Original Research Article

The Impact of the 2024 ESC Guidelines for the Management of Elevated Blood Pressure and Hypertension on a Population Sample with a Mean Age of 59 Years

ABSTRACT

Introduction: Hypertension is a challenge for the global healthcare system due to its high prevalence and importance as a risk factor for the development of cardiovascular disease (CVD) and premature death. Its control remains unsatisfactory, despite the proven efficacy and good tolerance of pharmacological treatment. Clinical practice guidelines are extremely important for guiding the management of these patients. The 2024 European Society of Cardiology (ESC) guideline classified blood pressure (BP) ≥ 120/70 and < 140/90 mmHg as elevated BP, indicating approach, and established a BP < 130/80 mmHg as the therapeutic target.
Objective: To evaluate the impact of the 2024 ESC Guidelines (ESC-2024) on blood pressure control rates and the prevalence of individuals requiring approach in a population sample, through a comparative analysis with the 2018 ESC Guidelines (ESC-2018).
Methods: This was a cross-sectional study involving adults aged ≥ 18 years. Sociodemographic data, history of cardiometabolic diseases, cardiovascular risk factors, anthropometric data, and BP were collected. The results were expressed as percentages, and comparisons were made using the McNemar test.
Results: 504 individuals were evaluated, with a mean age of 59.56 years; 50.59% were men, 40.68% obese, 21.63% diabetic, and 49.21% had a history of hypertension (HH). Under the ESC-2024 criteria, the therapeutic target was reached in 11.70% of hypertensive patients, a percentage 3.48 times lower than that observed when the ESC-2018 criteria were applied (P<0.001). According to the ESC-2024 recommendations, 59.38% of individuals without HH had an indication for approach, a percentage 5 times higher than that obtained under the ESC-2018 criteria, characterizing a significant difference (P<0.001).
Conclusion: In this population sample, ESC-2024 had a significant impact on hypertension control rates and the prevalence of individuals with indications for approaches, which reinforces the need to adopt evidence-based criteria in our clinical practice and discourages therapeutic inertia.

Keywords: Hypertension; risk factors; risk stratification; cardiovascular diseases.

1. INTRODUCTION

Systemic Arterial Hypertension (SAH), a chronic condition of multifactorial etiology characterized by sustained elevation of blood pressure, has been related to an increased incidence of heart failure, atrial fibrillation, chronic kidney disease, stroke, and early mortality (De Simone et al., 2008; Zhou et al.,2021), the risk of several cardiovascular outcomes, and significant loss of years of healthy life (Rapsomaniki et al., 2014). Therefore, its correlation with cardiovascular risk (CVR) is evident, demonstrating a linear and continuous growth from values such as 115/75 mmHg, with CVR doubling for every 20 mmHg increase in systolic pressure and 10 mmHg increase in diastolic pressure (Lewington et al., 2002; Vasan, 2021).

Hypertension is implicated in a wide variety of lethal outcomes, either directly or indirectly. Globally, in 2019, hypertension was responsible for 18% of deaths in males and 20% in females, 38% of whom were under 70 years of age (World Health Organization, 2023). In 2017, CVD caused 27.3% of deaths in Brazil, with hypertension present in 45% of total cases and associated with 51% of deaths from cerebrovascular disease. Although only 13% of deaths have hypertension as the basic cause, the condition is an underlying pathophysiological component in most deaths of cardiovascular origin (World Health Organization, 2008).

Age, ethnicity, sex, and clinical history significantly influence the epidemiological distribution; however, the socioeconomic profile of the analyzed population also stands out in this context. Globally, between 1990 and 2019, the prevalence of hypertension decreased from 38% to 32% in high-income countries, with the European continent showing a reduction from 45% to 37% (World Health Organization, 2023). Conversely, in 2010, it was estimated that 1.39 billion adults aged 20 and over had hypertension, with 75% of diagnosed individuals residing in low- and middle-income countries (Mills et al., 2016), highlighting the relationship between the socioeconomic disparity in today's world and the heterogeneous distribution of the disease. In addition, in Brazil, the frequency of hypertension is inversely related to the level of education, with a prevalence of 45.3% among individuals with up to 8 years of study, 24.2% among individuals aged 9 to 11, and 19% among those aged 12 or more (Ministério da Saúde do Brasil, 2023).

Despite the proven efficacy and good tolerance of pharmacological treatment, as well as the variability of regional data, reported hypertension control rates are unsatisfactory worldwide. In 2013, the estimated global control rates for women and men were 23% and 18%, respectively (Burnier et al., 2013). According to data from the ELSI-Brazil cohort study, 51.1% of individuals aged 50 and over had controlled blood pressure (Firmo et al., 2018). One of the main factors related to this scenario is the lack of adherence to treatment for various reasons, such as high complexity of drug therapy (Schmieder et al., 2023); inadequate development of the doctor-patient relationship; misperceptions regarding drug use and its effects; and limited access to health education and the possibilities for lifestyle change (Mazzaglia et al., 2009).

The proposed interventions to reverse this situation are grouped into three axes: patient, treatment, and health system. The first encompasses home BP measurement, encouraging family support, and health education, fostering patient self-care (Omboni et al., 2013); the second, the organization of simplified dosing regimens with fewer adverse effects, as well as easy-to-understand prescriptions (Gupta; Arshad; Poulter, 2009); and the third, strategies aimed at expanding multidisciplinary teams in the health system, developing a good doctor-patient and team-patient relationship, and improving the quality of home visits (Picon et al., 2012).

In this context, clinical practice guidelines, which summarize current knowledge, benefits, and risks of diagnostic and therapeutic approaches, and provide evidence-based recommendations developed by experts, serve as an important resource to assist physicians in patient management. Although there are criticisms pointing to guidelines as overly academic, poorly implemented, subject to external influences, and sometimes contrary to individualized physician-patient care (Shaneyfelt; Centor, 2009; Kaul, 2019), they are certainly a valuable resource.

The impact of these compilations of information can be partly estimated by access and citation data. The 2018 European Society of Cardiology (ESC) and European Society of Hypertension (ESH) guidelines for the management of hypertension have been viewed nearly 2 million times and have more than 14,000 citations (McCarthy et al., 2024). The ESC, which has been developing guidelines on cardiovascular diseases for 30 years, published new guidelines for the management of high blood pressure (BP) and hypertension in 2024, proposing significant changes compared to the recommendations of the 2018 guidelines. Aiming to simplify clinical practice, the number of categories based on blood pressure levels was reduced from 7 to 3, removing the concepts of optimal blood pressure, normal blood pressure, and high-normal blood pressure. The classification of blood pressure levels <120/70 mmHg as non-elevated BP, blood pressure levels ≥120/70 and <140/90 mmHg as elevated BP, and ≥140/90 mmHg as hypertension (McEvoy et al., 2024). This categorization was supported by robust data from clinical trials, which demonstrated that the effectiveness of reducing cardiovascular events related to blood pressure control extends to levels below 120/70 mmHg (Rahimi et al., 2021; The SPRINT Research Group, 2015; Zhang et al., 2021).

The 2018 ESC and ESH guidelines for the management of arterial hypertension recommended a BP <140/90 mm Hg as the initial therapeutic target, with pharmacological treatment generally reserved for high-risk patients or those who did not reach the recommended therapeutic target with non-pharmacological measures (Williams et al., 2018). However, the 2024 guidelines recommend pharmacological treatment for all hypertensive patients and for those with elevated BP ≥130/80 mm Hg, at high or moderate risk in the presence of risk modifiers, who did not reach the therapeutic target after 3 months of non-pharmacological measures, with the recommended therapeutic target being <130/80 mm Hg. Individualization and a less stringent target (BP<140/90 mmHg) are recommended for individuals who cannot tolerate lower BP levels, older adults with clinically significant frailty, ≥85 years, or with a life expectancy <3 Years (McEvoy JW, 2024).

The therapeutic target is the main driver of hypertension treatment, and the definition of blood pressure levels that indicate initiating non-pharmacological measures and stratifying CV risk guides early intervention, which, like the therapeutic target, contributes significantly to reducing adverse CV events. A comparative analysis of the current and previous ESC recommendations may provide a practical overview of their impact. In this sense, the present study, through comparative analysis with the 2018 ESC hypertension management guideline, aims to evaluate the impact of the 2024 ESC Guidelines on blood pressure control rates and the prevalence of individuals who require an approach for adequate classification and stratification of cardiovascular risk in a population sample of a municipality in the southern region of Brazil, with approximately 360,000 inhabitants, of which 72.6% are white, 24.2% are mixed race, 3.7% are black, 0.4% are Asian, and 0.08% are indigenous (Instituto Brasileiro de Geografia e Estatística (IBGE), 2024).

2. METHODOLOGY

Cross-sectional, retrospective study conducted through the analysis of data collected at outreach events linked to Outreach Project No. 00163.24.05353.03, which was conducted by students and professors from the Department of Medicine at the State University of Ponta Grossa, entitled "Informational and educational actions for better understanding and adherence to medical treatment." The information collected at these events consisted of

basic sociodemographic data (age, sex, education, and occupation), targeted medical history taking to detect cardiovascular risk factors and cardiometabolic diseases, and records of blood pressure measurements (as recommended in the 2018 and 2024 guidelines), waist circumference, and weight and height to calculate body mass index (BMI). Participants were volunteer adults aged 18 years or older, randomly approached in a location with high foot traffic. The results were expressed as percentages and percentage points. Comparisons were made using the McNemar test through the Jamovi computer program, version 2.6.26, with values of $p < 0.05$ considered significant.

3. RESULTS AND DISCUSSION

Five hundred four individuals were evaluated, with a mean age of 59.56 years, comprising 50.59% men and 49.41% women, most having low levels of education. Regarding lifestyle habits, 46.24% were sedentary, 14.09% were active smokers, and 33.47% consumed alcoholic beverages, with more than moderate consumption reported by 25% of them. Regarding anthropometric data, 23.41% had a normal body mass index, 35.91% were overweight, and 40.68% were obese. A history of diabetes was reported by 21.63% and dyslipidemia by 33.67% of the sample. A previous history of hypertension (HH) was reported by 248 volunteers (49.21%) and denied by 256, corresponding to 50.79% of the sample (Table 1).

Table 1. Sample characterization

Variable		n	%
Gender	Male	255	50.59
	Female	250	49.41
Education	None	12	3.11
	Incomplete Elementary School	143	37.05
	Complete Elementary School	97	25.13
	High School	113	29.27
	Higher Education	21	5.44
Body Mass Index (BMI)	Normal	118	23.41
	Overweight	181	35.91
	Obesity	205	40.68
Medical history of hypertension	No	256	50.79
	Yes	248	49.21
Dyslipidemia	No	333	66.33
	Yes	169	33.67
Diabetes mellitus	No	395	78.37
	Yes	109	21.63
Alcohol use disorder (AUD)	No	334	66.53
	Yes	168	33.47
	Moderate AUD	126	75
	Severe AUD	42	25
Tabagism	No	433	85.91
	Yes	71	14.09
Physical activity	No	191	46.24
	Yes	222	53.76

Source: Prepared by the authors.

Among individuals with HH, 70% received regular medical follow-up, and 84.6% used antihypertensive medication as prescribed. In this subgroup, blood pressure levels lower than 140/90 mmHg were observed in 40.73% and <130/80 mmHg in only 11.70%. Therefore, applying the criteria proposed by the 2018 ESC guideline for the management of arterial hypertension, initial blood pressure control was observed in 40.73% of the subgroup with HH. However, according to the criteria proposed by the 2024 ESC guideline for the management of high blood pressure and hypertension, the therapeutic target (<130/80 mmHg) was achieved in only 11.70% of this subgroup (Figure 1). Thus, using the criteria proposed by the 2024 ESC guideline, the hypertension control rate was significantly lower (*P<0.001*) 29.03 percentage points lower, or 3.48 times lower than that achieved using the 2018 ESC guideline criteria.

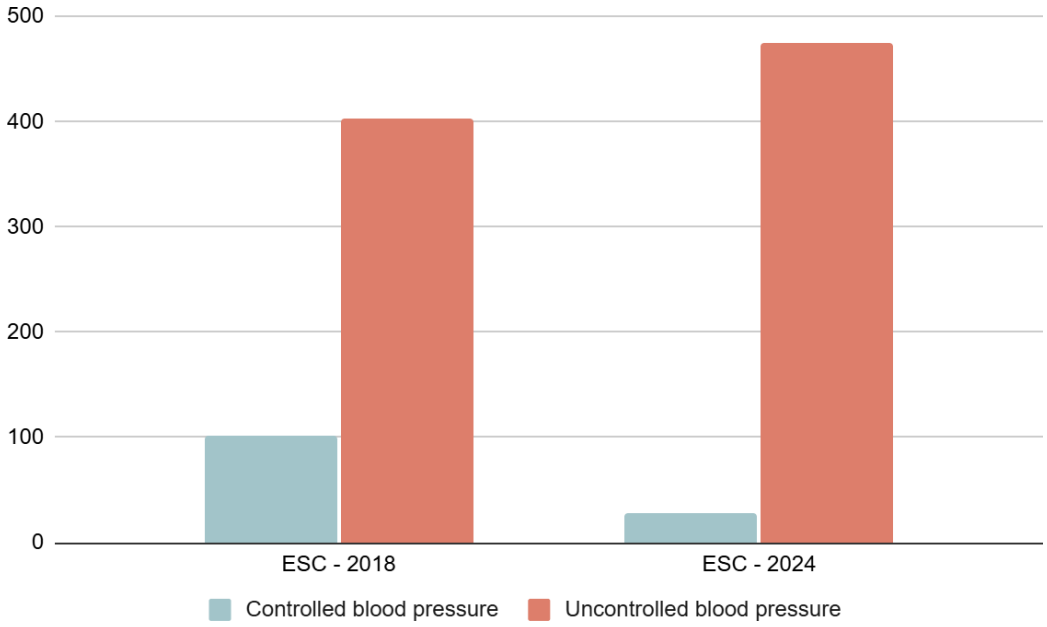

Fig. 1. Blood pressure control in individuals with a history of hypertension, according to the 2018 and 2024 ESC guidelines
Source: Prepared by the authors.

Regarding those who denied HH, 36.33% of them, corresponding to 93 individuals, had BP ≥ 140/90 mmHg. According to the classification proposed by the 2018 ESC guideline for the management of arterial hypertension, blood pressure levels compatible with high-normal blood pressure (≥ 130/85 and <140/90 mmHg) were observed in 11.72%, with normal blood pressure (≥ 120/80 and <130/85) in 30.86% and optimal blood pressure (<120/80) in 20.70% of this subgroup (figure 2). Therefore, under these criteria, only 11.72% of the sample, classified as having high-normal blood pressure, would require an approach for diagnosis and risk stratification. However, applying the criteria from the 2024 ESC guideline for the management of high blood pressure and hypertension, 59.38% were classified as having elevated BP (≥120/70 and <140/90) and 4.29% as having non-elevated BP (<120/70) (Figure 2). Therefore, under these criteria, only 4.29% of this subgroup would not indicate diagnostic and risk stratification approaches. Thus, the percentage of individuals requiring additional risk stratification and specific care would be 47.66 percentage points higher, or 5

times higher, when the criteria adopted are those defined by the 2024 ESC guideline, representing a significant difference between the criteria recommended by the two guidelines (*P<0.001*).

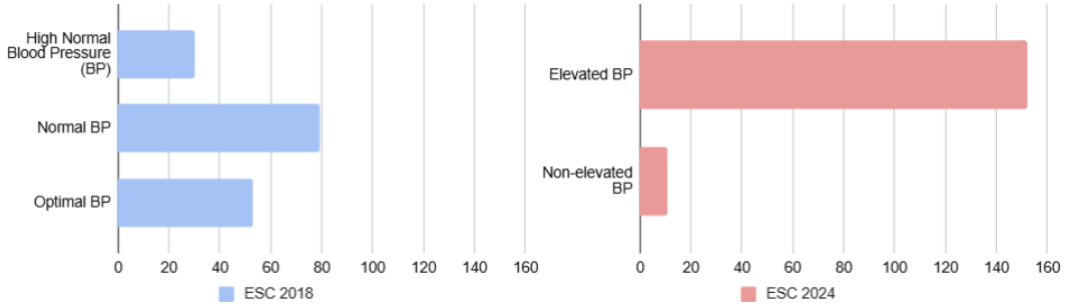

Fig. 2. Classification according to blood pressure levels of individuals without a history of hypertension according to the 2018 and 2024 ESC Guidelines
Source: Prepared by the authors.

4. DISCUSSION

Hypertension is a significant challenge for the global healthcare system due to its high prevalence and its importance as a risk factor for the development of cardiovascular disease (CVD) and chronic kidney disease (CKD) (Mills et al., 2016). In 2010, more than 60% of deaths caused by CVD, CKD, and diabetes mellitus (DM) were attributed to four modifiable cardiometabolic risk factors, with hypertension having the most significant impact, characterizing it as the leading modifiable risk factor for premature death globally (Mills et al., 2016; The Global Burden of Metabolic Risk Factors for Chronic Diseases Collaboration, 2014). Worldwide, more than one billion people have hypertension, which contributes to more than 20% of CVD (Malik et al., 2021).

In the present study, 35.91% of the population sample was overweight, 40.68% were obese, 21.63% had diabetes, and 33.67% had dyslipidemia. According to data reported by the WHO, in 2022, 43% of those over 18 years of age worldwide were overweight, 16% were obese, 14% were diabetic (World Health Organization, 2024; World Health Organization, 2020; WHO, 2024), and in 2008, 39% had hypercholesterolemia (WHO global health observatory data, 2008). Therefore, the prevalence of overweight individuals was approximately 7 percentage points lower, obesity 24 percentage points higher, diabetes 8 percentage points higher, and dyslipidemia 5 percentage points lower. These differences are likely primarily related to the average age of the sample.

The prevalence of hypertension in the sample evaluated in this study was 49.21%, approximately 12 percentage points above the European estimate of 37% (WHO, 2023) and 17 percentage points above the prevalence estimate in the United States (32%) when using the cut-off value ≥140/90 mm Hg or reported current use of antihypertensives (Whelton et al., 2018). However, the mean age of the sample in question was 59.56 years; therefore, similar to the prevalence of other comorbidities mentioned above, the age of the participants may, at least in part, justify the difference between the estimated prevalences. Results of a meta-analysis of 48 randomized trials published between 1972 and 2013 demonstrated that the reduction in the risk of major cardiovascular events was proportional to the reduction in systolic BP, regardless of the presence of CVD or baseline systolic BP, with the benefit observed even at baseline systolic BP levels <120 mmHg. Overall, a 5 mmHg reduction in

systolic BP reduced the risk of major cardiovascular events by approximately 10%. The corresponding proportional reductions in the risk of stroke, heart failure, ischemic heart disease, and cardiovascular death were 13%, 13%, 8%, and 5%, respectively (Rahimi et al., 2021).

The aforementioned meta-analysis reflects the scenario that motivated the ESC to implement the substantial changes that culminated in the 2024 guideline recommendations, and subsequently in the recommendations of the American College of Cardiology/American Heart Association (ACC/AHA) and the Brazilian Society of Cardiology (BSC) guidelines. In general, there is consensus among the 2024 ESC, 2025 ACC/AHA, and 2025 BSC guidelines regarding the decision to initiate pharmacological treatment based on BP level and CV risk, and regarding the benefit of achieving the therapeutic target of BP <130/80 mmHg. Similarly, there is also agreement among the cited guidelines regarding the need to introduce non-pharmacological measures and risk stratification when systolic blood pressure levels are ≥ 120 and/or ≤ 80 mmHg, although there is slight disagreement regarding the diastolic level adopted as a parameter (McEvoy et al., 2024; Jones et al, 2025; Brandão et al., 2025).

In our study, among the 256 individuals who denied HH, 93 (36.33%) had BP ≥ 140/90 mmHg at the time of treatment and were therefore unaware of this condition. Among individuals with HH (49.21% of the sample), 40.73% were within the initial treatment target, according to the criteria proposed by the 2018 ESC guideline (BP < 140/90 mmHg). However, according to the criteria proposed by the 2024 ESC guideline, the therapeutic target (<130/80 mmHg) was reached in only 11.70% of this subgroup (Figure 1). Thus, comparing control rates under the criteria of the two aforementioned guidelines, a significantly lower control percentage (3.48 times, p value < 0.001) is observed when the criteria of the 2024 guideline are applied.

The scenario worldwide is similar. According to data from the 2013 Prospective Rural Urban Epidemiology (PURE) study, which evaluated more than 150,000 adults aged 35 to 70 from various regions of the world, 46.5% of hypertensive individuals were aware of their diagnosis, and only 32.5% of those treated had controlled blood pressure levels (Chow et al., 2013). In 2019, a year in which the global prevalence of hypertension among adults aged 30 to 79 was 32% for women and 34% for men, the blood pressure control rate was estimated at 23% for women and 18% for men (Zhou et al., 2021). In the United States, these rates were estimated at 55.2% and 49.3%, respectively (National Center for Health Statistics (U.S.), 2014), with a prevalence of hypertension of 46% (Whelton et al., 2018). In Europe, the control rate was estimated at 48.4% (Reuter; Jordan, 2019) and the prevalence of hypertension at 37% (WHO, 2023).

Prevalence data and control rates may vary by region, as they depend on the criteria adopted. The 2017 ACC/AHA Guideline cites the discrepancy in the prevalence of hypertension observed when using the criteria adopted in 2017 (hypertension is defined as BP ≥130/80 mm Hg or reported current use of antihypertensive medications) compared to the criteria adopted by the previous guideline from the same entity (BP ≥140/90 mm Hg) and maintained by other guidelines such as the 2024 ESC and the 2025 BSC (Whelton et al., 2018). Since 2024, initiated by the 2024 ESC guideline and similarly reinforced by the ACC/AHA and BSC guideline in 2025, an approach with non-pharmacological measures and CV risk stratification has been recommended in patients with BP ≥ 120 and/or ≤ 80 mmHg, with the 2024 ESC recommendation being slightly more stringent in relation to BP, defining patients with BP ≥ 120/70 mmHg (elevated BP) as eligible for the aforementioned approach. In the present study, using the criteria of the 2024 ESC guideline, 59.38% of the subgroup without HH was classified as having elevated BP (≥ 120/70 and <140/90 mmHg) and 4.29%

as non-elevated BP (<120/70 mmHg). Therefore, 59.38% of the aforementioned subgroup would be indicated for non-pharmacological measures and CV risk stratification. On the other hand, applying the criteria of the 2018 ESC guideline, only 11.72% of these individuals would be classified as having high-normal blood pressure (≥130/85 and <140/90 mmHg), meaning they would be indicated for the same approach. Hence, the percentage of these individuals would be five times higher if the criteria adopted were those defined by the 2024 ESC guideline, which, in this context, characterizes a significant difference between the two guidelines (*P<0.001*).

Thus, it can be inferred that the new paradigm initially proposed by this guideline will contribute to the reduction of apparent therapeutic inertia, through the awareness of health professionals, the sensitization of public body managers, and the guidance of the population, which together can contribute to the reversal of this bleak global panorama related to hypertension and CVD in general.

5. CONCLUSION

The adoption of lower cutoff values, proposed by the 2024 ESC guideline, to guide patient management significantly increased the percentage of individuals with this condition. The more rigorous therapeutic target significantly reduced the percentage of individuals with blood pressure levels considered controlled. A significant portion of the sample (36.33%) lacked knowledge of individual health conditions related to blood pressure levels. The sample's blood pressure control rate was poor and disproportionate to the percentage of adherence to pharmacological treatment, which may characterize therapeutic inertia.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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