



**Category: Applied Research in Health and Medicine**

**REVIEW**

## **Arterial hypertension: A priority challenge for public health in Argentina**

### **Hipertensión Arterial: Un desafío prioritario para la salud pública en Argentina**

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#### **ABSTRACT**

**Introduction:** Arterial hypertension (AHT) is one of the leading causes of morbidity and mortality worldwide. Its asymptomatic nature and severe associated complications, such as cardiovascular disease and stroke, make it a public health priority. In Argentina, the prevalence of HT has increased, facing difficulties such as ignorance of the diagnosis and low adherence to treatment.

**Development:** HT affects 41% of adults over 35 years of age globally and more than 50% in Argentina, with effective control in only 18% of cases. International classifications define HT with blood pressure values  $\geq 140/90$  mmHg, distinguishing between primary (with no identifiable cause) and secondary (with demonstrable causes). Although HTN can remain asymptomatic for years, its complications include renal, cardiac, cerebral and ocular damage.

The Ministry of Health has implemented programs such as “Less salt, more life” and has developed surveys such as RENATA-2 and ENFR to characterize the problem. Strategies include salt consumption reduction, regular physical activity, health education and access to medication. However, gaps in control persist, especially in adult men due to labor and service access barriers.

Nurses play a key role in promoting healthy habits, patient education and treatment monitoring. Models of care such as Orem's self-care theory highlight the importance of a patient-centered approach and educational strategies that promote adherence to treatment.

**Conclusions:** HTA requires a comprehensive approach that combines governmental, community, and primary care efforts. Improving the training of health teams and optimizing resources will make it possible to address this problem more effectively.

**Keywords:** Arterial hypertension, public health, prevention, treatment adherence, nursing, Argentina.

## RESUMEN

**Introducción:** La hipertensión arterial (HTA) es una de las principales causas de morbilidad y mortalidad en el mundo. Su carácter asintomático y las complicaciones severas asociadas, como enfermedades cardiovasculares y accidentes cerebrovasculares, la convierten en una prioridad de salud pública. En Argentina, la prevalencia de la HTA ha aumentado, enfrentándose a dificultades como el desconocimiento del diagnóstico y la baja adherencia al tratamiento.

**Desarrollo:** La HTA afecta al 41% de los adultos mayores de 35 años a nivel global y a más del 50% en Argentina, con un control efectivo solo en el 18% de los casos. Las clasificaciones internacionales definen HTA con valores de presión arterial  $\geq 140/90$  mmHg, distinguiéndose entre primaria (sin causa identificable) y secundaria (con causas demostrables). Aunque la HTA puede permanecer asintomática durante años, sus complicaciones incluyen daño renal, cardíaco, cerebral y ocular.

El Ministerio de Salud ha implementado programas como “Menos sal, más vida” y ha desarrollado encuestas como RENATA-2 y la ENFR para caracterizar el problema. Las estrategias incluyen la reducción del consumo de sal, actividad física regular, educación sanitaria y acceso a medicación. Sin embargo, persisten brechas en el control, especialmente en hombres adultos debido a barreras laborales y de acceso a servicios.

El personal de enfermería desempeña un papel clave en la promoción de hábitos saludables, la educación del paciente y el seguimiento del tratamiento. Modelos de atención como la teoría del autocuidado de Orem destacan la importancia de un enfoque centrado en el paciente y en estrategias educativas que fomenten la adherencia al tratamiento.

**Conclusiones:** La HTA requiere un abordaje integral que combine esfuerzos gubernamentales, comunitarios y de atención primaria. Mejorar la capacitación de equipos de salud y optimizar los recursos permitirá enfrentar esta problemática de manera más efectiva.

**Palabras clave:** Hipertensión arterial, salud pública, prevención, adherencia al tratamiento, enfermería, Argentina.

## INTRODUCTION

High blood pressure (HBP) is one of the leading public health problems worldwide due to its high prevalence, chronic nature, and serious consequences if not detected and treated correctly. It is a silent disease that progresses asymptotically for years, causing significant damage to vital organs such as the heart, kidneys, and brain. This disorder, which affects a considerable percentage of the adult population, is one of the significant risk factors for cardiovascular disease, stroke, and vascular dementia. Furthermore, its impact is not limited to medical complications but includes substantial social and economic costs and costs to patients' quality of life.

In Argentina, various studies and initiatives have allowed for a deeper understanding of this disease and its implications. Research such as the Second National Registry of Arterial Hypertension (RENATA-2) and the National Survey of Risk Factors (ENFR) have provided key data on hypertension prevalence, diagnosis, and treatment. The results of these studies have revealed an increasing prevalence of the disease and demonstrated the difficulties in achieving adequate control, with a significant proportion of people unaware of their condition or not adhering to the prescribed treatment. These figures reflect the magnitude of the problem and the urgent need to implement more effective strategies for its prevention and management.

The Argentine Ministry of Health has developed various policies and programs to address this problem, notably the “Less Salt, More Life” program and the training of health teams at the primary

care level. These initiatives have sought to reduce risk factors, improve access to diagnosis and treatment, and raise awareness of the importance of adopting healthy lifestyles. However, significant challenges remain, especially in certain population groups, such as adult men, who have higher rates of treatment dropout due to factors such as long working hours and limited access to health services.

The role of nursing staff is a fundamental element in this context. As frontline professionals, nurses play a crucial role in the early identification of hypertension, patient education, treatment follow-up, and the promotion of healthy habits. Their ability to establish close relationships with patients and to act as mediators in the implementation of health policies reinforces their importance in the comprehensive approach to HBP.

In this context, it is essential to continue researching and generating strategies that make it possible to effectively face the challenges associated with this disease, optimizing available resources and strengthening primary care as a basis for improving the health and quality of life of the population affected by arterial hypertension.

#### General objective

To describe and analyze the strategies for the prevention, diagnosis, treatment, and monitoring of high blood pressure in the context of primary health care in Argentina, highlighting the role of nursing staff as key agents in the promotion of healthy habits, the improvement of treatment adherence and the control of this disease, to contribute to the strengthening of health policies and the optimization of available resources to reduce its impact on the population.

## DEVELOPMENT

### Arterial Hypertension, concept and epidemiology

The Argentine Society of Arterial Hypertension (SAHA, 2018) defines arterial hypertension (AHT) as a controllable disease with a multifactorial etiology that reduces quality of life and life expectancy. The Ministry of Health of Argentina (2022), in agreement with the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH) (Williams et al., 2019), uses the systolic and diastolic blood pressure values (SBP/DBP) to define HBP as an expression of a SBP  $\geq$  140 mmHg or a DBP  $\geq$  90 mmHg measured in the doctor's office.

Hypertension - an increase in the force exerted by the blood against the walls of the arteries - is not a disease or a syndrome for the Argentine doctor and teacher Wassermann (2013). It is not a disease because it does not have a unifying concept regarding etiology or pathophysiology. It is not a syndrome because it cannot be described as a set of signs and symptoms, given that - in addition to recording high blood pressure - the vascular problem may be due to other pathophysiological conditions. Therefore, the author affirms that there is agreement in defining hypertension as a vascular risk factor. The author challenges the traditional approach because he argues that the name is not unambiguous when discussing HTA and that essential hypertension is common enough to express that a specific cause cannot be demonstrated. That being the case, the term essential would seem to mean that there is an intrinsic and inevitable reason why blood pressure increases over the years, a fact and an inaccurate name. Thus, it is preferable not to talk about essential HBP but about primary HBP to define the increase in pressure without a recognizable cause and to call HBP secondary to those produced by demonstrable causes. The term primary hypertension is also not appropriate because it represents a minimal number of cases and because it confuses unknown causes with non-demonstrable causes. Furthermore, the so-called secondary hypertension - with a known cause - seems more accurate in light of current knowledge, where it is known that this risk factor is associated with lifestyle habits, such as diet, sedentary lifestyle, and alcohol intake. Other authors, such as Santamaría Olomo & Gorostidi (2021), define secondary hypertension as those with an identifiable cause and represent between 5-10% of hypertensive patients as opposed to those suffering from essential, idiopathic, or primary hypertension.

In Bakris's synthesis (2021), hypertension with no documented cause (primary, previously known as essential hypertension) is more frequent, while hypertension of known etiology (secondary hypertension) has causes such as sleep apnea, chronic kidney disease, primary aldosteronism, diabetes or obesity. As for the causes of primary HBP, it is unlikely to be monocausal due to the dynamism and constant changes of the hemodynamic components, such as plasma volume and the physiological hypertensive activity of the renin-angiotensin system. Even in the exceptional case that it is due to a single factor, such as the onset of the problem, numerous other factors would intervene in the maintenance of the BP. Some causes are associated with changes in the muscle tone of the arterioles as a result of alterations in the functioning of the ion pump; others are related to hereditary factors that act as predisposing factors; in turn, some environmental factors, such as diet and stress, also play a role. In general, hypertension does not show symptoms unless it has developed to a severe degree or has been present for a long time. The pathophysiology can be deduced if we consider that blood pressure is the result of cardiac output (volume of blood ejected from the heart every minute) multiplied by total peripheral vascular resistance (TPVR); therefore, any process that causes an increase in either of the two - CO or TPVR - will produce an increase in blood pressure. As has been shown, hypertension can progress silently for a long time until complications appear in the white organs with manifestations such as dizziness, facial flushing, headache, tiredness, nosebleeds, and nervousness. Severe hypertension often causes significant cardiovascular, neurological, renal, and retinal symptoms. Bakris (2021) reveals that a fourth heart sound is a common early sign of hypertensive heart disease and arteriolar changes in the retina. According to the classification of Keith, Wagener, and Barker, these changes allow prognoses of increasing severity to be made:

Grade 1: only constriction of retinal arterioles.

Grade 2: constriction and sclerosis of arterioles.

Grade 3: retinal hemorrhages and exudates.

Grade 4: retinal papilla edema.

The SAHA (2018) publishes that HBP is classified according to the following categories and blood pressure values:

- Normal pressure: SBP < 130 mmHg and/or DBP < 85 mmHg.
- Limit pressure value: SBP 130-139 mmHg and/or DBP 85-89 mmHg.
- HTA level 1: SBP 140-159 mmHg and/or DBP 90-99 mmHg.
- Stage 2 hypertension: SBP 160-179 mmHg and/or DBP 100-109 mmHg.
- Stage 3 hypertension: SBP > or equal to 180 mmHg and/or DBP > or equal to 110 mmHg.
- Isolated systolic hypertension: > 140 mmHg and < 90 mmHg.

These assessments are valid for office-based ABPM in healthy individuals over the age of 16 who do not take antihypertensive drugs. If the SBP and DBP fall into different categories, the higher one should be chosen.

Regarding the epidemiology of hypertension, in the Argentine Consensus on Arterial Hypertension, the SAHA, together with the Argentine Society of Cardiology and the Argentine Federation of Cardiology, stated that hypertension continues to be the leading cause of death in the world and the main modifiable risk factor for cardiovascular disease (CVD) with a prevalence that continues to increase. According to Gómez et al. (2019), cardiovascular diseases, such as acute myocardial infarction (AMI), ischemic or hemorrhagic stroke, and peripheral vascular disease, constitute the leading cause of premature death in the world. More specifically, hypertension is positively, linearly, and continuously related to cardiovascular risk (CVR), and the increase in risk associated with SBP and DBP has been very significant, where SBP greater than 140 mmHg and DBP greater than 90 mmHg - separately or together - constitute recommendations for the diagnostic threshold. This criterion is applied to patients who are not being treated with antihypertensive medication and are not going through an acute stage of the

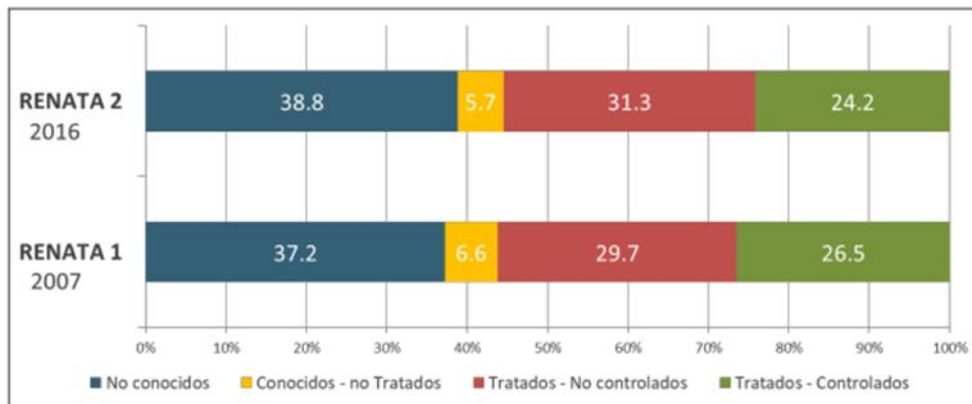
disease. Values that do not reach this threshold but show sustained increases are associated - to a lesser extent - with other cardiovascular risk factors (CVRF) (SAHA, 2018).

Even though hypertension is easily identified using non-invasive methods, Gómez et al. (2019) state that it has been demonstrated, at a global level, that the prevalence of hypertension in adults over 35 years of age is 41%, where those who are aware of the disease barely reach half of the cases and only one in three patients treated pharmacologically have reasonable control of the disease. The overall figure for patients aware of the disease - well treated - would barely reach 18%. These estimates coincide with European publications such as that of Williams et al. (2019), which indicate a prevalence in adults of 30-45% regardless of the country's income level, i.e., in countries with low, medium, or high incomes. Hypertension increases with age and reaches a prevalence of over 60% from age 60. The increase in population aging associated with more sedentary lifestyles suggests the problem will continue.

Advances in the epidemiology, pathophysiology, and risk factors associated with hypertension are essential for the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH). There would be no argument about the reduction of premature morbidity and mortality when hypertension is controlled using proven and effective therapeutic strategies in association with lifestyle changes. However, blood pressure control is unsatisfactory (Williams et al., 2019).

The degree of knowledge and control of the disease in Argentina reveals no progress in the last ten years.

**Figure 1: Evolution of knowledge and control of HTA in the Argentine Republic according to the National Registry of Arterial Hypertension (RENATA).**



Source: Argentine Society of Arterial Hypertension (2018).

According to Gómez et al. (2019), the factors that explain this situation are associated with the availability of and access to healthcare services, biases in the training of healthcare teams, and a lack of awareness among patients regarding their illness, resulting in low adherence to drug therapy and lifestyle changes.

The SAHA (2018) recommendations for improving knowledge of HBP include:

1. Each person should measure their blood pressure (BP) at least twice yearly and average the measurements. Averages above 130/85 mmHg warrant further medical evaluation.
2. Carry out community detection campaigns with screening strategies in different contexts.
3. systematically incorporate the measurement of BP in the clinical consultation.
4. Explore the family and personal history of HBP.

Concern about such an important public health problem led the United Nations General Assembly to prioritize implementing programs to reduce premature mortality from chronic non-communicable

diseases by 25% by 2025, an initiative known as 25x25. The program included the implementation of programs carried out by the Ministries of Health of each member country, together with the collaboration of national scientific societies and coordinated by the World Health Organization and the World Heart Federation (Gómez et al., 2019).

Although hypertension can only be controlled with the help of medication to keep blood pressure below 140/90 mmHg throughout life, the Ministry of Health of Argentina (2022) recommends other measures to improve the control of the disease and to intervene in the modifiable risk factors of cardiovascular disease such as reducing body weight and avoiding overweight, reducing salt intake and the sodium content of cold meats, sausages and other processed foods, reducing alcohol intake, incorporating physical activity for 30 minutes a day on as many days of the week as possible, increasing the consumption of fresh fruit and vegetables and quitting smoking.

#### Prevalence and control

The Prospective Urban Rural Epidemiology (PURE) study involves 142,042 participants aged between 35 and 70 years in urban and rural communities in 17 high-, middle- and low-income countries. The study included Argentina, Brazil, Chile, and Colombia as South American representatives, with findings of prevalence of high blood pressure ranging from 52.6% in Brazil, 50.9% in Argentina, 46.6% in Chile, and 37.5% in Colombia. Of the total number of patients, 57.1% were aware of their hypertension diagnosis, 52.8% were being treated, but only 18.8% were being monitored, meaning that only 35.5% of hypertensive patients receiving medication had their blood pressure under control (Gómez et al., 2019).

The National Risk Factor Survey (NRFS) forms part of the Non-Communicable Disease Surveillance System and the Integrated Household Survey System (IHSS); if we look at the results of the Fourth National Risk Factor Survey of the Argentine Republic (Argentine Ministry of Health, 2018), we can observe the evolution of the main factors associated with HBP:

**Table 1: Main results of the 4th national survey of risk factors 2018 and percentage comparison of prevalence 2005-2018.**

Indicators	ENFR1 2005	ENFR 2 2009	ENFR 3 2013	ENFR 4 2018
Low physical activity	-	54,9%	54,7%	64,9%
Always/almost always uses salt after cooking or when sitting down to eat	23,1%	25,3%	17,3%	16,4%
Consumes at least 5 portions of fruit or vegetables a day	-	4,8%	4,9%	6,0%
Prevalence of tobacco use	29,7%	27,1%	25,1%	22,2%
Exposure to second-hand tobacco smoke inside the home in the last 30 days	-	33,9%	27,6%	25,1%
Exposure to second-hand tobacco smoke in bars/restaurants in the last 30 days	-	47,2%	23,5%	21,5%
Prevalence of high blood sugar or diabetes	8,4%	9,6%	9,8%	12,7%
Overweight according to Body Mass Index (BMI $\geq 25$ and $< 30$ )	34,4%	35,4%	37,1%	36,2%
Obesity (BMI $\geq 30$ )	14,6%	18,0%	20,8%	25,4%
Excess weight (overweight + obesity)	49,0%	53,4%	57,9%	61,6%
Prevalence of high cholesterol	27,8%	29,1%	29,8%	28,9%

Source: Author's own creation.

The comparison of results showed ambivalence regarding the factors that interact with hypertension. On the one hand, the prevalence of low physical activity showed a progressive increase, but the difference between 2013 and 2018 was also statistically significant. The decrease in salt consumption stabilized in the last two measurements. Daily consumption of at least five portions of fruit or vegetables showed no statistically significant change. The percentage of the population that met or met the recommendation is very low. The trend in tobacco consumption continues to decline, accumulating 25% since 2005, and exposure to second-hand smoke at home is consolidating. Exposure to tobacco smoke in public spaces has stabilized in the last two measurements, but the reduction compared to 2005 is notable.

On the other hand, the negative results revealed by the survey showed a statistically significant increase in the indicator of high blood glucose or diabetes, reaching 12.7% of the population. Although the indicator for overweight appeared to have stabilized, obesity was recorded in a quarter of the population, and 6 out of 10 adults were overweight combined with obesity, maintaining the sustained increase since 2005 and increasing in a statistically significant way concerning 2013. The prevalence of cholesterolemia remained stable (Ministry of Health of Argentina, 2018).

Hypertension can remain asymptomatic for a long time. According to Bakris (2021), its diagnosis requires complementing the techniques of anamnesis and physical examination with several measurements of blood pressure (sphygmomanometry), complementary blood and urine tests, and an electrocardiogram (ECG). In the anamnesis, it is important to record the age of the diagnosis of arterial hypertension with the previously recorded pressure values and the personal and family history of the appearance of symptoms of coronary disease, sleep apnea or loud snoring, and of a history of other relevant diseases such as renal dysfunction, peripheral arterial disease, dyslipidemia, diabetes, and gout. The SAHA (2018) states that a complete anamnesis should include the existence of previous antihypertensive treatments with information on the therapeutic and adverse effects produced by the drugs used and report whether there have been episodes of sweating-diaphoresis, headache, palpitations, postural hypotension, and facial flushing.

On the other hand, lifestyle habits such as work activity, level of activity and exercise, consumption of alcohol and stimulant drugs (prescribed or illegal), and dietary habits with an emphasis on sodium intake - whether as table salt or as a preservative citrate - should be known (Bakris, 2021). An important psychosocial aspect is the patient's degree of knowledge of their illness. Finally, the complementary studies that are requested should allow the identification of cardiovascular risk factors and the detection of lesions in target organs such as the brain and eyes (headaches, dizziness, and deterioration of vision), the heart (precordial pain, dyspnea, palpitations, and edema), the kidneys (polydipsia, polyuria, nocturia, and hematuria) and peripheral arteries (cold extremities and intermittent claudication) (SAHA, 2018).

Regarding the physical examination of nursing, it is worth mentioning that it should include the measurement of height, weight, and waist circumference, which will allow the evaluation of two parameters for a simple and quick calculation of the patient's body composition (Díaz Gil, 2022):

The Body Mass Index (BMI) is calculated by dividing the weight in kilograms by the square of the height in meters. This index makes it possible to determine whether the patient's weight is consistent and adequate for their height. Based on the result can be compared with a table proposed by the World Health Organization (WHO) where low weight is equivalent to a BMI of less than 18.5; normal weight to a BMI between 18.5 and 24.9; overweight to a BMI between 25-29.9 and obesity to a BMI of 30 or higher.

The Waist-Height Index or Waist-Height Ratio (WHtR) is an alternative parameter for measuring body composition. It is obtained by dividing waist circumference by height, measured in the same units. The higher the WHtR, the greater the risk of obesity and cardiovascular disease. Values above 0.5 begin to indicate an increased risk.

In the conclusion of Díaz Gil (2022), BMI and WHR are simple and indicative calculations of the patient's physical build, possible overweight, or the risk of suffering from certain diseases. However, they must be considered in the context of clinical evaluation. Different individuals may show results compatible with their state of health, but this does not exempt them from risk factors due to other determining factors, such as genetics or environmental exposure.

**Table 2: Categories of physical build of patients according to ICA values.**

Niños y adolescentes (hasta 15 años)	Hombre	Mujer	Categoría
<0.34	<0.34	<0.34	Extremadamente delgado
0.35 a 0.45	0.35 a 0.42	0.35 a 0.41	Delgado sano
0.46 a 0.51	0.43 a 0.52	0.42 a 0.48	Sano
0.52 a -0.63	0.53 a 0.57	0.49 a 0.53	Sobrepeso
0.64 +	0.58 a 0.62	0.54 a 0.57	Sobrepeso elevado
	0.63 +	0.58 +	Obesidad mórbida

**Source: Díaz Gil, D. (2022). Different methodologies for measuring Body Composition. HSN blog. Nutrition, Health and Sports.**

The importance of sphygmomanometry requires a review of some concepts and criteria for measuring blood pressure. Although synonyms, blood and arterial pressure refer to different things. While arterial pressure is the force exerted by the action of blood on the walls of an artery, blood pressure is the state in which a body is under the influence of opposing forces. The contraposition of arterial pressure and the pressure exerted by the cuff that is inflated on the patient's arm come into play. When both pressures (arterial and cuff) are equal, it can be inferred that the tension force is equal to the force of the blood pressure. To infer - to lead towards an action or quality - comes from relating two abstract terms to reach a logical implication. In this way, the terms are not synonymous. However, instead, the measurement of blood pressure (known value) allows us to infer the value of arterial pressure (unknown value) using a technique of pressure contrast and auscultation and/or palpation of the moments of interaction of these pressures (Definición.de, 2022). Blood pressure can be measured directly with an intra-arterial catheter, but sphygmomanometry is indirect (Lopategui Corsino, 2022).

To ensure the quality of the pressure exerted, it is important to follow Bakris' (2021) recommendation that the sphygmomanometer or blood pressure monitor should have a cuff of a size appropriate to the patient's arm to cover two-thirds of the length of the biceps muscle and with the inflatable part long enough to cover 80% of the arm circumference. This recommendation justifies the possession of a blood pressure monitor suitable for obese patients with a larger arm circumference. The technique for measuring blood pressure in the doctor's office consists of inflating the cuff above the expected systolic blood pressure and slowly releasing the air to decompress the cuff while auscultating the brachial artery above the elbow crease. The pressure corresponding to the first heartbeat - as the



blood pressure monitor's clock starts to count down - represents the systolic blood pressure. At the same time, the total disappearance of sounds indicates the diastolic blood pressure. For the formal diagnosis of HBP in the doctor's office, there should be an average of 2 or 3 measurements taken at different times with the patient sitting in a chair with their feet flat on the floor and their back supported by the backrest for more than 5 minutes prior to taking the measurement. The patient must not have exercised, smoked, eaten, or drunk coffee for at least 30 minutes prior to the measurement; the arm on which the measurement is to be taken (with the patient wearing no clothing) must be at heart level, and the patient must not talk during the procedure.

In the first consultation, the pressure in both arms must be measured to determine which is higher. A difference of up to 10 mmHg is expected due to the measurement, and some studies reveal a tendency for it to be higher in the right arm. In any case, once the arm with the highest value has been identified, subsequent measurements should use the arm with the highest reading (Murciasalud, 2014).

Among the measurement methods, we can mention:

**Palpation method:** consists of feeling the radial pulse and inflating the cuff to 30 mmHg above the point at which the pulse is lost and then slowly deflating until it reappears (coinciding with the systolic). It is a technique widely used in emergency procedures to avoid underestimating the systolic value if an auscultatory silence interrupts the continuity of the noises (Wassermann, 2013).

**Auscultatory method:** Manual sphygmomanometers with aneroid manometers or automatic digital sphygmomanometers can be appropriately used. Cali can be berated and controlled in both cases. The lower edge of the cuff should be positioned 2 to 3 cm above the elbow crease in order to be able to feel the brachial artery in the antecubital fossa and, once located, position the stethoscope over it. The center of the inflatable chamber of the cuff should coincide with the brachial artery and should be at the level of the heart, while the pressure gauge should be evident to the examiner. First, the SBP is determined by palpation of the radial artery by rapidly inflating the cuff until it disappears (determination by palpation of the SBP level). Next, the cuff is deflated, and the stethoscope chest-piece is placed over the brachial artery and rapidly reinflated to 30 or 40 mmHg above the previously found palpatory systolic pressure level to begin auscultation. The cuff should be inflated at a rate of approximately three mmHg/second, using the first Korotkoff sound to identify the SBP value and the fifth sound (disappearance) for the DBP value (Gómez-León et al., 2016)

Korotkoff sounds are produced only between the SBP and the DBP, that is, by the systolic reopening of the artery wholly collapsed by the pressure of the cuff and the total relaxation of the artery below the SBP where it is entirely open and silent. At that interval, it is possible to recognize the following (Lopategui Corsino, 2020):.

**Phase 1:** The appearance of decreasing noises that occur when the pressure in the cuff drops below the SBP value.

**Phase 2:** Softer and longer percussive noises followed by murmurs.

**Phase 3:** A greater blood volume enters the partially occluded artery, producing drivers and louder noises.

**Phase 4 (often absent):** initial muffling of the noises.

**Phase 5:** Complete disappearance of the noises.

Wassermann (2013) states that frequent errors in measuring blood pressure - with the consequences that entail - include the use of unsuitable or incorrectly fitted cuffs; frequent errors in recording blood pressure, such as the stethoscope head being held by the cuff, very rapid deflation, reinflating to confirm the reading, without first deflating to zero, not leaving a gap between measurements, taking a single measurement, and considering Korotkoff phase V (noise damping) as the DBP.

**Treatment, adherence, and the role of nursing**

Worldwide, hypertension is considered the number one cause of clinical consultations in primary care. Treatment consists of controlling HBP pharmacologically, changing lifestyle habits such as

reducing sodium intake, losing weight, increasing physical activity, eradicating the consumption of tobacco and dangerous substances, and limiting alcohol consumption. In order to know the result of the treatment, it is essential that the patient adheres to it and controls the evolution of his disease (Bakris, 2021).

According to Piña (2022), the World Health Organization defines treatment adherence as the degree of willingness of a patient to comply with the medication and/or lifestyle changes prescribed or recommended by the healthcare professional. For the author, the evidence is overwhelming that treatment adherence is multifactorial and involves socioeconomic, demographic, and environmental factors. The doctor-patient relationship, the doctor's communication and persuasion skills, and the patient's awareness of their illness when it comes to making decisions directly influence adherence; patient participation in decision-making has shown better results in receptivity to and treatment adherence. Failure by individuals to adhere to prescribed antihypertensive treatment and lifestyle change recommendations results in poor control of hypertension. Adherence factors are not always related to the patient, and factors such as the incorrect choice of drug prescribed or its dose and factors that limit access to health services or infrequent contact with the system appear. The economic situation in Latin America makes it difficult to adjust working hours to those of the health system and to the possibility of obtaining and keeping medical appointments. For this reason, Piña (2022) asserts that it is wrong to prejudge that poor control of HBP is solely due to a lack of patient adherence without examining whether the treatment regimen is adequate. If patients perceive that the medication is not beneficial or has significant adverse effects, compliance with the drug therapy will be affected. On the other hand, non-acceptance or awareness of the diagnosis is a very important factor among the factors that the patient controls.

To resolve the problem of lack of treatment adherence, strategies to make the user aware of their health situation are decisive. This awareness must occur in the interaction between the professional and the patient. Oliveira Reiners and Nogueira (2009) believe that the problem is not the absence of this interaction but that the biomedical model of care inappropriately guides the strategy. These authors state that, despite the multifactorial cause of adherence, many of these factors end in the interaction between the health professional and the patient, which would allow us to ask how this interrelationship is characterized and to what extent and how this interaction influences patients to not adhere to the treatment. The model followed by health professionals means that the interaction with the patient is approached from their perspective and preconceptions. The interaction is centered on techniques and tasks that favor prescription and routine actions, focused on the body, the disease, and the treatment and its adherence. Nurses reproduce this type of biomedical interaction. It is characterized by asymmetrical and unequal, centralized in the active and expert health professional who defines what the user can or cannot do with their body and health. The user is left passive without the opportunity to share or participate. If it is understood that the problem is a lack of awareness, the logical decision is to use information and educational activities; at this point, the conceptions of health education of nurses, assistants, and doctors are exposed, and the expression transmission of knowledge is recurrent. To convince the patient to adhere, the health professional uses forms of communication to raise awareness; these vary from small challenges ("they pull your ear") to emotional speeches that often frighten the patient in an authoritarian context. If awareness is to be raised of the need for treatment adherence, it must be based on a relationship of parity and agreement.

A proposal for an alternative model as a reference for treatment adherence was developed by Manzini and Pessuto Simonetti (2009) when they proposed using Orem's self-care theory to systematize care during nursing consultations with hypertensive patients. The authors raised the need to apply the Nursing Process in the State of São Paulo, Brazil, as the basis for professional actions to organize consultations with a different approach to the purely medical approach. The nursing consultation is an appropriate modality of care to accompany lifestyle changes and reinforce self-care guidelines.

Dorothea Orem (1914-2007) postulates a general theory (1969) composed of three related theories that state that people carry out care activities for themselves (self-care), that these activities are sometimes not enough (self-care deficit), and that nursing plans compensation activities to cover these needs (nursing systems). To achieve self-care, individuals must be able to meet universal self-care requirements, developmental self-care requirements, and health deviation self-care requirements. The first nursing activity assesses this degree of compliance or deficit of compliance. Once the deficit has been established, nursing plans compensation activities for the aforementioned systems. Nursing systems can have a level of partial compensation, a level of total compensation, or educational support. One of the novel aspects of Orem's Self-Care Theory is that it proposes acting only on the deficit, allowing the patient to retain independence and autonomy. On the other hand, an educational support system implies that the patient could be meeting the self-care requirements and recognizing that, in the absence of a deficit, there are possibilities of doing so in a better way as healthy people who are making decisions to stay healthy or modify behaviors that are risky to their health (Naranjo et al., 2017).

The central argument of Naranjo et al. (2017) is that learning self-care and maintaining it are human functions that are learned according to the beliefs, habits, and practices characteristic of the culture to which the individual belongs. Knowledge is necessary to maintain these activities, and it is a challenge for nurses to assess what the patient needs to know to become aware of the situation and make decisions about it. Therefore, the patient's awareness of self-care and the need to adhere to a treatment to improve or maintain their state of health must be inspired by personal experiences, cultural norms, and learned behaviors to build a progressive commitment to maintaining health and well-being.

In the view of Castro-Serralde (2018), the challenge of intervention in treatment adherence includes reducing blood pressure figures, improving lifestyle habits, and pharmacological compliance. He designed a personalized consulting model for hypertensive patients and evaluated the results. In the first nursing consultation, almost an hour was spent assessing and recording anthropometric conditions, blood pressure, personal lifestyle habits, aspects of the disease, therapeutic compliance, and family environment. The second visit lasted half the time and was devoted to nursing diagnosis, prioritizing the needs for lifestyle modification associated with hypertension and the needs perceived as priorities by the patients. This information was applied to planning educational interventions, which were scheduled for the following appointments and interventions and allowed for the adjustments and accommodations that the patient required. The counseling program was evaluated on 86 patients with an average age of 58 years, of whom 46 continued to attend consultations without the consultancy intervention, and 40 did so in the usual way, without consultancy. The results showed - in terms of HBP control - that both groups had the same (average) decrease in SBP and DBP at 6 months of follow-up. However, at 12 months, the decrease continued in the patients in the consultancy, while in those who did not participate in the program, it increased and reached a very similar average to that at the start of treatment. The overall data from the evaluation of personalized consultation showed sensitivity to changes in blood pressure variables, compliance with pharmacological treatment, and perception of improvement in quality of life.

Hypertension, like any chronic condition that requires long-term treatment - including following prescriptions and changing habits - is a challenge for the healthcare team and the patient. The role of nurses is seen as being closer to the needs of assessing, listening to, and accompanying patients in this situation. Adherence will be significantly influenced by the type of assessment, monitoring, and control of evolution in the context of health education, which is part of the professional skills that can be performed in a community nursing office.

## CONCLUSIONS

High blood pressure (HBP) is one of the most significant global health problems due to its high prevalence, asymptomatic nature, and the serious consequences it can cause if not adequately controlled. This disorder affects a significant part of the adult population, and its association with cardiovascular disease, stroke, and cognitive impairment underlines the importance of its timely prevention, diagnosis, and treatment.

In the Argentine context, national studies such as RENATA-2 and ENFR have highlighted both the high prevalence of hypertension and the challenges to its proper management, including a lack of knowledge about the condition and low patient adherence to treatment. Despite the efforts of the Ministry of Health through policies such as “Less salt, more life” and the promotion of healthy lifestyles, significant gaps persist in the control of the disease, especially in vulnerable groups such as adult males.

Nursing staff participation is a fundamental pillar in the fight against HBP, thanks to their closeness to patients and their ability to promote health education, monitor treatment, and promote changes in lifestyle habits. However, the effectiveness of these actions requires strengthening primary care and implementing more effective and sustainable strategies that include interdisciplinary and community approaches.

In conclusion, facing the challenge of HTA requires a combination of individual, community, and government efforts focused on prevention and comprehensive patient care. Only by optimizing resources, training healthcare personnel, and improving access to and quality of services will it be possible to reduce the impact of this disease and improve the quality of life of the affected population.

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**FINANCING**

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**CONFLICT OF INTEREST**

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