

Targeting White Coat Hypertension: Is the Daytime Enough?

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White coat hypertension (WCH) refers to untreated individuals whose blood pressure (BP) is elevated in the office, but normal when assessed out-side the medical environment by 24-hour (h) ambulatory BP measurement (ABPM) and/or home BP monitoring. This definition has been extended to patients regularly taking antihypertensive drugs (i.e., white-coat uncontrolled hypertension or WUCH).¹ Although home BP monitoring is provided of an undisputed clinical and prognostic value, ABPM is considered the most accurate and widely accessible method for assessing out-of-office BP as it provides important information on circadian BP variations and nocturnal BP. However, despite the well-known advantage of ABPM over home BP monitoring in assessing nocturnal BP profile, it is surprising to note that in clinical practice and research setting nighttime BP is frequently disregarded in the diagnosis of WCH and WUCH. A large systematic review of studies addressing the association between WCH and subclinical organ damage revealed that almost all studies relied on average daytime or 24-h BP values.²

The 2018 European Society Hypertension/European Society Cardiology (ESH/ESC) guidelines do not provide explicit indications about the most appropriate ABPM parameter for detecting WCH, thus implying that this BP phenotype should be identified by normal BP values during both day- and nighttime period.³ It is even more noteworthy that the algorithm proposed by the American Cardiology College/American Heart Association American (ACC/AHA) guidelines for detection of WCH (or masked hypertension) recommends daytime BP (i.e., < 130/80 mm Hg) as the only diagnostic criterion.⁴

Overall, these observations indicate that diagnostic protocols for identifying out-of-office normotensive patients according to ABPM criteria (i.e., WCH and WUCH) are not standardized and that nighttime BP is a neglected component of the circadian profile. Despite the clinical relevance of this topic information on the prevalence of isolated

nocturnal hypertension in patients with WCH as defined by normal daytime or 24-h BP pattern is scanty. Thus, we have investigated this issue in a large cohort of hypertensive patients referred to a single hypertension out-patient clinic.

WCH and WUCH were retrospectively classified according to the BP thresholds recommended by the ACC/AHA guidelines.⁴ Namely, ≥ 130 mm Hg systolic (S) or ≥ 80 mm Hg diastolic (D) for office BP and <130/80 SBP/DBP for daytime BP.³ Based on the ACC/AHA guidelines, a nighttime BP elevation was defined as a value ≥ 115 mm Hg SBP or ≥ 65 mm Hg DBP.

A total of 7,353 of good quality recordings of 24-h ABPM (>70% successful readings) performed in a specialist center during a 6-year period (from 2013 to 2019) were analyzed. ABPM concerned either untreated adult subjects with a history of hypertension or treated hypertensive patients whose office BP measured before the application of device was ≥ 130 mm Hg systolic and/or ≥ 80 mm Hg diastolic. In each patient 3 sphygmomanometric BP measurements were recorded in the sitting position by professional nurses and averaged to obtain office BP.

All ABPMs were carried with a validated device set to obtain BP readings at 15/20-minute intervals during the day (07.00 AM to 11.00 PM) and at 20/25-minute intervals during the night (11.00 PM to 07.00 AM). All patients were asked to pursue their normal activities during the monitoring period and going to bed no later than 11.00 PM and arising not before 7.00 AM. Recordings were analyzed to obtain 24-h, day- and nighttime average SBP/DBP.

As many as 1,770 out of 7,353 individuals (24.1%) were found to have mean daytime BP <130/80 mm Hg; in particular, 659 subjects met the diagnostic criteria for WCH (8.9 %) and 1,111 for WUCH (15.1%). Among them, elevated out-of-office BP according to nighttime threshold ≥ 115 systolic mm Hg and/or ≥ 65 mm Hg diastolic (i.e., nocturnal hypertension) was found in 255 WCH individuals (38.6%) and 497 WUCH ones (44.7%) (Figure 1). Thus, more than one third

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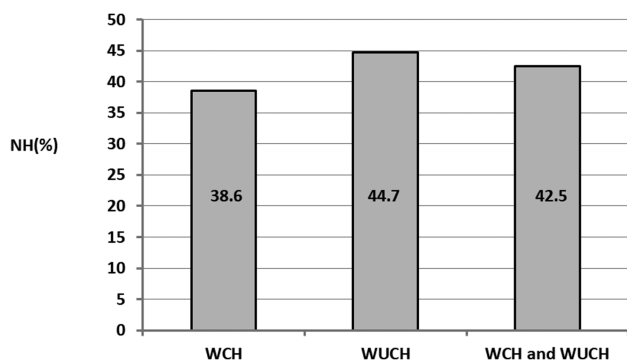


Figure 1. Prevalence of nocturnal hypertension (NH) in patients with white coat hypertension (WCH) and white coat uncontrolled hypertension (WUCH) and in both groups (WCH and WUCH), as defined by the ACC/AHA guidelines.

of subjects previously defined as WCH and WUCH, based on normal daytime values, had elevated BP during nighttime period (i.e., nocturnal hypertension). Altogether the present analysis shows that a comprehensive classification of WCH/WUCH (i.e., normal BP values in both circadian periods) markedly reduces the prevalence of both BP phenotypes by shifting a large fraction of individuals with WCH and WUCH to untreated sustained hypertension and sustained uncontrolled hypertension, respectively. Before further discussing the implications of our study, some brief comments on available evidence may be helpful in shedding light on this topic. The prevalence of WCH (and WUCH) widely varies in relation to demographic and clinical features of the population examined, to methods of office BP measurement (i.e., single or repeated office BP measurement by health care personnel vs. unattended BP measurement) as well as to normal out-of-office BP criteria. Cross-sectional studies carried out in hypertensive cohorts reported a WCH range from 15% to 30–40%. It should be emphasized, however, that WCH and WUCH prevalence was probably overestimated in most of these studies, as ambulatory BP normality was defined according to daytime period. Even when 24-h BP is used to define normal out-of-office BP tends to underestimate the impact of nocturnal BP load. This is because ABPM devices are usually set to measure BP at shorter intervals during daytime than at night (15–30 minutes during day and 20–60 minutes during night, respectively). In addition, regardless of methods used to define day-active and night-rest periods (fixed interval, diary, actigraphy), daytime is usually longer than nighttime period. For instance, in our series, the frequency of daytime BP recordings was approximately twice higher than at night.

In conclusion, our data strongly suggest that mean daytime thresholds for defining out-of-office BP normality, as

recommended by ACC/AHA guidelines, tend to overestimate the prevalence of WCH/WUCH and, consequently, to underestimate the fraction of patients with untreated sustained hypertension and uncontrolled sustained hypertension. Failure to identify nocturnal hypertension (a particularly harmful phenotype) is the cause of this misclassification that may have an adverse impact public health and cause inadequate antihypertensive treatment.⁵

In a practical perspective, aimed at improving the assessment of cardiovascular risk and making cardiovascular disease prevention increasingly effective, a comprehensive classification of BP phenotypes should include all ABPM periods.

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DISCLOSURE

The authors declared no conflict of interest.

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