Effective Health Care Program

Heart and Blood Vessel Conditions
High Blood Pressure

Effectiveness of Self-Measured Blood Pressure Monitoring in Adults With Hypertension

Focus of Research for Clinicians

To review the role of self-measured blood pressure (SMBP) monitoring with or without additional support (interventions such as telemonitoring, counseling, education, Web support, behavioral interventions, home visits, etc.) in the management of hypertension, a systematic review of 49 studies examined the comparative effectiveness and adherence predictors of SMBP monitoring. The review addressed SMBP monitoring performed by the patient or the patient's companion at home; it did not include monitoring done at the doctor's office, clinic, pharmacy, or health unit at work, nor did it include blood pressure (BP) monitoring done at home by nurses or other health care professionals. The full report, listing all studies, is available at www.effectivehealthcare.ahrq.gov/selfmeasuredbp.cfm. This summary is provided to assist in clinical decisionmaking along with consideration of a patient's values and preferences. However, reviews of evidence should not be construed to represent clinical recommendations or guidelines.

Background

High BP or hypertension (BP ≥140/90 mmHg) is a common, ongoing health condition, affecting 1 in 3 adults in the United States aged 20 or older. Hypertension has been identified as a major risk factor for cardiovascular disease and an important modifiable risk factor for acute myocardial infarction, stroke, congestive heart failure, and chronic kidney disease. Key strategies for managing hypertension include lifestyle and behavior modifications (such as dietary modification, weight loss, and regular exercise), usually combined with medication. Estimates indicate that a decrease of 5 mmHg in systolic BP can significantly reduce morbidity and mortality. However, long-term adherence to lifestyle modifications and medication remains a significant challenge in managing this condition.

While SMBP monitoring may improve patient participation in chronic disease management, the effects of this strategy on BP, clinical outcomes, and health care utilization remain uncertain.

Conclusions

In the management of hypertension, SMBP alone versus usual care yielded a modest reduction in clinic systolic BP (SBP) and diastolic BP (DBP) at 6 months (SBP/DBP -3.1/-2.0 mmHg) and 12 months (SBP/DBP -1.2/-0.8 mmHg). Meta-analyses showed that the net reduction in SBP and DBP was statistically significant at 6 months but not at 12 months. Combining additional support with SMBP monitoring led to greater BP reduction when compared to usual care at up to 12 months of followup based on consistent findings in six high-quality studies. However, the evidence was too limited to determine the superiority of any one form of clinical support, as modalities varied widely across studies. The evidence is weak or insufficient to determine if SMBP with or without additional support has an impact on other outcomes (including mortality, quality of life, number of medications used, medication adherence, and health care encounters). Additional research is needed to determine the effect of SMBP on BP control beyond 12 months and to determine long-term clinical consequences of SMBP.

Clinical Bottom Line

SMBP alone versus usual care

BP Control

SMBP alone improves BP control by a small amount when compared with usual care.[1] ●●○

Other Clinical, Surrogate, and Intermediate Outcomes[2]

Evidence fails to support a difference between SMBP alone versus usual care for other clinical, intermediate, and surrogate outcomes. ●○○

SMBP plus additional support versus usual care

BP Control

SMBP plus some form of additional support[3] improves BP control when compared with usual care at least up to 12 months. ●●●

Other Clinical, Surrogate, and Intermediate Outcomes

Evidence fails to support a difference between SMBP plus additional support versus usual care for other clinical, surrogate, and intermediate outcomes. ●○○

[1] Usual care is the standard-of-care management of hypertension in outpatient and general practice settings.

[2] Other outcomes assessed included clinical outcomes (quality of life, patient satisfaction with care), surrogate outcomes (left ventricular hypertrophy, left ventricular mass index), and intermediate outcomes (number and dosage of medications, medication adherence, number of health care encounters).

[3] Additional support varied across trials and included telemonitoring, counseling, education, Web support, behavioral interventions, home visits, et cetera.

(Continued on back)

Strength of Evidence Scale

High:	●●●	There are consistent results from good-quality studies. Further research is very unlikely to change the conclusions.
Moderate:	●●○	Findings are supported, but further research could change the conclusions.
Low:	●○○	There are very few studies, or existing studies are flawed.
Insufficient:	○○○	Research is either unavailable or does not permit estimation of a treatment effect.

Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

(Continued from front)

SMBP plus additional support versus SMBP without additional support or with less-intense additional support

BP Control

Evidence fails to support a difference between SMBP plus additional support versus SMBP without additional support or with less-intense additional support for BP control. ●○○

Other Clinical, Surrogate, and Intermediate Outcomes

Evidence fails to support a difference between SMBP plus additional support versus SMBP without additional support or with less-intense additional support for other clinical, surrogate, and intermediate outcomes. ●○○

Predictors of SMBP adherence

Evidence is insufficient to determine the predictors of SMBP adherence. ○○○

Strength of Evidence Scale

High:	●●●	There are consistent results from good-quality studies. Further research is very unlikely to change the conclusions.
Moderate:	●●○	Findings are supported, but further research could change the conclusions.
Low:	●○○	There are very few studies, or existing studies are flawed.
Insufficient:	○○○	Research is either unavailable or does not permit estimation of a treatment effect.

Gaps in Knowledge

- The following limitations identified in existing trials should be addressed in future trials:
  - Short duration of followup (<1 year in most studies).
  - Heterogeneity in SMBP monitoring and additional support protocols used.
  - The effect of SMBP monitoring on BP control as a predictor of clinical and surrogate outcomes such as mortality, quality of life, and left ventricular hypertrophy.
- In future studies, SMBP could be used to characterize the pattern of a patient's BP abnormality as uncontrolled hypertension or white coat hypertension before inclusion in a trial to enable appropriate assessment of outcomes.
- Self-measurement of BP can be burdensome over time. Future studies of SMBP should compare different monitoring schedules to determine the least burdensome protocol(s).
- Other important areas for future research include various approaches for improving adherence to SMBP and ways to improve the transmission of SMBP information for clinical decisionmaking.
- Given the paucity of data for clinical event outcomes, studies should also be conducted to examine the effects of SMBP on clinical events.
- Additional data are needed on predictors of adherence to SMBP.

What To Discuss With Your Patients

- The importance of effectively controlling high BP.
- The link between measuring BP and controlling high BP.
- Adherence to strategies aimed at managing hypertension such as lifestyle and dietary modifications and medication.
- How SMBP allows patients to participate more actively in managing their BP.
- The types of SMBP devices available and how to operate the device selected for the patient.

Resource for Patients

Measuring Your Blood Pressure at Home, A Review of the Research for Adults is a companion to this clinician research summary. It can help adults with hypertension talk to their health care professional about how to perform SMBP monitoring to help manage their condition.

Ordering Information

For electronic copies of *Measuring Your Blood Pressure at Home, A Review of the Research for Adults*, this clinician research summary, and the full systematic review, visit www.effectivehealthcare.ahrq.gov/selfmeasuredbp.cfm. To order free print copies, call the AHRQ Publications Clearinghouse at 800-358-9295.

Source

The information in this summary is based on *Self-Measured Blood Pressure Monitoring: Comparative Effectiveness,* Comparative Effectiveness Review No. 45, prepared by the Tufts Medical Center Evidence-based Practice Center under Contract No. HHSA 290-2007-10055-I for the Agency for Healthcare Research and Quality, January 2012. Available at: www.effectivehealthcare.ahrq.gov/selfmeasuredbp.cfm. This summary was prepared by the John M. Eisenberg Center for Clinical Decisions and Communications Science at Baylor College of Medicine, Houston, TX.

AHRQ Pub. No. 12-EHC002-3
February 2012