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Team-Based Hypertension Management to Improve Blood Pressure Control

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Abstract

Objective: Hypertension is the most common condition seen in primary care, occurring in 1 in 3 adults in the United States. The patient-centered medical home provides an opportunity for proactive, team-based care of hypertension. The purpose of this pilot study was to measure the effectiveness of a team-based approach to blood pressure management in a busy, primary care setting. **Methods:** Using panel management within 2 primary care clinics, a cohort of patients with blood pressures >160/100 mm Hg, was identified. The patients at 1 clinic were contacted by the primary care team and offered multiple interventions aimed at improving blood pressure control; including discussion of medication compliance, medication titration, home blood pressure monitoring, nutritional counseling, and motivational interviewing. The change in blood pressure for these patients at 4 months was compared to a parallel primary care clinic within the same medical center whose patients were treated with usual primary care. **Results:** A total of 350 and 315 patients were included in the intervention and usual care cohorts, respectively. At 4 months, the decrease of systolic blood pressure in the intervention group was significantly greater than in the usual care group (15.6 vs 9.9 mm Hg; $P < .001$). Sixty-two percent of patients in the intervention group had lower systolic blood pressures post intervention, compared with 41% of usual care patients ($P < .001$). Reduction in diastolic blood pressure occurred in 54% of intervention patients, compared with 37% of usual care patients ($P < .001$). **Conclusions:** Our findings demonstrate the effectiveness of a team-based approach to blood pressure management. This can provide a framework for implementation of team-based care for hypertension in the patient-centered medical home.

Keywords

disease management, prevention, primary care, quality improvement, medications

Introduction

Hypertension is the most common condition seen in primary care, occurring in 1 in 3 adults in the United States, accounting for almost 78 million individuals.[1,2] Data from the 2011-2012 National Health and Nutrition Examination Survey (NHANES) showed that approximately 20% of hypertensive individuals were unaware of their diagnosis and only about 50% had controlled hypertension.[2] Uncontrolled hypertension is a clear risk factor for cardiovascular disease and stroke, as well as increased mortality. Compared with normotensive men and women, hypertensive men and women have a total life expectancy that is 5.1 and 4.9 years shorter at the age of 50 years.[1] Adequate treatment for hypertension requires not only compliance with pharmacologic treatment, but also a multimodal approach, including dietary changes, weight loss, exercise, smoking cessation, and reduced alcohol consumption. Poor antihypertensive medication compliance, occurs in approximately 50% of patients prescribed these medications, and has been associated with an increased risk of cardiovascular disease.[3]

The patient-centered medical home involves a team-based approach to patient care, and is becoming the standard of care in primary care. In April, 2010, the Department of Veterans Affairs implemented a patient-centered medical home (PCMH) through the creation of patient aligned care teams (PACT), consisting of a physician, registered nurse, and health technician. This approach allows for more opportunities for patient care, since multiple team members at various levels of training can respond to patient needs and also proactively address preventive health care. Since implementation, clinics within the VA with the highest degree of PACT implementation have been shown to have lower hospitalization rates for ambulatory care–sensitive conditions, lower emergency department use, have higher

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performance on the majority (85%) of clinical quality measures, and have higher patient satisfaction, when compared with clinics with low adoption of PACT.[4] The PCMH has been shown to be an effective tool for diabetes management.[5] In addition, pharmacist-guided care of patients with hypertension has been shown to improve blood pressure control over 12 months.[6] The high prevalence of hypertension makes it an ideal candidate for a comprehensive, team-based approach to care. We aimed to determine whether proactive panel management within a PACT could improve blood pressure control in this primary care population.

Methods

The West Haven Veterans Affairs Medical Center cares for approximately 16 400 veterans across the state of Connecticut, 8200 of whom are seen in the Firm A clinic. These veterans are taken care of by 16 primary care providers and their PACT. Firm B is a parallel clinic at the same medical center, and cares for approximately 7000 veterans with 13 primary care providers and their PACT, and served as the usual care (UC) group for this intervention. Approximately 50% of Firm A and B patients have a diagnosis of hypertension. Thirty-three percent (5429) of these hypertensive patients have recent blood pressures >140/90 mm Hg, and approximately 5% (839) have recent blood pressures >160/100 mm Hg. There was no difference in the prevalence of poorly controlled hypertension between the 2 groups.

In October, 2014, a database was created of all Firm A patients with most recent systolic blood pressure (SBP) >160 mm Hg or diastolic blood pressure (DBP) >100 mm Hg. Each PACT was provided a list of their patients with blood pressures >160/100 mm Hg. Over the first month, the team's health technician attempted to contact each patient by phone, and arrange for in person follow-up, initially with a repeat blood pressure assessment by the PACT health technician. After one month, all patients were sent a letter informing them of the risk of continued high blood measure (stroke and heart attack), and were advised to arrange for a follow-up blood pressure check with the PACT health technician. If the blood pressure remained >140/90 mm Hg, patients were further evaluated by their PACT nurse. The PACT nurse could arrange for follow-up with the primary care provider, pharmacist, dietician, or health psychologist, or order a home blood pressure monitor and give advice on lifestyle modifications. The blood pressure documented closest to 4 months after the index date was used to compare with the baseline readings. This follow-up blood pressure was obtained by chart review and could have been in the context of any visit to the VA medical center.

For comparison, a cohort of Firm B patients with blood pressures of >160/100 mm Hg during the same time period was followed. This cohort had routine primary care and had access to the same medical services as the intervention group. Differences in blood pressure from entry to follow-up and between intervention and UC groups were compared using Student's t test for paired sample with 2-tailed distribution. The chi-square test was also for bivariate comparisons, and the null hypothesis was rejected when the 2-sided P values were less than .05.

Results

A total of 350 and 315 patients were included in the intervention and UC cohorts, respectively. The mean age was 72.7 years in Firm A and 72.2 years in Firm B, with a range from 25 to 98 years. More than 95% of all patients in both cohorts were male. Seventy-five percent of patients in both cohorts were Caucasian and 18% were African American. At entry, the average number of antihypertensive medications per patient was 1.37, with the most commonly prescribed medication classes being angiotensin-converting enzyme inhibitor or angiotensin receptor blocker (29.2%), beta-blocker (24.4%), diuretic (24.3%), and calcium channel blocker (21.4%). There were no differences between the intervention and cohort groups in medication type or number at entry. Over the study period, the mean number of visits to primary care was 1.2 in both groups, including primary care provider, nursing, pharmacy, and telephone visits.

At 4 months, 242 (69%) patients in the intervention group returned for a postintervention blood pressure, compared with 164 (52%) UC subjects. At entry, the mean blood pressure in the intervention group (167.7/84 mm Hg) was similar to the mean blood pressure of the UC group (170/82 mm Hg). At 4 months, the mean SBP had significantly decreased from 167.7 to 152.1 mm Hg ($P < .001$) and the DBP had significantly decreased from 84 to 78.6 mm Hg ($P < .001$) in the intervention group (Table 1). There was also a significant reduction of blood pressure in the UC group from 170.3/82 to 160.4/77.4 mm Hg ($P < .001$). The decrease of SBP in the intervention group was significantly greater than in the UC group (15.6 vs 9.9 mm Hg; $P < .001$; Table 2). DBP decreased more in the intervention group, though this did not reach statistical significance (5.4 vs 4.6 mm Hg; $P = .32$). Sixty-two percent of patients in the intervention group had lower SBPs at postintervention blood pressure check, compared with 41% of UC patients ($P < .001$). Reduction in DBP occurred in 54% of intervention patients, compared with 37% of UC patients ($P < .001$). Over this time, the mean number of blood pressure medications prescribed in the intervention group significantly increased from 1.37 to 1.5 ($P = .01$). One-third of patients in both cohorts had antihypertensive medication changes during the study period. When excluding patients with medication changes, there was still a statistically significant reduction in SBP (15 vs 7.3 mm Hg; $P < .001$) and a trend toward greater reduction in DBP (5.2 vs 3.6 mm Hg; $P = .079$) in the intervention compared with the UC group.

Table 1. Blood Pressure (BP) Change From Entry to 4-Month Follow-up in the Intervention Group.

	Entry	4 Months	Absolute Change	*P*
All patients (n = 350)				
Systolic BP	167.7	152.1	15.6	<.001
Diastolic BP	84	78.6	5.4	<.001
BP medications	1.37	1.5	0.13	.01
Returned for follow-up (n = 242)				
Systolic BP	167.2	144.8	22.4	<.001
Diastolic BP	84.3	76.6	7.7	<.001
BP medications	1.52	1.72	0.2	.004

Table 2. Comparison of Intervention and Control Groups.

	Intervention	Control	*P*
Change in systolic BP, mm Hg	–15.6	–9.9	<.001
Change in diastolic BP, mm Hg	–5.4	–4.6	.32
Percent with lower systolic BP at follow-up	61.1	41.0	<.001
Percent with lower diastolic BP at follow-up	53.7	37.5	<.001
Percent who did not return for follow-up	32.0	48.0	<0.001

Abbreviation: BP, blood pressure.

Analysis of the 242 patients in the intervention group who had a subsequent blood pressure in the 4-month period after entry revealed an even greater blood pressure reduction, with a reduction in SBP from 167.2 to 144.8 mm Hg ($P < .001$) and DBP from 84.3 to 76.6 mm Hg ($P < .001$). The mean number of blood pressure medications prescribed in this subgroup also increased from 1.52 to 1.72 ($P = .004$).

Discussion

Using a team-based, proactive approach to hypertension management, we were able to demonstrate a significantly greater reduction in blood pressure in the intervention group compared with the UC group. This reduction was apparent even when excluding patients with antihypertensive medication changes, suggesting that our intervention might have had an impact on medication compliance or other psychosocial behaviors that could impact blood pressure control. This clinical framework has the opportunity to impact more patients than direct face-to-face clinic visits with a provider, as has been the standard of care for many years.

The strength of this study is the real world implementation within a busy, primary care clinic. We were able to demonstrate significant blood pressure reductions with only a modest increase in antihypertensive medication prescriptions. We also demonstrated continued blood pressure reduction in the subgroup of patients without medication titration, suggesting either lifestyle changes or increased medication compliance. By using multiple team members, our pilot demonstrates an effective use of the full PACT.

Weaknesses of the present study are that we did not quantify lifestyle changes or medication compliance. We did not measure changes in tobacco use, body mass index, medication possession ratio, or alcohol use. While each of these might have impacted the final results, we believe that blood pressure reduction was the primary goal in this real-world implementation study, regardless of how the patients achieved this result.

Our pilot provides strong evidence for the effectiveness of proactive panel management of hypertension. We were able to achieve a greater reduction in SBP and lower blood pressure in more patients compared with usual care. Even when excluding patients with antihypertensive medication changes, we were still able to demonstrate greater blood pressure control with a team-based approach to treatment. Using multiple members of a PACT to manage chronic diseases not only has the chance to improve patient outcomes, but also empowers other members of the PACT to provide better care.

Declaration of Conflicting Interests

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