

# Prevalence of Systemic Hypertension and Hypertensive Crises among Adult Outpatients in a Cardiac Hospital in Central Nepal

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## ABSTRACT

**Background:** The prevalence of systemic hypertension is a significant global health concern, affecting a large population worldwide. The objective of the study was to determine the prevalence of systemic hypertension and hypertensive crises among adult outpatients in a cardiac hospital in central Nepal.

**Methods:** This is a hospital based cross-sectional observational study conducted at outpatient department of Cardiology in central Nepal. Consecutive 487 patients were included in the study. All the patients had undergone proper blood pressure measurements as per the standard protocol with Aneroid Sphygmomanometer.

**Results:** Out of 487 participants in the study, 199 were diagnosed as hypertensives. The prevalence of hypertension was 40.86%, out of whom 56.28% were males and 43.72% were females with male: female ratio of 1:1.28. Mean age of the patients was 54.97 years with SD( $\pm$ 14.18years). The highest number of patients with hypertension was in 51 to 60 years (25.6%) followed by 41-50years (21.60%), 31(15.60%) of the patients presented with Hypertensive crises.

**Conclusion:** The prevalence of systemic hypertension was considerably high in our study. Newer and multifaceted approaches along with other effective preventive strategies have to be implemented to raise awareness among the publics regarding risk factors for systemic hypertension and its control. Early detection and proper management of Hypertension including therapeutic lifestyle modifications is the key to success.

**Keywords:** Systemic hypertension; hypertensive crises; prevalence; control.

## INTRODUCTION

Systemic hypertension is an emerging major public health problem. The prevalence of systemic hypertension is a significant global health concern, affecting a large population worldwide. According to the World Health Organization (WHO), approximately 1.13 billion people globally have hypertension, with the numbers continuing to rise steadily.<sup>1</sup> In Nepal, hypertension is also a growing health issue, partly due to changing lifestyles, increasing urbanization, and an aging population. Hypertensive crises, also known as hypertension attacks or hypertensive urgencies/emergencies, are sudden and severe episodes of high blood pressure that can lead to serious health complications if not treated promptly. These crises can occur at any time, but they are most common in people with pre-existing hypertension or those who have recently experienced a major stressor. Accelerated hypertension<sup>2</sup> is

defined as a recent significant increase over baseline BP that is associated with target organ damage. This is usually seen as vascular damage on fundoscopic examination, such as flame-shaped hemorrhages or soft exudates, but without papilledema. Hypertensive urgency must be distinguished from hypertensive emergency. Urgency is defined as severely elevated BP (ie, systolic BP >220 mm Hg or diastolic BP >120 mm Hg) with no evidence of target organ damage. Hypertensive emergencies are potentially life-threatening manifestations of hypertension, associated with acute impairment of  $\geq$ 1 organs including the large arteries, heart, kidney, and brain.<sup>3</sup> Of the different types of hypertensive emergencies, malignant hypertension (MHT) is characterized by extreme BP elevations and acute microvascular damage affecting various organs, in particular the retina, brain, and kidney.<sup>4</sup> Regular monitoring, lifestyle modifications, and

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access to quality healthcare services are crucial in managing and reducing the prevalence of systemic hypertension and hypertensive crises.

## METHOD

It was a hospital based cross-sectional study conducted from November to December 2024 in patients presenting in cardiac outpatient department (OPD) over a period of 1 month. Simple random sampling procedure was conducted in outpatient departments. A total of 487 outpatient department patients participated in this research whose age was  $\geq 18$  years. Patients with serious illnesses, acute life-threatening conditions and severe injury were excluded from the study. Two measurements of the blood pressure of each study participant were made 30 minutes apart, with the participants in the sitting position, by using an aneroid sphygmomanometer. Participants were inquired whether they had consumed any beverage such as tea or coffee or alcohol, smoked cigarette or undertaken any physical activity 30 min before measurement. The blood pressure measurements were made on the subject's right arm by using a cuff of the appropriate size, at the level of the heart. The cuff pressure was inflated 30 mm Hg above the level at which the radial pulse disappeared and then it was deflated slowly at the rate of about 2mmHg per sec. The readings were recorded to the nearest 2 mm Hg. In the cases where the two readings differed by over 10 mm of Hg, a third reading was obtained, and the three measurements were averaged. The pressures at which the sound appeared and disappeared, were taken as the Systolic Blood Pressure (SBP) and the Diastolic Blood Pressure (DBP) respectively. The blood pressure was graded as normal (SBP  $<120$  and DBP  $<80$  mmHg), pre-hypertension (SBP = 120-139 and/or DBP = 80-89 mmHg), stage I hypertension (SBP = 140-159 and/or DBP = 90-99 mmHg), and stage II hypertension (SBP  $> 160$  and/or DBP  $> 100$  mmHg), as per the US Seventh Joint National Committee on the Detection, Evaluation and the Treatment of Hypertension (JNC VII) criteria<sup>5</sup>. Hypertension was diagnosed when the systolic BP was

JNC7 Blood Pressure Classification <sup>5</sup>	SBP (mm Hg)	DBP (mm Hg)
Normal	$<120$	and $<80$
Prehypertension	120-139	and $<80$
Stage 1 hypertension	140-159	or 80-89
Stage 2 hypertension	$\geq 160$	$\geq 90$

140mmHg and/or the diastolic BP was 90mmHg, or higher. Isolated systolic hypertension was defined as

ESC/ESH vs. ACC/AHA Hypertension Guideline					
ESC/ESH 2018 (June)			ACC/AHA 2017 (Nov)		
Category	Systolic (mmHg)	Diastolic (mmHg)	Category	Systolic (mmHg)	Diastolic (mmHg)
Optimal	$<120$	and $<80$	Normal	$<120$	and $<80$
Normal	120-129	and 80-84	Elevated BP	120-129	and $<80$
High Normal	130-139	and/or 85-89	Stage 1	130-139	or 80-89
Grade 1	140-159	and/or 90-99	Stage 2	$\geq 140$	or $\geq 90$
Grade 2	160-179	and/or 100-109	Hypertensive crisis	$\geq 180$	or $\geq 120$
Grade 3	$\geq 180$	and/or $\geq 110$			

Compiled by plexusind

Individuals with systolic (SBP) and diastolic (DBP) blood pressure in 2 categories are designated to the higher blood pressure category.

SBP (mmHg)	DBP (mmHg)	JNC 7	ACC/AHA 2017
$<120$	AND $<80$	NORMAL BP	NORMAL BP
120-129	AND $<80$	Prehypertension	Elevated BP
130-139	OR 80-89	Prehypertension	Stage 1 Hypertension
140-159	OR 90-99	Stage 1 Hypertension	Stage 2 Hypertension
$\geq 160$	OR $\geq 100$	Stage 2 Hypertension	Stage 2 Hypertension

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; JNC 7: Seventh Report of the Joint National Committee on prevention, detection, evaluation, and treatment of high Blood Pressure; ACC/AHA: American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

a systolic BP of 140mmHg or higher and a diastolic BP of  $< 90$ mmHg.<sup>5</sup> Also, hypertension was categorized according to the ACC/AHA(2017) Guidelines<sup>6</sup> and ESC/ESH(2018) Guidelines<sup>7</sup> as shown below. Data was entered into Microsoft Excel Software and analysis performed accordingly. Descriptive statistics such as frequency and cross tabulation were calculated for selected variables. Adjusted odds ratio (AOR) with 95% confidence interval (CI) and p-value  $\leq 0.05$  in the final model were used to determine significant predictors whenever necessary.

## RESULTS

A total of 487 clients participated in this study study. In age majority of the participant were in the age group 50-59 years followed by 40-49 years. The Mean $\pm$ SD age of the participants was  $54.97 \pm 14.18$  years. The minimum age of patients were 28 years

while maximum age was 86 years. In sex, 56.28% were female by gender while remaining were female with ratio 1:1.28 (Table 1).

Variables	Frequency (%)
<b>Age (years)</b>	
<40	36 (18.1)
40-49	43 (21.6)
50-59	51 (25.6)
60-69	34 (17.1)
70-79	26 (13.1)
80-89	9 (4.5)
Mean±SD = 54.97±14.18years	
Minimum(Maximum) = 28(86)years	
<b>Sex</b>	
Female	87 (43.72)
Male	112 (56.28)
Male:Female	1:1.28

Prevalence of HTN according to JNC-7 was 62% were stage 2 hypertension, 37% were stage 1 hypertension and 2% were prehypertension. While based on Esc/ESH criteria 1.5% were Higher normal, 36.7% were in grade I, 41.2% were in grade II and 20.6% were in grade III. According to ACC/AHA criteria 3% were in stage I, 85.9% were in stage II and 11.1% were hypertension (Table 2).

Variables	Frequency (%)
<b>JNC-7</b>	
Normal	-
Prehypertension	3 (2)
Stage 1 hypertension	73 (37)
Stage 2 hypertension	123(62)
<b>Esc/ESH</b>	
Higher normal	3 (1.5)
Grade I	73 (36.7)
Grade II	82 (41.2)
Grade III	41 (20.6)
<b>ACC/AHA</b>	
Stage I	6 (3.0)
Stage II	171 (85.9)
Elevated BP	22 (11.1)

Following table showed the prevalence of Accelerated HTN. This showed that the prevalence of

Hypertensive crises was 15.6% (with 95% confidence interval 10.84% to 21.38%). In our study, 31(15.6%) presented in Hypertensive crises (Table 3).

Hypertensive crises	Frequency (%)	95% Confidence interval	
		Lower	Upper
Yes	31 (15.6)	10.84	21.38
No	168 (84.4)		

## DISCUSSION

The overall prevalence of hypertension in our study was 34.7%, which is significantly higher than both a hospital based and a community based cross sectional studies done in Nepal and India.<sup>8,9,10</sup> This discrepancy could be explained in three ways; this study is a hospital based that the participants were patients, whereas the previous studies were a community based. The second reason for the discrepancy might be the age difference in the study population ( $\geq 18$  years of age with the mean age of 54.97 years in this case were participated while other study included aged  $\geq 15$  years,<sup>8</sup> 25–64 years and  $> 31$  years.<sup>9</sup> And the other reason for this study is considered only urban setting whereas the former studies included urban and rural settings.<sup>11</sup> This coincides well with findings in most studies conducted in SSA, where the prevalence rate of hypertension was found to be higher in urban dwellers than in rural dwellers. This finding is similar with the prevalence in Southern Africa (34.6%), Northern Africa (33.3%)<sup>12</sup> and Nepal.<sup>13,14</sup> This finding is lower than a study in Kazakhstan (70%),<sup>15</sup> the higher result may be due to older age populations (50–75 years age). About 0.5% to 3% of all emergency department visits concern individuals who present with a suspected hypertensive emergency. One quarter of them have a hypertensive emergency that requires urgent treatment to lower blood pressure (BP) to safe levels.<sup>16</sup> The Studying the Treatment of Acute Hypertension registry reported 6.9% hospital mortality and a 37% readmission rate 90 days after discharge for a hypertensive emergency in 25 US institutions, between January 2007 and April 2008.<sup>17</sup> Data on prevalence and incidence of MHT are sparse. In large multi-ethnic urban communities in

Birmingham (United Kingdom) and Amsterdam (Netherlands), overall incident rates of MHT have been 2 new cases per 100 000 individuals per year, with up to 4-fold higher rates (7.3 per 100 000 per year) reported for self-reported Black-African/Afro-Caribbean ethnicity.<sup>18</sup> The Prevalence of Hypertensive crises in our study was 15.6%. While survival after MHT has considerably improved, it is still associated with significant morbidity and mortality. Amraoui et al<sup>19</sup> reported an all-cause mortality of 10% at 5 years in patients with a mean age of 44 years, while 20% needed a kidney replacement. Yet MHT has received little attention from the medical and scientific community, and diagnostic and therapeutic guidelines are mainly based on consensus rather than robust data, while definitions are not uniform. The prevalence of hypertension was found to be high among Outpatient clients. The findings in this study and other recent studies conducted in the country have clearly shown that hypertension is becoming a serious public health concern.

## CONCLUSION

Therefore, mass screening of hypertension and life

style modifications and motivating the community for adequate BP control are recommended. It is also better to give special emphasis for health education regarding the daily live events like healthy dietary habit and regular exercise and preventing alcohol consumption and cigarette smoking. Policy makers need to focus on community level intervention through integration with the open-door health extension program. Furthermore, there must be national strategies and guidelines for hypertension screening and control in the community.

**Limitation:** A major limitation of this study was that the blood pressure pattern estimates were based on the measurements of the blood pressure on a single day and were not repeated again on next day for practical reasons. Also, the subjects for the study were chosen from the out patients Department and thus they may not have been the representatives of the entire community of Nepal. However, our study areas had a representative mix of subjects, with all the different age groups, ethnic, religions and socioeconomic classes.

**Conflict of interest:** None

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