

Review Article

Advocating Home Blood Pressure Monitoring in Improving Hypertension Control in the Philippines

Raymond V. Oliva

Department of Medicine, Section of Hypertension, Philippine General Hospital, Manila, Philippines

Abstract

Obtaining a target goal blood pressure (BP) is crucial in the management of hypertension so as to prevent cardiovascular disease, kidney failure, and stroke. Home BP monitoring is one method to achieve target pressure and has the potential to improve the outcomes of hypertensive patients. Several advantages have been identified with the use of home monitoring, particularly in properly diagnosing white coat and masked hypertension. Studies have shown that home monitoring significantly reduce BPs, may improve compliance and lessen therapeutic inertia. It has a significant correlation with cardiovascular risk factors and appropriate control may reduce mortality. The downside in the use of home monitoring is the cost of validated automatic machines, which may be expensive for Filipino patients. Despite that limitation, home monitoring of BP may be incorporated into the care for Filipino patients with hypertension.

Key words: Ambulatory blood pressure monitoring, home blood pressure monitoring, hypertension, office blood pressure monitoring

Introduction

High blood pressure (BP) is the most common modifiable cardiovascular risk factor worldwide. Guidelines have been formulated all over the world addressing the issue of hypertension; however, the control rates for hypertension remains discouraging, particularly in the Philippines. In the latest National Nutrition and Health Survey, the prevalence of hypertension in the Philippines is 22.3% and is highest in individuals more than 70 years old. The problem with the survey that measurement was based only on single measurements done in doctors' clinics.^[1] The use of conventional measurement of BP done in the office BP monitoring (OBPM) has been the norm in the diagnosis and management, but this method has downsides, particularly of white coat hypertension and masked hypertension, which are quite common for both untreated and treated hypertensives. The reliability of OBPM is questioned with issues such as the unstandardized setting and conditions of clinics, observer bias and errors, and the small number of readings. There is also a discordance in the measurements of OBPM compared

to out-of-office BP (OBP) measurements which could have an effect on the "true underlying BP reading" of the individual.^[2]

Home BP monitoring (HBPM) refers to the measurement of BP at home, ideally by the individual. It is optimal when the patient is seated at rest at around the same time in the morning and evening, usually a period of 1 week.^[2,3] The readings are recorded using a validated, automated BP device and are then conveyed to the physician for interpretation. This method is appealing to most patients and can lead to more awareness and control of their hypertension. HBPM allows standardization of conditions, leading to little measurement variability and reproducibility of readings. Home BP (HBP) measurements can easily identify patients with white coat, masked, and sustained hypertension. HBPM is also widely available and can provide day-to-day BP variability values.^[3-5] Despite the several advantages of HBP measurements, it has yet to gain popularity in the Philippines due to the cost of the automated BP machines, lack of patient training, and the preferential use of OBP of physicians.

Address for correspondence:

Raymond V. Oliva, FPCP, Department of Medicine, Section of Hypertension, Philippine General Hospital, Taft Avenue, Manila, Philippines. Tel.: +63 977 822 5632. E-mail: rvoliva@up.edu.ph

Received: 02-05-2019; Accepted: 16-05-2019

doi: 10.15713/ins.john.0154



HBPM and its Impact in Cardiovascular Disease

Out-of-OBP readings taken multiple times have a better predictive value than OBPM regarding BP-related outcomes. Compared with clinic BP, HBPM has stronger associations with target organ disease. A meta-analysis examined the association of HBPM versus OBPM and ABPM, and analysis of the 10 studies included showed that HBPM has a stronger correlation with echocardiographic left ventricular mass index compared to OBPM.^[6] Another meta-analysis demonstrated that HBPM is a stronger determinant of proteinuria than OBPM.^[7]

The ultimate objective for a diagnostic method to assess a cardiovascular risk factor is its ability to predict future cardiovascular events. In prospective studies included in a meta-analysis of about 17,000 patients, HBPM showed to be superior to OBPM and is a significant predictor of cardiovascular mortality.^[8] In the international database of HBP in relation to cardiovascular outcome study, participants with optimal or normal OBPM, hazard ratios for a composite cardiovascular endpoint associated with a 10 mmHg higher systolic HBPM were 1.28 and 1.22, respectively. At high-normal OBPM and in mild hypertension, the hazard ratios were at about 1.20 for all cardiovascular events and 1.30 for stroke. HBPM has an independent prognostic value for cardiovascular morbidity and allows for a more accurate risk stratification than OBPM.^[9]

HBPM for Detection of White Coat and Masked Hypertension

The use of the 24 h ambulatory BP monitoring (24 h ABPM) is considered the gold standard in determining white coat or masked hypertension. White coat hypertension is defined in the latest report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines^[10] as higher OBP measurements than out-of-OBP readings and is considered significant if BP readings are >20/10 mmHg higher than HBPM or 24-h ABPM. Masked hypertension, on the other hand, is defined as controlled OBP readings but uncontrolled out-of-OBP settings. The risk for cardiovascular disease and all-cause mortality with masked hypertension is similar to that with sustained hypertension and about twice as high in the abovementioned risk with normotensive patients. The inaccessibility of a 24-h ABPM in most clinics in the Philippines makes HBPM the ideal method in detecting white coat and masked hypertension. Both methods employ multiple measurements in the usual environment of each individual; however, there are a few differences. HBPM is performed while the patient is seated and has rested for a few minutes, while the ABPM is performed in fully ambulatory conditions and postures at home, work, or during sleep. However, despite these differences, average HBPM and daytime ABPM appear to have similar thresholds and diagnostic accuracy for white coat and masked hypertension.^[10]

HBPM and its Impact in BP Control

Patients who are monitoring their BP at home have been shown to improve control, with the use of HBPM associated with significant reductions in systolic and diastolic BP and reductions in antihypertensive medications compared to usual care.^[11] Advocating HBPM in hypertensive patients has reduced therapeutic inertia, which is defined as unchanged medications despite the elevation of BP. However, simple home monitoring is not enough in BP control of patients. There should be interaction between the patient and their doctor. Telemonitoring has been utilized when doing HBPM, whereby the BP readings are instantly relayed to a primary health-care professional who can guide treatment along a predetermined algorithm. The use of telemonitoring avoids travel for the patient and saves time for the health-care team. There are some small studies suggesting that the use of HBPM may improve adherence of patients to their medications, but guidelines, such as the UK NICE guidelines, still recommend a 24-h ABPM.^[11]

Cost-effectiveness of HBPM

The only issue in the use of HBPM in the Philippines is the cost of the validated automatic BP machines. There is no health economic assessment using HBPM in the country. There is a strong call to create such studies, particularly in an out-of-pocket economy like ours. There are data in other countries, where HBPM has been shown to be cost neutral after taking into account the number of consultations, drugs, referrals, equipment, and training expenses.^[12] However, it is cost effective in terms of reduced medication and insurance savings, particularly in patients identified with white coat hypertension. A meta-analysis showed that HBPM may be associated with lower medical cost but may be offset by equipment and technology costs related to telemonitoring.^[2] Telemonitoring is not available in the Philippines.

Procedures for Using HBPM

The latest American College of Cardiology/American Heart Association (ACC/AHA) guidelines for hypertension have outlined the steps in conducting BP readings at home. It is recommended that the individual should be trained by their physicians regarding information about hypertension and how to select the appropriate equipment to use. The patient should also realize that there might be variability in individual results. The physician must also educate the patient to interpret the results.^[10]

The automated device should be verified and validated. The use of auscultatory devices is not recommended as the patients may not master the technique necessary for measuring of BP. The appropriate cuff size must fit in the arm, and interarm differences are significant. If the differences are significant, the arm with the higher readings should be used.^[10]

During the procedure, the patient must remain still and avoid smoking, exercising, or drinking coffee within 30 min before BP

measurements. The patient must be able to rest at least 5 min before doing the measurements. The patient should sit correctly, with his back straight and supported, feet flat on the floor and uncrossed, and the arm supported on a flat surface. Ideally, multiple BP readings, at least two readings 1 min apart before taking medications and in evening before supper, should be taken. The BP should be recorded accurately and be obtained at least 2 weeks after a change in the treatment regimen and during the week before a clinic visit.^[10]

Conclusion

OBP measurements are necessary in diagnosing hypertension, but HBPM may be a necessary adjunct in establishing and monitoring BP trends and differentiating white coat and masked hypertension. We advocate the use of HBPM in Filipino hypertensive patients but should take consideration the cost of the validated machines.

References

1. Castillo R. Prevalence and management of hypertension in Southeast Asia. *J Hypertens* 2016;Suppl 1:e4.
2. Sharman JE, Howes FS, Head GA, McGrath BP, Stowasser M, Schlaich M, *et al*. Home blood pressure monitoring: Australian expert consensus statement. *J Hypertens* 2015;33:1721-8.
3. George J, MacDonald T. Home blood pressure monitoring. *Eur Cardiol* 2015;10:95-101.
4. Padfield PL. The case for home monitoring in hypertension. *BMC Med* 2010;8:55.
5. Sebo P, Pechère-Bertschi A, Herrmann FR, Haller DM, Bovier P. Blood pressure measurements are unreliable to diagnose hypertension in primary care. *J Hypertens* 2014;32:509-17.
6. Ward AM, Takahashi O, Stevens R, Heneghan C. Home measurement of blood pressure and cardiovascular disease: Systematic review and meta-analysis of prospective studies. *J Hypertens* 2012;30:449-56.
7. Agarwal R, Andersen MJ. Prognostic importance of clinic and home blood pressure recordings in patients with chronic kidney disease. *Kidney Int* 2006;69:406-11.
8. Cappuccio FP, Kerry SM, Forbes L, Donald A. Blood pressure control by home monitoring: Meta-analysis of randomised trials. *BMJ* 2004;329:145.
9. Nomura K, Asayama K, Thijs L, Niiranen TJ, Lujambio I, Boggia J, *et al*. Thresholds for conventional and home blood pressure by sex and age in 5018 participants from 5 populations. *Hypertension* 2014;64:695-701.
10. Whelton PK, Carey RM, Aronow WS, Casey DE Jr, Collins KJ, Himmelfarb CD, *et al*. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation and management of high blood pressure in adults. *Hypertension* 2017;71:e13-115.
11. Agarwal R, Bills JE, Hecht TJ, Light RP. Role of home blood pressure monitoring in overcoming therapeutic inertia and improving hypertension control: A systematic review and meta-analysis. *Hypertension* 2011;57:29-38.
12. Lovibond K, Jowett S, Barton P, Caulfield M, Heneghan C, Hobbs FD, *et al*. Cost-effectiveness of options for the diagnosis of high blood pressure in primary care: A modelling study. *Lancet* 2011;378:1219-30.

How to cite this article: Oliva RV. Advocating Home Blood Pressure Monitoring in Improving Hypertension Control in the Philippines. *Hypertens* 2019;5(2):58-60.

Source of support: Nil, **Conflict of interest:** None

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Oliva RV. 2019