How Many Days, Which Period of the Day and How Many Measurements per Day are Recommended in Home Blood Pressure Monitoring?

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In 2001 the first Brazilian guidelines for the use of home monitoring of blood pressure (HMBP) were published. Those guidelines stated that although a number of HMBP protocols were in use at the time, there was no standard pattern. Recommendation was then for at least two measures in the morning - before medications and before breakfast -, and two in the evening - before dinner or three hours after dinner, in order to avoid post-prandial reduction of blood pressure (BP). The procedures should be carried out at least for three consecutive days of routine activities. First day measures should be disconsidered.[1]

The International Consensus Conference 2000 pointed out HMBP relevance, but added that it must be carried out after five minutes at rest.[2] In his book, Pickering claims the relevance of HMBP, but does not specify how many times, at what points in time and how to carry out HMBP.[3] Other guidelines and publications - VI JNC[4], VII JNC[5], WHO-ISH[6], and ESH-ESC[7] included – as well as the First International Consensus Conference on Self-Blood Pressure Measurement[8] do not specify procedure recommendations. However, all guidelines recommend HMBP morning and evening measures. At the American Society of Hypertension Ad Hoc Panel, Pickering recommended HMBP measuring everyday (whether on working days or not), but did not specify how it should be carried out[9].

For how many days should HMBP be measured?

In regard to the question of for how many days the exams must be carried out for the best HMBP mean values, high discrepancy is reported by studies in the literature. Some studies collect data on one single day[1,2]; others, in three or four days[3,4,5]; others, for at least one week[6,7,8,9,10] or even over one month.[11] Studies under analysis also show high divergence as to how many measures should be taken a day: a single morning measure, one[10,11], two[14,18,19], or three in the morning and in the evening[12,13,15,16].

How many measures per day?

HMBP reproductibility is directly correlated to the number of measures taken.[1] Chatellier et al have demonstrated that maximal reduction on SD of two HMBP means was obtained with thirty measures (ten consecutive days with three measures per day), and 80% of maximal reduction was obtained in five days (fifteen measures).

The first study specifically designed to specify the number of measures to be carried out for HMBP was that by Stergiou et al., carried out in 1998, with 189 hypertensives. The study reported that first day measures should be disconsidered, and that the last two days are necessary for better reproductibility, and more effective than measures at the doctor´s office. The same authors later confirmed those data, suggesting it would be necessary to have at least three days of monitoring (first day always discarded).

Recent guidelines published by the European Society of Hypertension Working Group on Blood Pressure Monitoring have suggested that values obtained on first HMBP measures must be excluded for the purpose of means calculation.[2]

While studying 74 elderly patients in a 10-day HMBP, Celis et al concluded that three days were necessary for stable BP meausres to be obtained through HMBP. Brook reviewed 12 studies on HMBP. While analyzing the variability of BP measures, the total number of measures, the total number per series, the number of series, and the number of days for HMBP, the author concluded that a small number of measures could be obtained, and a simplified protocol of 2 measures a day could be used.[3]

In a study by Ohkubo et al – carried out with a Japanese population at Ohasama, involving 1,491 [3] 40 year-old

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patients under a mean follow-up period of 10.6 years – predictive value was higher with highest number of measures taken, reaching up 35% risk increase for CVA with HMBP increase of 10 mmHg. One most interesting finding was that out-of-the-doctor´s office measure reported significant increase of CVA risk when compared to conventional BP measure (average from two measures at the office), with a 19% risk increase for CVA due to initial 10 mmHg increase in HMBP, and 8% increase for office measure of systolic BP, respectively. The analysis of such findings leads to the recommendation of preferably using over 14 measures. It is important to emphasize that HMBP holds higher predictive value for the risk of CVA if compared to conventional BP measuring, even with reduced number of measures.

Chatellier et al suggest fifteen HMBP measures as recommended, with the possibility of a higher number. Stergiou et al, in their turn, suggest 12 measures. Guidelines issued by the European Society of Hypertension Working Group on Blood Pressure Monitoring recommend 2 measures in the morning and in the evening, for 7 days, with first day disconsidered, and mean values based on 24 measures (six days).

Conclusion

In order to determine the optimal number of measures for HMBP, additional information is made necessary, especially in regard to cardiovascular diseases. In the authors' opinion, HMBP should comply with the following protocol: (a) to be carried out on representative, working days; (b) to schedule one day for delivery of equipment and orientation to patient and/or person accompanying patient; (c) to be kept for four monitoring days; (d) to include two series per day – morning and evening – (preferably before breakfast and before dinner, or two hours following meals and before medications); (e) to take three measures per series (after three minutes at rest, with one minute interval between measures); (f) to disconsider first day monitoring measures due to alarm reaction; (g) to perform a total of 18 valid measures to calculate mean values; and (h) to accept a lower number of valid measures provided not under 12 measures, with all days having been represented.

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