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Home blood pressure monitoring: updates and the nurse's role

MONITORIZAÇÃO RESIDENCIAL DA PRESSÃO ARTERIAL: ATUALIDADES E PAPEL DO ENFERMEIRO

MONITORIZACIÓN DOMICILIARIA DE LA PRESIÓN ARTERIAL: ACTUALIDADES Y PAPEL DEL ENFERMERO

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ABSTRACT

This is a review article on home blood pressure monitoring (HBPM) developed with the purpose to increase the current scientific knowledge and present the importance of this approach in the care to patients with hypertension in our setting. This technique has advantages over the causal measurement, as it provides more measurements, a better relationship with the target-organs injuries, it also quantifies the white-coat effect, has good reproducibility, good acceptability by the patients, assesses blood pressure without the influence from the observer and the environment of the appointment, reduces the number of visits to the doctor and promotes greater adherence to treatment. The importance of nursing practice in HBPM is associated with the education process, using teaching-learning strategies, implementing team-patient communication and encouraging patients towards performing self-care.

KEY WORDS

Hypertension.
Blood pressure determination.
Nursing care.
Self care.

RESUMO

Trata-se de um artigo de revisão sobre o assunto monitorização residencial da pressão arterial (MRPA) com o objetivo de agregar a contribuição científica atual e apresentar a relevância desta abordagem na assistência ao paciente hipertenso em nosso meio. A técnica oferece vantagens em relação à medida casual, pois proporciona um maior número de medidas, melhor relação com lesão de órgãos-alvo, quantifica o efeito do avental branco, possui boa reprodutibilidade, boa aceitabilidade pelos pacientes, proporciona avaliação da pressão sem a influência do observador e do ambiente do consultório, diminui o número de visitas ao consultório e promove maior adesão ao tratamento. A importância da atuação do profissional enfermeiro na MRPA está ligada ao processo de educação, utilizando estratégias de ensino-aprendizagem, implementando a comunicação equipe-paciente e motivando o paciente a realizar o autocuidado.

DESCRIPTORES

Hipertensão.
Determinação da pressão arterial.
Cuidados de enfermagem.
Autocuidado.

RESUMEN

Se trata de un artículo de revisión sobre el tema de monitorización domiciliar de la presión arterial (MRPA) con el objetivo de sumar la contribución científica actual y presentar la relevancia de este abordaje en la atención al paciente hipertenso en nuestro medio. La técnica ofrece ventajas en relación a la medida casual, pues proporciona un mayor número de medidas, mejor relación con lesión de órganos-blancos, cuantifica el efecto del delantal blanco, posee buena reproductibilidad, buena aceptación por los pacientes, proporciona evaluación de la presión sin la influencia del observador y del ambiente de consultorio, disminuye el número de visitas al consultorio y promueve mayor adhesión al tratamiento. La importancia de la actuación del personal de enfermería en la MRPA está ligada al proceso de educación, utilizando estrategias de enseñanza-aprendizaje, implementando la comunicación equipo-paciente y motivando al paciente para que realice su autocuidado.

DESCRIPTORES

Hipertensión.
Determinación de la presión sanguínea.
Atención de enfermería.
Autocuidado.

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INTRODUCTION

The purpose of this paper is to analyze the role of Home Blood Pressure Monitoring (HBPM) in the context of arterial hypertension diagnosis and treatment. Interest in this theme has been growing in recent decades, as illustrated by the growing scientific production on the theme. A survey on the theme in Medline-Pubmed, without time limits, using the descriptors *home* and *blood pressure*, located 502 publications between 1958 and 2008. As observed in Figure 1, the growth of scientific production is verified as from the 1970's, quadruplicating in the 1980's and almost tripling in the subsequent decades, between 1990 and 2008.

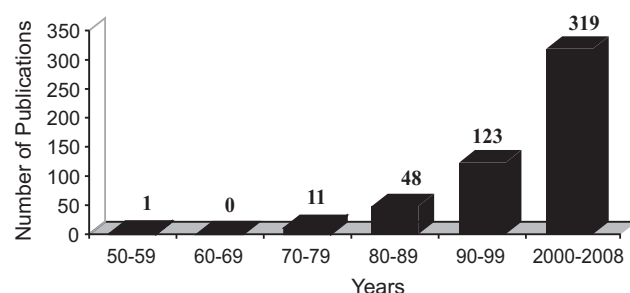


Figure 1 - Evolution in number of scientific publications on Home Blood Pressure Monitoring between 1950 and 2008

Arterial hypertension and the extent of the problem

Arterial hypertension is a severe public health problem. Challenges include the prevention of target organ lesions and the most indicated treatment for each individual. It represents the main modifiable risk factor for cardiovascular diseases and a determinant factor of premature death causes⁽¹⁻³⁾. According to the World Health Organization, today, there are 600 million hypertensive people around the world. In its annual report, the organization accuses hypertension of being the third main risk factor associated with global mortality, preceded only by unsafe sex and malnutrition⁽³⁾.

Brazilian data indicate hypertension prevalence levels of 23.6% in Rio Grande do Sul⁽⁴⁾; 29.9% in Salvador-BA⁽⁵⁾, 36.4% in Goiânia-GO⁽⁶⁾; and 22.58% in Fortaleza-CE⁽⁷⁾. These data confirm the great extent of hypertension in the Brazilian context.

Global control of arterial hypertension is unsatisfactory and the search for strategies to increase pressure level control has been increasingly addressed in clinical practice⁽⁸⁾. Adequate blood pressure control starts with correct diagnosis and involves high costs, mainly deriving from its complications⁽⁹⁾.

Casual blood pressure measurement and measurement outside the office

Due to the range of its importance, the blood pressure measurement should be treated with care, with a view to guaranteeing accurate measures. Health team members, responsible for measuring blood pressure, should provide

conditions to distance any error possibility that can jeopardize not only the arterial hypertension diagnosis, but also the conduction of anti-hypertension treatment⁽¹⁰⁾. In clinical practice, many questions remain on the best way to measure blood pressure, either through casual measurement during health service visits or measures outside this environment, at home or during the individual's routine activities⁽¹¹⁾.

Blood pressure can be measured through the direct and indirect method. The indirect method can be performed continuous, intermittent or casually, using auscultatory and oscillometric techniques⁽¹²⁾.

Casual blood pressure measurement is the most used method for arterial hypertension diagnosis and treatment. Health professionals use mercury column sphygmomanometers, aneroid or automatic devices, in a health context, either in primary health care, consultation rooms or other institutionalized locations.

It is observed in different studies that office blood pressure measurement produces higher levels than those registered through Outpatient Blood Pressure Monitoring (OBPM), which permits assessing pressure levels for 24h while patients accomplish their habitual activities, during sleep and wake and through home measurements. This fact is related with the white-coat phenomenon, represented by white-coat hypertension and the white-coat effect. White-coat hypertension occurs when blood pressure levels exceed 140/90 mmHg during office readings, but show normal levels when assessed through OBPM and/or HBPM⁽¹³⁾. The white-coat effect has also been related with the blood pressure response when the physician is present and is characterized by higher office pressure levels, independently of the hypertension or normotension diagnosis⁽¹⁴⁾. A study carried out at Basic Health Units, comparing the average of four days of home monitoring with the nurse's measure at the unit, showed no difference for systolic pressure, but a significantly lower diastolic pressure at home than when measured by the nurse, characterizing the white-coat effect⁽¹⁵⁾.

Home Blood Pressure Monitoring

Home monitoring became studied more properly after the development of automatic devices, which do not depend on the individual's ability to measure his/her own blood pressure, permitting many measures in situations outside the doctor's office. HBPM is the systemized registration of blood pressure, in the morning and at night, for five days, which the patient or another person performs during the wake period, at home or at work⁽¹⁶⁾. HBPM should be distinguished from self-registration, which hypertensive patients perform sporadically.

Studies appoint that HBPM is a better alternative method than office measurement and as good as home blood pressure monitoring for cardiovascular risk assessment in the general and hypertensive population⁽¹⁷⁻¹⁸⁾. A

research at an outpatient clinic of a Teaching Hospital in São Paulo City, evidenced the benefic effect of HBPM to assess hypertensive patients' control, even surpassing OBPM assessments. The same study highlights that the pressure revealed through HBPM was lower than that obtained through OBPM, both of which were lower than the office measurement. This confirm literature findings that office blood pressure is higher than levels obtained through the above mentioned methods⁽¹⁹⁾.

Indications and advantages of HBPM

The use of HBPM to confirm the arterial hypertension diagnosis is indicated in arterial hypertension management guidelines as an alternative method and can be used whenever available, associated with office measurement and OBPM⁽²⁰⁾. According to the European Hypertension Society, MRPA is more appropriate than casual measures for patient monitoring due to the low cost and convenience to repeat measures. It also promotes additional information, permitting a precise diagnosis and better hypertension monitoring during treatment⁽²¹⁾. The countless advantages of HBPM can be observed in Chart 1.

Chart 1 - Advantages of home blood pressure monitoring over casual measuring⁽¹⁶⁾

More measures during the day and for several days, weeks or months
Assessment of treatment effects at different times of day
No alarm reaction
Good acceptability by patients
Good replicability and prognosis value
Pressure evaluation without influence from observer and office environment
Better relation without target organ lesion
Decreases number of office visits room
Mitigates observer errors and preferences
Permits storage, printing and transmission of the readings at a distance
Quantifies the white-coat effect
Promotes greater treatment adherences and involvement in hypertension management

HBPM protocol

The II Guideline for the Use of Blood Pressure Monitoring at Home suggests that monitoring during the five work-days, with the first day reserved for instructions, training and selection of the arm with higher pressure levels, where blood pressure will be measured. During the next four days, blood pressure should be measured at least thrice in the morning and thrice at night, between 06-10 h and 18-22 h. The HBPM result is considered abnormal when the systolic pressure average exceeds 135 and/or the diastolic average exceeds 85 mmHg⁽¹⁶⁾.

To interpret the data, the HBPM report should include daily and total averages. For the register to be considered valid, at least 12 valid measures should be reached. Aver-

ages will be obtained with effective records for at least four days, discarding levels obtained on the first day of monitoring, but these levels should be included in the report to assess the alarm reaction. Excessive levels should be excluded, provided that there is no clinical justification^(16,22).

To perform the blood pressure measurement procedure, the patient should be oriented as shown in Chart 2.

Chart 2 - Patient orientations for HBPM⁽¹⁶⁾

Accomplish the measures in a calm environment at a pleasant temperature
Empty your bladder
Do not practice any physical exercise 60-90 minutes before
Do not consume alcoholic beverages, coffee, food or tobacco 30 minutes before
Do not talk during the measure
Accomplish the measures before medication intake and before breakfast and dinner, or two hours later
Accomplish the measures sitting down, after 2 minutes of rest, with you back supported and legs uncrossed, with a one-minute interval between measures
Place the cuff on your arm without clothes and without tourniquet due to tight clothes
Always use the same arm defined in the instruction, supported at the height of the heart, with your hand palm turned upwards and do not move during the measures

HBPM devices

For reliable monitoring in clinical practice, manual automatic or semi-automatic devices for arm measurement are recommended, although automatic monitors are more indicated because of their easy handling. All devices should be validated according to international standards, like those by the British Hypertension Society (BHS) and the Association for the Advancement of Medical Instrumentation (AAMI)⁽²³⁾. Devices that do not comply with the AAMI criterion or receive BHS classification C or D for systolic or diastolic pressure are not recommendable⁽²⁴⁾.

When purchasing the device, besides validation, some factors need to be taken into account, such as the cost of the device and software, sufficient memory to perform the protocol, possibility of printing data, adequate instruction manual, maintenance cost, cost of consumption material, different cuff sizes⁽²⁵⁾, availability of technical support and guarantee⁽¹⁶⁾. One resource that can be used to assess the reliability of an automatic blood pressure measurement device is to consult the list of devices validated according to international protocol, published on the site of the British Hypertension Society⁽²³⁾. Unfortunately, the large majority of these devices is not available on the Brazilian market, and those available are expensive, which makes their large-scale use difficult, mainly in public services.

Nurses' role

Nurses' role in arterial hypertension, a disease that involves multiple factors and demands a multiprofessional

approach, is aimed at health promotion. Nursing consultations for hypertensive patients are a strategy that offers great benefits. Education about the disease and orientations on healthy life habits, clearly focusing on lifestyle attitude changes, aim for further clarifications on the disease, self-care promotion and, consequently, better pressure control and adherence to the proposed treatment. In HBPM, nurses aim for care excellence with a view to providing clear training, in which patients feel at ease to clarify their doubts and perform the test protocol in the best possible way. Nurses are present in all phases of this process, starting with the choice of the device and continuing during orientation on how to use it, complete the activity diary, perform the test itself, and finishing with the report. Patients' satisfaction during this process is directly related with the way the protocol is accomplished and one of the ways to guarantee comfort and security during this process is the availability of direct contact. Hence, a telephone number should be provided for the patient to clarify doubts during HBPM.

HBPM use in clinical research

Studies show that HBPM improves adherence to anti-hypertension treatment, increasing the number of patients who reach the therapeutic target, even at primary health care level, improving arterial pressure control ratios^(16,26).

Other studies have evidenced the relevance of HBPM in hypertensive patient management. The PAMELA (*Pressione Arteriose Monitorate E Loro Associazioni*) study prospectively followed more than 2000 patients, representing the general population from a region in Northern Italy for an average 131 months, using office blood pressure reading, OBPM and HBPM. Independently of how blood pressure was measured, a direct and exponential relation existed between initial blood pressure levels and cardiovascular mortality⁽²⁷⁾. The SAMPLE (Study on Ambulatory Monitoring of Pressure and Lisinopril Evaluation) monitored the evolution of left ventricular hypertrophy in patients using anti-hypertensive drugs and, at the end, revealed the better prognostic power of OBPM and HBPM in comparison with casual office blood pressure reading⁽²⁸⁾.

In a study where systolic, diastolic and pulse pressure levels were correlated with the left ventricular mass, including HBPM use, the main finding showed a positive correlation between the left ventricular mass and pulse pressure, concluding that the left ventricular mass increases concomitantly with rises in systolic blood pressure and pulse pressure, with a more significant correlation with pulse pressure⁽²⁹⁾. A recent publication in Japan, based on simulated spending to put in practice HBPM, using data from a clinical research in Ohasama, found that when HBPM is not incorporated in the diagnosis process, its medical cost is

estimated at US\$ 10.89million/1000patients/5years. When HBPM is incorporated, on the other hand, spending drops to US\$ 9.33million/1000patients/5years, representing savings ranging from US\$ 674 thousand to US\$ 251million/1000patients/5years in hypertension treatment. The authors of that study conclude that introducing HBPM is very useful to bring down health costs⁽³⁰⁾.

The HOMERUS (Home versus Office blood pressure MEasurements: Reduction of Unnecessary treatment Study) and THOP Trial (Treatment of Hypertension According to Home or Office Blood Pressure) studies found that medication treatment combined with the introduction of HBPM benefitted the patient in comparison with conventional treatment. At the end of the studies, a higher percentage of patients monitored through HBPM needed less intensive medication treatment, proving the cost decrease⁽³¹⁻³²⁾. In a Brazilian study that compared HBPM and OBPM with office registers and correlated the left ventricular mass with HBPM and office readings, HBPM obtained a better correlation with target organ lesion than office pressure measures⁽³³⁾. In another study that compared blood pressure measurement at home by physicians, nurses and patients with office readings, OBPM and HBPM, the measure that provided the closes approximation of HBPM and OBPM was the patient's measure and OBPM and HBPM showed a good prognostic value in comparison with office readings⁽³⁴⁾.

CONCLUSION

This paper highlighted the importance of hypertensive patient management through home blood pressure monitoring. HBPM is a method that permits the medium and long-term assessment of blood pressure behavior, and is effective to assess anti-hypertensive treatment. Its possible advantage on OBPM is that it is more accepted among patients and cheaper.

The review showed a consensus with the indication of the method in recent bibliography, underlining its acceptance in the scientific context. Although the technique is disseminated around the world, discussions remain on the number of readings and duration. A review on the subject⁽²²⁾ maintains the recommendation to monitor pressure levels for seven days, discarding the first day for analysis, despite studies with monitoring during a shorter period. Another relevant point in this method is the possibility to obtain blood pressure readings without interference from the examiner and the environment, which is still the main benefit of this technique in clinical practice. Although HBPM offers advantages, conventional office blood pressure reading for diagnosis and blood pressure control purposes is still the standard method used in the Brazilian context, while HBPM appears as a complementary blood pressure assessment method.

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