Home Blood Pressure Monitoring

Summary and conclusions

**SBU’s appraisal of the evidence**

Home blood pressure monitoring, as referred to in this assessment, is performed by patients themselves using automated devices at home. Office blood pressure monitoring refers to the conventional way of managing treatment by measuring blood pressure in a clinical setting.

- In people with hypertension, home blood pressure monitoring is equally effective as office monitoring to guide antihypertensive medications. Patients take prescribed medications to the same extent, and reductions in blood pressure are similar.\(^1\)

- Home blood pressure appears to be at least as accurate as office blood pressure in predicting risks of mortality and cardiovascular disease. However, home blood pressure monitoring is not shown to be better or worse than office monitoring in guiding treatment to reduce the risk of mortality and cardiovascular disease.

- Home blood pressure monitoring can save costs in health care since it lowers the number of clinic visits compared to conventional treatment of hypertension. The cost or cost-effectiveness of the method cannot be accurately analyzed due to a lack of knowledge on the long-term use of the method.

- Home blood pressure monitoring could have both advantages and disadvantages for the patient. Although the method can be more convenient, this must be weighed against the greater responsibility placed on the patient, which could induce anxiety or lead to other problems. Scientific evidence on these issues is, however, lacking. The use of home blood pressure monitoring should be preceded by an individual assessment of motivation and appropriateness.

**Technology and target group**

According to office blood pressure, approximately 1.8 million people in Sweden suffer from hypertension. This corresponds to 27% of the adult population. Medications and changes in lifestyle are used in treating hypertension with the intent to reduce the incidence of cardiovascular diseases, mainly stroke, heart failure, and myocardial infarction.

The conventional way to monitor blood pressure in managing treatment is to take several measurements in the physician's office. In recent years, however, it has become increasingly common for patients to self-monitor their blood pressure at home. An advantage of home blood pressure monitoring is that patients do not need to visit the physician’s office every time their blood pressure needs to be measured. Other potential advantages are that home blood pressure monitoring can yield more reliable blood pressure values since it is possible to take readings at different times during the day, and stress reaction that leads to elevated blood pressure that some patients exhibit in the office can be avoided when measuring blood pressure at home. Potential disadvantages of the method include the greater responsibility placed on patients, which could induce anxiety, and also that some patients might change their treatment based on casual home measurements without doctor’s guidance. Hence, not everyone with hypertension is a candidate for home blood pressure monitoring, and the use of the method should be preceded by individual assessment of motivation and appropriateness.

Home blood pressure monitoring, as referred to in this assessment, is performed by patients themselves using automated electronic devices. As a rule, these devices use an oscillometric determination of the blood pressure and the equipment consists of a cuff and an electronic monitor that are connected by an air tube. The monitor registers variations in pressure, i.e., oscillations.

For blood pressures measured in the office the reference value for normal blood pressure is <140/90 mmHg. Since home blood pressures generally are lower than office blood pressures, the reference value for normal blood pressure at home is usually set as <135/85 mmHg.

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\(^1\) A prerequisite is that the target blood pressure is <135/85 mmHg in home blood pressure monitoring, compared to the normal reference value of <140/90 mmHg in office blood pressure monitoring.
Establishing a reference value for home blood pressure remains, however, a subject for research.

**Primary questions**

To determine the value of home blood pressure monitoring for patients with hypertension, this evaluation aims to answer the following questions:

- Can patients’ blood pressure be reduced more effectively if home blood pressure monitoring is used to guide treatment?
- How well do patients comply with antihypertensive pharmacotherapy if home blood pressure monitoring is used to guide treatment?
- What kind of symptoms do the patients experience if home blood pressure monitoring is used in managing antihypertensive pharmacotherapy?
- What costs are associated with home blood pressure monitoring? What is the cost-effectiveness of the method?

To determine the value of home blood pressure monitoring as regards the risk of mortality and cardiovascular disease, this assessment aims to answer the following question:

- Regarding mortality and the risk of cardiovascular disease, does home blood pressure provide better prognostic information than blood pressures measured in the office?

This assessment is not intended to compare the diagnostic accuracy of the different home blood pressure monitors available on the market.

**Patient benefit**

Eight randomized controlled trials were included to assess home blood pressure monitoring as measured by reduction in blood pressure, compliance with pharmacotherapy, and experienced symptoms. The studies compared the values from home blood pressure monitoring with values measured in the office or by using 24-hour ambulatory monitoring\(^2\). In total, approximately 2700 patients were included.

The results from the literature review suggest that home blood pressure monitoring is equally effective as office monitoring when it comes to guiding antihypertensive pharmacotherapy. Assuming that the recommended target blood pressure levels are used, there is no difference between home and office monitoring as regards blood pressure reduction after 1 year (moderately strong scientific evidence ⊕⊕⊕).\(^1\)

Two studies that investigated compliance with pharmacotherapy estimated that approximately 90% of all patients took their prescribed drugs. No difference was found between the group whose treatment was guided by home blood pressure monitoring and the group whose blood pressure was measured in the office (moderately strong scientific evidence ⊕⊕⊕).\(^1\)

One of the included studies assessed the amount of symptoms, eg, dizziness, headache, and palpitations. During the course of the study, symptoms decreased equally in the groups receiving home blood pressure monitoring and office blood pressure monitoring.

Given the fact that blood pressure treatment is often lifelong, the observation times in the studies are relatively short, and few studies report more than 1 year of follow-up. The method’s long-term effects could not be assessed due to the absence of long-term results.

Home blood pressure monitoring can be more convenient, in part because the patient does not need to be as closely tethered to health services. The prerequisite for using the method is that patients are motivated and have the ability to learn to self-monitor their blood pressure appropriately. There are currently no dedicated programs available that address how to use and follow up home blood pressure monitoring. The method should be viewed as a complement to conventional office blood pressure monitoring.

Four observational studies have been included to appraise the value of home blood pressure monitoring regarding mortality and risk of cardiovascular disease. Average follow-up times in these studies varied from just over 3 years to 12 years. Three of the studies used regression analysis to calculate the correlation between blood pressure levels measured via home and office-based monitoring respectively, and mortality and/or prevalence of cardiovascular disease. In summary, the included studies suggest that home blood pressure is at least as accurate as office blood pressure to predict the risk of death or being affected by a cardiovascular event, eg, stroke or myocardial infarction (limited scientific evidence ⊕⊕). Based on these observational studies alone, however, no conclusions can be drawn on home blood pressure monitoring in guiding the treatment.

\(^2\) 24-hour ambulatory monitoring involves using a portable device that registers blood pressure several times per hour for 24 hours.
Economic aspects
A home blood pressure monitor fitted for upper-arm measurement costs approximately 500 to 1500 Swedish kronor (SEK) including VAT. Possible differences in the direct costs of home and office blood pressure monitoring mainly involve the staff resources required by the different methods. Although home blood pressure monitoring can reduce the office workload by need for fewer visits, concurrently it requires extra time to check on the patient’s use of the device and the results produced.

The included studies suggest that home blood pressure monitoring saves costs in health care. An accurate analysis of the costs and cost-effectiveness of the method cannot be presented due to the absence of established programs on using and following up home blood pressure monitoring, and because the long-term effects are unknown.

References

Excluded studies