it is not considered a primary outcome but a measure used for a sensitivity analysis.

To assess medication adherence, we used the Morisky Medication Adherence Scale (45). This self-reported measure of medication adherence is composed of four Likert-scaled questions related to previous patterns of medication adherence. The questions were: 1) "Do you ever forget to take your medication?"; 2) "Are you careless at times about taking your medications?"; 3) When you feel better, do you sometimes stop taking your medications?"; and 4) "Sometimes if you feel worse when you take your medications, do you stop taking them?" The four categories for each of these medication adherence questions were as follows: "all the time", "most of the time", "some of the time", "none of the time". Patients were considered to have high medication adherence if they responded "none of the time" to all four questions; otherwise, they were coded as having low medication adherence.

### 2.5. Covariates

We adjusted for patients' age, gender, race (grouped as minority or white), education, and health status (obtained by physical and mental component summary measures of the Medical Outcomes Study 12-item short form [MOS SF-12]). These variables were included

in the multivariate models because of their documented associations with trust (31, 32, 46). Additionally, we adjusted for the intervention status of the patients and physicians.

### 2.6. Data analysis

To account for the nesting of patients within physicians, we used logistic regression with generalized estimating equations to examine the effects of patient trust in their physician on adoption of physician-recommended healthy lifestyle behaviors and medication adherence for high blood pressure control. Multivariate analyses adjusted for all of the covariates listed above. We also tested for an interaction of patient race and trust. Hypothesis testing was two-sided, and a P-value of $< 0.05$ was considered significant. Data were analyzed using SAS version 9.2 (SAS Institute, Inc., Cary, NC).

## 3. Results

### 3.1. Demographics

Demographic and clinical characteristics of the 200 patients are described in Table 1. The patients had a mean age of 62 years, were predominantly African American, female, and high school graduates, and had health insurance. Most patients were obese or overweight; only 11% were normal weight. Most were known “very well” to “moderately well” by their physicians. The characteristics of the physicians are summarized in Table 2. The physicians were ethnically diverse; over half were women, and the overwhelming majority were trained in internal medicine, board certified and obtained their medical degrees in the United States.

### 3.2. Patient trust in their physicians

The distribution of patient responses at baseline to the individual trust questions are presented in Table 3, and the percent that responded “completely” ranged from 71% to 78% on the 5 trust questions. The summary (predictor) variable “Complete trust in physician” was present in 65% of patients.

### 3.4. Outcome variables: adoption of physician-recommended lifestyle behavior change, and medication adherence

The number and percent of patients reporting each of the self-management behaviors at 12-month follow up are presented in Table 3. The percent of patients reporting positive behaviors ranged from 35% to 63%.

Results from the unadjusted and adjusted logistic regression models are presented in Table 4. The adjusted models included the covariates of patient gender, age, race, education, the physical and mental component scores from the MOS SF-12, and patient and physician intervention status. Patients who reported having complete trust in their physicians at baseline had significantly higher odds of reporting that they were trying to lose weight at 12-months follow-up than did patients who had less trust in their physicians; this finding was present in both the unadjusted model (OR 2.00, 95% CI 1.16, 3.45) and the adjusted model (OR 2.07, 95% CI 1.22, 3.52). Similarly, in the adjusted models patients with complete trust in their physicians had higher odds of reporting they were trying to cut salt and exercise more at 12-months than did patients with less trust; however these differences were not statistically significant. There was no association between patient reports of trust in their physician and their reports of medication adherence. The interaction of patient race and trust was not found to be significant for any of the outcomes.

# 4. Discussion and Conclusion

## 4.1. Discussion

The finding that patients' trust in their physicians was significantly associated with attempts to lose weight has not previously been reported. Patients' trust in their physicians was also associated with attempts to cut salt in their diets and increase exercise, but not significantly so. The association between trust in the physician and attempts to exercise more was also reported by Safran and colleagues (35). Our study did not show an association between patient trust in their physician and self-reported medication adherence, in contrast to several previous studies (24, 47, 48) significantly linking trust with adherence to medical treatments, and use of appropriate preventive services (34, 39, 47, 48). In populations similar to our study population, trust has played a significant role in adherence to antiretroviral therapy and to glaucoma medications, (49, 50). The absence of a relationship between trust and hypertensive medication adherence in our study may be due to socioeconomic factors or to lack of empowerment for self-care practices. "Complete" trust in their physician shown by two thirds of the patients may have caused them to disengage in the treatment decision-making process, leaving their complete care in the hands of the provider. One other study, with a patient sample similar to ours (27) also failed to find an association between trust in physicians and medication adherence in hypertensive patients. On the other hand, there may be an association between trust and hypertension medication adherence that we failed to detect because of measurement error.

Our study's unique contribution is its focus on the association between trust and patient reports of adopting physician-recommended lifestyle behavior modifications. The strengths of our study include the longitudinal study design, use of validated measures of patient trust, and the inclusion of patients from underserved clinical settings receiving care from a diverse group of physicians. However, the study findings should be interpreted with consideration of the following limitations. First, our patients were recruited from urban community-based clinics, thus the generalizability of this study may be limited to similar populations rather than to the general population. Second, study outcomes were measured using self-reports. There may have been recall bias and/or social desirability bias. However, the medication adherence measure has been well validated (51) and our sensitivity analysis of the relationship between patient trust and the well-validated self-report measure of engaging in "regular exercise such as brisk walking, jogging, bicycling, etc. long enough to work up a sweat" at least three times per week at baseline-- revealed a positive association similar to the one we found over time. Even so, we acknowledge that the associations we observed may reflect a general tendency for patients to report positive attitudes and behaviors to study interviewers in order to gain approval. Third, the ratings of trust were positively skewed, such that 65% of the patients reported complete trust in their physicians. Perhaps a broader distribution of trust responses would have allowed for the use of a more sensitive numeric scale in the analysis. Additionally, researchers have suggested that patients and physicians in typical encounters often have an implicit interpretation of trust; in other words, they take trust in one another for granted until they find a reason not to do so. As such, an explicit interpretation of trust, such as responses to a questionnaire, may not cover all aspects of trust relationships between doctors and patients (52). Fourth, several potential confounding variables were excluded. For example, we did not measure the duration of the relationship between patient and physician, or the duration of visits during the course of the study. Duration of visit has been associated with trust in physician (37). However, we did examine the physician's familiarity with the patient, which may be considered as a proxy for the length of the relationship. Since this variable might be in the causal pathway between trust and the outcome, we did not adjust for it. We did not measure patients' knowledge of hypertension, other attitudes regarding treatment such as those toward the effectiveness, safety, or potential side effects of medication, or other psychosocial stressors, which may

have a stronger influence on medication adherence than trust in one's physician. Moreover, although we adjusted for education as a proxy for socioeconomic status, it is possible that other unmeasured financial barriers exerted an influence on medication adherence. To confirm our findings, future studies should include larger patient samples with ethnically and socially diverse populations and use more objective measures of lifestyle modification and medication adherence.

### 4.2. Conclusion

The results of this study newly identify the importance of patient trust in physicians as a predictor of adherence to recommended lifestyle modifications for hypertension control; they also substantiate the results of previous work that demonstrates the important role of trust in enhancing patient outcomes.

### 4.3. Practice Implications

Studies examining physician behaviors that promote trust suggest that exploring the patient's illness experience, being informative, and using partnership building are associated with higher patient trust (53–55). Strengthening patient-physician relationships through efforts to enhance trust may be a promising strategy to enhance patients' engagement in healthy lifestyle behaviors to achieve blood pressure control. However, few interventions have been developed specifically to increase patient trust in physicians (56). Thus, future research should explore the impact of policy changes, guidelines, and specific physician training on patients' trust.

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## Table 1

Baseline demographic and clinical characteristics of patients with hypertension

| Patient Characteristics | Percent or Mean (SD) (n=200) |
|---|---|
| Age (years) | 61.9 (11.5) |
| Female | 62 |
| Race: | |
| African American | 62 |
| Asian | 1 |
| Native American | 1 |
| White | 36 |
| Married | 35 |
| Education (years) | 11.9 (2.4) |
| < High school graduate | 30 |
| REALM, ≥9$^{th}$ grade | 67 |
| Income < $10,000/yr | 37 |
| Income < $35,000/yr | 71 |
| Any healthcare insurance | 89 |
| Medicaid | 29 |
| Medicare | 39 |
| Private insurance | 50 |
| MOS SF-12 physical component | 41.1 (12.5) |
| MOS SF-12 mental component | 50.8 (11.0) |
| Body mass index (kg/m$^2$) | 32.7 (8.0) |
| Body mass index category: | |
| Underweight = <18.5 kg/m$^2$ | 1 |
| Normal weight = 18.5–24.9 kg/m$^2$ | 11 |
| Overweight = 25–29.9 kg/m$^2$ | 29 |
| Obese = 30 kg/m$^2$ or greater | 59 |
| How well clinician knows patient: | |
| Not at all | 1 |
| Slightly | 2 |
| Somewhat | 10 |
| Moderately well | 48 |
| Very well | 40 |

Abbreviation: MOS SF-12, Medical Outcomes Study 12-item short form

**Table 2**

Characteristics of primary care physicians

| Characteristic | Percent or Mean (SD) (n=41) |
|---|---|
| Age (years), mean (SD) | 43.0 (8.6) |
| Female | 54 |
| Race: | |
| African American | 29 |
| Asian | 24 |
| Hispanic | 2 |
| White | 44 |
| Medical specialty: | |
| Family practice | 17 |
| General practice | 2 |
| Internal medicine | 80 |
| Board certified | 93 |
| Medical degree obtained in United States | 76 |
| CME in communication skills | 46 |

Abbreviation: CME, continuing medical education

## Table 3

Patients' trust in physician at baseline and self-reported medication adherence and attempts at lifestyle modification at 12-month follow-up

| Measure | No. of Patients (%) |
|---|---|
| Summary trust measure: | |
| Less than complete trust | 70 (35) |
| Complete trust | 130 (65) |
| Individual items: | |
| "I trust this doctor to look out for my best interest." (best interest) | |
| Somewhat | 6 (3) |
| Mostly | 52 (26) |
| Completely | 142 (71) |
| "I have confidence in this doctor's knowledge and skills." (skills) | |
| Somewhat | 5 (2) |
| Mostly | 45 (22) |
| Completely | 150 (75) |
| "I trust this doctor to tell the truth about my health." (truthfulness) | |
| A little | 1 (1) |
| Somewhat | 4 (2) |
| Mostly | 44 (22) |
| Completely | 151 (76) |
| "I trust this doctor to keep what I tell him or her confidential." (confidentiality) | |
| Somewhat | 2 (1) |
| Mostly | 43 (22) |
| Completely | 155 (78) |
| "I trust this doctor to put my medical needs above all other considerations when treating my medical problem." (needs) | |
| Somewhat | 4 (2) |
| Mostly | 50 (24) |
| Completely | 147 (74) |
| Self-reported behavior at 12 months * | |
| Attempts to: | |
| Lose weight | 95/196 (48) |
| Cut back on salt | 109/178 (61) |
| Exercise more | 69/197 (35) |
| Medication adherence | 123/195 (63) |

*Some data were missing, so number of patients with data is specified.

**Table 4**

Odds ratios of reporting medication adherence and healthy lifestyle modifications at 12-month follow-up. Results compare patients with complete trust in their physician to the reference group of patients with less than complete trust.

| | Unadjusted Model* | | | Adjusted Model* | | |
|---|---|---|---|---|---|---|
| **Outcome Variable** | **Odds Ratio** | **95% CI** | ***P* value** | **Odds Ratio** | **95% CI** | ***P* value** |
| Attempts to: | | | | | | |
| Lose weight | 2.00 | 1.16, 3.45 | 0.01 | 2.07 | 1.22, 3.52 | 0.007 |
| Cut back on salt | 1.13 | 0.66, 1.94 | 0.65 | 1.58 | 0.85, 2.95 | 0.15 |
| Exercise more | 1.34 | 0.70, 2.55 | 0.38 | 1.63 | 0.85, 3.12 | 0.14 |
| Adherent to medication | 1.36 | 0.78, 2.39 | 0.28 | 1.04 | 0.55, 1.97 | 0.90 |

Abbreviation: CI, confidence interval

*Unadjusted model controls for nesting of patients within physicians only. Adjusted model also controls for patient gender, age, race, education, the physical and mental component scores from the Medical Outcomes Study 12-item Short Form, and patient and physician intervention status.