

decision-making relative to treatment. Lifestyle modification and choice of antihypertensive agents are detailed, secondary hypertension screening and comorbidities are addressed, urgencies and emergencies as well as resistant hypertension are considered. Adherence, communication technology and health services and community involvement are also discussed and recommendations are made regarding their application to improve BP control.

I believe that one of the main consequences of the dissemination and implementation of this new guideline will be the intensification of therapy for most hypertensive patients, hopefully without unintended consequences, and leading to improved CV outcomes.

- Ernesto Schiffrin

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COMMENTS ON PREVIOUS ISSUE ARTICLE [Click here](#)

With over a billion people with raised blood pressure, how do we set our priorities straight? Alta Schutte and Peter M Nilsson



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Comment 1

In the previous issue of ISH Hypertension News, Drs. Alta Schutte and Peter Nilsson (1) address a problem that is overlooked by clinicians and scientists, including those active in cardiovascular prevention. Namely, that although large scale epidemiological studies show hypertension to be the first cause of death and burden of disease worldwide (2,3), the adverse effect of this condition for public health and people's survival is underestimated.

As Schutte and Nilsson emphasize, one of the reasons is that epidemiological studies do not (and cannot) take into account masked hypertension, i.e. a condition in which office blood pressure (BP) is normal whereas home and (or) ambulatory BP are elevated (4). The resulting underestimation of the

hypertension-related cardiovascular risk is by no means trivial because 1) in samples representative of the entire population, masked hypertension has been detected in about 1 out of 7 individuals with a normal office BP, which means that, globally, a huge number of people are affected and 2) the adverse consequences of this condition for vital organ function and structure as well as for the risk of a clinical event are substantially greater than in normotensive people, approaching in some studies those of individuals with an in- and out-of-office BP elevation (4,5).

Recalculation of the risk of death and disease attributable to hypertension should of course also take into account that in a large fraction of hypertensive patients (probably 30-40% globally, and up to 50% in the elderly) out-of-office BP normality, i.e. white coat hypertension, makes the risk less than that calculated

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on the basis of office BP values, although still significantly greater than that of normotensive subjects (6). As argued by Schutte and Nilsson, however, the balance remains largely dominated by masked hypertension with probably a net substantial increase of the hypertension-attributable risk compared with currently reported figures.

What should be done to allow masked hypertension to diagnostically emerge? Schutte and Nilsson correctly note that population-wide out-of-office BP monitoring is impractical or even unthinkable in many countries, and place a greater hope in single or combined clinical or demographic conditions that have been shown to be markers of an ambulatory or home BP elevation. There is no question that, based on published data, this may be a helpful approach, and that probably already today at least the most reliable of these markers (e.g. high normal office BP and silent organ damage) should be used for this purpose. Personally, however, I also have confidence in the future development of simple, cheap and reasonably accurate devices that may allow BP to be assessed away from the clinic environment, offering information on its abnormalities.

Technical improvement aside, it is also important to remember that crucial information on clinical aspects of white coat and masked hypertension is not available. Very limited evidence exists on whether antihypertensive treatment is beneficial in white coat hypertension, and no study has ever addressed whether, and to what extent, masked hypertension is favourably affected by antihypertensive drugs. It would be paradoxical to achieve an improvement in identification of this condition in the general population without knowing whether and to what extent its increased risk can be favourably modified by treatment.

- Giuseppe Mancia

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Practical use of self-measured home blood pressure

Comment 2

People with normal or even optimal blood pressure should not be overlooked if they have high out-of-office blood pressure, i.e. self-measured home and/or 24-h ambulatory monitored values [1]. Out-of-office blood pressure is a more reliable prognosticator than the blood pressure conventionally measured in an outpatient clinic or a health checkup center. In particular, self-measured home blood pressure using a validated automated device has the

advantage of assessing blood pressure in a relatively standardized and relaxed environment at home, providing results that is highly reproducible and reliable for predicting cardiovascular complications [1]. With the greater number of measurements able to be taken at home, such continuous records of daily self-measurement enable us to capture a large amount of blood pressure information on long-term seasonal and annual changes [2-4]. We recently reported that the highest and lowest home blood pressures were observed in mid-to-late January and mid-to-late July, respectively, among hypertensive patients on antihypertensive pharmacotherapy, with our findings suggesting that home blood pressure should be carefully monitored in order to mitigate cardiovascular risk [2]. Furthermore, home blood pressure measurements require an active commitment by the patients themselves in medical care and health management, thereby resulting in a marked improvement in the adherence to medication.

The risk of cardiovascular complications in patients with masked hypertension, as Schutte and Nilsson indicated in the previous issue of *Hypertension News*, should be again emphasized. Individuals with optimal, normal, or even high-normal conventional blood pressure are assumed to be associated with minimum or mildly increased cardiovascular risk [5,6]; however, among those with masked hypertension based on self-measured home blood pressure, their value was 2.3-fold higher than in those with true optimal conventional blood pressure without masked hypertension [7]. Confirmatory findings have been reported based on ambulatory blood pressure information [8,9]. Out-of-office blood pressure considerably refines the risk stratification at levels of conventional blood pressure in which one is assumed to have a relatively low risk of cardiovascular complications, particularly for those with masked hypertension. The recently published American Heart Association Guidelines recommend home blood pressure monitoring as a screening tool for masked uncontrolled hypertension in adults being treated for hypertension, and ambulatory blood pressure monitoring as a confirmation of the diagnosis of masked uncontrolled hypertension before considering intensifying antihypertensive drug treatment [10].

In contrast to masked hypertension, the prognostic significance of white-coat hypertension is still under debate [11,12]. One critical issue is the definition of white-coat hypertension which differs among studies, making the risk of white-coat hypertension difficult to pin down [12]. Based on the International Database on Ambulatory blood pressure in relation to Cardiovascular Outcomes (IDACO) data, the frequencies of white-coat hypertension range from 6.3%–12.5% depending

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on the ambulatory monitoring intervals, i.e. daytime, nighttime, or 24-h [13]. The multivariable-adjusted hazard ratios (HRs) for white-coat hypertension vs. normotension declined from 1.38 (95% confidence interval [CI], 1.03–1.87) based on daytime information to 1.16 (CI, 0.82–1.64) based on a combination of 24-h plus daytime and nighttime, which was similar to that of normotensive participants [13]. Furthermore, the out-of-office blood pressure in the general population was investigated in Ohasama, Japan; the stroke risk in residents with normotension and in those with complete white-coat hypertension (i.e. office hypertension but normal blood pressure both self-measured at home and in 24-h ambulatory settings), did not markedly differ (HR, 1.38; CI, 0.82–2.32); however, in residents with partial white-coat hypertension, either home or ambulatory normotension with office hypertension indicated that they were at significant risk of stroke (HR, 2.16; CI, 1.36–3.43) [14]. Although the prevalence of complete white-coat hypertension was 9.4%, 17.3% of the Ohasama population could be categorized as having white-coat hypertension (i.e. partial white-coat hypertension) when the home or ambulatory blood pressure was monitored [14]. White-coat hypertension has been reported to be a transitional condition to hypertension outside medical settings [15]. The definition of white-coat hypertension under the current guidelines is not considered to be sufficiently precise. To identify truly low-risk white-coat hypertension, patients with hypertension in the office setting should be carefully monitored and followed-up with multiple out-of-office blood pressure measurements in various settings.

Expert committees further recommend the measurement of out-of-office blood pressure to confirm the diagnosis of hypertension and evaluate the effect of antihypertensive treatment [5,6]. According to the multi-center Hypertension Objective Treatment Based on Measurement by Electrical Devices of Blood Pressure (HOMED-BP), the risk increases across tertiles of systolic home blood pressure both at baseline and during follow-up without evidence of a J- or U-curve [16]. Notably, the mean blood pressure in the lowest tertile was 138.2 mm Hg at baseline and 116.8 mm Hg under treatment with antihypertensive drugs, and the mean blood pressure in the middle tertile, which was 123.4–133.5 mm Hg, was associated with a significantly higher risk of a major adverse cardiovascular event than the lowest tertile based on on-treatment systolic home blood pressure [17]. Though not proven by a randomized controlled trial, the long-term management of hypertension in an individual should be based on home blood pressure self-measurement. Given that affordable and validated automated blood pressure measurement devices are readily available, and that the advantages of using self-measured home blood pressure information are well recognized, it is time to heed the call-to-action articles published by Pickering and colleagues advocated 10 years ago [18] to use home blood pressure measurements.

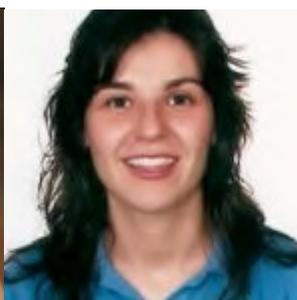
- Kei Asayama, Yutaka Imai & Takayoshi Ohkubo

See references overleaf - page 19

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Author Reply: Response to Professor Mancia and Drs Asayama, Imai & Ohkubo



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In our paper published in *ISH Hypertension News* in the September 2017 issue, we highlighted the immense global burden of hypertension with a specific emphasis on conditions such as masked hypertension and white-coat hypertension that cannot be accounted for when reporting global prevalence estimates. In his response, Professor Giuseppe Mancia reiterated the challenges to better diagnose especially masked hypertension more effectively. Aligned with many working in this field he expressed his confidence in the development of affordable and accurate new devices to be used in the future in out-of-office settings. As Mancia emphasizes, on **page 14**, as yet there is very limited evidence on the beneficial effects of antihypertensive treatment on either masked or white-coat hypertension. In another response to our paper by Drs. Kei Asayama, Yutaka Imai and Takayoshi Ohkubo, they suggest widespread use of home blood pressure devices to overcome the challenge in detecting masked and white-coat hypertension. They elegantly provided evidence regarding the usefulness of self-measured home blood pressure. Indeed, with an engaged patient home blood pressure monitoring can improve medical care and management, as well as adherence to medication. And as they argue, there is no doubt that if affordable and validated monitors are readily available for home use, it is likely that elevated out-of-office pressure can easily be detected by patients.

Perhaps we could make two further comments to this discussion. Firstly, with prehypertension recognized as a common feature in masked hypertensive patients, (1) the new Stage 1 Hypertension category (130-139/80-89 mmHg) introduced by the AHA/ACC 2017 Hypertension Guidelines (2) may result in the detection of more masked hypertensive patients in developed countries. However, as we argued in our original paper, the burden of hypertension has shifted to low and middle income countries (LMICs) (3) where there is an insurmountable task to even detect and treat clinic blood pressures exceeding 140/90 mmHg. The usability of these new guidelines in LMICs are therefore questionable. Secondly, clear evidence supports the usefulness of self-measured home blood pressure, and there is much scope to implement this method in developed countries. (4,5) When reflecting again on the situation in LMICs, the availability of validated clinic blood pressure devices continues to be a challenge, where home blood pressure monitoring is a distant reality. But together with Professor Mancia we are hopeful that affordable devices or tools for the detection of masked and white-coat hypertension will be developed for use in all countries.

- Alta Schutte & Peter Nilsson

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