

# The Quandary of Improving Hypertension Control in Diabetes

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## STUDY

Kerr EA, Zikmund-Fisher BJ, Klamerus ML, Subramanian U, Hogan MM, Hofer TP: The role of clinical uncertainty in treatment decisions for diabetic patients with uncontrolled blood pressure. *Ann Intern Med* 148:717–727, 2008

## SUMMARY

**Design.** A prospective cohort study examining what proportion of diabetic patients with a triage blood pressure > 140 mmHg systolic or 90 mmHg diastolic received a treatment change during a single routine visit and to what extent certain provider and patient factors influenced the likelihood of change.

**Subjects.** The study included 1,169 diabetic patients with elevated blood pressure treated by 92 primary care providers at nine Veterans Affairs facilities in three Midwestern states over 13 months. Patients were older (mean age 66 years) and were primarily male (97%) and white (80%). The mean systolic blood pressure was 154 mmHg (standard deviation: 113–228).

**Methods.** The main outcome was the proportion of patients who had either intensification of blood pressure medication or a planned follow-up visit within 4 weeks. Data were obtained from patient surveys, provider surveys, medical records, and VA automated sources. Factors hypothesized to influence the likelihood of change were analyzed in a logistic regression model that assessed

four categories of variables: clinical uncertainty; competing demands and prioritization of comorbid conditions; medication issues; and practice organizational characteristics.

**Results.** A total of 573 (49%) patients with a triage blood pressure > 140 mmHg systolic or 90 mmHg diastolic had a treatment change: 511 had medications changes, and 62 had a plan for follow-up blood pressure measurement within 4 weeks. The likelihood of treatment change increased markedly as systolic and diastolic blood pressure increased. Providers were less likely to change medication if repeat blood pressure measurement was < 140/90 mmHg (13 vs. 61%,  $P < 0.001$ ) or if the patient reported a home blood pressure reading of < 140/90 mmHg (18 vs. 52%,  $P < 0.001$ ). Providers whose systolic blood pressure goal was < 130 mmHg were more likely to intensify therapy compared to those with a goal > 130 mmHg (52 vs. 33%,  $P = 0.002$ ).

The discussion of comorbid conditions unrelated to hypertension or diabetes (versus no discussion) decreased the likelihood of treatment change (44 vs. 55%,  $P = 0.008$ ), but there was no relationship between an increasing number of comorbid conditions and the likelihood of change. Discussion of medication or adherence issues was associated with a lower likelihood of medication change (23 vs. 53%,  $P < 0.001$ ). There was no association between the number of medications

(either among antihypertensive agents or all classes of medications) and the likelihood of change. Visit length, the number of visits per clinic session, and the availability of case management staff were not correlated with the likelihood of change. In addition, there were no associations between patient age, patient race, patient education, or provider age and change in treatment.

**Conclusion.** Uncertainty about the accuracy of triage blood pressure measurements was a prominent factor in the decision to not intensify antihypertensive therapy in ~ 50% of diabetic patients with elevated blood pressure readings.

## COMMENTARY

Blood pressure control is the lynchpin of cardiovascular risk reduction. Its optimal control may be even more important in diabetic patients. Yet, copious research demonstrates that a high proportion of hypertensive patients do not achieve blood pressure control that conforms to current recommendations.<sup>1,2</sup> Studies from the United Kingdom have shown that > 70% of nondiabetic and diabetic patients had suboptimal control, even in the context of high (91%) adherence to prescribed regimens. Seventy percent of these patients were taking fewer than three antihypertensive agents. Despite elevated blood pressure readings, 45% of patients did not have therapy changed at a first follow-up visit, and 36% did not have intensification at a second visit.<sup>3</sup> This

tendency to defer intensification of therapy either by not initiating a new antihypertensive agent or not increasing the dose of an existing medication has been termed “therapeutic inertia.”<sup>4</sup> The provider and patient factors that comprise therapeutic inertia, however, have not been well defined.

This study by Kerr et al. asks the question: Why do clinicians fail to intervene on suboptimally controlled blood pressure? Their finding that only about half of patients with suboptimally controlled blood pressure had medication changes is consistent with previous research. In addition, their findings provide new insights into the factors underlying the missed clinical opportunities to improve blood pressure control in diabetic patients.

The authors investigated four domains postulated *a priori* to influence clinical decision-making: clinical uncertainty about whether a clinic triage blood pressure measurement was accurate; the competing demands and priorities of care in chronically ill patients; the affect of medications and polypharmacy; and the influence of patient scheduling and associated time constraints.

Clinicians’ skepticism about the accuracy of triage blood pressure measurements was strongly associated with nonintensification of therapy. Clinicians were much more likely to base their decisions on a lower repeat blood pressure or a patient’s report of normal home measurements rather than acting on an elevated triage measurement. Such a course of inaction might be justified if repeat measurements are proven to be more accurate; however, as the authors point out, there is evidence that a physician’s repeated values are susceptible to a variety of biases. The accuracy of home blood pressure measurements is also open to question, and the question of how home readings

should affect hypertension management remains unsettled.<sup>5-7</sup>

Competing demands and prioritization of medical conditions and medication issues appear to influence the decision to intensify therapy, but in a less persuasive manner than clinical uncertainty. It is interesting that the authors found no relationship between the number of other conditions discussed or the magnitude of polypharmacy and the likelihood of treatment change. This lack of a dose-response effect may be explained by a lack of statistical power to detect such differences. In a recent study whose specific aim was to gauge the effect of comorbid conditions on hypertension management, Turner et al.<sup>8</sup> showed that patients with multiple comorbid conditions had 0.59 the odds of treatment intensification compared to patients without comorbidities.

The authors’ finding that the time allotted for a visit (or its inverse, the number of patients seen per half-day session) did not influence medication change should be interpreted with caution. Visit length was dichotomized between visits lasting < 30 minutes and those lasting 30 minutes or longer. Other primary care settings in which 15-minute return visits are the rule may show a different relationship.

In addition, this lack of generalizability to non-VA settings is felt in other ways. VA subjects have a comprehensive and reasonably priced pharmacy benefit. Medication issues might influence therapeutic inertia in typical clinical settings where even insured patients face daunting financial and logistical barriers to obtaining their medications.

One weakness of this study was its definition of an intervention. The investigators chose to count a repeat blood pressure measurement as a therapeutic change but did not count counseling to improve adherence in

the absence of a medication change. Although these decisions undoubtedly resulted from the data sources available for analysis, they produce misleading results. For example, having a discussion about adherence was associated with a lower likelihood of medication change. In this context, however, a discussion about adherence may be the most appropriate next step; the best intervention for nonadherence could be a shared agreement to help the patient overcome adherence barriers. Nevertheless, in this study, it is counted as a failure. Future studies should utilize other sources of data, including visit transcripts and outcomes of additional follow-up visits, to better determine whether actions are truly appropriate or not.

What is the remedy for the inertia and uncertainty preventing clinicians from improving hypertension control in their patients? First, better studies are needed on how to utilize home blood pressure readings and how to ensure more accurate, reliable, and actionable clinic blood pressure readings. Feedback on performance and education of physicians has helped improve AIC values but has had little or no effect on blood pressure control.<sup>9</sup>

In our work, we have found that a multimodal intervention that includes a multidisciplinary care team led by a clinical pharmacist practitioner, computerized registries, and standardized treatment algorithms could successfully reduce blood pressure in patients with diabetes.<sup>10</sup> Notably, our program was not successful in lowering blood pressure until the clinical pharmacist practitioners were able to make direct changes in medications; simply alerting the physicians was not successful.

## REFERENCES

- <sup>1</sup>Okonofua EC, Simpson KN, Jesri A, Rehman SU, Durkalski VL, Egan BM: Therapeutic inertia is an impediment to achieving the *Healthy People 2010* blood pressure control goals. *Hypertension* 47:345–351, 2006
- <sup>2</sup>Saaddine JB, Cadwell B, Gregg EW, Engelgau MM, Vinicor F, Imperatore G, Narayan KM: Improvements in diabetes processes of care and intermediate outcomes: United States, 1988–2002. *Ann Intern Med* 144:465–474, 2006
- <sup>3</sup>Guthrie B, Inkster M, Fahey T: Tackling therapeutic inertia: role of treatment data in quality indicators. *BMJ* 335:542–544, 2007
- <sup>4</sup>Phillips LS, Branch WT, Cook CB, Doyle JP, El-Kebbi IM, Gallina DL, Miller CD, Ziemer DC, Barnes CS: Clinical inertia. *Ann Intern Med* 135:825–834, 2001
- <sup>5</sup>Vaur L, Dubroca II, Dutrey-Dupagne C, Genes N, Chatellier G, Bouvier-d'Yvoire M, Elkik F, Menard J: Superiority of home blood pressure measurements over office measurements for testing antihypertensive drugs. *Blood Press Monit* 3:107–114, 1998
- <sup>6</sup>McManus RJ, Mant J, Hull MR, Hobbs FD: Does changing from mercury to electronic blood pressure measurement influence recorded blood pressure? An observational study. *Br J Gen Pract* 53:953–956, 2003
- <sup>7</sup>La Batide-Alanore A, Chatellier G, Bobrie G, Fofol I, Plouin PFL: Comparison of nurse- and physician-determined clinic blood pressure levels in patients referred to a hypertension clinic: implications for subsequent management. *J Hypertens* 18:391–398, 2000
- <sup>8</sup>Turner BJ, Hollenbeak CS, Weiner M, Ten Have T, Tang SS: Effect of unrelated comorbid conditions on hypertension management. *Ann Intern Med* 148:578–586, 2008
- <sup>9</sup>de Grauw WJ, van Gerwen WH, van de Lisdonk EH, van den Hoogen HJ, van den Bosch WJ, van Weel C: Outcomes of audit-enhanced monitoring of patients with type 2 diabetes. *J Fam Pract* 51:459–464, 2002
- <sup>10</sup>Rothman RL, Malone R, Bryant B, Shintani AK, Crigler B, Dewalt DA, Dittus RS, Weinberger M, Pignone MP: A randomized trial of a primary care-based disease management program to improve cardiovascular risk factors and glycated hemoglobin levels in patients with diabetes. *Am J Med* 118:276–284, 2005

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