

# Overview of the Prevalence and risk factors of hypertension in Saudi Arabia: Systematic review

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## Abstract:

Hypertension is an important public-health challenge worldwide and a major risk factor leading to stroke, myocardial infarction, heart failure, renal failure, and ultimately death. Socioeconomic and demographic transitions occurring in many developing countries have contributed to the burden of hypertension. Prevalence of this condition is frequently underreported because of its often-silent nature. Population-based studies that explore the occurrence and correlates of these conditions are scarce in Saudi Arabia. Hypertension, along with pre-hypertension and other hazarously high blood pressure, is responsible for 8.5 million deaths from stroke, ischaemic heart disease, other vascular diseases, and renal disease worldwide. Hypertension can be detected in the community and primary care facilities, and several effective drugs are available at fairly low cost for treating patients with hypertension and reducing the risk of its sequelae. Improving the effective coverage of treatment for patients with hypertension is an objective of many global, regional, and national initiatives, and programmes.

**Keywords:** Hypertension, Prehypertension, Blood pressure, Normotensive, Hypertensive, Risk factors, prevalence, management.

## Introduction:

The current definition of hypertension (HTN) is systolic blood pressure (SBP) values of 130 mm Hg or more and/or diastolic blood pressure (DBP) of more than 80 mm Hg. Hypertension ranks among the most common chronic medical condition characterized by a persistent elevation in arterial pressure. (1)

More than one billion adults worldwide have hypertension, with up to 45% of the adult populace being affected by the disease. The high prevalence of hypertension is consistent across all socio-economic and income strata, and the prevalence rises with age, accounting for up to 60% of the population above 60 years of age. (2)

In the year 2010, the global health survey report published in Lancet, which was comprised of patient data from 67 countries, reported Hypertension as the leading cause of death and disability-adjusted life years worldwide since the year 1990.

In the United States, HTN alone accounts for more cardiovascular disease-related deaths than any other modifiable risk factor and is second only to cigarette smoking as a preventable cause of death for any reason. (3)

Recent estimates have suggested the number of patients with hypertension could increase as much as 15% to 20%, which could reach close to 1.5 billion by 2025. (4)

Most cases of hypertension are idiopathic, which is also known as essential hypertension. It has long been suggested that an increase in salt intake increases the risk of developing hypertension. One of the described factors for the development of essential hypertension is the patient's genetic ability to salt response. About 50% to 60% of the patients are salt sensitive and therefore tend to develop hypertension. (5)

There are various mechanisms described for the development of hypertension, which include increased salt absorption resulting in volume expansion, an impaired response of the renin-angiotensin-aldosterone system (RAAS), and increased activation of the sympathetic nervous system. These changes lead to the development of increased total peripheral resistance and increased afterload, which in turn leads to the development of hypertension. (6)

Most cases of hypertension are asymptomatic and are diagnosed incidentally on blood pressure recording or measurement. Some cases present directly with symptoms of end-organ damage as stroke-like symptoms or hypertensive encephalopathy, chest pain, shortness of breath, and acute pulmonary edema. (7)

The ACC recommends at least two office measurements on at least two separate occasions to diagnose hypertension. The patient should remain seated quietly for at least 5 minutes before taking the blood pressure, and proper technique is necessary. The blood pressure cuff should cover 80% of the arm circumference because larger or smaller pressure cuffs can falsely underestimate or overestimate blood pressure readings. (8) Ambulatory blood pressure

measurement is the most accurate method to diagnose hypertension and also aids in identifying individuals with masked hypertension as well as the white coat effect. The management of hypertension subdivides into pharmacological and nonpharmacological management. Non-pharmacological and lifestyle management are recommended for all individuals with raised BPs regardless of age, gender, comorbidities, or cardiovascular risk status. (10)

**Table (1)**

Author	Country	Study design	Participants (n)
Abdalla A. Saeed et al. 2011 (10)	Department of Community Medicine, Faculty of Medicine, King Saud Bin Abdulaziz University for Health Sciences, King Fahad Medical City	cross-sectional community-based study	(4758)
Mansour M Al-Nozha et al 2007 (11)	Saudi Arabia	cross-sectional community-based study	(17230)
Abdullah K Al-Ahmari et al. (2022) (12)	Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al-Kharj, Riyadh, Saudi Arabia	a cross-sectional study of adult patients with rheumatoid arthritis	(1490)
Aqeel M. Alenazi et al 2023 (13)	Saudi Arabia	The study used the data from household health survey carried out by the General Authority for Statistics	(24,012)
Luai Alhazmi et al. 2023 (14)	Jazan University, Saudi Arabia	cross-sectional analytical study	(607)
A Bandy et al. 2019 (15)	Sakaka City, Aljouf Region of Saudi Arabia	school-based cross- sectional study	(400)

**Table (2)**

Study name	prevalence	Risk factors	Conclusion
Prevalence, Awareness, Treatment, and Control of Hypertension among Saudi Adult Population: A National Survey	Of the total 4758 subjects who participated in the study, about 51% were females. A total of 1213 were hypertensives giving a prevalence of 25.5% (27.1% for males and 23.9% for females). Of all hypertensives, 542 (44.7%) were known patients confirmed by health professionals and 671 (55.3%) were unaware of their disease.	There is a significant association between hypertension and each of the following: gender, age, region, educational level, and participants' occupation ( $P < 0.001$ ). The prevalence of hypertensive males was significantly higher than hypertensive females. As age increases, the prevalence of hypertension significantly increases. People in the central region of the KSA have higher prevalence than other	There is a high prevalence of hypertension and low prevalence of awareness. Significant predictors of hypertension included male gender, urbanization, low education, retirement from work

		regions. Uneducated participants showed higher prevalence than others. Retired participants showed the highest prevalence compared to other occupations. For smoked tobacco products, there is a significant association ( $P = 0.002$ )	
Hypertension in Saudi Arabia	The prevalence of hypertension was 26.1% in crude terms. For males, the prevalence of hypertension was 28.6%, while for females; the prevalence was significantly lower at 23.9% ( $p < 0.001$ ). The urban population showed significantly higher prevalence of hypertension of 27.9%, compared to rural population's prevalence of 22.4% ( $p < 0.001$ ). The prevalence of CAD among hypertensive patients was 8.2%, and 4.5% among normotensive subjects ( $p < 0.001$ ). Increasing weight showed significant increase in prevalence of hypertension in a linear relationship.	Gender, residence, CAD, and body mass index all significantly affect hypertension prevalence	Hypertension is increasing in prevalence in KSA affecting more than one fourth of the adult Saudi population, aggressive management of hypertension as well as screening of adults for hypertension is recommended.
Prevalence of Hypertension and Its Associated Risk Factors Among Patients with Rheumatoid Arthritis in the Kingdom of Saudi Arabia	The prevalence of hypertension was found in 32.35% of the 1490 rheumatoid arthritis patients who participated in the study. The mean ages of the hypertensive and non-hypertensive patients were 56.9 and 46.3 years, respectively.	Logistic regression analyses revealed that advanced age ( $> 60$ years; OR: 9.981, 95% CI: 6.679–14.915), female sex (OR: 0.34, 95% CI: 0.263–0.44), a low level of education (OR: 2.821, 95% CI: 1.92–4.143), unemployment, smoking, and visiting physicians less than two times within the past 12 months were risk factors for the increased prevalence of hypertension among patients with RA.	Hypertension is highly prevalent among patients with rheumatoid arthritis, and advanced age, sex, low educational level, unemployment, smoking, and comorbidities are risk factors for increased hypertension prevalence.
National and regional prevalence rates of hypertension in Saudi Arabia: A descriptive analysis using the national survey data	The prevalence of HTN was 9.2% among Saudi population aged 15 years and older.	It was relatively higher in women (10.0%) than in men (8.5%). The prevalence of HTN increased with advancing age (aged 65 years and older), accounting for 55.3% in women and 48.0% in men; its prevalence was relatively low among the younger age group, accounting for 0.1% in those aged 15–19 years. A large difference was found in the prevalence of HTN between regions, ranging from 6.0% in Najran region to 10.0% in Makkah region.	This study reported the national and regional prevalence of HTN among Saudi adults using a representative sample with large variations in the prevalence rates according to age, sex, and regions. Older age, men, and Makkah region had higher prevalence of HTN.
Prevalence and Awareness of Hypertension	Out of the 607 participants, 210 were hypertensive, resulting in a prevalence of 12% (28.7% for the men and 43.3% for the women).	The univariate analysis revealed that age, sex, educational level, income, marital status, and tobacco chewing were significantly associated with HTN.	The global prevalence of HTN is increasing annually owing to rapid changes in lifestyle and dietary habits.

among a Rural Jazan Population		The likelihood of HTN increased with advancing age, with a 13% increase for each year (aOR = 1.13, 95% CI = 1.10–1.16, $p < 0.001$ ). The female participants were more likely to be hypertensive than the male participants (aOR = 1.79, 95% CI = 1.06–3.03, $p = 0.029$ ).	Furthermore, because adherence to antihypertensives is poor in rural Jazan, the Ministry of Health and researchers advocate implementing a program to increase awareness and assess patient adherence to prescribed medication for the control of HTN.
Hypertension and its risk factors among male adolescents in intermediate and secondary schools in Sakaka City, Aljouf Region of Saudi Arabia	Overall 36 (9.0%) adolescents had prehypertension and 69 (17.2%) had hypertension. Systolic prehypertension, systolic hypertension, diastolic prehypertension, and diastolic hypertension were present in 6.5%, 17.2%, 5.8%, and 9.0% of the adolescents, respectively	Bivariate analysis revealed that overweight and obesity, no physical activity, or once-a-week physical activity, positive family history of hypertension, and smoking were predictors of systolic prehypertension and showed a significant relationship with systolic hypertension.	There is a considerable prevalence of prehypertension and hypertension, among school-going male adolescents. school-based health education programs and routine screening directed toward the risk factors of noncommunicable diseases like hypertension with special attention to obesity, physical inactivity, and smoking are recommended.

### Discussion:

Systemic arterial hypertension is the most important modifiable risk factor for all-cause morbidity and mortality worldwide and is associated with increased risk of cardiovascular disease (CVD). Obesity, gender, age, educational level, socioeconomic level all have been proved by many studies and the studies mentioned above to affect hypertension prevalence (10,11,12 ). In 2008, 24% of the world's adult population had uncontrolled hypertension, which is predicted to rise to 31% by 2025. (16) A high prevalence of hypertension has been discovered among the Saudi Arabian population in several studies. Al-Nozha et al reported that hypertension affects more than one-fourth of the adult Saudi population and that its prevalence is increasing. (11) In a nationwide survey conducted by El Bcheraoui et al, the prevalence of hypertension in Saudi Arabia was approximately 15.2%, whereas that of borderline hypertension was nearly 41%. (17) Additionally, Al-Wabel et al reported high rates of prehypertension and hypertension among young adults and that the majority of these cases were undiagnosed. (18) Elkhailifa et al showed a high prevalence of

hypertension among individuals in Saudi Arabia and that diabetes, obesity, and aging were the most important determinant factors for hypertension. (19)

Rheumatoid arthritis (RA) is a long-term inflammatory illness that affects synovial joints and causes tissue degeneration. It typically develops in middle-aged individuals. (20) It can affect extra-articular tissues, including the kidneys and heart. (21) Charles-Schoeman stated that the prevalence of cardiovascular diseases (CVDs) increases in patients with RA. (22) Furthermore, Chung et al reported that hypertension was likely more common in patients with RA than in the control subjects in their study. (23) Additionally, Dessein et al reported that in patients with RA, hypertension may represent a traditional cardiovascular risk factor whose prevalence increases and alters based on the presence of the disease. (24)

### Conclusion:

Hypertension is a leading risk factor for morbidity and mortality. Untreated hypertension may lead to many serious health conditions, including stroke, aneurysms, hypertensive heart disease, coronary artery disease,

kidney disease, or peripheral artery disease. Hypertension has a major economic impact ranging from medical costs to human capital loss and decrease in productivity. Rheumatoid arthritis, and advanced age, sex, low educational level, unemployment, smoking, and comorbidities are risk factors for increased hypertension prevalence. There is also a considerable prevalence of prehypertension and hypertension, among school-going male adolescents. The prevalence of hypertension and borderline hypertension is very high in Saudi Arabia. Moreover, control of hypertension is poor. With the majority of hypertensive Saudis being unaware of their condition, a national plan is needed to increase utilization of freely available screening, preventive, and medical services.

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