Overcoming Clinical Inertia: A Visit-Specific Scale for Measuring Quality in Hypertension Care

Wendy Henderson, MD, Hayden B. Bosworth, PhD, Corrine I. Voils, PhD, Tara K. Dudley, MStat, Felicia A. McCant, MSSW, Pamela W. Gentry, BSN, RN, and Eugene Z. Oddone, MD, MHSc

Abstract

- **Objective**: To develop a valid, reproducible scale that quantifies a provider's reaction to uncontrolled blood pressure.
- **Design**: Retrospective chart review.
- **Setting and participants**: 70 patients with hypertension who were treated with antihypertensive medication at the Durham Veterans Affairs Medical Center primary care clinic.
- **Methods**: Three raters blinded to each other's assessments rated each patient visit using the hypertension quality of care scale. This scale includes 4 categories reflecting the extent of provider recognition of elevated blood pressure and action to lower it (0: blood pressure not recorded at visit; 1: blood pressure not controlled, not mentioned in the medical record, and nothing further done; 2: blood pressure not controlled, mentioned in the medical record, but nothing further done; 3: blood pressure not controlled and the provider acted in some manner to lower it).
- **Results**: Providers failed to recognize or act on inadequately controlled blood pressure at 48% of visits. The average frequency of scores for all raters was 2.9% (no blood pressure recorded), 30.5% (blood pressure recorded but not mentioned), 14.3% (blood pressure recorded, provider recognized elevation, but no action), and 25.3% (provider acted to lower blood pressure); blood pressure was adequately controlled in 27.1% of patients. Inter-rater agreement was excellent (Kendall's W = 0.92).

Scale scores were moderately related to the extent of systolic blood pressure elevation (r = 0.29, averaged across raters).
- **Conclusion**: The scale demonstrated excellent inter-rater agreement and moderate correlation with elevation in systolic blood pressure. The scale could be used to measure the effectiveness of interventions designed to prompt providers to respond to inadequately controlled hypertension.

Hypertension is a prevalent disease that increases the incidence of death from coronary heart disease and stroke. It also increases the risk of developing congestive heart failure, peripheral vascular disease, and impaired renal function [1,2]. Effective treatment of hypertension reduces the incidence of cardiac death and fatal stroke, yet only one third of all hypertensive patients have their blood pressure under adequate control (< 140/90 mm Hg) [3-5]. Phillips and colleagues used the term “clinical inertia” to describe the failure of health care providers to initiate or intensify therapy when needed [6]. Hypertension management may be susceptible to clinical inertia because hypertensive patients are asymptomatic, antihypertensive medication changes require additional monitoring, and medications can cause side effects. Additionally, physicians’ self-reported blood pressure thresholds for intensifying hypertension treatment are often higher than the threshold recommended in current treatment guidelines [7].

A limited number of studies have examined whether increased action by the physician during the patient encounter leads to improved blood pressure control [8-11]. Asch and colleagues focused on 13 hypertension quality of care indicators (1 screening, 5 diagnostic, 5 treatment, and 2 follow-up) and found that on average adherence to all indicators was lower in patients with uncontrolled blood pressure (> 140/90 mm Hg) than in those with controlled blood pressure [8]. Their method used chart abstractions over a 2-year period [8]. Nobrega et al found no statistically significant improvement in patients’ hypertension control when physicians showed greater adherence to a process list of 89 items in the categories of medical history, physical examination, initial laboratory tests, special diagnostic procedures, treatment, and follow-up [9]. Haynes et al identified 3 care processes in a population of hypertensive steel workers: the initiation of antihypertensive medication, the “vigor” of medication, and patient compliance [10]. He found that all...
3 processes positively related to a decrease in diastolic blood pressure [10]. Finally, Berlowitz et al calculated an intensity score using the number of antihypertensive medication dosage increases per patient over a 2-year period and found that a higher intensity score correlated with better blood pressure control [11].

The purpose of this study was to develop a valid and reliable quality of care assessment method to quantify providers’ response to uncontrolled hypertension that could be easily applied to individual primary care visits. Such a measure would be useful in determining the effect of interventions designed to motivate providers to achieve better hypertension control and in assessing quality of care.

Methods
Patients and Setting
This was a secondary analysis of patients enrolled in a study designed to determine antecedents for poor hypertension control in the primary care setting. This study took place in the primary care clinic at the Durham Veterans Affairs Medical Center (VAMC), which includes the women’s health clinic and the general medicine clinic. The clinics are staffed by 28 internal medicine attending physicians, 20 resident physicians, and 10 mid-level providers.

Patients were included in the study if they were enrolled in a Durham VAMC primary care clinic; had a visit to their primary care provider within the past year; had an outpatient diagnosis of hypertension, as defined by outpatient diagnostic code; and had received a prescription for hypertension medication from the Veterans Affairs pharmacy in the previous year. Patients were excluded if they had a score of less than 7 out of 10 on the Short Portable Mental Health Status Questionnaire; an active diagnosis of psychosis; a hospitalization for stroke, myocardial infarction, or coronary artery revascularization within the past 6 months (because we wanted to enroll patients for whom blood pressure management was the primary issue and not a secondary major comorbidity); a diagnosis of metastatic cancer in the past 6 months; no telephone access; nursing home residence; severely impaired speech or hearing; enrolled in another hypertension trial; enrolled in home health care; or refused to provide informed consent. The study was approved by the Durham VAMC institutional review board.

Study Sample
Using the Veterans Health Information Systems and Technology Architecture (VistA), we identified 8382 patients with hypertension who visited the Durham VAMC in 2000. Of these, 6278 met the additional inclusion criteria, and 272 were randomly identified. None of the 272 patients met any exclusion criteria. Patients were approached and enrolled when they came to the Durham VAMC for a regularly scheduled primary care appointment. Enrollment was stopped at 70 patients (95% of patients approached) due to time and budget limitations.

Visit-Specific Quality of Care Scale
The goal was to develop a valid and reliable scale for physician-directed actions with regard to hypertension management at the office visit. The scale was divided into 4 categories: 0: blood pressure not recorded at visit; 1: blood pressure not controlled, not mentioned in the medical record, and nothing further done; 2: blood pressure not controlled, mentioned in the medical record, but nothing further done; 3: blood pressure not controlled and the provider acted in some manner directed at lowering blood pressure. To receive a score of 3, the medical record evidence had to include at least 1 of the following: increasing or adding an antihypertensive agent, suggesting a lifestyle modification (eg, lose weight, limit alcohol, exercise, reduce sodium, stop smoking, reduce fat or cholesterol intake), or arranging additional follow-up (cardiologist, nephrologist, hypertension clinic, nurse clinic, or pharmacy clinic). The scale was not applied for patients whose blood pressure was controlled during the index visit because we assumed that no further action was required for these patients. Blood pressure was defined as controlled or not controlled based on goal values from the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) [12]. For patients with diabetes, adequate control was less than 130/85 mm Hg, and for nondiabetics, adequate control was less than 140/90 mm Hg. JNC VI criteria were used because patients were enrolled prior to publication of JNC VII.

Data Collection
Data were extracted from the VAMC computerized medical record. For each study participant, the primary care provider’s note from the first visit following study enrollment was reviewed. The physicians caring for patients in this study were not aware of the patients’ enrollment, nor were they aware of the objectives of this study. An attending physician, an internal medicine resident, and a nurse extracted each patient record. Each reviewer performed his or her review blinded to the assessment of the others. The data were entered directly into Microsoft Access.

Analysis
The frequency of each quality score across raters was calculated. Kendall’s coefficient of concordance was calculated to assess reliability across the 3 raters [13]. Categories were created to represent extent of elevated systolic blood pressure (1 to 10 points above normal; 11 to 20 points; 21 to 30 points; and more than 30 points). For each rater, a
Spearman correlation coefficient was calculated for the relationship between extent of elevated blood pressure and the score on the quality of care scale to determine whether greater blood pressure elevation would lead to higher rates of recognition and action, as manifested by higher scores.

**Results**

Participants were predominantly male (91%) and white (64%) (Table 1). The mean age of the patients was 65 years (range, 40–100 years), and 41% of the sample were diabetic. The mean number of antihypertensive medications used was 2. The mean systolic blood pressure at the index visit was 146 mm Hg, and the mean diastolic blood pressure was 75 mm Hg.

Table 2 shows the frequency of quality scores determined by each rater. When patients’ blood pressure was elevated, providers failed to recognize or act on the value for approximately 50% of all visits. The 3 raters agreed on 65.7% (n = 46) of the providers’ actions. There was a 1-point discrepancy for 24.3% (n = 17) of the ratings and a 2-point discrepancy for 10% (n = 7) of the ratings. Kendall’s coefficient of concordance for the agreement among the 3 raters was 0.92. The average frequency of each score across the raters was 2.9% (0), 30.5% (1), 14.3% (2), and 25.3% (3). Blood pressure was controlled for 27.1% of patients.

As the systolic blood pressure at the index visit increased above goal, there was a trend toward a higher quality of care score. The Spearman correlation coefficient for the relationship between the quality score and the extent of systolic blood pressure elevation was 0.29 (averaged across raters).

**Discussion**

We developed a method to quantitatively assess visit-specific quality of hypertension care that incorporates the degree of action providers record for their patients with uncontrolled hypertension. The quality scale demonstrated excellent inter-rater agreement and moderate correlation with systolic blood pressure elevations. Only 4 items were required to determine a quality score, which is less than the number of items required by the previously published methods by Asch et al and Nobrega et al [8,9]. Our scale can be applied to any primary care visit and does not require chart extraction over multiple visits as do the scales by Asch et al and Berlowitz et al [8,11]. Finally, our scale addresses the issue of clinical inertia, which is addressed in the Haynes et al scale by only one criterion (ie, decision of whether to start a medication) [10].

The finding that visits most frequently received a score of 1 (blood pressure not controlled, not mentioned in the record, nothing further done) is in agreement with data that shows that hypertension is inadequately treated [5]. Likewise, the correlation between the quality score and the extent of systolic blood pressure elevation supports data indicating that physicians often have a higher threshold for initiating change in treatment than is suggested by guidelines [7]. These findings support the belief that clinical inertia is one reason for poor blood pressure control. The degree to which this attribute is specific to an individual physician or a function of a particular physician-patient dyad will need to be explored with larger samples of patients.

This study has several limitations. Because we used a retrospective chart review to assess quality, we may have failed to capture physician discussions not recorded in the record. Specifically, recommendations for lifestyle change, one of the scored actions, may be discussed but not noted in the chart. Therefore, the scale would underestimate the amount of provider action. Second, there was a discrepancy in the score for 24 patients. One major reason for the discrepancy likely comes from the raters’ interpretation of whether lifestyle changes were suggested. For example, in some charts a short statement such as “lose weight” was made but was not linked to a mention of the patient’s hypertension. We do not

**Table 1. Patient Characteristics at Index Visit**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Patients, n (%) (n = 70)</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>63 (91)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>45 (64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>23 (33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetic</td>
<td>28 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, yr</td>
<td>65.3 (12.9)</td>
<td>40–100</td>
<td></td>
</tr>
<tr>
<td>No. of BP medications*</td>
<td>1.97 (1.1)</td>
<td>0–5</td>
<td></td>
</tr>
<tr>
<td>Systolic BP, mm Hg*</td>
<td>146 (21)</td>
<td>98–221</td>
<td></td>
</tr>
<tr>
<td>Diastolic BP, mm Hg*</td>
<td>75 (11)</td>
<td>44–96</td>
<td></td>
</tr>
</tbody>
</table>

BP = blood pressure; SD = standard deviation.

* n = 68.

**Table 2. Frequency of Visit-Specific Hypertension Quality of Care Chart Scores for Each Rater**

<table>
<thead>
<tr>
<th>Chart Score</th>
<th>Frequency, n (%)</th>
<th>Rater A</th>
<th>Rater B</th>
<th>Rater C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: no BP recorded</td>
<td>2 (2.9)</td>
<td>2 (2.9)</td>
<td>2 (2.9)</td>
<td></td>
</tr>
<tr>
<td>1: no recognition</td>
<td>16 (22.9)</td>
<td>22 (31.4)</td>
<td>26 (37.1)</td>
<td></td>
</tr>
<tr>
<td>2: no action</td>
<td>16 (22.9)</td>
<td>7 (10.0)</td>
<td>7 (10.0)</td>
<td></td>
</tr>
<tr>
<td>3: action</td>
<td>17 (24.3)</td>
<td>20 (28.6)</td>
<td>16 (22.9)</td>
<td></td>
</tr>
<tr>
<td>BP in control</td>
<td>19 (27.1)</td>
<td>19 (27.1)</td>
<td>19 (27.1)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Percentages may not total 100 due to rounding.

BP = blood pressure.
have a sufficient number of patients for each provider to make a stable estimate of provider-specific quality rating discrepancy. A more thorough definition of what constitutes a lifestyle change recommendation would be useful for future research. The scoring method, however, was easy to implement and was consistent with guidelines that recommend using both medications and lifestyle changes to treat hypertension. Third, the study was conducted at one VAMC, which may limit its generalizability, especially to female patients. The study, however, did have a representative racial sample. Fourth, because of the modest sample size, the study may have been underpowered to detect a significant correlation between scale score and extent of blood pressure control.

Phillips and colleagues have written that clinical inertia can be reduced by quality improvement efforts focused on provider behavior, the use of flow sheets and computerized or paper reminders, and regular feedback on performance [6]. The quality of care scale in this study could be used as a visit-specific quality measure that is incorporated into an intervention designed to motivate providers or used to measure the effectiveness of the intervention. Because the score is only an intermediate variable, future studies should examine scale score and subsequent blood pressure values since improved hypertension control is the ultimate goal.

Corresponding author: Wendy Henderson, MD, VAMC (11C), 508 Fulton St., Durham, NC 27705.

Funding/support: This research was supported by a Department of Veterans Affairs, Health Services Research & Development grant (#IIR-20-034). The views expressed in this manuscript are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs.

Financial disclosures: None.

Author contributions: conception and design, WH, HBB, EZO; analysis and interpretation of data, HBB, CIV, TKD, EZO; drafting of the article, WH, HBB, CIV, EZO; critical revision of the article, HBB, CIV, EZO; provision of study materials or patients, HBB; statistical expertise, CIV, TKD; obtaining of funding, HBB, EZO; administrative, technical, or logistic support, HBB, FAM, EZO; collection and assembly of data, WH, PWG, EZO.

References