

# Attended and Unattended Automated Office Blood Pressure Measurements Have Better Agreement With Ambulatory Monitoring Than Conventional Office Readings

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**Background**—Automated office blood pressure (AOBP) measurement is superior to conventional office blood pressure (OBP) because it eliminates the “white coat effect” and shows a strong association with ambulatory blood pressure.

**Methods and Results**—We conducted a cross-sectional study in 146 participants with office hypertension, and we compared AOBP readings, taken with or without the presence of study personnel, before and after the conventional office readings to determine whether their variation in blood pressure showed a difference in blood pressure values. We also compared AOBP measurements with daytime ambulatory blood pressure monitoring and conventional office readings. The mean age of the studied population was  $56 \pm 12$  years, and 53.4% of participants were male. Bland–Altman analysis revealed a bias (ie, mean of the differences) of  $0.6 \pm 6$  mm Hg systolic for attended AOBP compared with unattended and  $1.4 \pm 6$  and  $0.1 \pm 6$  mm Hg bias for attended compared with unattended systolic AOBP when measurements were performed before and after conventional readings, respectively. A small bias was observed when unattended and attended systolic AOBP measurements were compared with daytime ambulatory blood pressure monitoring ( $1.3 \pm 13$  and  $0.6 \pm 13$  mm Hg, respectively). Biases were higher for conventional OBP readings compared with unattended AOBP ( $-5.6 \pm 15$  mm Hg for unattended AOBP and oscillometric OBP measured by a physician,  $-6.8 \pm 14$  mm Hg for unattended AOBP and oscillometric OBP measured by a nurse, and  $-2.1 \pm 12$  mm Hg for unattended AOBP and auscultatory OBP measured by a second physician).

**Conclusions**—Our findings showed that independent of the presence or absence of medical staff, AOBP readings revealed similar values that were closer to daytime ambulatory blood pressure monitoring than conventional office readings, further supporting the use of AOBP in the clinical setting. (*J Am Heart Assoc.* 2018;**7**:e008994. DOI: 10.1161/JAHA.118.008994.)

**Key Words:** automated office blood pressure • conventional office blood pressure readings • daytime ambulatory blood pressure

The diagnosis of hypertension has recently been based on 24-hour ambulatory blood pressure monitoring (ABPM) and home blood pressure (BP) rather than conventional office BP (OBP) measurements. This preference was based on evidence that OBP is a relatively poor technique for evaluating cardiovascular risk compared with out-of-office measurements.

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The automated OBP (AOBP) technique, methodology adopted in SPRINT (Systolic Blood Pressure Intervention Trial),<sup>1</sup> used a fully automated oscillometric device with the patient sitting alone in the examination room for 5 minutes, after which 3 readings were taken automatically at 1-minute intervals with all 3 values averaged. In so doing, human involvement was reduced to the minimum, eliminating the “white coat effect,” and AOBP readings correlated more closely with those of ABPM than conventional office recordings.<sup>2</sup> Because the advancement in AOBP technology has enhanced its usefulness, the manual sphygmomanometer technique could be replaced by AOBP.<sup>3</sup> It has been shown previously that, in contrast to casual BP, mean AOBP readings obtained in different clinical settings were not only comparable with mean daytime ABPM values, but also their values had little variation from visit to visit.<sup>4,5</sup>

Furthermore, both AOBP and daytime ambulatory BP have been shown to correlate better with left ventricular mass, microalbuminuria, and intima–media thickness of the carotid

## Clinical Perspective

### What Is New?

- The present study compares automated office blood pressure (AOBP) readings taken with and without the presence of medical personnel and before and after conventional office readings to determine any difference in BP values; furthermore, a comparison of AOBP values to daytime ambulatory blood pressure monitoring and conventional office measurements was also performed.
- Comparison of AOBP measurements, attended and unattended, showed similar values.
- There was a higher bias between conventional readings and AOBP as opposed to the mean difference between AOBP measurements and daytime ambulatory blood pressure monitoring.

### What Are the Clinical Implications?

- The present study compared AOBP, attended and unattended, taken either before or after conventional readings and AOBP and daytime ambulatory blood pressure monitoring and showed comparable results.
- In contrast, higher blood pressure values were obtained with conventional office readings.

artery than conventional clinical readings.<sup>6–8</sup> In addition to SPRINT, AOBP has also been used for cardiovascular outcomes in a Canadian study of older community-dwelling people followed up for an average of 4.6 years. In this study, AOBP values of 110 to 119 mm Hg were associated with lower cardiovascular risk.<sup>9</sup> We have also reported previously that AOBP predicts cardiovascular events equally well to other BP measurement techniques.<sup>10</sup>

Although the method for measuring BP in SPRINT was designed to obtain the true baseline BP of the patient, unaffected by external factors such as white coat effect or observer influences, the BP methods used in SPRINT were strongly criticized by some seasoned authors in Europe.<sup>11</sup> This criticism was focused on 2 points: (1) In a significant number of cases, a nurse remained in the room; and (2) the original SPRINT publication did not describe in details of the exact procedure followed for the measurement of BP. In fact, as presented at the American Heart Association meeting, the participant was left alone only during the rest period in 1746 cases and only during the BP readings in 570 cases, whereas in 2247 cases, a healthcare professional was in the room for the entire BP measurement.<sup>12</sup> It appears that data comparing head-to-head BP readings with the nurse present or absent, taken either before or after the conventional office measurements, are lacking in the recent literature, and thus the validity of AOBP remains ambiguous.

Taking these issues into account, we conducted this method comparison study. The aim of the study was to investigate the agreement between AOBP readings, recorded in the presence or absence of a nurse, and to compare those values with conventional OBP and daytime ambulatory BP readings. Although OBP and ambulatory BP readings do not purport to measure the same quantity, it is essential to establish how close their numerical values are.

## Methods

The data that support the findings of this study will be made available from the corresponding author on reasonable request.

## Study Participants

We evaluated all patients referred for hypertension by their family physicians to the Hypertension Center at Evangelismos General Hospital in Athens, Greece. Both treated and untreated hypertensive patients were considered for inclusion in the study. The only exclusion criterion was inability to adequately use the ambulatory BP measurement device. Written informed consent was obtained, and the study was approved by the scientific board of the hospital.

## BP Measurements

Six types of BP readings were obtained at a single visit, using validated monitors:

1. Unattended AOBP: the average of 3 readings at 1-minute intervals after a 5-minute resting period in the examination room, using the fully automated Omron-HEM 907 sphygmomanometer. Participants were alone during the 5-minute resting period and the 3 measurements.
2. Attended AOBP: the average of 3 readings at 1-minute intervals after a 5-minute resting period in the examination room, using the fully automated Omron-HEM 907 sphygmomanometer. The study nurse was present during the 5-minute resting period and the 3 measurements.
3. OBP measurements taken by a nurse: the average of 3 consecutive readings taken with the digital oscillometric Microlife BP A100 device (Microlife AG). Readings were taken during the same visit with 1-minute intervals between readings. Participants remained seated for 5 minutes before OBP was measured and were asked to refrain from speaking during measurements.
4. OBP measurements taken by a physician, as described in reading type 3.
5. OBP measurements taken by another physician using the auscultatory technique with the Welch-Allyn Maxi Stabil 3

BP monitor; the same steps were taken as in reading types 3 and 4.

6. ABPM over 24 hours, with the Microlife Watch BP O3 device: Measurements were taken at 20-minute intervals for 24 hours, and study participants were instructed to remain still with the forearm extended during each BP reading. ABPM recordings with <16 valid daytime readings and <6 asleep were excluded. Daytime and nighttime periods were defined according to the patients' diaries (daytime and asleep periods). All valid daytime readings were averaged to provide a single daytime ABPM value per study participant.

The order of the office measurements was as follows: Automated and conventional measurements were taken in alternating sequence in successive participants (ie, AOBP taken first and OBP afterward in a given participant, and vice versa, in the subsequent patient). In addition, within each modality, the order was again alternated between attended and unattended AOBP and between the 2 oscillometric and the auscultatory OBP techniques. This was done to minimize a potential order effect on the measured BP values. With its modality, all BP measurements were taken by the same study nurse or study physician in every occasion. As a final precaution, the nurse and the physicians from the study team were not informed of each other's measured BP values. Appropriate bladder size was used in all instances, and training and assessment of observers for accurate BP measurement were ensured. For all office BP measurements (automated and conventional readings), participants were seated on an upright chair with arms supported by adjustable armrests at heart level and with feet uncrossed on the floor.

### Statistical Analyses

Continuous variables are reported as mean±SD. Frequencies are given as percentages. We compared agreement between BP measurements in 2 ways: We used the method of Bland and Altman with bias (defined as the mean value of the differences) and 95% limits of agreement with their confidence intervals; in addition, we calculated the intraclass correlation coefficient. Because the devices do not retain the replicate measurements but provide only the average, the study follows a paired measurements design. We used IBM SPSS version 22.0 and MedCalc statistical software version 17.11.5 for data analysis.

### Results

A total of 146 participants were included in the study, 78 men and 68 women, with a mean age of 56±12 years (47%

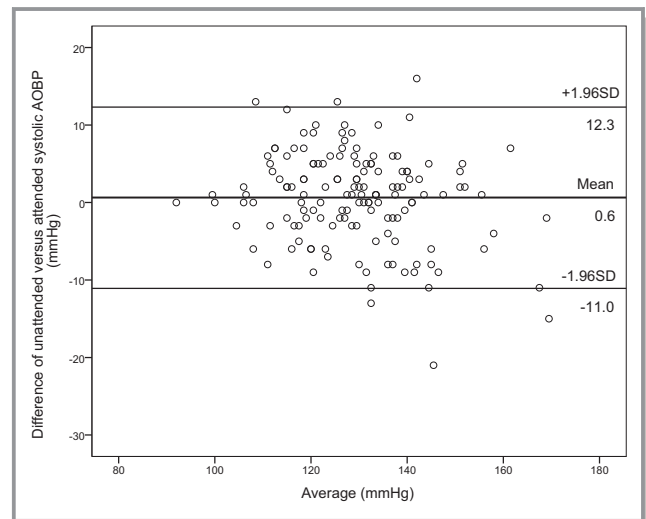
**Table 1.** Study Population

| Characteristics, N=146  | Result       |
|---|--------------|
| Sex, n (%)  |              |
| Male  | 78 (53.4)    |
| Female  | 68 (46.6)    |
| Age, y  | 56±12        |
| Mean BP, mm Hg  |              |
| Oscillometric OBP, systolic/diastolic (measured by a physician) | 135±17/84±12 |
| Oscillometric OBP, systolic/diastolic (measured by a nurse)     | 136±17/84±13 |
| Auscultatory OBP, systolic/diastolic (measured by a physician)  | 132±6/83±11  |
| AOBP, systolic/diastolic, attended                              | 129±15/78±13 |
| AOBP, systolic/diastolic, unattended                            | 129±14/79±13 |
| Daytime average systolic/diastolic (ABPM)                       | 128±13/79±11 |

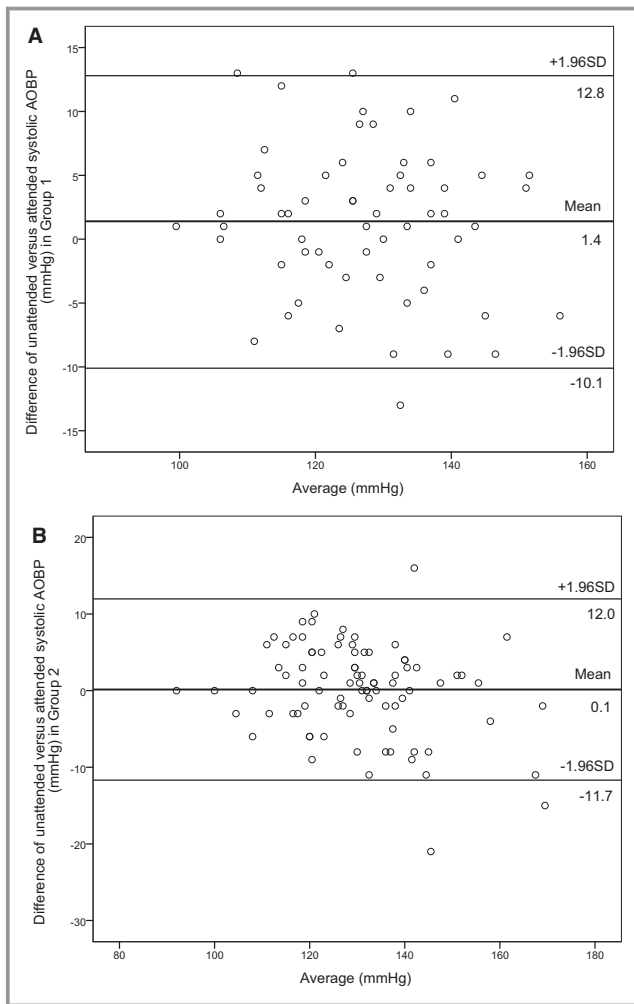
Data shown as mean±SD except as noted. ABPM indicates ambulatory blood pressure monitoring; AOBP, automated office blood pressure; BP, blood pressure; OBP, office blood pressure.

treated). Their clinical characteristics and their BP measurements are shown in Table 1.

We present Bland–Altman plots for systolic BP only. The lines indicate the bias and the upper and lower 95% limits of agreement for the compared methods. The comparison of unattended and attended AOBP is given in Figure 1. There was a positive bias for the mean systolic attended AOBP of 0.6±6 mm Hg with 95% limits of agreement of −11.0 to 12.3 mm Hg.



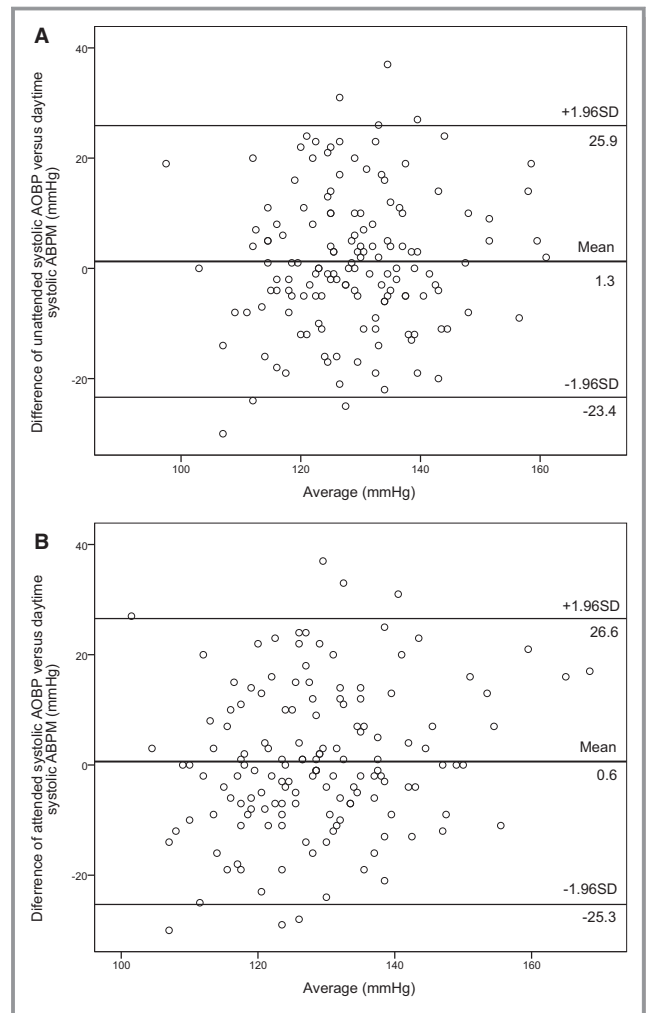
**Figure 1.** Bland–Altman plot comparing unattended and attended systolic AOBP (mm Hg) in the studied population. Solid lines, mean bias; dashed lines, 95% limits of agreement. AOBP indicates automated office blood pressure.



**Figure 2.** Bland-Altman plots comparing unattended and attended systolic AOBP (mm Hg) in the group 1 (A) and in the group 2 (B). Solid lines, mean bias; dashed lines, 95% limits of agreement. In Group 1 AOBP was the first measurement performed in the studied population. In Group 2 AOBP was the last measurement performed in the studied population. AOBP indicates automated office blood pressure.

In Figure 2, the comparison of unattended and attended AOBP is given separately for the participants who had it measured before and after the conventional measurements. Specifically, for mean systolic unattended AOBP, a positive bias of  $1.4 \pm 6$  mm Hg with 95% limits of agreement of  $-10.1$  to  $12.8$  mm Hg was found when AOBP measurements were performed before conventional measurements and  $0.1 \pm 6$  mm Hg with 95% limits of agreement  $-11.7$  to  $12.0$  mm Hg when they were performed after the conventional measurements.

Plots for the comparison of each AOBP modality with the daytime ambulatory measurements are given in Figure 3. The 95% limits of agreement with their 95% confidence intervals for systolic and diastolic BPs are given in Tables 2 and 3.



**Figure 3.** Bland-Altman plots comparing unattended systolic AOBP (mm Hg) and daytime systolic ABPM (mm Hg) (A) and attended systolic AOBP (mm Hg) and daytime systolic ABPM (mm Hg) (B). Solid lines, mean bias; dashed lines, 95% limits of agreement. ABPM indicates ambulatory blood pressure monitoring; AOBP, automated office blood pressure.

The intraclass correlation coefficient for systolic attended and unattended AOBP was 0.954 ( $P < 0.001$ ; 95% confidence interval, 0.936–0.967). Similarly high coefficients were found when AOBP was performed either before or after the conventional OBP measurements. The intraclass correlation coefficients for all sets of systolic BP measurements are shown in Table 4.

## Discussion

This study compared the values between AOBP readings taken in the presence and the absence of the nurse and AOBP taken as either the first or the last measurement. Moreover, these measurements were evaluated against daytime ABPM

**Table 2.** Comparison of Systolic AOBP, Conventional OBP, and Ambulatory BP

| BP Methods                                  | Bias | 95% CI       | Lower 95% LoA | 95% CI         | Upper 95% LoA | 95% CI    |
|---|------|--------------|---------------|----------------|---------------|-----------|
| Unattended AOBP vs attended AOBP            | 0.6  | −0.3 to 1.6  | −11.0         | −12.7 to −9.37 | 12.3          | 10.6–13.9 |
| Unattended AOBP vs attended AOBP (group 1)* | 1.4  | −0.2 to 3.0  | −10.1         | −12.7 to −7.5  | 12.8          | 10.2–15.4 |
| Unattended AOBP vs attended AOBP (group 2)† | 0.1  | −1.2 to 1.4  | −11.7         | −14.0 to −9.5  | 12            | 9.7–14.2  |
| Unattended AOBP vs daytime ABPM             | 1.3  | −0.8 to 3.3  | −23.4         | −26.9 to −19.9 | 25.9          | 22.4–29.4 |
| Attended AOBP vs daytime ABPM               | 0.6  | −1.5 to 2.8  | −25.3         | −29.0 to −21.6 | 26.6          | 22.9–30.3 |
| Physician oscillometric‡ vs daytime ABPM    | 6.9  | 4.6 to 9.2   | −20.4         | −24.3 to −16.5 | 34.1          | 30.2–38.0 |
| Nurse oscillometric§ vs daytime ABPM        | 8.1  | 5.9 to 10.3  | −18.6         | −22.4 to −14.8 | 34.8          | 31.0–38.6 |
| Physician auscultatory   vs daytime ABPM    | 3.4  | 0.9 to 5.9   | −26.2         | −30.4 to −22.0 | 33.0          | 28.8–37.3 |
| Unattended AOBP vs physician oscillometric‡ | −5.6 | −8.0 to −3.2 | −34.0         | −38.0 to −30.0 | 22.8          | 18.8–26.9 |
| Unattended AOBP vs nurse oscillometric§     | −6.8 | −9.1 to −4.6 | −34.1         | −38.0 to −30.2 | 20.4          | 16.5–24.4 |
| Unattended AOBP vs physician auscultatory   | −2.1 | −4.2 to −0.1 | −26.2         | −29.7 to −22.7 | 21.9          | 18.4–25.3 |
| Attended AOBP vs physician oscillometric‡   | −6.2 | −8.6 to −3.9 | −34.6         | −38.7 to −30.6 | 22.2          | 18.1–26.2 |
| Attended AOBP vs nurse oscillometric§       | −7.5 | −9.7 to −5.3 | −33.9         | −37.7 to −30.1 | 18.9          | 15.2–22.7 |
| Attended AOBP vs physician auscultatory     | −2.8 | −4.7 to −0.8 | 26.2          | −29.5 to −22.9 | 20.6          | 17.3–24.0 |

ABPM indicates ambulatory blood pressure monitoring; AOBP, automated office blood pressure; BP blood pressure; CI, confidence interval; LoA, limits of agreement; OBP, office blood pressure.

\*In group 1, AOBP was the first measurement performed in the studied population.

†In group 2, AOBP was the last measurement performed in the studied population.

‡The average of 3 consecutive readings taken with the digital oscillometric Microlife BP A100 device during the same visit with 1-minute intervals between readings. Participants remained seated for 5 minutes before OBP was measured and were asked to refrain from speaking during measurements. Measurements were taken by a physician.

§The average of 3 consecutive readings taken with the digital oscillometric Microlife BP A100 device during the same visit with 1-minute intervals between readings. Participants remained seated for 5 minutes before OBP was measured and were asked to refrain from speaking during measurements. Measurements were taken by a nurse.

||OBP measurements taken by another physician using the auscultatory technique. BP was calculated from the average of 3 consecutive readings taken during the same visit with 1-minute intervals between readings. Participants remained seated for 5 minutes before OBP was measured and were asked to refrain from speaking during measurements.

and conventional OBP. Our findings show similar BP values between AOBP readings recorded regardless of the presence of the nurse, whereas conventional OBP had higher values, independent of who took the measurement (the nurse or the doctor). The mean difference between the 2 systolic AOBP measurements (in the presence and absence of the nurse) was on the order of 1 mm Hg, suggesting similar quality values for this technique when the patient rests for 5 minutes in a quiet examining room before the sphygmomanometer takes 3 readings at 1-minute intervals. This finding suggests that regardless of whether AOBP readings are recorded, with or without the presence of healthcare personnel, the measurements are obtained without any active involvement of the medical staff. It is of note that systolic AOBP, attended and unattended, taken either before or after the office readings had a negligible difference on average; however, the scatter plots show significant individual variance. In any case, the individual variance of the conventional measurements is much larger.

SPRINT findings, in which BP measurements were taken with or without staff present, are largely comparable to the results of our study, which determines variation in BP measurement techniques. Similarly, no differences were observed among BP values independent of whether BP measurements were performed in the presence or absence

of healthcare professionals.<sup>12</sup> We believe that the novelty of SPRINT in BP measurement is that having 5 minutes of rest before performing 3 BP readings can avoid falsely elevated BP values, a common finding in routine clinical practice. Our findings are timely because they give an insight into the great SPRINT debate that was raised after the publication of this trial regarding the BP measurement protocol that was followed by the researchers. A recent study showed similar results when AOBP readings were taken in the presence or absence of staff in general practitioners' offices.<sup>13</sup> Moreover, Filipovský et al suggested that unattended systolic OBP was not only lower than manual OBP but also 6 mm Hg lower than home BP.<sup>14</sup> It is well known that in the clinical setting, the more you check the BP, the lower it becomes. Consequently, to avoid AOBP readings becoming subject to the "order effect," AOBP measurements for half the patients were taken after conventional office readings, whereas for the other half, they were taken beforehand. No difference in systolic AOBP values was found between values registered before or after conventional office measurements. This suggests that because AOBP readings were taken before the attended oscillometric readings, the white coat effect and anxiety experienced by some patients when readings are taken by a health professional were eliminated during the 5-minute



**Table 3.** Comparison of Diastolic AOBP, Conventional OBP, and Ambulatory BP

| BP Methods                                  | Bias | 95% CI       | Lower 95% LoA | 95% CI         | Upper 95% LoA | 95% CI    |
|---|------|--------------|---------------|----------------|---------------|-----------|
| Unattended AOBP vs attended AOBP            | 0.2  | −0.5 to 0.8  | −7.8          | −8.9 to −6.7   | 8.2           | 7.0–9.3   |
| Unattended AOBP vs attended AOBP (group 1)* | 0.7  | −0.5 to 1.9  | −8.3          | −10.4 to −6.3  | 9.7           | 7.7–11.8  |
| Unattended AOBP vs attended AOBP (group 2)† | −0.2 | −0.9 to 0.6  | −7.4          | −8.7 to −6.0   | 6.9           | 5.6–8.3   |
| Unattended AOBP vs daytime ABPM             | −0.5 | −2.3 to 1.2  | −21.2         | −24.1 to −18.2 | 20.1          | 17.1–23.0 |
| Attended AOBP vs daytime ABPM               | −0.7 | −2.5 to 1.0  | −21.8         | −24.7 to −18.7 | 20.3          | 17.3–23.3 |
| Physician oscillometric‡ vs daytime ABPM    | 4.6  | 3.3 to 6.0   | −11.0         | −13.3 to −8.8  | 20.4          | 18.2–22.6 |
| Nurse oscillometric§ vs daytime ABPM        | 4.7  | 3.5 to 6.1   | −11.1         | −13.4 to −8.8  | 20.7          | 18.4–22.9 |
| Physician auscultatory   vs daytime ABPM    | 3.8  | 2.2 to 5.4   | −15.8         | −18.6 to −12.9 | 23.4          | 20.6–26.2 |
| Unattended AOBP vs physician oscillometric‡ | −5.2 | −6.9 to −3.5 | −25.7         | −28.7 to −22.8 | 15.3          | 12.4–18.2 |
| Unattended AOBP vs nurse oscillometric§     | −5.3 | −6.9 to −3.7 | −24.7         | −27.7 to −22.2 | 14.3          | 11.5–17.1 |
| Unattended AOBP vs physician auscultatory   | −4.4 | −5.7 to −3.0 | −20.5         | −22.8 to −18.2 | 11.7          | 9.5–14.1  |
| Attended AOBP vs physician oscillometric‡   | −5.4 | −7.1 to −3.7 | −25.9         | −28.9 to −23.0 | 15.2          | 12.3–18.1 |
| Attended AOBP vs nurse oscillometric§       | −5.5 | −7.1 to −3.8 | −25.3         | −28.2 to −22.5 | 14.3          | 11.5–17.2 |
| Attended AOBP vs physician auscultatory     | −4.5 | −5.9 to −3.1 | −21.2         | −23.6 to −18.8 | 12.1          | 9.7–14.5  |

ABPM indicates ambulatory blood pressure monitoring; AOBP, automated office blood pressure; BP blood pressure; CI, confidence interval; LoA, limits of agreement; OBP, office blood pressure.

\*In group 1, AOBP was the first measurement performed in the studied population

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||OBP measurements taken by another physician using the auscultatory technique. BP was calculated from the average of 3 consecutive readings taken during the same visit with 1-minute intervals between readings. Participants remained seated for 5 minutes before OBP was measured and were asked to refrain from speaking during measurements.

resting period. The necessity of the resting period before BP measurements with the patient alone has been emphasized by Armstrong et al, who yielded an average of 10/7 mm Hg lower BP values than those of routine clinical practice when the patient rested alone during the whole time of resting and measurements, independent of whether measurements were performed with or without an automated office device.<sup>15</sup>

In our study, the agreement between AOBP and daytime ABPM was significantly better than conventional office

readings. Mean AOBP was 129/79 mm Hg compared with a mean daytime ABPM of 128/79 mm Hg, whereas oscillometric result was 134/84 mm Hg and the auscultatory result was 132/83 mm Hg, suggesting that AOBP is a more accurate technique than conventional office measurements in the evaluation of an individual’s true BP status. Our findings concur with previous results showing similar values for mean AOBP and daytime ABPM, with both values being significantly lower than conventional office readings; this also suggests

**Table 4.** Intraclass Correlation Coefficients for All Sets of Systolic BP Measurements

| BP Measurements  | ICC   | P Value | 95% CI      |
|--|-------|---------|-------------|
| AOBP unattended–AOBP attended  | 0.954 | <0.001  | 0.936–0.967 |
| AOBP unattended–AOBP attended (group 1)*                               | 0.946 | <0.001  | 0.910–0.968 |
| AOBP unattended–AOBP attended (group 2)†                               | 0.958 | <0.001  | 0.935–0.972 |
| AOBP unattended–OBP, systolic, measured by a physician (oscillometric) | 0.712 | <0.001  | 0.601–0.792 |
| AOBP unattended–OBP, systolic, measured by a nurse (oscillometric)     | 0.742 | <0.001  | 0.642–0.814 |
| AOBP unattended–OBP, systolic, measured by a physician (auscultatory)  | 0.796 | <0.001  | 0.717–0.853 |
| AOBP unattended–daytime, systolic, ABPM                                | 0.697 | <0.001  | 0.580–0.782 |

ABPM indicates ambulatory blood pressure monitoring; AOBP, automated office blood pressure; BP blood pressure; CI, confidence interval; ICC, intraclass correlation coefficient; OBP, office blood pressure

\*AOBP was performed before the other conventional OBP measurements (oscillometric and auscultatory).

†AOBP was performed last, after the other conventional OBP measurements (oscillometric and auscultatory).

that white coat hypertension was significantly more prevalent when routine OBP readings were analyzed.<sup>6,8,16,17</sup> Staessen et al reviewed 30 studies in which conventional office readings were compared with daytime ABPM in untreated patients with borderline or definite hypertension; their findings showed that mean OBP was 12/2 and 20/1 mm Hg higher, respectively, than the corresponding mean daytime ABPM.<sup>18</sup> The main issues of office measurements regarding the white coat effect, observer error, and bias problems are presented mainly by auscultatory devices; therefore, oscillometric devices are almost exclusively used for OBP measurement. AOBP is recommended as the preferable technique for OBP measurement by the Canadian Hypertension Education Program<sup>19</sup> and by the position statement of the European Society of Hypertension working group on BP monitoring and cardiovascular variability, which suggests it as a superior OBP measurement method.<sup>20</sup> The main limitation of our study is the unavailability of the replicated measurements made by the devices, as this would allow for more precise characterization of agreement. Furthermore, the relatively small sample size of the study population may limit generalization.

## Conclusion

AOBP readings had similar values when BP measurements were taken with or without medical staff. They are devoid of order effect and were comparable with daytime ABPM rather than conventional office values, suggesting AOBP as the technique of choice in an office setting.

## Perspectives

Based on the present results, AOBP taken with or without medical staff and before and after conventional office readings and daytime ABPM showed similar values. These findings confirm the validity of AOBP as the technique that could attenuate the white coat effect. The nonactive involvement of the medical staff and the 5-minute resting period before AOBP measurements are hypothesized as the reasons for these results and thus enhance AOBP's role.

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## Disclosures

None.

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