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Prevalence of Hypertension Among Young Adults: A Narrative Review

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ABSTRACT

Background: Hypertension is a growing global health concern, with its prevalence increasing among young adults. Despite being a significant risk factor for myocardial infarction, congestive heart failure, renal dysfunction and cerebrovascular accidents, hypertension remains under-diagnosed and inadequately managed in this demographic. Understanding its prevalence, risk factors, and trends across different regions is essential for effective prevention and management strategies.
Method: A narrative review has been conducted by analyzing studies published between 2011 and 2024 from PubMed, Scopus, Google Scholar, and Web of Science databases. Keywords like "hypertension," "prevalence of hypertension," and "hypertension in young adults" were used during search. Studies from multiple countries were reviewed to assess prevalence trends, risk factors, gender disparities, and regional variations.
Results: The prevalence of hypertension among young adults has shown a rising trend across multiple countries. In India, hypertension prevalence increased from 13.8% in 2015 to 18.3% in 2020. Regional disparities have been observed, with regards to the contributing factors such as obesity, smoking, sedentary lifestyles, and high salt intake. In Bangladesh, the prevalence was 9.7% in 2020, while Indonesia showed an increase from 25.8% in 2013 to 34.1% in 2018, with a large proportion of undiagnosed cases. In Nigeria in 2022, hypertension prevalence was 21%, with a higher burden in women (23.4%) than in men (18.8%). In the United States, hypertension prevalence among young adults was 22.4% in 2020, with a notable gender gap (31.2% in men vs. 13.0% in women). Longitudinal data revealed an increase in hypertension from 41.7% in 2013-2014 to 45.4% in 2017-2018, along with significant racial disparities. In addition, common risk factors across the studies included smoking, obesity, high salt intake, sedentary behavior, stress, and poor sleep patterns, with regional differences in their impact.
Conclusion: Hypertension among young adults is an increasing public health concern, with prevalence rising across different regions. The exceptionally high rates reported in some parts of India require further investigation to understand potential regional or methodological variations. Key risk factors, such as unhealthy lifestyle habits, highlight the urgent need for early screening, preventive interventions, and lifestyle modifications to mitigate the growing hypertension burden in younger populations. Tackling differences in awareness, diagnosis, and treatment is vital for improving cardiovascular health outcomes globally.

Keywords: Countries, Global Health, Hypertension Prevalence, Risk factors, Young Adults.

INTRODUCTION

Around 1.28 billion adults between the age of 30 and 79 worldwide suffer from hypertension, with the majority (two-thirds) living in low- and middle-income countries.[1] Approximately, 46% of these adults are undiagnosed hypertensives and less than half (42%) are diagnosed and receive treatment. However, approximately 21% of adults with hypertension have it under control.[1]

Hypertension is a major contributor to premature death globally. One of the global objectives for control of noncommunicable diseases is to lower the prevalence of hypertension by 33% from 2010 to 2030.[1]

Hypertension among young adults aged 30–49 years has a global prevalence of 19% in women and 24% in men, with men generally exhibiting higher rates. This age-related gender disparity is observed across most of the countries, where younger men are more likely to develop hypertension. Despite medical advancements, the prevalence of hypertension in this age group remains largely unchanged over the past three decades. While high-income countries have reported slight declines in the rates due to improved healthcare and lifestyle interventions, low and middle-income countries (LMICs) have reported an increase in the prevalence, contributing to a growing burden of hypertension in the younger populations.[2]

Although hypertension affects a significant proportion of young adults, diagnosis and treatment remain inadequate. Among those with hypertension, only a fraction receives proper care. Globally, just 54% are diagnosed hypertensives. Among those, 42% receive treatment, and only 21% achieve controlled blood pressure. The lack of symptoms in early stages often leads to delayed detection, particularly in young adults, who may not perceive themselves at risk. With rising cases in LMICs and growing concerns about long-term cardiovascular health, targeted screening and intervention strategies are essential to address hypertension among young adults.[2]

The Comprehensive National Nutrition Survey conducted between 2016 and 2018 in India found that 5% of adolescents were classified as hypertensives. The prevalence of hypertension varies across states, ranging from 0% to 10%. The states with the highest prevalence of hypertension among adolescents (≥ 8%) were Delhi (10.1%), Uttar Pradesh (8.6%), and Manipur (8.3%). Haryana, Punjab and Kerala have very low hypertension prevalence rates (0.0%, 0.2% and 0.5% respectively.[3]

The North and Central regions have states with higher variability in hypertension prevalence, with some states showing much higher rates than others.[3]

The Southern region has a somewhat mixed distribution, but Kerala stands out with the lowest prevalence.

The East and Northeast regions show moderate levels of hypertension, with some states like Manipur having relatively higher rates.[3]

Hypertension goes beyond simply abnormal blood pressure readings; it serves as a key risk factor for development of numerous serious health problems, including cardiovascular diseases, strokes, kidney diseases, and other long-term conditions. The extensive consequences of hypertension have driven considerable scientific research focused on identifying risk factors and creating preventive measures.[4]

Recent data from the National Health and Nutrition Examination Survey in the United States, covering the period from August 2021 to August 2023, revealed that 47.7% of adults aged 18 and older suffer from hypertension. The prevalence was higher in men (50.8%) compared to women (44.6%), and it increased with age. Among adults aged 18–39, 23.4% had hypertension, which raised to 52.5% in those aged 40–59 and reached 71.6% for individuals aged 60 and older.[5] The survey also showed that both men and women experienced a similar rise in hypertension prevalence as they aged. However, men had a higher prevalence in

the younger age groups, with 30.0% of men aged 18–39 affected compared to 16.4% of women. For those aged 40–59, 55.9% of men had hypertension, while 49.0% of women did. In contrast, there was no significant difference between men and women aged 60 and older.[5]

Hypertension has emerged as a significant public health challenge among young adults globally, various studies over the years documenting its increasing prevalence, associated risk factors, and gaps in diagnosis and treatment. Despite its growing burden, hypertension among young adults often remains under-diagnosed and inadequately managed, leading to long-term health consequences. This review synthesizes findings from various studies conducted across different regions globally, highlighting trends in prevalence of hypertension over time and the evolving understanding of this condition among young adults.

The objective of this analysis is to provide a comprehensive examination of how hypertension prevalence has changed over time, with a focus on the demographic, regional, and socio-economic variations influencing its trends.

MATERIALS & METHODS

This narrative review has been carried out to examine the prevalence of hypertension among young adults. Relevant articles were searched across several electronic databases, including PubMed, Scopus, Google Scholar, Medline, and Web of Science. The review covered studies published between 2011 and 2024. The filter was applied specifically using the terms such as “hypertension,” “prevalence of hypertension,” and “hypertension and young adults” were employed. The sources used for this review included randomized clinical trials (RCT), clinical studies meta-analysis and Cochrane data analysis to include data from different regions across the world. Additionally, the reference lists of key studies were examined to find other pertinent articles.

RESULT

India and Pakistan

India has seen a steady rise in hypertension prevalence, particularly among young adults, as evidenced by the National Family Health Survey (NFHS) studies. The NFHS-4, conducted in 2015-2016 had reported that 13.8% of young adults had hypertension, with only 51.1% being aware of their condition and 19.5% seeking treatment for the same.[6]

According to the NFHS-5 (2019-2021), the prevalence had risen to 18.3%, with disparities between men (21.6%) and women (14.8%) as compared to the NFHS-4 (2015-2016).[7] However, the awareness and treatment rates remained low, with only 34.3% being diagnosed hypertensives, 13.7% being treated, and a mere 7.8% achieving blood pressure control.

An observational study conducted a hospital-based screening of hypertension from 2017 to 2024 as a part of global BP screening program. The prevalence of hypertension was reported to be 9.2% among young adults. Among these, 58.4% were male while 41.6% were female. They also reported a strong association between hypertension with being obese/overweight. [8]

A cross-sectional study conducted at Hazrat Bari Sarkar Medical and Dental College, Islamabad, Pakistan in 2023 among 18-35 years old adults showed the prevalence of hypertension to be 14.83% and pre-hypertension to be 14.07%. Association was found between hypertension with age, a sedentary lifestyle, high salt intake, obesity and smoking.[9]

Another study from Kerala, 2022, conducted among 1,221 men of 20-39 years age group suggests a hypertensive prevalence of 11.2% and 33.3% to be pre-hypertensives. It was found to be higher in men (20.5%) than women (7.5%). Risk factors associated with elevated blood pressure were found to be male sex, abdominal obesity, urban residency and hypercholesterolemia. Awareness and treatment of hypertension was seen to be

poor among younger adults as compared to older adults.[10]

A study conducted in Lahore in 2022 among young adults aged 18-39 years found that 15.7% of the participants had hypertension. Of those, 51.9% were male and 48.1% were female, indicating a slightly higher prevalence in males. The study highlighted a strong link between daily smoking and hypertension and showed that a sedentary lifestyle increased the risk of hypertension by 80%. Obesity was also seen to be closely associated with hypertension. There was no significant difference in hypertension risk between males and females.[11]

An online cross-sectional survey was conducted in 2021 among 2,287 clinicians in India, including cardiologists, diabetologists, consultant physicians, and family physicians, found that 46.8%, 44.1%, and 43.1% of cardiologists, diabetologists, and consultant physicians, respectively, reported over 20% of young adults to be hypertensive. In contrast, 38% of family physicians reported a prevalence of less than 10%. Regional analysis revealed the highest prevalence of 10-20% was observed in the east zone (43.2%), while the central zone had the highest prevalence of 20-30% (44.1%). Across all experience levels, 63-66% of clinicians reported a hypertension prevalence of 10-30% in young adults. The primary risk factors for hypertension were perceived to be smoking, mental stress, and obesity, high salt intake, increased alcohol consumption, sedentary behaviour, and insufficient sleep (less than 7 hours).[12]

A systematic review with meta-analysis was conducted to calculate the pooled prevalence of hypertension among adolescents (10–19 years) in India in 2020, showed that the estimated prevalence of hypertension across different studies varied from 2% to 20.5%, with an average estimate of 7.6%. A subgroup analysis focused on western India showed less variation.[13]

Another study conducted among high school students aged 13 to 16 years in urban Bangalore in 2020 found that 21.6% had pre-hypertension and 8.9% had hypertension. Factors such as overweight, obesity, high salt intake, tobacco use, and stress were significantly associated with high blood pressure. The study also revealed that 94.9% of students had insufficient physical activity, 94.36% consumed inadequate amounts of fruits and vegetables daily. Also, 65.45% of students reported insufficient sleep duration, 17.45% had high salt intake, 2.18% consumed alcohol, and 7.8% used tobacco in any form.[14]

The data from a study conducted among 16-25 years old young adults in Pune in 2020 indicates that 52% of adolescents had normal blood pressure, while 40.8% were in pre-hypertensive stage and 7.2% were in stage I hypertension. Among young adults, 58.6% had normal blood pressure, 31.2% were in the pre-hypertension stage, 9.8% were in stage I hypertension, and 0.4% were in stage II hypertension. [15]

A study conducted in Kerala in 2016 among 18-89 years old showed that the prevalence of raised BP was 34.6% in men and 27.9% in women. There were no rural–urban differences. The prevalence of tobacco and alcohol use among men was 20.3% and 28.9%, respectively, while the estimated average daily salt intake was 6.7 grams.[16]

A cross-sectional study done in Mumbai in 2016 on the age group of 20 to 40 years revealed that out of the 450 participants, 55 (12.2%) participants had pre-hypertension, 64 (14.2%) had stage I hypertension and 9 (2.0%) had stage II hypertension. Several factors, including gender, advancing age, a history of addiction, excessive salt consumption, a family history of hypertension, high BMI, and lack of physical activity, were linked to a higher risk of developing hypertension.[17]

According to a study conducted in 2016 in Uttar Pradesh among 18 to 40 years old, hypertension was detected in 188 of the 1061 subjects (17.7%). The prevalence of pre-hypertension was higher in younger age groups; while hypertension was more prevalent in the older age group 13.22% vs 23.30%. Prevalence was seen to be higher among men (18.8%) as compared to women

(15.2%). A total of 40.2% of the subjects were found to have pre-hypertension. Prevalence of hypertension was higher in those with a history of smoking. [18]

A health survey conducted from January 2015 to December 2018 among the tribal population of the Kashmir Valley, aged over 20, revealed an overall hypertension prevalence of 41.4%, with 46.7% of men and 37.9% of women being affected. Among those with hypertension, 19% had isolated systolic hypertension, 24.8% had isolated diastolic hypertension, and 33.25% had combined hypertension. The prevalence of prehypertension was seen to be 35%. The chances of developing hypertension were higher with advancing age, male gender, smoking, and obesity.[19]

Similarly, a 2012 study conducted in Karnataka among 30 years and above found a prevalence of 43.3%, with men (51.6%) being more affected than women (38.9%).[20] In Kerala (2018), the authors conducted a study among 25 to 64 years old and have reported that the prevalence of hypertension was found to be 48.3% among the Kani tribe, which was found to be significantly higher than the general population.[21]

A study conducted in Tamil Nadu, in 2014 suggests prevalence of hypertension to be 29% in urban areas and 17% in rural areas with associated risk factors being high tobacco (23%) and alcohol (62%) use in rural areas, and low physical activity in 63% of urban and 43% of rural populations.[22]

A systematic review conducted in 2013 including ≥18 years old, estimated an overall prevalence of hypertension of 29.8% in India, with urban areas showing higher rates (33.8%) than rural areas (27.6%).[23]

Another longitudinal study in rural North India conducted between 2011 and 2014 among adults of ≥18 years old observed an increased prevalence of hypertension from 34.4% to 40.4%, emphasizing the growing burden of hypertension in younger populations of the country.[24]

In a study conducted in coastal Karnataka in 2011-2013 among 20-30 years old, the prevalence of pre-hypertension was found to be 45.2%. Multivariate logistic regression analysis revealed that age group of 25–30 years, white collared and skilled occupation, students, use of refined cooking oil, adding extra salt in meals, consuming salty food items, pre-obese and obese were the significant correlates of pre-hypertension. [25]

A cross-sectional study conducted among 200 undergraduate medical students of ages 18-21 years old in 2011 in Hi-Tech Medical College and Hospital, Bhubaneswar, Odisha suggests a prevalence of pre-hypertension to be 71.3% in males and 54.5% in females and prevalence of hypertension to be 3.57% and 2.27% in males and females respectively.[26]

China

3 cross-sectional surveys conducted in the years 2005, 2010, 2014 in southwest Hubei, China among 4,120 participants of 20-44 years old young adult (31.8 ± 7.2 years) showed that the prevalence of hypertension was seen in 13.4% which was 10.6% and 8.2% in 2005 and 2010 respectively which then doubled to 20.2% in 2014 along with increasing incidence of overweight and obesity. The prevalence increased exponentially with age being lowest among 20-24 years old at 8.9%, 10.2% among 25-29 years old, 12.3% among 30-34 years old, 14% among 35-39 years old and 22.2% among 40-44 years old. It was also seen to be higher among men (17.6%) than women (9.4%) and higher in rural area (15.3%) as compared to urban area (12.6%) across ages. [27]

Bangladesh, Indonesia

A study conducted in 2022 in Dhaka, Bangladesh among four medical colleges shows that the prevalence of prehypertension was 28% and hypertension was 4.8 among medical students. Data showed that the most common risk factors were male sex, alcohol consumption and overweight. They report that alcohol

consumption and overweight needs to be the target intervention. [28]

In Bangladesh, a study published in 2021 analyzing data from the 2017-18 on demographic health survey found that the prevalence of hypertension was 9.7% among young adults aged 18-34 years, with prehypertension affecting 33.4% of the population. Age over 25 years, male sex, and obesity were identified as significant risk factors, but urban-rural differences were not pronounced.[29]

Another study analyzing data from two nationally representative surveys in Bangladesh in 2011 and 2017-18 for adults of ages 18 years and above reported that the prevalence among adults aged 35 years and above increased from 25.8% in 2011 to 39.4% in 2018. Age-specific prevalence for hypertension has increased in all age groups with highest being among 35-44 years (63%). [30]

Indonesia has also shown a rise in hypertension prevalence. A study conducted in 2024 revealed that rates of hypertension increased from 25.8% in 2013 to 34.1% in 2018 among individuals aged 26-35 years.[13] Risk factors were seen to include gender, obesity, diabetes, stress, and instant food consumption, and a striking 55% of young men and 44% of young women remained undiagnosed.[31]

Africa

A population-based cross-sectional survey conducted in Zimbabwe between 2021 and 2022 among youth aged 18–24 years found that hypertension was more prevalent in men (8.7%) as compared to women (6.6%). However, as age increased, the prevalence in both genders became more similar. At age 18, 7.3% of men and 4.3% of women had hypertension, while at ages 23-24, the prevalence was 10.9% in men and 9.5% in women. Hypertension was found to be associated with male sex, older age, and a BMI of 30.0 kg/m² or higher.[32]

A cross-sectional study conducted in Nigeria in 2022 in Rivers State among 16 to 35 years old young adults from University of Port Harcourt, Rivers State University and Ignatius Ajuru University reported a prevalence of hypertension of 21%, with a higher proportion of cases in women (23.4%) compared to men (18.8%). Unlike other regions, dietary habits, particularly excessive salt and processed food intake were significant contributors to hypertension prevalence in Nigeria.[33]

A study conducted in Ibadan, Nigeria in 2022 among clinical students in the College of Medicine, University of Ibadan states that the prevalence of hypertension was 8% and pre-hypertension was 33% among young adults. It was significantly higher in males than in females. [34]

A cross-sectional study carried out among 18 years and above in 2021 in Mizan Aman town in Ethiopia showed a prevalence of undiagnosed hypertension to be 15.7% among 18–34-year-old young adults and having association with low physical activity, low consumption of fruits and vegetables and higher BMI.[35]

A cross-sectional study conducted in 2021 among 279 medical students of ages 18-35 years of University Enugu in southeastern Nigeria revealed a prevalence rate of 19.93% with 13.65% being isolated diastolic hypertension, 0.74% systolic hypertension and systolic-diastolic hypertensive prevalence of 5.4%. The prevalence of prehypertension was found to be higher in females (25.8%) than males (22.9%). [36]

A case control study was conducted among young adults aged 18-35 years at Tenwek Mission Hospital, Bomet County, Kenya in 2018. The study reports a higher prevalence of hypertension in rural area (69.3%) than urban area (14%). The risk of hypertension was seen to be increasing with frequency of red meat consumption, drinking alcohol, smoking and physical inactivity. There was also an association of higher anthropometric parameters- BMI and WHR with hypertension.[37]

A cross-sectional study conducted in 2013 at Makerere University College of Health Sciences, Kampala, Uganda, Africa among

900 medical students of ages 18 and above suggests a prevalence of pre-hypertension to be 18.8% and hypertension to be 14%. The factors associated with hypertension were found to be increased weight, older age and personal or family history of cardiovascular disease. [38]

A community-based cross-sectional survey was conducted in Bedele Town, Ethiopia in 2011 among 396 participants of ages 15-70 years revealed a prevalence of hypertension of 5% among 15-24 years old. [39]

Saudi Arabia

A 2022 study conducted among females aged 18–25 years in Makkah reported that 18.3% had stage 2 hypertension, 30.8% had stage 1 hypertension, and 9.2% had elevated blood pressure. The study also found a significant association between blood pressure levels and both waist circumference and waist-hip ratio. [40]

A study conducted in 2017 analyzing the data from health survey carried out by General Authority for Statistics revealed the prevalence of hypertension to be 9.2% among Saudi population aged 15 years and older with higher prevalence in females than in males (10% vs 8.5%). The prevalence was relatively lower among 15-19 years old (0.1%). The study also concludes that older age, men and Makkah region had higher prevalence of hypertension. [41]

In a study conducted in 2017 among medical students of College of Medicine at Qassim University, Saudi Arabia in 130 students reported a prevalence of 14.6% out of which 6.9% has isolated diastolic hypertension while 4.6% had isolated systolic hypertension and rest 3.1% had systolic-diastolic hypertension according to JNC-7 guidelines. 21.1% were found to be hypertensive and on anti-hypertensive therapy. [42]

The National Saudi Health Information Survey (SHIS) conducted among 15 years and above in 2013 revealed a prevalence of hypertension among 15-34 years old to be 14.6% in males and 6.6% in females. [43]

United States

The United States presents one of the most detailed datasets. According to the CDC NHANES (National Health and Nutrition Examination Survey) (2017-2018), hypertension prevalence among young adults (18-39 years) was 22.4%. The rate of hypertension was significantly higher among men (31.2%) than women (13.0%), and racial disparities were notable, with Black adults (57.1%) exhibiting higher prevalence than White (43.6%) and Hispanic (43.7%) individuals. The overall trend showed an increase in prevalence of hypertension from 41.7% in 2013-2014 to 45.4% in 2017-2018.[44]

Another study comparing the national survey of hypertension data of 20-79 years age group from England, USA, and Canada conducted in 2013 showed that in the age group of 20–39 years, the percentage of individuals with high blood pressure varies significantly across the three countries. Pre-hypertension was found to be in 42.6% of individuals in England, 15.2% in Canada and 29.7% in the USA. Hypertension prevalence was lowest in Canada (19.5%), followed by the USA (29%) and England (30%). For Stage 1 hypertension, the prevalence in England is 8.0%, while in the USA, it is lower at 4.4%. Stage 2 hypertension was seen to be relatively rare in this age group, with 0.8% in England and 0.7% in the USA.[45]

The data from the 8th National Health and Nutrition Examination Surveys (NHANES), USA conducted between 1999 and 2014 revealed that the prevalence of hypertension among young adults has remained relatively stable over the past few decades. The prevalence of hypertension was 7.3% and pre-hypertension was 23.4% in 2014 among those aged 18 to 39 years. Young adults aged 18 to 39 years saw a reduction in prevalence of pre-hypertension, from 32.2% in 1999 to 2000 to 23.4% in 2013 to 2014. The prevalence of pre-hypertension was found to be higher in men (33.6%) as compared to women (12.8%) in 2013–2014.[46]

Despite stable prevalence rates from 1999–2000 to 2013–2014, the awareness and treatment of hypertension in young adults have improved from 52.1% to 74.7% for awareness, 27.7% to 50.0% for treatment, and 14.1% to 40.2% for control of hypertension.[46]

Gender Disparities and Regional Variations

Across all regions, men consistently exhibit higher hypertension prevalence than women. In India, studies show notable gender disparity with 21.6% young men having hypertension as compared to 14.8% women. A similar pattern can be observed in Pakistan, China, Saudi Arabia and The United States. Racial disparities are worth noting in the US where Black adults experience much higher rates of hypertension as compared to White and Hispanic populations.

Regional variations also highlight the influence of socio-economic and lifestyle factors on the prevalence of hypertension. Obesity, high salt intake, lack of physical exercise and high stress seem to be fuelling the increase in hypertension among young adults globally.

Hypertension rates vary across India with 10-20% in east, 20-30% in the central zone. It can also be seen that urban population is more affected by hypertension that the rural populations across India, Pakistan, China (15.3% vs 12.6%), the US, Nigeria and Saudi Arabia.

In Zimbabwe, a unique finding was observed that lower prevalence of hypertension was seen among HIV-positive individuals, suggesting possible physiological or treatment-related influences.

Diagnosis and Treatment Gaps Over the Years

Studies consistently highlight gaps in the diagnosis and treatment of hypertension among young adults. Over the time, studies have reported low awareness, diagnosis, and treatment rates among hypertensive young adults. Treatment and awareness gaps are often more pronounced in men, as seen in Kerala (2022), where only 23.9% of hypertensive men were aware of their condition compared to 51.7% of women. Similar trends were observed in the U.S., where young men had lower awareness and treatment rates as compared to women.

In India, despite rising prevalence, treatment rates remained low i.e. only 13.7% receives treatment as per NFHS-5 survey as compared to 17.7% in earlier studies. In Nigeria, a similar trend exists, where access to healthcare remains a significant barrier, with limited infrastructure and awareness contributing to low diagnosis rates. Conversely, the U.S. has made progress, with 50% of hypertensive young adults receiving treatment, although control rates remain suboptimal.

In African countries like Kenya and Nigeria, lack of early diagnosis and treatment is a major concern. For example, in Kenya, many young people don't know they have hypertension until it becomes a more serious health issue, and access to treatment remains limited in rural areas. [34,37]

Key Results

i. Figure-1- The bar graph showing hypertension prevalence among young adults though the years 2015-2024 and reveals the rising burden of the disease across the regions.
ii. Table-1 provides summarized data of prevalence of hypertension among young adults across the studies
iii. Globally Rising Prevalence: Prevalence of hypertension was reported to be highest in SEAR, rising from 45.2% (2011-13) to 48.3% (2018-19). WPR saw a sharp increase from 10.6% to 341% (2018-19) which was also seen in AMR where the prevalence increased from 7.3% in 2011 to 15.7% in 2020.
iv. Gender Disparities: Higher prevalence is seen in men than women in India (21.6% vs. 14.8%), Bangladesh, Indonesia, and the U.S. (31.2% vs. 13.0%). However, Nigeria showed the

opposite trend (women- 23.4%, men- 18.8%).

v. Key Risk Factors: Smoking, stress, central obesity, high salt intake, sedentary lifestyle, alcohol, and poor sleep, urbanization were common risk factors identified across all regions. Studies also highlighted processed food consumption as a major contributor.

vi. Low Awareness and Treatment: In India, only 34.3% were diagnosed hypertensives, 13.7% were treated, and 7.8% had controlled hypertension. However, in Indonesia, 55% of men and 44% of women remained undiagnosed. The U.S. improved awareness but showed racial disparities in the prevalence of hypertension (Black adults: 57.1% vs White: 43.6%). These trends imply that despite increased efforts by the WHO and the government, hypertension still remains under-diagnosed among young adults and there is still a gap in diagnosis and treatment

vii. Youth and Prehypertension Concerns: The presence of high prevalence of hypertension reaching 48% in SEAR and 34% in WPR suggests that a significant proportion of younger adults may fall into elevated or prehypertensive ranges. Such early onset increases lifetime risk of cardiovascular disease.

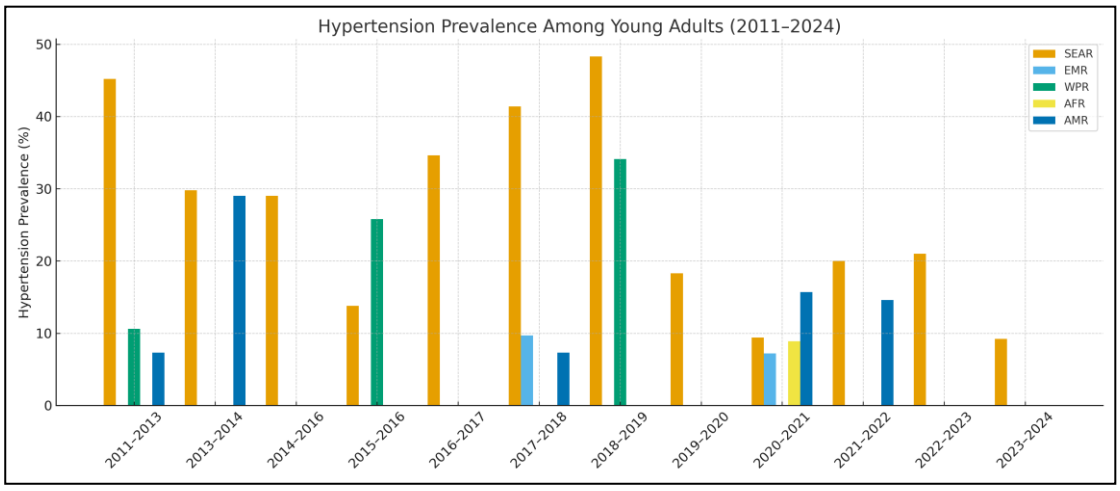

Figure-1: Global trend of hypertension among young adults (2015-2024)

Table-1: Prevalence of Hypertension among Young Adults across the studies (2015-2024) (Summarized Data).

Year Range	SEAR (India, Bangladesh, Indonesia)	EMR (Pakistan, Saudi Arabia)	WPR (China)	AFR (Africa pooled estimate)	AMR (USA)
2011–2013	45.2	–	10.6	–	7.3
2013–2014	29.8	–	–	–	29
2014–2016	29	–	–	–	–
2015–2016	13.8	–	25.8	–	–
2016–2017	34.6	–	–	–	–
2017–2018	41.4	9.7	–	–	7.3
2018–2019	48.3	–	34.1	–	–
2019–2020	18.3	–	–	–	–
2020–2021	7.6 & 11.2 (avg 9.4)	7.2	–	8.9	15.7
2021–2022	10–30 (range)	–	–	–	14.6
2022–2023	21	–	–	–	–
2023–2024	9.2	–	–	–	–
SEAR: South East Asia Region, EMR: East Mediterranean Region, WPR: West Pacific region, AFR: African Region, AMR: Region of the Americas (USA)					

CONCLUSION

Hypertension among young adults is an increasing public health concern, with prevalence rising across different regions globally. The exceptionally high rates reported in some parts of India require further investigation to understand potential regional or methodological variations. The key risk factors, such as unhealthy lifestyle habits, highlight the urgent need for early screening, preventive interventions, and lifestyle modifications to mitigate the growing hypertension burden in younger populations.

Hypertension prevalence varies significantly across regions, in India (18.3% to 28.1%), Bangladesh (9.7%), Indonesia (34.1%), and the U.S. (22.4%). In India, Kerala (48.3%) reported exceptionally high rates of hypertension among young adults.

Men consistently show higher prevalence than women, and gender disparities in diagnosis and treatment remain a global issue. The risk factors such as obesity, urbanization, high salt intake, and stress are common across countries, while region-specific contributors include high instant food consumption in Indonesia, higher BMI in Bangladesh and India, and racial disparities in the U.S. While some regions have improved awareness and treatment, control rates remain inadequate. Addressing disparities in awareness, diagnosis, and treatment, early screening, lifestyle modifications, and targeted public health initiatives are essential to combat this growing burden and for improving cardiovascular health outcomes worldwide.

This review also suggests that there might be missed diagnosis during adolescence with respect to multiple research and initiatives that been taken for early diagnosis of non-communicable diseases among adolescents and young adults. This is evident from the findings of studies that have shown a rise in prevalence of hypertension among younger adults showing that the risk factors might already exist or is a result of missed diagnosis. Findings from national surveys like India's NFHS (National Family Health Survey) and the USA's NHANES (National Health and Nutrition Examination Survey) have begun to shed light on rising NCD prevalence in younger populations, but these surveys also reveal significant gaps in early diagnosis and awareness. One of the main challenges is the lack of integration of NCD screening into school health programs and primary healthcare services targeted at youth. Recognizing these gaps, various initiatives have been introduced globally. The World Health Organization (WHO) launched the Global Action Plan for the Prevention and Control of NCDs, which emphasizes early detection and management, especially among vulnerable groups such as adolescents. Similarly, India's Rashtriya Kishor Swasthya Karyakram (RKSK) focuses on adolescent health and includes components for early detection of NCDs, although implementation and coverage vary widely. The establishment of ARSH (Adolescent Reproductive and Sexual Health) clinics at PHC (Primary Health Centres), CHC (Community Health Centres) and DH (District Hospital) levels and AFHC (Adolescent friendly health clinics) under RKSK at PHC, CHC, DH and Medical college levels has expanded opportunities for screening and counselling of NCDs; particularly hypertension, yet there is an increase in its prevalence suggesting gaps in the policy formulation or its on-ground implementation.

The Indian Hypertension Control Initiative (IHCI), launched in 2017 for better management of hypertension across India has primarily targeted the population of 30 years and above. However, no dedicated program targeting the young adults has led to a substantial increase in the prevalence of hypertension as many undiagnosed hypertensives in this age group may remain undetected. This gap is especially concerning given the increasing evidence of early-onset hypertension in India.

Although there are promising initiatives underway, greater investment in adolescent health systems, school-based screening

programs, community awareness, and policy enforcement is essential to ensure timely diagnosis and intervention, ultimately preventing the long-term burden of chronic diseases and cardiovascular risks.

Future research should focus on innovative strategies for detection of hypertension and its control and management among young adults, particularly in regions with the highest burden.

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