

# Implementing Home Blood Pressure Monitoring Into Usual Care

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## ABSTRACT

Hypertension is a major public health issue in the United States with a high prevalence, increased burden in underserved populations, and suboptimal control. Home blood pressure monitoring (HBPM) has been demonstrated to improve BP control. The practice improvement project described in this study incorporates a culturally tailored HBPM program into primary care in a community health center. The outcomes demonstrate it is feasible to implement HBPM into primary care in an underserved, high-risk population and that control of BP was improved.

**Keywords:** chronic care model, evidence-based guidelines, home blood pressure monitoring (HBPM), hypertension, policy, self-management skills

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Hypertension is a major public health problem in our communities, affecting 33% of American adults > 20 years old at a cost of \$47.5 billion annually in direct medical expenses and \$3.5 billion in lost productivity.<sup>1</sup> Chronic hypertension is a risk factor for cardiovascular disease and increases the risk of heart attack, stroke, kidney disease, and heart failure. Of the estimated 78 million adults with hypertension in the United States, 82% are aware of their condition, but only 53% have their blood pressure (BP) controlled to target levels and, among underserved populations, the percentage at target is even lower.

The literature indicates that home blood pressure monitoring (HBPM) can be an effective method to improve hypertension control.<sup>2</sup> Evidence-based guidelines recommend HBPM in addition to office BP for hypertension management, because HBPM readings show better correlations with measures of target organ damage.<sup>2</sup> Furthermore, HBPM patients become more engaged in their hypertension care, which improves shared decision-making with their providers. HBPM can be incorporated into the usual care of hypertensive patients in the same way home blood glucose monitoring has become a routine part of the management of diabetes. The Chronic Care Model has demonstrated that engaged, informed teams and patients together can improve

outcomes;<sup>3</sup> thus, HBPM has the potential to improve BP control.

## LOCAL PROBLEM

A practice improvement project was carried out at a Federally Qualified Community Health Center (FQCHC) in the Northeast region of the US. State estimates of the prevalence of hypertension in the Northeast catchment area (32%) were higher than those for the state of Massachusetts (25%).<sup>4</sup> A 2011 quality improvement review at the FQCHC showed that 68% of hypertensive patients were not at goal level (< 140/90 mm Hg) and significantly below the benchmark (70% at goal) set by the quality improvement committee. Thus, at this FQCHC, the prevalence of hypertension was higher than expected and control was suboptimal.

## INTENDED IMPROVEMENT

The intended improvement was implementation of HBPM into usual care at the FQCHC. Patients with a diagnosis of hypertension or at risk for hypertension (BP > 140/90 mm Hg at most recent visit) were identified and recruited to participate in the project and were supplied with a validated HBPM device. Patients were instructed in HBPM and self-management strategies at the first visit using culturally/linguistically tailored visual handouts in English, Spanish, and Portuguese and motivational

interviewing techniques. Initially, the providers (nurse practitioners [NPs] and doctors [MDs]) provided the instruction; however, using rapid cycle change feedback, it was determined that the providers did not have the time to do this and the protocol was modified to have registered nurses (RNs) assume this responsibility. The RNs provided outreach for continued motivation and adherence and providers integrated the information from each patient's HBPM diary into their treatment strategy and offered ongoing motivation for HBPM.

## METHODS

Deming's Model for Improvement was used to guide the project. This model utilizes the phases of Plan, Do, Study, and Act in a rapid cycle format, which allows for changes in the protocol as feedback is gathered and facilitates the use of teamwork to make improvements.<sup>5</sup> The FQCHC endorsed the project and key stakeholders of the family practice group joined together to write a grant to provide funding for digital HBPM and support. In advance of rolling out the intervention to patients, 4 NPs, 4 MDs, and 3 multilingual RNs were educated about HBPM, trained in the use of digital BP monitors, and provided with information on motivational interviewing techniques to engage patients.

The patient population came from active patients cared for at the health center. Inclusion criteria were adult, nonpregnant patients with BPs > 140/90 mm Hg; those with a history of hypertension; and those at risk for hypertension, defined as having recent hypertensive-range BP readings at the clinic. Patients willing to become involved in the project were given a program description written in English and Portuguese and invited to participate. Rolling recruitment closed at 50 active participants.

Participants were given a free digital American Heart Association—approved home BP monitor and were trained to use the device. They also received culturally/linguistically/literacy-tailored health education materials relevant to self-management of hypertension, including information on diet, exercise, smoking cessation, and medications. Patients were asked to measure and record their BP in the early morning or evening 3 or 4 times per week and to bring the HBPM record to scheduled follow-up

visits for discussion with providers. The provider and patient reviewed the recorded home BPs and discussed self-management skills and medication compliance, and then agreed upon a mutually identified action plan. Missed appointments were rescheduled by the RN and project manager.

## Ethical Issues

The project was reviewed by a university institutional review board and determined to be exempt from need for approval because it is consistent with quality improvement and standard practice procedures. Thus, written informed consent was not required.

## Setting

The improvement project was carried out in an FQCHC with the purpose of enhancing primary care services in urban and underserved rural communities. Approximately 90% of the health center patients were considered low income, defined as < 200% of the federal poverty level; the majority were Brazilian immigrants and approximately 35% considered Portuguese their primary language. Thus, the project was implemented in a population at high risk for hypertension and its cardiovascular sequelae in a predominantly low-income, non-English-speaking population.

## Evaluation Methods

Mixed methods were used to evaluate the outcomes of the project. Quantitative measures included number of patients recruited and retained; number of clinic sessions attended; pre (baseline) and post (12-month) measures of mean BP; proportion of patients at BP goal (< 140/90 mm Hg); and change in systolic and diastolic BP, as well as pre/post percentage improvement in BP. Providers entered the data into the electronic medical record and later retrieved the data for abstraction. Qualitative measures included open-ended questions regarding patient assessment of self-care skills and satisfaction with HBPM and provider satisfaction with HBPM using project-generated surveys.

## RESULTS

De-identified patient data were abstracted from the medical record and entered on an Excel spreadsheet

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