

Does the change of hypertension guidelines actually affect our reality?

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The advantage of the modern era is that doctors nowadays all over the world have the opportunity to diagnose disease and treat it under the same conditions. Unfortunately, not all diagnostic tools and treatment options are available worldwide, but at least there is some common frame that doctors should follow in wide range of disease. Guidelines are updated regularly and it is always expected that new recommendations will resolve the most of issues from the previous. However, it often does not occur. Perhaps our expectations are too high.

Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7), was published in 2003 (1). Fourteen years later the American College of Cardiology/American Heart Association (ACC/AHA) published their guidelines for arterial hypertension (2) and at the beginning it was considered that these recommendations are essentially different from all previous, starting from cut-off values for blood pressure (BP) in various patient groups to treatment approach.

Recently, Muntner *et al.* published an interesting study comparing these two guidelines and their impact on the general population (3). The authors retrospectively analyzed 9,623 adults taken from the National Health and Nutrition Examination Survey in period from 2011 to 2014 using JNC 7 and ACC/AHA guidelines from 2017. Several aspects of this study deserve further discussion.

The main difference between these two recommendations is the definition of arterial hypertension. JNC 7 used cut

off of 140 and/or 90 mmHg for systolic and diastolic BP, respectively (1). On the other hand, ACC/AHA reduced these cut-off values on 130 and/or 80 mmHg (2). Guideline-recommended antihypertensive medication mostly remained the same in general population, patients with diabetes and chronic kidney failure. The largest difference refers to patients older than 60 years with whom antihypertensive therapy should be initiated already with systolic BP ≥ 130 mmHg according to ACC/AHA 2017 recommendations (2), whereas this group was not separately quoted in JNC 7 (1). The other important difference between these guidelines refers to the target values of BP in hypertensive patients who are already on antihypertensive therapy. According to the ACC/AHA 2017 guidelines target value of BP is <130 and <80 mmHg for systolic and diastolic BP (2), respectively, while in the JNC 7 guidelines corresponding values are <140 and <90 mmHg (1). There was no difference between guidelines regarding target BP values in patients with diabetes and chronic kidney disease.

The mentioned differences between these two guidelines were the main reason for the results obtained by Muntner *et al.* (3). Namely, the investigators reported significantly higher prevalence of hypertension among U.S. adults using 2017 ACC/AHA guidelines 45.6% [95% confidence interval (CI): 43.6% to 47.6%] than using JNC 7 guidelines 31.9% (95% CI: 30.1% to 33.7%). However, what is probably more important, the difference in prevalence of patients who should receive antihypertensive therapy was significantly lower and it was 36.2% (95% CI: 34.2%

to 38.2%) and 34.3% (95% CI: 32.5% to 36.2%) of U.S. adults, for 2017 ACC/AHA and JNC 7 guidelines, respectively. As expected, the percentage of hypertensive patients who were taking antihypertensive medication and did not achieve BP goal was significantly higher when 2017 ACC/AHA were used [53.4% (95% CI: 49.9% to 56.8%)] than when JNC 7 cut-off values were used as the reference [39.0% (95% CI: 36.4% to 41.6%)].

The question that arises is why we detect hypertension and then we do not treat it. In other words what to do with the patients in large “gray zone” with pressure between 130 and 140 mmHg for systolic and between 80 and 90 mmHg for diastolic BP. The European guidelines tried to skip this trap introducing term “high-normal BP” (4) that also existed in JNC 7 guidelines as prehypertension (1), but were not addressed in 2017 ACC/AHA because BP thresholds were changed. There was always a difference in the definition of “gray zone” between U.S. and Europe. Namely this term had significantly wider meaning in JNC 7 (120–139 mmHg for systolic BP and 80–89 mmHg diastolic BP) (1) than in European guidelines (130–139 mmHg for systolic BP and 80–89 mmHg diastolic BP) (4). The latest European guidelines, which are recently presented at the annual meeting of European Society for Arterial Hypertension and Cardiovascular Prevention, confirmed previous definition of high-normal BP from the previous European guidelines (4).

Our study group numerous times showed that high-normal BP was associated with left ventricular remodeling that involves cardiac mechanics (strain), diastolic function and hypertrophy (5,6). We also showed that high-normal BP was related with deterioration of right ventricular function and mechanics, as well as with left atrial function impairment (7). What is more clinically relevant, our investigation showed significant correlation between functional capacity and high-normal BP values (8). These findings confirm the importance of “gray zone” of BP on target organ damage and many other studies demonstrated its predictive value in cardiovascular morbidity and mortality (9).

The other important point is the target BP values. The SPRINT trial was one of the latest and largest trials which showed the importance of intensive BP lowering in hypertensive patients (10). The authors reported significantly better outcome in patients with target systolic BP <120 mmHg in comparison with those with conventional target BP <140 mmHg (10).

In the current study Muntner *et al.* showed that treated hypertensive patients had higher cardiovascular risk

than untreated hypertensive patients (3). The reason for this could lay in the fact that treated patients had more comorbidities such as diabetes and chronic kidney disease, as well as previous cardiovascular events (3). On the other hand, using the 2017 ACC/AHA guidelines hypertension was diagnosed significantly more in the subjects younger than 65 years and therapy was initiated only in a few percentages more. This might be very helpful from clinical point of view because we will be more careful with these patients and we will provide closer follow-up that will result with earlier initiation of antihypertensive therapy and avoidance of hypertensive induced target organ damage. This study is providing answers on all criticisms that new guidelines will significantly increase the costs of treatment in hypertensive patients. After this study is evident that only a few percentages of patients who will take medications according to new standards will not affect cost-effectiveness ratio. Interestingly, white people will get antihypertensive therapy more often than other races (black, Asian, Hispanic), which was somewhat unexpected because it was considered that lower cut-off values will be more important for black people who will use antihypertensive therapy more often than earlier.

In total 13.7% more adults were diagnosed as hypertensive according to 2017 ACC/AHA guidelines comparing with JNC 7, but only 1.9% subjects would be treated due to difference in guidelines. Non-pharmacological intervention would be advised for the 9.4% of U.S. hypertensive adults who are not recommended for antihypertensive medication according to the 2017 ACC/AHA guidelines (3). Even 14.4% more hypertensive patients pharmacologically treated would not achieve BP goal with 2017 ACC/AHA guidelines in comparison with JNC 7.

One should not forget the importance of BP measurement used in this study that is completely in line with all recommendations regarding arterial hypertension. Large number of studies and trials are not consistent in their methodology regarding BP measurement. Often investigators used only one or two measurements in separate occasions. This investigation one more time emphasized the importance of traditional and accurate 3 measurements with sphygmomanometer in a sitting position after 5 min resting time and with up to 1 min period between these measurements. Only this kind of measurement could be considered as valid and referent for other measurements made during follow-up.

The findings from Muntner *et al.* are very important because the European guidelines from 2013 and new

European guidelines are in line with JNC 7 regarding cut-off and target BP values. This means that changing cut-off values for diagnostic of hypertension, but not for therapy introduction might be an important way to follow-up these patients, to persuade them to change their lifestyle and more use non-pharmacological methods to reduce BP, and ultimately to prevent and protect our patients from hypertension-induced target organ damage. In the conclusion it is important to underline the relevance of every new guidelines even if they appear very similar at the first site. They always bring something new that we could apply in our everyday clinical practice and in this way help our patients.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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