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## Patterns of disease progression and risk determinants of arterial hypertension in adults aged 45–59 years.

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**Keywords:** Arterial hypertension, middle-aged adults, cardiovascular determinants, lifestyle-related risk, target organ involvement, prevention.

**Abstract.** Arterial hypertension is a chronic cardiovascular disorder that significantly increases the risk of adverse health outcomes in middle-aged populations. The age range of 45–59 years represents a critical stage during which long-term exposure to behavioral, metabolic, and psychosocial factors leads to persistent elevation of blood pressure. This review explores the patterns of hypertension progression in this age group and examines the major determinants influencing disease development and severity. The analysis is based on recent international recommendations and peer-reviewed literature. Evidence indicates that hypertension in middle-aged adults often remains clinically unrecognized while simultaneously promoting early target organ involvement. The high prevalence of modifiable risk determinants highlights the importance of early prevention and individualized risk management strategies.

**Introduction:** Arterial hypertension is among the most prevalent non-infectious diseases worldwide and remains a primary contributor to cardiovascular morbidity and premature mortality. Despite significant progress in diagnostic approaches and therapeutic options, blood pressure control rates remain insufficient, particularly among individuals of middle age.

Between 45 and 59 years of age, physiological aging of the cardiovascular system becomes more evident. These changes include progressive arterial stiffening, endothelial dysfunction, and increased systemic vascular resistance. When combined with long-term exposure to unhealthy lifestyle behaviors and psychosocial stressors, these mechanisms contribute to the manifestation and progression of hypertension. A major challenge in this population is the frequently asymptomatic nature of elevated blood pressure, which delays diagnosis and increases the likelihood of complications. Therefore, detailed analysis of disease characteristics and risk determinants in this age group is of substantial clinical and preventive importance.

**Methods:** This narrative review was conducted through structured analysis of scientific publications and international clinical guidelines released from 2015 to 2024. Literature sources included PubMed, Google Scholar, and official documents from leading cardiovascular organizations.

Publications addressing arterial hypertension in adults aged 45–59 years were preferentially selected. Emphasis was placed on clinical progression, contributing determinants, and preventive approaches. Only peer-reviewed articles published in English were included. Data were synthesized using a qualitative analytical approach.

**Discussion and analysis:** In adults aged 45–59 years, hypertension typically develops gradually and may remain undetected for extended periods. Blood pressure elevation often progresses silently, with clinical recognition occurring during routine medical evaluations or following the onset of cardiovascular complications. Systolic blood pressure elevation is commonly observed in this population, reflecting reduced arterial elasticity and structural vascular remodeling. Even in the absence of severe hypertension, early signs of target organ involvement—such as myocardial structural adaptation, renal microvascular changes, and retinal vascular alterations—may already be present.

The etiology of hypertension in middle-aged adults is multifactorial and involves both non-modifiable and modifiable determinants.

Non-modifiable determinants include biological aging, sex-related differences, and inherited predisposition. Individuals with a family history of hypertension exhibit increased susceptibility due to genetically mediated alterations in vascular regulation and neurohormonal balance.

Modifiable determinants play a dominant role in disease initiation and progression. These include excessive dietary sodium consumption, poor nutritional quality, physical inactivity, increased body mass, tobacco use, and harmful alcohol intake. Central obesity and insulin resistance contribute to endothelial dysfunction and sympathetic nervous system activation, thereby sustaining elevated blood pressure levels.

Chronic psychological stress, frequently associated with professional and social responsibilities during middle age, further exacerbates blood pressure dysregulation by stimulating neuroendocrine pathways.

Hypertension in this age group often coexists with metabolic and renal disorders, including type 2 diabetes mellitus, dyslipidemia, and early chronic kidney disease. The coexistence of these conditions markedly increases overall cardiovascular risk and accelerates the progression of target organ damage.

**Conclusion:** Arterial hypertension in adults aged 45–59 years is characterized by a predominantly silent clinical course and a high burden of modifiable risk determinants. During this stage of life, prolonged exposure to unfavorable lifestyle and metabolic factors leads to progressive vascular and organ damage.

Early detection, comprehensive risk assessment, and sustained preventive interventions are essential to reduce long-term cardiovascular complications. Individualized management strategies combining lifestyle modification and pharmacological therapy represent the most effective approach for controlling hypertension in middle-aged populations.

In summary, addressing hypertension during middle age provides a critical opportunity to reduce cardiovascular morbidity and mortality and to improve population health outcomes.

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