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Brief Provider Communication Skills Training Fails to Impact Patient Hypertension Outcomes

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Abstract

Objectives—Hypertension remains a prevalent risk factor for cardiovascular disease, and improved medication adherence leads to better blood pressure (BP) control. We sought to improve medication adherence and hypertension outcomes among patients with uncontrolled BP through communication skills training targeting providers.

Methods—We conducted a randomized controlled trial to assess the effects of a communication skills intervention for primary care doctors compared to usual care controls, on the outcomes of BP (systolic, diastolic), patient self-reported medication adherence, and provider counseling, assessed at baseline and post-intervention. We enrolled 379 patients with uncontrolled BP; 203 (54%) with follow-up data comprised our final sample. We performed random effects least squares regression analyses to examine whether the provider training improved outcomes, using clinics as the unit of randomization.

Results—In neither unadjusted nor multivariate analyses were significant differences in change detected from baseline to follow-up in provider counseling, medication adherence or BP, for the intervention versus control groups.

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*I confirm all patient/personal identifiers have been removed or disguised so the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

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Conclusion—The intervention did not improve the outcomes; it may have been too brief and lacked sufficient practice level changes to impact counseling, adherence or BP.

Practice Implications—Future intervention efforts may require more extensive provider training, along with broader systematic changes, to improve patient outcomes.

Keywords

hypertension; blood pressure; patient-provider communication; medication adherence; patient-centered care

1. Introduction

Hypertension remains a prevalent risk factor for cardiovascular disease and related mortality.[1] In 2010, approximately 29% of Americans aged 18 or older had been diagnosed with hypertension.[2] Data from the 2003-2010 National Health and Nutrition Examination Surveys reveal that an estimated 53.5% (35.8 million) of those diagnosed with hypertension had uncontrolled blood pressure (BP).[3] Of those, 44.8% were pharmacologically treated for their hypertension and 39.4% were not even aware of this diagnosis.[3]

The overwhelming majority of those with uncontrolled hypertension report having a usual source of care (89.4%), underscoring the opportunity for health care providers to counsel patients about pharmacologic treatment and lifestyle behaviors to improve BP.[3] Patient-provider communication is an important determinant of medication adherence.[4-6] Effective communication also can impact intermediate outcomes, such as patients' understanding of their health, trust and commitment to treatment, which in turn can improve health behaviors and outcomes.[5-9]

Patient-centered, culturally competent care and counseling have the potential to improve patients' hypertension control.[10] One approach to training in such care is the “5 A's”, in which health care providers are trained to: *ask* the patient about a certain health issue or behavior, *assess* their motivation in making a behavior change to address this issue, *advise* the patient about addressing the issue, *assist* them in overcoming barriers to treatment and *arrange* for follow-up.[11] The 5A's model is an evidence-based approach for behavior change counseling for a broad range of behaviors and health conditions with prior effects on smoking,[12] physical activity,[13] weight loss,[14] and chronic illness care,[15] but it has not yet been applied in the context of hypertension care.

It can be argued that patient-centered counseling is inherently culturally sensitive because it requires clinicians to understand the issues and factors surrounding medication adherence that are most meaningful to individual patients in their own cultural context. Insofar as individuals vary in their adoption of cultural beliefs or approaches to illness, the individual remains important to understand. However, it can also be argued that without an understanding of the patient's broad cultural context (e.g., norms and beliefs of one's cultural group), it may not be possible to fully understand the individual.

Patient-centered counseling can focus on a single behavior (e.g. antihypertensive medication adherence), and is designed to enhance a patients' self-efficacy for that specific behavior by addressing logistical and practical barriers to adherence. In contrast, cultural competency enhances a clinician's ability to view the patient in his/her socio-cultural context, improving the understanding of the patient's background. Culturally competent views of patients happen when a clinician's understanding of a patient in context, and the patient's world view (regarding illness generally and hypertension specifically), are clearly understood. We posit that a better and more complete understanding of patients occur when physicians are both skilled in patient-centered counseling and are culturally competent.

We examined whether comprehensive training for clinicians to improve communication about hypertension would improve such communication, affect antihypertensive medication adherence, or BP outcomes.

2. Methods

Overview

We conducted a randomized controlled trial to evaluate whether a communication skills training intervention would affect physician counseling about hypertension, patient adherence to antihypertensive medications, or improve patient BP among adult men and women diagnosed with hypertension and prescribed at least one antihypertensive medication, compared to a usual care control condition. This training, implemented with two separate workshops related to patient-centered counseling and cultural competency, was provided to clinicians in randomly assigned clinics within an outpatient general internal medicine practice at a large urban safety net institution. To assess provider counseling and patient medication adherence, we conducted patient interviews before and after the provider training, approaching patients during regularly scheduled visits. Study staff assessed patients' BP at baseline. BP data from regular clinic visits, recorded in the electronic medical record (EMR) was then used for the follow-up BP reading.

2.1 Sample

2.1.1. Providers—Fifty eight providers in seven primary care clinics comprised our sample. Clinics were randomly assigned to either the communication skills training intervention (N=4) or usual care control condition (N=3). The communication skills training entailed two intervention workshops, one on patient-centered counseling (PCC) and the other on cultural competency (CC). In the four intervention clinics, sixteen out of 31 providers (52%) attended at least one intervention workshop; all 16 providers attended the PCC and 11 of those also attended the CC training. We analyzed outcomes using providers in clinics *assigned* to the intervention condition, and separately those providers in clinics assigned to the intervention condition who *received* the training. The 27 providers in the three control clinics did not receive any training and thus provided usual care.

2.1.2. Patients—At baseline, prior to conducting the provider training, we identified patients in all clinics with a diagnosis of hypertension, who were prescribed at least one antihypertensive medication, self-identified as white or black race, and were age 21 or older.

Recruitment and data collection are described in detail elsewhere [16]; briefly, we enrolled 869 patients for the initial survey. After the provider training was conducted, research assistants (RAs) approached enrolled patients as they returned to the clinic (both intervention and control) for follow-up office visits, and asked them to complete a survey. Of the 869 who completed the baseline survey, 379 had uncontrolled BP (systolic BP above 140 mm/Hg or diastolic BP exceeded 90 mm/Hg (or BP above 130/80 for patients with diabetes or renal insufficiency[1])); to detect improvements in BP outcomes we only analyzed this subset. Of those, 203 (54%) had complete follow-up data and comprised our final sample. Because each patient served as his/her own control from baseline to follow-up, data for the 176 subjects who did not complete follow-up were not analyzed (see Appendix). We assessed the change from baseline to follow-up in each outcome. The study was approved by the Institutional Review Board of Boston University Medical Center.

2.2 Measures

2.2.1. Patient Characteristics—Patient sociodemographic characteristics including race (assessed using the US Census categories), education in years, income, marital status and employment status were obtained through self-report at baseline. Patients' clinical data were extracted from the EMR at baseline, including age, gender, height, weight, and hypertension diagnosis, as well as diagnoses of comorbid conditions which might affect the management of hypertension or contribute to difficulty controlling it,[1] including renal insufficiency, coronary artery disease, peripheral vascular disease, nicotine dependence, hyperlipidemia, diabetes, congestive heart failure, cerebral vascular disease and obesity. Obesity was considered a diagnosis for any patient who had either a diagnosis in the EMR or a calculated body mass index of 30 and above.[17]

2.2.2. Outcome Assessments

Provider Counseling Behavior: We developed an assessment of the patient-provider discussion regarding hypertension care and management, following prior studies, which showed that such assessments are a valid measure of the provider-patient interaction, when compared to audiotapes of such interactions.[18,19] This series of 12 dichotomous items (0=no, 1=yes) asked the patient to report whether or not the provider asked or advised them about various issues related to antihypertensive medication adherence, including patient concerns about medications, and barriers and facilitators to medication taking. We summed the scores from these items to create a scale score (range:0-12), where higher scores indicate that more hypertension-related issues were discussed. This scale was completed by patients following their clinic visit at both baseline and follow-up. Follow-up data came from a survey conducted an average of 6.3 months (range:1.3-18.4) after the intervention and administered during the patient's regularly scheduled clinic visit.

Medication Adherence: We assessed medication adherence, with the Hill-Bone Compliance to High Blood Pressure Therapy Scale, comprised of items scored on a 4-point scale (responses ranging from “None of the time” to “All of the time”).[20] We used the 9-item adherence sub-scale, which has been validated against BP control, summing the items to create a scale score (range: 9-36; higher scores indicate *lower* adherence). This scale was completed by patients at both baseline and follow-up visits, on average 10.0 months (range:

4.3-21.1) after baseline. We intentionally delayed administering this scale until a targeted 30-days after the follow-up survey, to allow for time for the intervention to have an impact on behavior.

Blood Pressure: At baseline, research staff assessed patients' BP using an automatic, portable machine (Omron HEM-907), which has been validated according to the international validation protocol. Approximately 9% of subjects did not have a BP reading taken by the RA at baseline; for these the BP reading taken by the medical assistant during their regular clinic visit was used. For follow-up BP values, we obtained BP readings from the EMR at the patient's second primary care clinic visit after the provider training had been provided. This delay, again, was necessary in order for the counseling during the first visit post intervention to have the potential to impact medication adherence and BP. On average, 4.9 months (range:0.2-12.2 months) elapsed from the intervention date until the BP reading. (We cut off BP readings after 12 full months post intervention had elapsed.) We examined both change in systolic BP (SBP) and diastolic BP (DBP) from baseline to follow-up, using SBP and DBP as separate dependent variables.

2.3. Intervention

We conducted two educational workshops for primary care providers in clinics randomly assigned to the intervention condition to improve providers' communication skills regarding adherence to hypertension medication.[21-23] The first educational workshop taught providers to use patient-centered counseling, which uses open-ended questions to identify the barriers to treatment adherence and potential strategies for addressing these barriers that are relevant to each individual patient. The methodology teaches physicians to: advise a patient about a recommended health behavior, assess the patient's prior experience in changing this behavior, determine the patient's resources for changing the behavior and barriers to doing so, review current practices of the behavior, prioritize areas of desired change, develop a plan for making such change, and arrange for follow-up. This approach helps clinicians develop counseling skills and enhances their self-efficacy at effecting behavior change among their patients.

In a one hour training session led by experts in medicine and patient-centered counseling, providers were taught, using a one page counseling algorithm handout summarizing the suggested approach, to address several dimensions with patients. Through didactic presentations and role play exercises, providers were trained to implement the 5A's: *ask* the patient about their BP management, *assess* their medication adherence, *advise* the patient about pharmacologic treatment, *assist* them in overcoming barriers to treatment adherence and *arrange* for follow-up. We placed copies of this counseling algorithm in the clinic exam rooms in the intervention condition, including suggested scripts for counseling.

The second workshop intended to improve providers' cultural competency in working with patients towards hypertension management. Building on their prior work, Carrillo, Green and Betancourt[24] created a model to guide physicians' communication with patients to enhance medication adherence, which has been specifically applied to the issue of hypertension medications among multicultural populations. The model holds that physicians

must first understand patients' conceptualization of their illness (explanatory model), in order to then effectively communicate regarding their understanding of their illness. Second, it specifies the importance of physicians understanding the social and financial risks for non-adherence, including inability to pay for prescribed medications, or social barriers such as one's support system not believing in the efficacy of such medications. Third, the model emphasizes learning about patients' fears and concerns about medications and their side effects, in order to address them directly with the patient. The fourth and final element of this model focuses on determining patients' understanding of the treatment regimen. Physicians are encouraged to ask patients to 'playback' their understanding of the medication instructions, and to provide written instructions for taking the medication.[24]

The second training workshop, based on this model,[24] was specifically adapted for use in improving patients' adherence to antihypertensive medications, and was predicated on the theory that gaining insight into patients' health beliefs and social situations will allow for more effective negotiation on a shared medical treatment plan, such as adherence to antihypertensive medications. To develop clinicians' skills, role-play exercises using vignettes were used to demonstrate and practice applying this model. Clinicians were taught about eliciting the explanatory model, or the patients' perspective on their condition. Clinicians also practiced delivering open-ended questions designed to elicit patient beliefs, barriers and ideas consistent with the patient-centered counseling approach.

Because prior research has shown that providers need to be reminded to engage in patient-centered counseling,[22] pop-up reminders in the EMR were implemented to remind intervention providers to counsel hypertensive patients according to this approach. In the intervention clinics, we provided patients with hypertension-related educational materials. Providers in the control condition did not receive any workshops or patient education materials.

2.4 Statistical Analysis

The goal of the analysis was to examine the effects of the intervention on four outcomes: provider counseling, antihypertensive medication adherence, and BP (SBP and DBP) among patients with uncontrolled BP. First, we performed bivariate analyses to compare sociodemographic and clinical characteristics between intervention and control patients. We also summarized differences in baseline and follow-up scores for all four outcomes among intervention versus control patients. To assess the impact of intervention on continuous provider counseling, adherence scores, SBP and DBP, we performed random effects least squares regression, which included the main effects of time period (baseline vs. follow-up), study arm assignment (control vs. intervention), and their interaction. The intervention effect in each regression was the interaction coefficient. (Because the t-values calculated in our random effects models are not easily interpreted, we show only the parameter estimates and corresponding 95% confidence intervals.) We adjusted for relevant socio-demographic and health-related covariates (age, race, marital status, gender, employment status, income, education, comorbid conditions and obesity). Provider-specific random effects were included in the models to account for provider clustering within clinic. We included patient-specific random effects, not assumed to be nested within provider because different

providers could treat a patient during baseline and follow-up periods. Analyses were conducted using SAS version 9.3 and R version 3.0.2.

3. Results

The majority of our sample was self-reported black or African American (66.5%), female (72.4%), with an income of <\$20,000 annually (56.2%), more than high school education (79.1%; Table 1) and a mean age of 60.6, ranging from 29 to 88 (not shown). Clinically, most patients were considered obese (64.5%) and diagnosed with hyperlipidemia (55.2%); almost half had diabetes (48.8%). Some were diagnosed with other comorbid conditions (9.4% nicotine dependence, 6.4% peripheral vascular disease, 11.3% renal insufficiency, 2.0% benign prostatic hypertrophy, 13.3% coronary artery disease, 3.5% congestive heart failure and 6.9% cerebrovascular disease). Patients completing follow-up assessments did not differ from those who did not, on sociodemographic or clinical characteristics, with one exception: patients not completing follow-up assessments were significantly more likely to be male ($p<0.0001$) (not shown). Thirty-four (16.7%) patients saw a different provider at baseline and follow-up.

In bivariate analyses, we found that the patients of physicians in the intervention group were significantly more likely than controls to be employed (39.0% vs. 24.1%; $p=0.03$). No other significant differences were found between groups. In unadjusted analyses, no significant differences were detected between patients of intervention versus control clinicians at baseline, follow-up, or in change from baseline to follow-up in provider counseling, medication adherence, SBP or DBP scores (Table 2).

The random effects least squares regressions models of the four separate dependent variables showed no significant interactions between intervention group and time period (Table 3). Thus, we found no evidence of any significant differences in the change in provider counseling [Parameter estimate (PE): 0.83, 95% Confidence Interval (CI): -0.13, 1.79], patient medication adherence (PE: -0.26, CI: -0.79, 0.27), SBP (PE: -1.67, CI: -6.98, 3.64) or DBP (PE: -0.82, CI: -4.21, 2.57), from baseline to follow-up, in the control compared to the intervention group. These analyses were “intent-to-treat” in the sense that providers were considered to be in the intervention group if their clinic was randomly *assigned* to the intervention condition. In sensitivity analyses, we also performed “as-treated” analyses (for providers who *received* the training, instead of only being assigned to the training) in which providers were considered to be in the intervention group if they attended at least one training session. We also conducted analyses on all enrolled subjects (not restricted to those with uncontrolled BP) for all four outcomes. No significant intervention effects were found in any sensitivity analyses (not shown).

4. Discussion and Conclusion

4.1. Discussion

We found no evidence of any significant effects of our provider communication skills training intervention in the change in provider counseling, patient medication adherence, SBP or DBP, from baseline to follow-up, in the control group compared to the intervention

group. This absence of observed effects may be a function of various aspects of the study, and is in contrast to a recent review of provider interventions to improve communication in the clinical encounter that found largely positive results on outcomes including measures of communication and provider interpersonal behavior. However, that review included mostly “high intensity” interventions (multiple types of intervention, often including provider feedback, and given multiple times).[25] Despite these positive reported effects, some were without lasting impacts, and the effect on more distal outcomes, such as patient behavior and outcomes, was not discussed. This review also noted that given potential publication bias to publish positive results, their results may be an overestimate of the effects of brief provider interventions.[25] While our intervention did include EMR reminders to use patient-centered counseling, it did not offer feedback to providers about their communication skills or personalized suggestions for improvement. Providers were also only trained via one or two brief one-hour workshop trainings, which could be viewed as too brief according to the World Health Organization guidelines for clinician education, which recommends over 50 hours of training.[26] The impact of the intervention may have diminished over time, since our follow-up period extended until an average of 10 months. Patient contact with providers may have been insufficient, as opposed to more frequent interaction via phone or mail. This intervention did not incorporate any additional social support. These factors may have contributed to the lack of significant effects of our training intervention on provider counseling, and hence, on the other outcomes.

We can learn as much from a failed experiment as we can from one with successful results. The null findings of our intervention could be a result of: 1) problematic conceptual development of the intervention, 2) failure of implementation or 3) inappropriate measurement of the intervention's impact. In terms of the conceptual underpinnings of the intervention, the 5 A's approach to improving patient-provider communication has been criticized for solely focusing on changing *provider* behavior, although ideally it should work through providers to help patients change.[9] Successful interventions to improve medication adherence for cardiovascular diseases should ideally target both patients and providers, and address broader social and financial barriers to care, including ability to fill medication prescriptions, and have sufficient access to ongoing follow-up care.[27] One proposed framework for improving patient-provider communication in hypertension care includes understanding provider nonverbal cues and bedside manner, the environmental context in which counseling is conducted (i.e., provider interruptions, distractions) and the patient's background, health literacy and psychosocial factors.[28] The 5 A's intervention used in our study did not explicitly address these broader issues in effective communication. The “dose” of this intervention may have been too brief to impact provider behavior, although it was similar in scope to others, which have significantly affected provider behavior and patient outcomes.[21-23] In addition, other interventions to improve BP control focused on factors outside of patient-provider communication, including clinical management such as treatment intensification (when providers initiate and intensify therapy for patients with elevated BP)[16] and outside of the medical encounter entirely, such as programs pairing home BP monitoring with pharmacist medication management.[29] The pursuit of interventions to improve communication in the clinical encounter in conjunction with these other approaches may prove most successful.

The training sessions were implemented according to protocol and, in that regard, were successful, although a limitation was that not all providers randomized to the intervention participated in the training. We conducted sensitivity analyses to examine the outcomes based on provider attendance at the intervention workshops and found similar, non-significant effects. Unfortunately, we did not have any data about providers who did not participate in any part of the intervention. Also, providers may have not implemented the intervention protocol with patients. It is possible that conducting multiple training workshops with providers over a longer period of time, having a more robust office system for prompting or supporting providers to intervene, or providing detailed feedback from practice sessions with mock patients or from encounters with real patients, would increase the likelihood of provider behavior change to improve communication and thus patient outcomes.[25] We could have potentially gained a more accurate assessment of the interaction through observation or audio recording, although patients' reports are found to be valid measures of clinical interactions.[18]

Our analysis may exemplify a mismatch between the conceptual link of how effective communication affects health outcomes and the measures used to assess this impact.[9] Due to power issues, we could not analyze by providers who received only one intervention training, compared to those who received two. Our analysis also does not include measures of potential proximal outcomes that impact patient health behavior and outcomes, such as patient trust or commitment to treatment. As Street suggests, perhaps beginning at the end (i.e. the desired outcome of hypertension control) and working backwards to identify the mediating mechanisms is optimal in designing future interventions to impact outcomes.[9] Our design, which involved randomizing by clinic and assuming only modest within-clinic clustering effects, may have also reduced the power to detect intervention effects. Our a priori power assumptions may have been too optimistic, particularly for treatment effect sizes, and we might have been able to detect a small treatment effect with a larger sample size. Patients who completed the follow-up may have been psychologically different in their response to counseling than those who did not, in ways we did not measure. Although we developed our assessment of provider behavior based on the structured algorithm used to train providers to ensure consistency and based on an established approach,[18] the use of a limited number of survey items may have limited our ability to measure a complex concept such as patient-provider communication, a common challenge for this type of research. We did not capture other measures of patient-provider relationship. Patients seeing a different provider at follow-up may have impacted our findings, but these comprised a small proportion of the sample, and effects would likely be in the reported direction of no significant differences. Patient and provider race/ethnicity and/or gender, and their concordance, could have also impacted the counseling process, but we did not have sufficient information or power to examine it in this sample.[30-34]

The pathways through which provider communication affects patient behavior and health are complex and difficult to measure. It has recently been hypothesized that, although patient-provider communication can directly impact patient outcomes, more often it operates indirectly through proximal and intermediate outcomes, such as patient understanding, trust, self-management skills and commitment to treatment.[9] However, inciting change in

patient behavior and outcomes is difficult, given the plethora of influences and circumstances outside of the medical encounter that can impact BP outcomes.

4.2 Conclusion

This brief communication skills training for providers was not successful in improving their delivery of hypertension-related counseling, nor did it impact patient medication adherence or BP. These null findings may be a result of failed conceptualization of the intervention, implementation and/or measurement of mediating factors that affect hypertension.

4.3 Practice Implications

More intensive interventions focusing on strengthening providers' skills, enhancing health care systems to support the delivery of interventions and follow-up, as well as interventions to support patients in improving medication adherence within their social context outside of the clinical encounter, are likely needed to provide an impact on hypertension outcomes. The clinic visit remains a clear opportunity for providers to help patients improve BP management. The main challenge is in developing interventions to improve not only the patient-provider exchange, but also health care systems to ensure interventions are delivered, along with ongoing support to patients in order to affect patient behavior and outcomes.

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Appendix A: CONSORT Flow Chart

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Highlights

- We test a provider training to improve patient hypertension outcomes.
- Training to improve communication skills related to patient-centeredness.
- The intervention did not improve counseling, adherence or blood pressure outcomes.
- It may have been too brief and lacked sufficient practice level changes.

Table 1

Sample sociodemographic and clinical characteristics

	Total n=203 (%)	Intervention n=119 (%)	Control N=84 (%)	p-value
Race				
White	33.5	36.1	29.8	0.34
Black	66.5	63.9	70.2	
Age				
21-30	0.5	0	1.2	0.81
31-40	2.0	2.5	1.2	
41-50	16.3	15.1	17.9	
51-60	32.0	35.3	27.4	
61-70	29.6	28.6	31.0	
71-80	15.3	14.3	16.7	
81-90	4.4	4.2	4.8	
Married/living with partner	33.5	38.5	26.5	0.08
Female	72.4	71.4	73.8	0.71
Employed	32.8	39.0	24.1	0.03*
Income				
<\$20,000	56.2	53.8	59.3	0.45
\$20,000	43.9	46.2	40.7	
Education				
High school/GED	20.9	20.5	21.4	0.88
Obese	64.5	67.2	60.7	0.34
Comorbid conditions				
nicotine dependence	9.4	7.6	11.9	0.30
hyperlipidemia	55.2	58.8	50.0	0.21
diabetes	48.8	52.1	44.1	0.26
peripheral vascular disease	6.4	5.0	8.3	0.35
renal insufficiency	11.3	10.1	13.10	0.51

	Total n=203 (%)	Intervention n=119 (%)	Control N=84 (%)	p-value
benign prostatic hypertrophy	2.0	0.8	3.6	0.31
coronary artery disease	13.3	12.6	14.3	0.73
congestive heart failure	3.5	3.4	3.6	1.00
cerebrovascular disease	6.9	5.0	9.5	0.22

* significant at the $p < 0.05$ level

Table 2
Unadjusted baseline vs. follow-up mean scores for each outcome

Outcome	Baseline			Follow-up			Change from baseline to follow-up *		
	Intervention	Control	p-value	Intervention	Control	p-value	Intervention	Control	p-value
Provider counseling[^]	6.0 (3.2)	6.4 (2.9)	0.46	5.8 (3.3)	5.4 (2.9)	0.46	-0.3 (3.3)	-0.9 (3.3)	0.18
Medication adherence[‡]	10.7 (2.2)	10.2 (1.6)	0.11	10.6 (1.9)	10.5 (1.7)	0.55	0.03 (1.7)	0.3 (1.8)	0.35
Systolic Blood Pressure	144.7 (12.8)	146.3 (15.8)	0.45	131.3 (15.2)	134.4 (16.9)	0.17	-13.5 (19.5)	-11.9 (16.9)	0.56
Diastolic Blood Pressure	83.8 (10.9)	85.7 (12.8)	0.24	76.8 (10.5)	79.7 (10.2)	0.06	-6.9 (12.4)	-6.1 (11.0)	0.62

Showing mean score (standard deviation)

* small discrepancies in change scores from baseline to follow-up likely due to rounding

[^] A series of 12 dichotomous items were used to create a summary scale score with a range of 0-12, where higher scores indicate that more hypertension related issues were discussed between the provider and the patient.

[‡] Using the Hill-Bone Compliance to High Blood Pressure Therapy Scale, comprised of 9 items scored on a 4 point scale (responses ranging from "None of the time" to "All of the time"), summing the items to create a scale score (range: 9-36; higher scores indicate *lower* adherence)

Table 3

Random effects least squares regression for each outcome*

	Physician Counseling [‡]		Medication Adherence [^]		Systolic BP		Diastolic BP	
	Parameter estimate (standard error; SE)	95% Confidence Interval (CI)	Parameter estimate (SE)	95% CI	Parameter estimate (SE)	95% CI	Parameter estimate (SE)	95% CI
Interaction of intervention with time period	0.83 (0.49)	-0.13, 1.79	-0.26 (0.27)	-0.79, 0.27	-1.67 (2.71)	-6.98, 3.64	-0.82 (1.73)	-4.21, 2.57

* adjusted for age, race, marital status, gender, employment status, income, education, comorbid conditions (nicotine dependence, hyperlipidemia, diabetes, peripheral vascular disease, renal insufficiency, benign prostatic hypertrophy, coronary artery disease, congestive heart failure, cerebrovascular disease) & obesity

[‡] A series of 12 dichotomous items were used to create a summary scale score with a range of 0-12, where higher scores indicate that more hypertension related issues were discussed between the provider and the patient.

[^] Using the Hill-Bone Compliance to High Blood Pressure Therapy Scale, comprised of 9 items scored on a 4 point scale (responses ranging from "None of the time" to "All of the time"), summing the items to create a scale score (range: 9-36; higher scores indicate *lower* adherence)