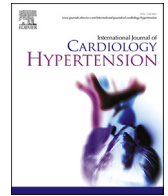




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## Editorial

## Strategies to improve blood pressure control: A step forward to winning the battle



## ARTICLE INFO

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Hypertension  
Blood pressure guidelines  
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## ABSTRACT

**Objective:** Hypertension represents a common risk factor for all major cardiovascular diseases. The issue of inappropriate blood pressure control in the hypertensive population is a worldwide still unsolved problem, with heavy consequences on the health care systems. A call to action is required to optimize blood pressure control and to reduce the cardiovascular risk.

**Methods and results:** In this issue of the journal a new study presents the results of a multifaceted complex approach, in the context of a quality improvement program, through the involvement of a high functioning multidisciplinary team. A patient population largely underprivileged, urban and 75% African American, referring to an Internal Medicine Clinic, included a large majority of hypertensive patients with inappropriate blood pressure control. By addressing identified barriers to achieve optimal blood pressure control, the current improvement program pursued the education of physicians, nurses and patients as a key driver to optimize patients-provider communication and to achieve a satisfactory final result.

**Conclusions:** The strategy described in the study by Sadeghi et al. allowed to maintain positive results for one year and thereafter. Despite some weaknesses, this multifaceted complex approach deserves particular attention since it describes relevant findings that represent a significant step forward to improving blood pressure control in the hypertensive population.

Hypertension is a common pathological condition representing the number one risk factor for increased risk of stroke, coronary artery disease, heart failure, and kidney disease [1]. On the other hand, it has been consistently demonstrated that more intense blood pressure (BP) lowering significantly reduces the risk of stroke, coronary events, major cardiovascular events, and mortality [2]. Some uncertainty still exists about optimal BP targets.

The need to reduce the heavy negative impact of hypertension justifies all efforts made by the medical community, primarily the introduction of specific guidelines. The latter inform physicians about data regarding BP, recommend optimal BP levels, also related to comorbidities, and indicate the appropriate management of hypertension and related cardiovascular risk. As a very stringent guidelines, those published in 2017 from the American College of Cardiology (ACC)/American Heart Association (AHA) recommend values lower than 120/80 mmHg as the optimal BP level. Based on these guidelines, stage 1 hypertension is classified as systolic BP 130–139 or diastolic BP 80–89 mm Hg [3]. The results of the SPRINT trial, showing the beneficial effect of a more intensive BP control in high-risk patients in the high-normal range, provided a major input for the US guidelines [4]. The subsequent 2018 European Society of Cardiology (ESC)/European Society of Hypertension (ESH) guidelines recommend a first BP target <140/90 mm Hg in all patients, with the recommendation to further lower BP values < 130/80 mmHg only in patients at cardiovascular risk. The suggested target of diastolic BP is < 80 mmHg for all hypertensive patients, independently

of age, comorbidities, and established cardiovascular disease [5].

Unfortunately, a large proportion of the hypertensive population carries BP levels higher than those recommended as optimal by guidelines, particularly by the US guidelines. Several factors can explain the difficulties in achieving and maintaining the BP goal, that is the inadequate preparation and inertia of medical and nursing staffs, the inaccurate BP measurement and home BP monitoring, the lack of adherence to medical visits, lifestyle changes and medication often observed in patients, with the unavoidable limitations inherent to economic reasons.

A call to action is required to optimize BP control and reduce the cardiovascular risk worldwide.

Many quality improvement (QI) programs to raise hypertension control were reported during the past decades [6]. Based on the results of these studies, team-based care, including nurse clinicians and pharmacists collaborating with a physician, were shown to consistently improve hypertension control [7]. However, disparities were often observed in QI intervention programs and were mostly due to patient race/ethnicity and socioeconomic status. Usually, white people and patients belonging to a high socioeconomic status show a better response. Patients at high cardiovascular risk also provide a better result, with evidence of minor effect of disparities among subgroups [8].

Some important limitations of the QI programs were also underscored in previous studies. One of the most relevant is that an improved hypertension control during the first six months is often not sustained at one year. Furthermore, cost and complexity are major barriers when

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translating research evidence into clinical practice. In fact, sustainability is a major issue, also related to dissatisfaction and inertia of physicians and various stakeholders.

One of the QI programs suitable to afford the issues of cost and complexity is the MAP (Measure accurately, Act rapidly, Partner with patients). Due to its simplicity, MAP appears to be at least as effective for improving BP control in black as in white adults with hypertension [9].

However, more efforts are needed to afford all main criticisms of the QI program approach.

In the work by Sadeghi C et al. published in the current issue of the journal [10] the authors observe, first of all, that a large proportion (80%) of hypertensive patients referring to their Internal Medicine clinic (including a patient population largely underprivileged, urban and 75% African American) had BP level >130/80 mmHg, according to the ACC/AHA guidelines. Moreover, 60% of them had BP level >140/90 mmHg. This evidence confirmed that uncontrolled hypertension is a common, still unsolved issue.

A QI pre-defined program was therefore designed to address identified barriers to optimal BP control. In the specific, the QI was based on the Plan-Do-Study-Act (PDSA) model of health care improvement. It was set up for education for hypertension and counseling for medication adherence by nursing staff and physicians to improve BP control <130/80 mmHg and <140/90 mmHg between ages of 18–75 years, within 12 months. All major weaknesses related to the BP management and control were targeted step-by-step. Physicians and nurses were instructed about BP guidelines, reconciliation, and optimization of medication. Patients were instructed about lifestyle changes, including the dietary approaches to stop hypertension (DASH) diet, physical exercise, and smoking cessation, as well as about the importance of medication adherence and the importance of medical screening. The final aim was to improve patient-provider communication. Importantly, costs of therapies were reduced by prescription of generic medications, combination of medications, prescription of 90 days' supply of medications at a time to overcome transportation barrier to pharmacy.

By the end of the study, the rate of BP control rose to 62.6% for BP < 140/90 mmHg, and to 24.5% for BP < 130/80 mmHg. BP control further improved by 72.6% and 44.5%, respectively, over the subsequent 10 months.

The current results demonstrate that an improved BP control can be achieved by applying multifaceted complex strategies, that is overcoming physician clinical inertia, educating nurses, enhancing patient adherence to appointments and medications, and ultimately through the establishment of a high functioning multidisciplinary team (also including front-line clinic staff, administrative leadership, a social worker, a case manager and information technology staff). In fact, these results confirm that a team-based care is an effective intervention to control BP (7). Overall, education of physicians, nursing staff and patients was the key driver to success.

Most importantly, the QI multifaceted strategy applied in this study was able to maintain a better hypertension control up to one year and thereafter, and, remarkably, it reached this objective in a primary care setting serving disadvantaged communities. The positive outcome of the strategy was compatible with the sustainability of the approach, thanks to the effort of the organizational leadership, with a translation to the routine clinical work. Therefore, the major known limitations of the QI approach were overcome by the present intervention program.

Yet, although the benefits were clear, other problems outlined in previous QI studies remained unsolved in the current one. In the specific, despite all efforts made to set up and to carefully apply a multifaceted strategy, the response to interventions remained undefined in few patients categories: those affected by comorbidities and higher atherosclerotic risk, patients affected by resistant hypertension, patients belonging to distinct ethnic groups and to different socioeconomic status. They all represent critical patient subgroups, commonly encountered in the clinical work, and they should deserve more attention and care. The inability to report on BP control rates in these categories, justified by the

limited capability of the electronic health records and lack of resources to analyze data manually, represents a weakness of the study and implies that the subsequent negative outcomes could not be avoided in some patients subgroups. In particular, the failure in defining the achievement of BP goal in each population strata and patient category may mostly depend on the difficulties encountered when moving from closed health care systems and academic medical centers to a broad community initiative. As it has been previously proposed, specific strategies aimed to address the needs of subpopulations should be designed. A lesson learned through the current QI intervention strategy is that more efforts should still be made with the aim to fill up the remaining gaps and to fully translate a QI intervention program into the real-life world. Moreover, the contributory role of a telehealth approach with remote BP monitoring in the electronic health records remains to be tested in this context, particularly for high risk patients.

In conclusion, the application of QI programs is confirmed as a promising approach to combat the problem of the inappropriate BP control in the hypertensive population, to reduce the burden of cardiovascular diseases and related health care costs. Further steps need to be undertaken to overcome the current limitations and to achieve the final goal.

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#### Declaration of competing interest

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