Implementing a Population Health Management Intervention to Control Cardiovascular Disease Risk Factors

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INTRODUCTION

Patient- (e.g., health literacy), provider- (e.g., clinical inertia), and system-level (e.g., under-empowered care teams) barriers have contributed to suboptimal cardiovascular disease (CVD) risk management among US Veterans.¹ Among Veterans using the Veterans Health Administration (VHA), more than 80% have at least two CVD risk factors,² with approximately 34% and 49% having a diagnosis of hypertension and dyslipidemia, respectively.³ Innovative care delivery models that use patient-generated health data, integrate non-physician providers into the primary care team, and facilitate patient-provider interaction have the potential to control CVD risk factors at the individual- and population-level.^{4, 5} Therefore, the objective of the Team-supported, Electronic health record (EHR)-leveraged, Active Management (TEAM) pilot study was to assess the feasibility of a multi-component CVD risk management intervention among Veterans in rural North Carolina.

METHODS

TEAM consisted of the following steps: (1) population health manager (PHM) reviewed clinical data and used established algorithms to identify adults (aged 18–79) with uncontrolled blood pressure (systolic blood pressure > 140 mmHg) and/or meeting criteria for, but not prescribed, statin therapy; (2) patients identified by the PHM received a letter which communicated patient-specific CVD risk and associated health implications, self-management strategies, and topics to discuss with their primary care team; (3) PHM entered care plan (detailed CVD risk profile, clinical guidelines, and treatment recommendations) in the EHR to

facilitate treatment discussions between patients and their primary care team at the point of care; (4) primary care team member(s) ordered treatment (pharmaceutical or behavioral) as appropriate; and (5) PHM monitored and reported patients' progress.

We reviewed EHRs at 45 and 90 days after the intervention to document changes in blood pressure and to identify Veterans' engagement with the healthcare system (e.g., scheduled/attended appointments).

RESULTS

Over 4 months, 100 Veterans received personalized CVD risk letters, of which 46 received a letter prior to their primary care appointment and 54 received a letter without having a scheduled appointment (Table 1). In the 90 days following the intervention, 83% (38/46) of patients attended scheduled appointments and 61% (33/54) of Veterans who did not have an appointment at the time of the letter scheduled one. Notably, 62% (62/100) of Veterans contacted a healthcare provider to check their blood pressure, modify their medications, or obtain a referral for another health service (e.g., smoking cessation program).

Responding to healthcare provider and patient recommendations, the letter was modified to better inform patients of their immediate CVD risk (blood pressure was used instead of Atherosclerotic Cardiovascular Disease Risk Score). In the 45 days following receipt of the revised intervention, 40% (20/50) of Veterans had blood pressure measurements < 140/90 mmHg (Table 2). Compared with baseline, 45-day systolic blood pressure and diastolic blood pressure decreased an average 11 mmHg and 5 mmHg, respectively.

DISCUSSION

TEAM was a relatively low-touch intervention that used tailored messaging to communicate CVD risk and empowered an existing non-physician provider as a PHM. These factors

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Table 1 Characteristics of Veterans Who Received a Cardiovascular Disease Risk Letter

Characteristic*	Received original letter (n = 100)	Received revised letter (n = 50) [†]
Demographics		
Age (mean, SD)	61.92 (8.47)	64.34 (10.26)
Sex (N, %)		
Male	88 (88)	44 (88)
Female	12 (12)	6 (12)
Race/ethnicity (N, %)		
White	27 (27)	16 (32)
Black	71 (71)	33 (66)
Pacific Islander	0 (0)	1 (2)
Native Hawaiian	1 (1)	0 (0)
Declined to answer	1 (1)	0 (0)
Clinical characteristics		
Baseline SBP (mean, SD)	156.22 (14.11)	153.96 (11.38)
Baseline DBP (mean, SD)	87.72 (11.11)	83.60 (9.38)
45-day SBP (mean, SD)	N/A	142.74 (18.56)
45-day DBP (mean, SD)	N/A	78.50 (9.12)
ASCVD Risk Score (mean, SD)	37.23 (21.07)	N/A
BMI (mean, SD)	31.19 (7.94)	N/A
Tobacco use (N, %)	36 (36)	16 (32)
Diabetes (N, %)	36 (36)	35 (70)
Intervention and health system engagement		
Letter sent prior to scheduled appointment	46 (46)	0 (0)
Letter sent without scheduled appointment	54 (54)	50 (100)
Interacted with PHM	68 (68)	31 (62)
Appointment attended [‡]	38 (83)	0 (0)
Appointment scheduled [§]	33 (61)	46 (92)

ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; DBP, diastolic blood pressure; PHM, population health manager; SBP, systolic blood pressure; SD, standard deviation

*Patient characteristics and health system engagement were collected from electronic health records

[†]Based on healthcare provider and patient recommendations, the letter was modified to better inform patients of their cardiovascular disease (CVD) risk. Since blood pressure was used instead of ASCVD risk, BMI and ASCVD risk scores were not collected for this cohort

[‡]The percentage of Veterans who attended scheduled primary care appointment was based on the number of those (n = 46) who received a CVD risk letter prior to their scheduled primary care appointment

[§]The percentage of Veterans who scheduled a primary care appointment was based on the number of those (n = 54) who received a CVD risk letter without having a primary care appointment scheduled

prompted patient engagement with the healthcare system and improvements in both systolic and diastolic blood pressure. As the primary care infrastructure is increasingly stretched thin, this two-pronged approach may be a sustainable solution to address uncontrolled CVD risk factors for it promotes patients' awareness and management of their CVD risk and enables a single member of the primary care team to oversee a large patient panel.

Limitations included a predominantly male patient population; thus, we were unable to account for potential gender differences in CVD risk management and health-seeking behaviors. Additionally, we used a pre/post study design without a control group and could not discern which intervention component(s) drove observed clinical and behavioral changes. Lastly, our study focused on rural Veterans receiving care at an

integrated healthcare system, which limits generalizability to other healthcare settings.

Despite these limitations, our study has important clinical implications. First, personalized CVD risk letters have the potential to educate a large population of at-risk patients and thus increase patient self-management and participation in healthcare decision-making. Second, interactions with a PHM may ensure patients are prepared to discuss treatment options with their provider, therefore resulting in timely treatment initiation or intensification. Finally, engaging existing non-physician providers as PHMs may reduce the burden of primary care physicians and thus allow them to focus on more complex cases.

Table 2 Baseline and 45-Day Blood Pressure Measurements

Blood pressure category*	Baseline blood pressure	Follow-up blood pressure
BP < 140/90	0	20
140/90 < BP < 150/90	14	8
150/90 < BP < 160/90	27	5
BP > 160/90	9	9

BP, blood pressure

*Blood pressure values were collected from electronic health records and are reported for the 50 Veterans who received the revised cardiovascular disease (CVD) risk letter

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Compliance with Ethical Standards:

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REFERENCES

1. **Borzecki AM, Oliveria SA, Berlowitz DR.** Barriers to hypertension control. *Am Heart J.* 2005;149(5):785–94.
2. **Richlie DG, Winters S, Prochazka AV.** Dyslipidemia in Veterans: multiple risk factors may break the bank. *Arch Intern Med.* 1991;151(7):1433–36.
3. **Fryar CD, Herrick K, Afful J, Ogden CL.** Cardiovascular disease risk factors among male Veterans, U.S., 2009–2012. *Am J Prev Med.* 2016;50(1):101–05.
4. **Milman T, Joundi RA, Alotaibi NM, Saposnik G.** Clinical inertia in the pharmacological management of hypertension: a systematic review and meta-analysis. *Medicine (Baltimore).* 2018;97(25):e11121.
5. **Russell-Jones D, Pouwer F, Khunti K.** Identification of barriers to insulin therapy and approaches to overcoming them. *Diabetes Obes Metab.* 2018;20(3):488–496.

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