The Accuracy of Clinician Perceptions of "Usual" Blood Pressure Control

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BACKGROUND: The term "clinical inertia" is used to describe the failure to manage a chronic condition aggressively enough to bring it under control. The underlying mechanisms for clinical inertia remain poorly understood.

OBJECTIVE: To describe one potential mechanism for clinical inertia, seen through the lens of clinician responses to a computerized hypertension reminder.

DESIGN: Cohort study.

PARTICIPANTS: A total of 509 hypertensive patients from 2 primary care clinics in urban Veterans Health Administration (VA) Medical Centers. All patients had elevated blood pressure (BP) values that triggered a computerized reminder. Given a set of possible responses to the reminder, clinicians asserted at least once for each patient that medication adjustments were unnecessary because the BP was "usually well controlled".

MEASUREMENTS: Using recent BP values from the electronic medical record, we assessed the accuracy of this assertion.

RESULTS: In most instances (57%), recent BP values were not well controlled, with the systolic BP (56%) much more likely to be elevated than the diastolic BP (13%). Eighteen percent of recent systolic BP values were 160 mmHg or greater.

CONCLUSIONS: When clinicians asserted that the BP was "usually well controlled", objective evidence frequently suggested otherwise. This observation provides insight into one potential mechanism underlying clinical inertia.

KEY WORDS: hypertension; ambulatory care; informatics; quality of care; chronic disease.
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BACKGROUND

The term "clinical inertia" is used to describe the failure to manage a chronic condition aggressively enough to bring it under control.[1] Numerous studies have shown that more aggressive management improves control of hypertension,[2,3] diabetes,[4,5] and hyperlipidemia.[6] While attempts to reduce clinical inertia have had some success,[7,8] a fuller understanding of the context in which it occurs might help in designing better interventions.

The Veterans Health Administration (VA) has several computerized reminders, which are aimed to assist providers in adhering to guideline-recommended care for common medical conditions.[9–11] One reminder focusing on improving care for hypertension not only prompts clinicians to address uncontrolled hypertension, but also collects data regarding the clinical decision-making process.[12] We used data from two VA primary care clinics to evaluate the concordance of electronically recorded blood pressure (BP) values with claims that the BP is "usually well controlled". In so doing, we used the computerized hypertension reminder as a window into the cognitive processes underlying clinical inertia.

METHODS

Patient Sample

Our sample was drawn from a larger study of VA patients with hypertension, conducted between 1/1/02 and 4/21/04.[13] All patients had diagnoses of hypertension, defined by International Classification of Diseases (ICD-9) codes, on at least 2 occasions in 2001 at the primary care clinics of 2 urban tertiary care VA Medical Centers. There were 3 clinics in the original study[13]; the current analysis includes the two sites that employed the computerized hypertension reminder. These 2 clinics employed many clinicians: 41 clinicians wrote at least 200 prescriptions for antihypertensives at 1 site, and 39 clinicians at the other site. The study was approved by all applicable Institutional Review Boards.

The VA Hypertension Reminder

The VA hypertension reminder was designed to help clinicians provide guideline-concordant care.[12,14] When the most recently recorded BP is 140/90 mmHg or above, including BP values

Table 1. Responses to the Computerized Hypertension Reminder

Response	Number	Percent
Medications adjusted or initiated	942	46
Refuses medication adjustment	50	2
Patient being evaluated/referred for resistant or secondary HTN	37	2
Medication change not warranted due to: Patient usually has well-controlled BP on current therapy	555	27
Medication change not warranted due to: Patient has been non-adherent to current Rx regimen	226	11
Medication change not warranted due to: Patient's current therapy is appropriate based on concomitant risk factors and/or other comorbidities	74	4
Medication change not warranted due to: Patient has had unacceptable side effects from previous attempts at more intensive therapy	12	1
Medication change not warranted due to: Patient has limited life expectancy	6	0.3
Medication change not warranted due to: Other	172	8

Distribution of responses to the computerized hypertension reminder in 2071 separate care episodes for 1,580 patients with elevated blood pressure. The wording is copied verbatim from the text of the reminder; response options related to lifestyle interventions are excluded. Because it was possible to give multiple simultaneous responses, percentages do not add up to 100%.

recorded just before opening the electronic medical record (EMR), the reminder prompts clinicians to adjust the medication, to intervene in some other manner, or to supply a reason for not intervening (Table 1). Recording a repeat BP below 140/90 turns off the reminder until a subsequent BP becomes elevated, but this is not recorded as a reminder response.

Although it is possible to respond to the reminder by recommending lifestyle changes to the patient, we examined only responses relating to increasing medical therapy or justifying a decision not to do so. Specifically, we focused on 1 response: "Medication change not warranted due to: Patient usually has well controlled BP on current therapy." Because some patients had multiple reminder responses during the study, we analyzed the first time a clinician claimed that a patient's BP was "usually well controlled".

Analyses

When clinicians asserted that the BP was "usually well controlled", we examined the most recent BP value before the day of the reminder resolution, using data from the vital signs module of the EMR. To the extent available, we similarly examined the most recent 3 BP values and the final BP value recorded during the study. When there were multiple BP measurements on the same day, we used the value with the lowest systolic blood pressure. We reasoned that most clinicians are prepared to accept the lowest BP measurement on a given day. All analyses were conducted using SAS 9.1 (SAS Corporation, Cary NC).

RESULTS

Table 1 shows the frequency of each possible response to the computerized hypertension reminder. The most common response to the reminder was to adjust the medications (46%); the next most common was to assert that no medication adjustment was needed because the BP was "usually well controlled" (27%). This assertion that the BP was "usually well controlled" was made at least once for 509 patients (32% of 1,580); these 509 patients constituted our study sample. Of these 509 patients, the vast majority (477 [94%]) had at least 1 BP value of 140/90 mmHg or higher recorded in the EMR on the day of the reminder resolution.

The mean age of these 509 patients was 67 years (standard deviation 10.7) with 97% male. Black patients comprised 47% of the sample and White patients the remainder. The sample had a high burden of comorbid illness: 52% had hyperlipidemia, 45% coronary artery disease, 40% diabetes, 20% cerebrovascular disease, 15% renal disease, and 14% congestive heart failure. Only 15% of patients had none of these comorbid conditions, and 28% had 3 or more of them.

Table 2 shows the most recent systolic and diastolic blood pressure (SBP and DBP) values before the day of the reminder resolution. Using a criterion of 140/90 mmHg or greater to represent uncontrolled BP,[14,15] such BPs were uncontrolled in 285 patients (57%). It was much more common for the SBP to be uncontrolled than the DBP.

This phenomenon was not limited to the single BP value before the day of the reminder resolution. For example, among the 468 patients (92% of 509) who had at least 3 BP values before the day of the reminder resolution, 2 of the previous 3 BP values were uncontrolled in 34%, and all 3 were uncontrolled in 26%. BP values after the date of the reminder were similarly likely to be uncontrolled. Three hundred and forty-nine (69% of 509) patients had at least 1 "final" BP value on a later date than the reminder resolution (a median of 184 days later); of those, 56% had an SBP of 140 mmHg or greater, with 13% at 160 mmHg or greater.

Table 2. Blood Pressure Measurement Preceding the Computerized Reminder (*n*=509)

Blood Pressure Measurement	Number of Patients (%)
Systolic Blood Pressure (mm/Hg)	
<140	225 (44)
140–149	120 (24)
150–159	72 (14)
160–179	75 (15)
180+	16 (3)
Diastolic Blood Pressure (mm/Hg)	
<90	444 (87)
90–99	49 (10)
100–109	10 (2)
110+	5 (1)

An elevated blood pressure value activated a computerized hypertension reminder for 509 patients. In response, their clinicians stated that medication adjustments were unnecessary because the blood pressure was "usually well controlled". This table shows, for these 509 patients, the blood pressure value prior to the day of the reminder resolution. One patient had no previous blood pressure values.

DISCUSSION

In response to a computerized BP reminder, clinicians in our study frequently asserted that medication adjustments were not necessary because the BP was "usually well controlled". This claim was often in conflict with recorded vital signs from the EMR, especially with regard to the SBP. Many patients also had uncontrolled BP at the end of the study, suggesting that their BP control did not improve over time. Several possible reasons for the discrepancy between physician responses to a computerized reminder and recorded vital signs are discussed below.

1) *Clinicians may not accurately recall recent BP values.*
   Part of the theory of clinical inertia is that clinicians have unrealistic assessments of recent control.[1] This may take the form of selective recall of controlled BP values as opposed to uncontrolled ones. Berlowitz et al.[2] have documented that patients may have many visits with uncontrolled BP, but relatively few where the therapy is increased. It is possible that the reminder could be redesigned to combat this tendency to misinterpret recent BP trends, to the extent that it exists, by explicitly reminding clinicians of recent BP values.
2) *Clinicians may not be aware of or agree with consensus guidelines regarding BP targets.*
   Two important reasons why clinicians may not accept or observe clinical practice guidelines are unfamiliarity or disagreement with the guideline.[16] Hyman and Pavlik have shown that clinician thresholds for the treatment of hypertension are higher than the consensus guideline of 140/90 mmHg, that many clinicians are not familiar with such guidelines, and that familiarity with the guidelines predicts more aggressive treatment.[17] Oliveria et al.[18] have also demonstrated that clinicians are frequently willing to accept BP (especially SBP) in excess of guideline-recommended target values. In our study, if VA guidelines had categorized an SBP of 149 mmHg as "well controlled", this would have reduced the proportion of patients whose most recent BP was "uncontrolled" by almost half.
3) *Clinicians may have access to data not available from the vital signs module of the EMR.*
   For example, clinicians might have access to the results of home BP monitoring, or might have recorded repeat vital signs in their free-text clinical notes as opposed to the vital signs module of the EMR, from which our BP values were drawn.

Several limitations of our study should be noted. First, we used a population of patients from two urban VA primary care clinics. Our patients were predominantly male and had a high burden of comorbidity, which may affect the generalizability of our results. Second, as noted above, clinicians may have documented additional BP values in their clinic notes, but not in the vital signs package of the EMR. However, Borzecki et al.[19] have shown that the addition of chart reviews to automated data does not affect conclusions in VA studies of hypertension. Finally, clinician response to the reminder was not mandatory; our sample represents only the subset of patients whose clinicians chose to resolve the reminder.

In summary, providers' perceptions that patient BPs are "usually well controlled" are frequently in conflict with objective data from the EMR, especially regarding systolic BP. Future studies should examine whether patient or provider characteristics predict clinician perceptions of BP control independently of recent BP values. It is likely that inaccurate recall of recent BP values and unawareness of or disagreement with clinical practice guidelines are contributing factors. For some clinicians, interventions that target these phenomena may be useful in improving patients' BP control.

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