

Home Blood Pressure Measurement Lead to Improved Blood Pressure Control

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Abstract

Hypertension is one of the most important non-communicable diseases in the world causing premature morbidity and mortality. As a part of treatment and management regular measurement of blood pressure is emphasized for early detection and better control of hypertension. Beside blood pressure measurement in physician's chamber, home measurement of blood pressure can help in obtaining this goal. It is evidenced that early detection of hypertension, better control of BP and avoidance of complications could be achieved by home blood pressure measurement, while proper awareness program on the other hand might help avoid the disadvantages of blood pressure measuring at home.

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Introduction

Hypertension is one of the most important non-communicable diseases in the world causing premature morbidity and mortality. It is a major risk factor for ischaemic and haemorrhagic stroke, myocardial infarction, heart failure, chronic kidney disease, cognitive decline and premature death¹. Untreated hypertension is usually associated with a progressive rise in blood pressure. As a part of treatment and management regular measurement of blood pressure is emphasized. Regular measurement of blood pressure is also beneficial in apparently normal people with increased blood pressure as hypertensive patients are mostly asymptomatic. Blood pressure measurement is as well important among high risk groups who are at present normotensive but who have risk factors potentiating the development of hypertension². All these factors emphasize the need to measure blood pressure more regularly and frequently more than the current trend of blood pressure measurement which is physician dependent³. In this study the concept of Home Blood Pressure Measurement for the improvement of blood pressure control is presented.

Concept of Home Blood Pressure

Measurement:

It means measuring blood pressure at home⁴. It can be done by a person himself with the help of a blood pressure instrument. Home Blood pressure monitoring can be done to diagnose an apparently normal person as a case of hypertension or regularly check a person's BP at his home to monitor his or her hypertension.

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At present the recommendation is to use self operated digital blood pressure machine or aneroid blood pressure machine to check a person's blood pressure at home⁵. A person can measure his own blood pressure at any time of the day and record it so that it can be produced in front of his concerned home physician. While blood pressure more than 140/90 is termed as hypertension in physician's chamber while the blood pressure of more than 135/85 is termed as hypertension when it is found in home blood pressure measurement^{5,6}.



Literature Review

Home blood pressure monitoring (HBPM) provides superior prediction of cardiovascular disease, compared with clinic pressures⁷. It was demonstrated that HBPM could be a valuable resource for the effective treatment of hypertension, when combined with other modalities used to improve patient education, lifestyle enhancement, adherence to medication and reduction of unnecessary clinic visits.

JNC 7 guideline⁶ on Hypertension indicated that BP self measurements could benefit patients by providing information on response to antihypertensive medication, improving patient adherence with therapy and in evaluating white-coat hypertension. Persons with an average BP more than 135/85 mmHg measured at home are generally considered to be hypertensive. Home measurement devices should be checked regularly for accuracy. However JNC 7 has no elaboration on how to perform home blood pressure monitoring - as described by NICE.

NATIONAL Institute for Health and Clinical Excellence (NICE) guideline⁵ has elaborately described and compared various aspects of home blood pressure monitoring. In this guideline the following definitions are used.

- Stage 1 hypertension Clinic blood pressure is 140/90 mmHg or higher and subsequent ambulatory blood pressure monitoring (ABPM) daytime average or home blood pressure monitoring (HBPM) average blood pressure is 135/85 mmHg or higher.
- Stage 2 hypertension Clinic blood pressure is 160/100 mmHg or higher and subsequent ABPM daytime average or HBPM average blood pressure is 150/95 mmHg or higher.

According to NICE when using HBPM to confirm a diagnosis of hypertension, one should ensure that:

- For each blood pressure recording, two consecutive measurements are taken, at least 1 minute apart and with the person seated and blood pressure is recorded twice daily, ideally in the morning and evening and

- Blood pressure recording continues for at least 4 days, ideally for 7 days.
- Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm a diagnosis of hypertension.

When using HBPM to monitor the response to treatment (for example, in people identified as having a 'white-coat effect' and people who choose to monitor their blood pressure at home), NICE aims for a target average blood pressure during the person's usual waking hours of:

- below 135/85 mmHg for people aged under 80 years
- Below 145/85 mmHg for people aged 80 years and over.

One meta-analysis of 18 randomized controlled trials by Francesco and his colleagues⁸ concluded that blood pressure control in people with hypertension (assessed in the clinic) and the proportion achieving targets are increased when home blood pressure monitoring is used rather than standard blood pressure.

Agarwal and his colleagues⁹ showed that compared to clinic BP monitoring alone, home BP monitoring has the potential to overcome therapeutic inertia and lead to a small but significant reduction in systolic and diastolic BP. Hypertension control with home BP monitoring can be enhanced further when accompanied by plans to monitor and treat elevated BP such as through telemonitoring.

Systematic review of randomized controlled trials by Glynn and his colleagues¹⁰ have found the fact that antihypertensive drug therapy should be implemented by means of a vigorous stepped care approach when patients do not reach target blood pressure levels. Self-monitoring is a useful adjunct to care while reminder systems and nurse/pharmacist-led care require further evaluation.

American academy of family doctors⁴ has advocated various types of blood pressure machines for home blood pressure monitoring. While there are various types, aneroid or

digital blood pressure machine¹¹ are mostly advised by the academy for home blood pressure machine. However they have emphasized the need for validated machine and for correct use.

Current trend in Bangladesh

At present in Bangladesh a person's blood pressure is measured by a physician, a nursing staff or a village doctor - it is done in a chamber or hospital setting, indoor or outdoor basis. A new patient comes to contact with these people if he is symptomatic, if he has developed a complication of hypertension or if he has visited the physician for some other diseases when the increased BP is an incidental finding. In another situation a hypertensive patient time to time attend a physician for follow up visits¹². Blood pressure measurement outside the chamber or hospital is sporadic - done by pharmacy men in drug stores, sometimes in working places as a part of office health care service and sometimes at home environment by the person himself or by a family member.

At home, the current trend is one or more than one of the family members measure the blood pressure of the others. Aneroid blood pressure machines are mostly used for this purpose. Digital blood pressure machines are not widely in use since these are expensive and produce reading that differ with that of the aneroid machines- reading of which the latter is more accepted due to their common use. A family member has his or her blood pressure measured when he or she is a known case hypertension or suffering from symptoms that may relate to increased BP. However blood pressure measuring by oneself in family environment is seldom practised.

Importance of regular Blood pressure measurement at home

World Hypertension League has highlighted the importance of measuring blood pressure in the theme of World Hypertension Day 2011 - "Know your number"¹³. This awareness campaign on blood pressure can view widespread success if blood pressure is

measured in home setting beside other approaches. It can detect hypertension earlier which would be otherwise undetected, it can null a symptom like headache, neckache, weakness, malaise, restlessness etc. as a cause of hypertension and thereby avoid unnecessary worry. It can also help a hypertensive person to monitor his own blood pressure control, monitor the effects of antihypertensive drugs, and take prompt decision in case any situation arising from hypertensive urgency or emergency¹⁴. Home blood pressure monitoring can be important for those who have comorbidities like diabetes, stroke occurrence, renal failure, ischemic heart disease etc^{4,6}.

Regular measuring of blood pressure can encourage one to adopt the other measures of blood pressure control like practising DASH eating, reducing obesity, checking the side effects of antihypertensives, doing exercise and stop smoking⁵. This self care approach may lead to individual enthuse other normotensives but with potential to develop hypertension and hypertensives to control their blood pressure. Blood pressure measuring at home can make a person regular in his follow up visits to concerned physician. However it can also reduce the number of visits to a physician once good control of blood pressure is obtained¹⁵.

Home blood pressure measurement can also avoid conditions like white coat hypertension or masked Hypertension that are encountered in physician's chamber¹⁶.

Advantage and disadvantage of blood pressure measurement at clinical practice

No doubt that blood pressure measurement at clinical practice that is under physician's supervision is more accurate and more evidence based. But it costs a patient. It produces condition like white coat hypertension. Sometimes patients are unable to attend the physician or hospital regularly due to unavoidable conditions or sometimes patients are simply unwillingly to do so.

Blood pressure measurement at a physician's chamber produces unwanted conditions like

white coat hypertension, masked hypertension and fails to identify patients who are non dippers at night^{4,17}.

How Home Blood Pressure should be measured

The current recommendations by Hypertension guidelines mainly emphasize the need for home blood pressure monitoring with abridge descriptions. Recently National Institute for Health care and Excellence (NICE) has updated its hypertension guideline with specific instructions. Home blood pressure monitoring can be practised in two different situations. One for identifying an apparently normotensive person as a case of hypertension when his BP at home measurement is more than 135/85 mm of Hg. Another situation is to measure blood pressure of a known hypertensive person in regular intervals at his home to monitor his blood pressure control.

NICE has recommended the use for ambulatory blood pressure machines to detect and monitor hypertension. When this machine is not available (as in most situations) NICE guideline advocates the use of either digital or aneroid blood pressure machine for home blood pressure measurement. Whatever the machine, it should be a validated one so that the reading is correct. Concerned physicians can regularly check the home blood pressure measuring device whether it is working properly and simply validate it.

While the mercury machines are ideal for blood pressure measurement, these are expensive and cumbersome to use therefore not recommended in home blood pressure measurement setting.

Self operated digital blood pressure machines for brachial artery pressure are though expensive but easy to use since these devices incorporate automatic or semiautomatic use. Moreover a person using this device do not need to hear the blood pressure sound since the blood pressure reading comes up in the screen automatically.

Self operated aneroid blood pressure machines for measuring brachial artery blood

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