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Hypertension and associated risk factors in young adults: a cross-sectional study from a tertiary care hospital in Nepal

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Abstract

Introduction: Hypertension is increasingly being diagnosed in young adults, raising concerns regarding future cardiovascular morbidity and mortality. However, limited data are available regarding the demographic and clinical characteristics of hypertensive young adults in Nepal. This study aimed to describe the demographic and clinical characteristics of hypertensive young adults and to characterize the distribution of traditional cardiovascular risk factors, including increased body mass index (BMI), smoking, alcohol consumption, and positive family history of hypertension, within this population.

Method: Cross-sectional descriptive study was conducted at the General Clinic of Patan Hospital from November 2024 to October 2025. Total of 183 hypertensive young adults aged 18–40 years were enrolled using convenient sampling. Hypertension was defined according to the 2017 ACC/AHA guideline. Demographic characteristics, anthropometric measurements, and cardiovascular risk factors were recorded using a standardized structured proforma.

Result: Among 183 hypertensive young adults, the mean age was 32.45 ± 5.74 years. Male participants constituted 72.1% (n=132) of the cohort, while females accounted for 27.9% (n=51). The mean BMI was 29.42 ± 4.13 kg/m², and 90.2% of participants were either overweight (49.7%) or obese (40.4%). Current smoking was reported by 39.3% (n=72) of participants, alcohol consumption by 29.0% (n=53), and positive family history of hypertension by 24.0% (n=44). Multiple cardiovascular risk factors frequently coexisted within the hypertensive cohort.

Conclusion: This study demonstrated ypertensive young adults attending tertiary care hospital had a high burden of modifiable cardiovascular risk factors, particularly overweight and obesity, smoking, and alcohol consumption.

Keywords: Body mass index; Hypertension; Nepal; Risk factors; Young adults

INTRODUCTION

Hypertension is recognized as one of the leading modifiable risk factors for cardiovascular disease, stroke, chronic kidney disease, and premature mortality worldwide.¹ The global burden of hypertension has increased substantially over the past two decades, affecting approximately 1.28 billion individuals globally.² Although traditionally considered a disease of older adults, hypertension is increasingly being diagnosed among young adults, including individuals in their twenties and thirties.³ This trend is particularly concerning in developing countries, where rapid urbanization, sedentary lifestyle, unhealthy dietary habits, and limited healthcare access contribute to increasing cardiovascular risk.

In South Asia, the prevalence of hypertension varies widely depending on population characteristics and study settings.⁴ Nepal has undergone significant epidemiological and nutritional transition over recent decades, accompanied by increasing prevalence of obesity and hypertension.⁵ However, data specifically describing hypertensive young adults in Nepal remain limited.

Several modifiable and non-modifiable factors contribute to early-onset hypertension. Increased body weight and obesity are strongly associated with elevated blood pressure through mechanisms including insulin resistance, sympathetic nervous system activation, and vascular dysfunction.⁶ Tobacco smoking and alcohol consumption also contribute significantly to cardiovascular risk and hypertension development.^{7,8} In addition, positive family history reflects underlying genetic susceptibility and familial clustering of cardiovascular risk factors.⁹

Early identification of cardiovascular risk factors among hypertensive young adults is important for preventing long-term cardiovascular complications.¹⁰ Therefore, this study aimed to describe the demographic and clinical characteristics of hypertensive young adults presenting to a tertiary care hospital in Nepal and to characterize the distribution of traditional cardiovascular risk factors within this population.

METHOD

A hospital-based cross-sectional descriptive study was conducted at the General clinic (Male and Female) of Patan Hospital, Lagankhel, Lalitpur, Nepal, a tertiary care center affiliated with Patan Academy of Health Sciences (PAHS), serving Kathmandu Valley and surrounding regions of Nepal. Data collection was carried out over a 12-month period from November 2024 to October 2025.

Young adults were defined as individuals aged 18–40 years based on commonly used epidemiological classifications adopted in cardiovascular research. During the study period, a total of 38,267 patients aged 18–40 years attended the general outpatient clinic. From this source population, 183 hypertensive young adults were enrolled using convenient sampling.

Patients aged 18–40 years with confirmed hypertension who provided written informed consent and had complete demographic and anthropometric data were included in the study. Hypertension was defined according to the 2017 ACC/AHA guideline as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg measured on at least two separate occasions.¹ Blood pressure was measured using a calibrated digital sphygmomanometer after the participant had rested for at least five minutes in a seated position, and measurements were repeated after an interval of at least two weeks during follow-up visits.

Patients with acute severe illness requiring emergency intervention and patients with severe psychiatric disorders that could interfere with reliable history taking or blood pressure assessment, including acute psychosis and severe anxiety disorders, were excluded from the study.

Written informed consent was obtained by the principal investigator prior to enrollment. Ethical approval was obtained from the Institutional Review Committee of Institutional Review Committee-PAHS (Approval No: drs2411191963).

Data were collected using a standardized structured proforma that included demographic variables (age and sex), anthropometric measurements (height, weight, and BMI), cardiovascular risk factors (current smoking, alcohol consumption, and family history of hypertension), and blood pressure recordings. Current smoking was defined as smoking any tobacco product within the previous 30 days. Alcohol consumption was defined as consumption of alcoholic beverages within the previous 30 days. Ex-smokers and former alcohol users were categorized according to their current status.

Body mass index was calculated as weight in kilograms divided by height in meters squared (kg/m^2). BMI categories were defined according to World Health Organization criteria as normal weight ($< 25 \text{ kg/m}^2$), overweight ($25\text{--}29.9 \text{ kg/m}^2$), and obesity ($\geq 30 \text{ kg/m}^2$).⁶

Descriptive statistics including mean, standard deviation, frequency, and percentage were calculated for all variables. Categorical variables were expressed as frequencies and percentages. Data entry and statistical analysis were performed using Statistical Package for the Social Sciences (SPSS) version 23.

RESULT

A total of 183 hypertensive young adults were enrolled during the study period. The demographic and clinical characteristics of the study participants are presented in Table 1.

The mean age of the participants was 32.45 ± 5.74 years. Male participants constituted the majority of the cohort (72.1%), whereas females accounted for 27.9%.

Table 1. Demographic and clinical characteristics of hypertensive young adults (N=183)

Characteristic	f(%)
Age (mean $\pm$ SD, years)	32.45 $\pm$ 5.74
Sex	
Male	132(72.1%)
Female	51(27.9%)
BMI (mean $\pm$ SD, kg/m ²)	29.42 $\pm$ 4.13
BMI Categorization	
BMI <25 kg/m ²	18(9.8%)
BMI 25–29.9 kg/m ²	91(49.7%)
BMI $\geq$ 30 kg/m ²	74(40.4%)
Overweight/Obese (BMI $\geq$ 25 kg/m ²)	165(90.2%)
Personal History	
Current Smoking	72(39.3%)
Alcohol Consumption	53(29.0%)
Family history of HTN	
Positive Family History of HTN	44(24.0%)

The mean BMI was 29.42 $\pm$ 4.13 kg/m². Overall, 90.2% of participants were either overweight or obese. Specifically, 49.7% were overweight and 40.4% were obese. Only 9.8% of participants had normal BMI.

Current smoking was reported by 39.3% of participants, whereas alcohol consumption was reported by 29.0%. Positive family history of hypertension was present in 24.0% of participants.

Multiple cardiovascular risk factors frequently coexisted within the hypertensive cohort. Overweight or obesity combined with smoking and alcohol use was commonly observed among study participants.

DISCUSSION

This cross-sectional descriptive study evaluated the demographic and clinical characteristics of hypertensive young adults attending a tertiary care hospital in Nepal. The study demonstrated a high burden of modifiable cardiovascular risk factors, particularly overweight and obesity, smoking, and alcohol consumption.

The most striking finding of the present study was the high proportion of overweight and obese participants among hypertensive young adults. Approximately 90% of participants had BMI $\geq$ 25 kg/m². This finding is consistent with regional and international studies demonstrating increasing prevalence of obesity among younger populations.^{3,5,11} Rapid urbanization, increasing consumption of calorie-dense processed foods, reduced physical activity, prolonged screen time, and sedentary occupations may contribute to increasing obesity in urban Nepalese settings.

Obesity is strongly associated with hypertension through several mechanisms including activation of the renin-angiotensin-aldosterone system, insulin resistance, endothelial dysfunction, and increased sympathetic nervous system activity.⁶ The elevated mean BMI observed in this cohort reflects substantial cardiovascular risk burden

in young hypertensive individuals.

Smoking was reported by approximately 40% of participants. Smoking contributes to endothelial dysfunction, arterial stiffness, oxidative stress, and accelerated atherosclerosis.^{7,12} Previous studies among Nepalese adults have also reported considerable prevalence of tobacco use in younger age groups.¹⁶ The coexistence of smoking and hypertension among young adults significantly increases long-term cardiovascular risk.

Similarly, alcohol consumption was reported by 29% of participants. Alcohol consumption has been associated with elevated blood pressure through increased sympathetic activation and vascular effects, particularly with regular or excessive intake.^{8,13} The proportion of alcohol users observed in this study is comparable to findings reported in other South Asian studies among young adults.

Positive family history of hypertension was present in nearly one-quarter of participants, suggesting the contribution of genetic predisposition and familial cardiovascular risk clustering. Genetic and environmental factors likely interact in the development of early-onset hypertension.^{9,14} Individuals with positive family history may benefit from earlier blood pressure screening and lifestyle interventions.

An important observation in this study was the clustering of multiple cardiovascular risk factors within individual participants. Many hypertensive young adults simultaneously exhibited obesity, smoking, alcohol use, and positive family history. This multifactorial risk clustering highlights the importance of comprehensive cardiovascular risk assessment and integrated lifestyle modification strategies in young hypertensive populations.¹⁶

This study has several limitations. First, the study included only hypertensive individuals and did not include a non-hypertensive comparison group. Therefore, associations between individual risk factors and hypertension could not be determined. Second, the use of convenient sampling from a tertiary care center may limit generalizability to the broader community population. Third, the study relied partly on self-reported smoking and alcohol history, which may have introduced recall bias.

CONCLUSION

This study demonstrated that hypertensive young adults attending a tertiary care hospital in Nepal had a high burden of modifiable cardiovascular risk factors, particularly overweight and obesity, smoking, and alcohol consumption. Multiple cardiovascular risk factors frequently coexisted within the study population, highlighting the importance of comprehensive cardiovascular risk assessment among young hypertensive individuals. Early identification and lifestyle modification may help reduce future cardiovascular morbidity and mortality in this population.

DECLARATIONS

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None

Conflict of Interest

Two of the author of this original article are the editorial member of this journal. They had no role in any of the editorial process of this article.

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Ethical Clearance

Ethical clearance was obtained from PAHS-IRC with reference number drs2411191963 obtained on 19th Nov 2024.

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