Original Article

Prevalence of hypertension, screening, awareness, and associated risk factors in teaching institution of Etawah District, Uttar Pradesh: A cross-section study

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Abstract

Background: Hypertension is one of the leading causes of death worldwide, affecting over one billion people. It is responsible for roughly half of all heart disease and stroke-related deaths globally. Because hypertension does not cause any symptoms on its own, it is commonly referred to as "the silent killer." **Objective:** This study aimed to determine (1) the prevalence of hypertension and its associated risk factors and (2) the level of awareness of hypertension status among study participants. **Material and Methods:** A facility-based cross-sectional analytical study was conducted for 3 months during January–March 2023 at the teaching institution in Etawah District, Uttar Pradesh. It was conducted among 392 study participants who were ≥18 years old. Data were collected through a predesigned, pretested, semi-structured questionnaire, and anthropometric measurement was determined using standard guidelines. **Results:** The overall prevalence of hypertension screening was 69.4% (male: 33.8% and female: 66.2%), respectively. The majority of hypertensives were found in female participants. Tobacco and alcohol consumption, obesity, physical inactivity, stress and strain, and an unhealthy diet were also associated with hypertension. Among 392 study participants, only 67 (24.6%) were aware of their hypertension status. **Conclusion:** We conclude that hypertension has been described as an "Iceberg disease" as those who suffer are usually unaware and hence usually seek healthcare services at a very late stage. Preventive measures should be needed to improve hypertension screening, awareness, treatment, and control.

Keywords: Awareness, cardiovascular diseases, hypertension, JNC-8; screening

Introduction

Hypertension is one of the major public health issues worldwide, and its prevalence is rapidly increasing in developing countries.[1] Various risk factors are involved in hypertension, such as high salt intake, overweight and obesity, tobacco or alcohol consumption, physical inactivity, mental stress, inadequate intake of fruits and vegetables, high intake of fats, and an unhealthy diet.[2] Rapid urbanization develops an unhealthy environment while promoting unhealthy diets, tobacco, and the harmful use of alcohol, which in turn may lead to hypertension.[3] These illnesses develop slowly and do not show symptoms in their early stages. As a result, hypertension management has become a major concern in emerging countries such as India.

According to the World Health Organization (WHO), noncommunicable diseases (NCDs) are the leading cause of

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death worldwide, killing 41 million people each year, equivalent to 71% of all deaths globally.[4] If timely interventions for NCD prevention and control are not implemented, the total annual number of deaths from NCDs will rise to 55 million by 2030.[5] The vast majority of NCD-related deaths are avoidable.[6] Cardiovascular diseases and cancer are at present the leading causes of death in developing countries.[7] The majority of NCD deaths (17.9 million per year) are caused by cardiovascular illnesses, followed by cancer (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million, including diabetes-related kidney disease deaths).[8] Obesity is also a significant risk factor for cardiovascular disease (CVD), coronary heart disease (CHD), type 2 diabetes mellitus (T2DM), heart failure (HF), and hypertension, accounting for around 70% of its adverse effects.[9]

One of the key factors contributing to the growing prevalence of hypertension in India is a lack of awareness. According to the National Family Health Survey (NFHS)-5 (2019–2020), hypertension affects 24% of men and 21% of women, an increase from 19% and 17%, respectively, from the previous years (2015–2016).[10]

Primary care is more than the first point of contact; it is the foundation of every healthcare system. It is accessible to all patients and can control the early stages of NCDs by providing first contact, continuity, and integration of care.[11] Primary care becomes an effective way to manage NCDs when it transforms from giving an episode of care to offering an integrated approach that includes prevention, diagnosis, treatment, and palliative care for all illnesses over time.[12]

To achieve this goal, it is critical to teach health personnel to know the risk factors for NCDs in general and the avoidable risk factors in particular. This will help health professionals promote healthy lifestyles, reduce risk factors, identify and intervene early, and encourage treatment compliance and follow-up. Because lowering many risk factors requires behavioral change, health staff must be taught to engage clinical and community populations and persuade them to change, initiate, and maintain good behaviors that will assure people's optimal health.[13]

Material and Methods

A facility-based, cross-sectional analytical study was conducted in the screening outpatient department (OPD) by the Department of Community Medicine at the tertiary care hospital in Etawah District, Uttar Pradesh. The study was conducted for 3 months in January, February, and March 2023. The patients who came for health checkups in screening OPD were screened for NCDs such as diabetes, hypertension, obesity, and tuberculosis. The purposive sampling technique was used to select 392 study participants who came for health checkups to screening OPD. The study only included participants who were 18 years of age and older and gave their consent at the time of data collection. Those who did not provide consent at the time of data collection were excluded from the study.

For data collection, a predesigned, pretested semi-structured questionnaire was used via the face-to-face interview method, and anthropometric measurement was determined using standard guidelines. The working pro forma is comprised of questions related to sociodemographic profile and assessment of behavioral risk factors such as unhealthy diet, lack of physical activity, tobacco abuse, cigarette smoking, and alcohol consumption, and anthropometric measurements such as blood pressure (BP), weight, height, and body mass index (BMI) were recorded using standard procedure. Hypertension was defined as per the Joint National Committee (JNC)-8 criteria.[14]

After discussing the purpose, nature, and procedure of the study, all study participants provided informed written consent. The information collected was entered into a Microsoft Excel spreadsheet, checked for accuracy, and then analyzed using IBM Statistical Package for Social Sciences (SPSS) software, version 25.0. Written permission was obtained from the Institutional Ethics Committee. The overall prevalence of hypertension was determined using the following formula: Prevalence = Number of hypertensives/total number of participants ×100. The Chi-square test was used to determine whether a statistically significant association exists between hypertension and its risk factors, for all the analyses performed with $P < 0.05$ taken as statistically significant.

Study tool

According to the JNC-8, an individual was classified as hypertensive if they had systolic BP of ≥140 mmHg or diastolic BP of ≥90 mmHg or reported antihypertensive medication use during the survey.[15] Sitting BP was measured after 15 minutes of rest using a diamond BPMR120 deluxe conventional mercurial type BP instrument as per standardized protocol, such as an instrument placed at the level of the heart, legs uncrossed, and the back supported. The three measurements were taken after a 5-minute interval. The average of these three measurements was used for analysis, and patients were classified as per JNC-8 criteria.

The BMI was calculated as weight in kilograms (kg) divided by height in meters squared (m^2) and was classified according to South Asian population guidelines.

The measurements of weight and height were determined with participants wearing light clothing and no shoes. An analog weighting machine was used for measuring body weight. Height was measured using a wall-mounted height measurement scale with the shoulders placed in a relaxed position, arms hanging freely, and legs closed together.

Results

A total of 392 study participants were interviewed for the screening of hypertension. Of these, 126 (32.1%) were male

participants, and 266 (67.9%) were female. The majority of participants (257 (65.6%)) were more than 30 years of age. The mean age ± standard deviation (SD) of the study participants was 38.5 ± 14.9 years for males and 37.8 ± 13.8 years for females, respectively. Regarding religion and caste of the study participants, around 366 (93.4%) subjects were Hindu and 26 (6.6%) were Muslim; the majority of the participants were in the general category, respectively. The majority of the study subjects were married (340 (86.7%)), and only 260 (66.3%) of the study participants were literate. According to the modified B. G. Prasad's classification All-India Consumer Price Index (AICPI) 2023, the majority (173 (44.1%)) belonged to the upper class, 128 (32.7%) belonged to the middle class, and 91 (23.2%) belonged to the lower class [Table 1].

In this study, the prevalence of hypertension in the individuals was 272 (69.4%), and normotensive individuals were 120 (30.6%). Among those study participants who were screened for hypertension, only 67 (24.6%) were aware of having raised BP, and the rest of them (205 (75.4%)) were unaware of having raised BP [Figure 1]. According to the BMI classification (as per Asian criteria), the majority of females are above the normal range of BMI (18.5–22.9) compared with males. Most of the females (64 (16.3%)) fall under the obese class I category, 41 (10.5%) are overweight, and 40 (10.2%) are obese class II [Table 2]. According to the hypertension classification (as per the JNC-8 criteria), the majority of females (180 (45.9%)) are hypertensive. Most of them (81 (20.7%)) are classified as prehypertension, followed by 55 (14.0%) hypertension stage 1, 28 (7.1%) hypertension stage 2, and 16 (4.1%) having hypertensive crises that need urgent intervention [Table 3].

Table 4 shows the association between study participants according to their hypertension status and their associated risk factors. It was found that there was a statistically significant association between behavioral risk factors such as obesity, alcohol intake, physical inactivity, stress and strain, headaches, and eating an unhealthy diet with hypertension with a P value < 0.05. Obesity is the most common cause of hypertension (167 (61.4%)), followed by alcohol intake (202 (58.2%)), physical inactivity (158 (58.1%)), stress and strain (154 (56.6%)), and eating an unhealthy diet (172 (54.4%)), according to the study.

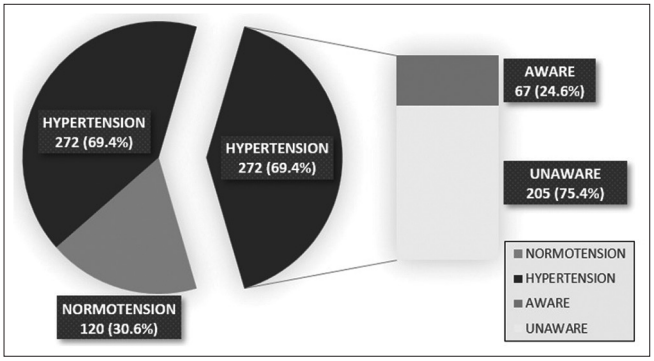

Figure 1: Prevalence and level of awareness of hypertension among study participants

Discussion

Undiagnosed and untreated hypertension increases the risk of developing cardiovascular, brain, and kidney disorders significantly. As hypertension does not generate symptoms on its own, it is commonly referred to as a "silent killer."[16]

Prevalence and level of awareness of hypertension

The present study revealed that among 392 study participants who were screened for hypertension, 272 (69.4%) had elevated BP and 120 (30.6%) had normal BP. The majority of study participants (197 (72.4%)) were more than 30 years old and had high BP. Females (180 (66.2%)) were found to be significantly more hypertensive than males (92 (33.8%)). According to the NFHS-5, the prevalence of hypertension was reported to be 24% in men and 21% in women, an increase from 19% and 17%, respectively, in the previous round (2015–2016).[10] Basu S *et al.*[17] observed that the majority of hypertension cases (56.41%) who were male, belonged to middle-aged groups (52.84%), were rural inhabitants (51.68%), were tobacco users (59%), and were alcohol users (62.7%) were previously undiagnosed. The current study's participants are all from rural areas, with most of them being Hindu (256 (94.1%)) and Muslim (16 (5.9%)). Married couples (269 (98.9%)) were found to be more hypertensive than unmarried couples (2 (1.1%)).

According to socioeconomic status, the majority of hypertensive individuals (156 (57.4%)) are upper class, followed by 92 (33.8%) middle class and 24 (8.8%) lower class. Veghari G *et al.*[18] did a population-based cross-sectional study on 3497 participants aged 15–65 and discovered 741 (21.2%) cases suffered from hypertension and illiterate people were significantly more aware of their disease (P = 0.011). Illiteracy is a risk factor for hypertension, according to a logistic regression study (P < 0.001). In this study, the prevalence of hypertension was higher in literate people (164 (60.3%)) than in illiterate people (108 (39.7%)).

In a study conducted by Singh S *et al.*,[19] in urban Varanasi, it was concluded that male respondents, the oldest age group, married subjects, subjects of higher socioeconomic status, uneducated subjects, and retired subjects were more likely to be hypertensive. Only 81 (38.4%) of the 211 hypertensive participants were aware of their hypertension status; of them, 57 (70.4%) were seeking treatment, and 20 (35.08%) had their BP adequately regulated. In this study, the prevalence of pre-hypertension was 116 (29.6%) [20.7% in females and 8.9% in males], hypertension stage-1 was 89 (22.7%) [14% in females and 8.7% in males], hypertension stage-2 was 44 (11.2%) [7.1% in females and 4.1% in males], and hypertensive crisis was 23 (05.9%) [4.1% in females and 1.8% in males] who require immediate treatment.

According to the findings of a study conducted by Vimala A *et al.*,[20] in an urban population of Kerala (South India), 482 people were screened for hypertension. The overall prevalence of hypertension was 47% (n = 226), with a nearly equal sex

Table 1: Distribution of study participants according to sociodemographic profile and their hypertension status

Sociodemographic profile		Hypertension			Chi-square	*P*	Odds ratio
Variables	**Subgroups**	**Hypertensive (*n*=272)**	**Normotensive (*n*=120)**	**Total (*n*=392)**			
Gender	Male	92 (33.8%)	34 (28.3%)	126 (32.1%)	1.150	0.28	1.292
	Female	180 (66.2%)	86 (71.7%)	266 (67.9%)			
Age group (in years)	<30 years	75 (27.6%)	60 (50.0%)	135 (34.4%)	18.547	0.0017*	0.380
	≥30 years	197 (72.4%)	60 (50.0%)	257 (65.6%)			
Religion	Hindu	256 (94.1%)	110 (91.7%)	366 (93.4%)	0.807	0.37	1.454
	Muslim	16 (05.9%)	10 (08.3%)	26 (06.6%)			
Marital status	Unmarried	2 (01.1%)	49 (40.8%)	52 (13.3%)	110.808	0.0001*	0.010
	Married	269 (98.9%)	71 (59.2%)	340 (86.7%)			
Educational status	Illiterate	108 (39.7%)	24 (20.0%)	132 (33.7%)	14.477	0.0142*	2.634
	Literate	164 (60.3%)	96 (80.0%)	260 (66.3%)			
[#]Socioeconomic status (modified BG Prasad's classification as per AICPI 2023)	Upper class	156 (57.4%)	17 (14.2%)	173 (44.1%)	114.826	0.0001*	
	Middle class	92 (33.8%)	36 (30.0%)	128 (32.7%)			
	Lower class	24 (08.8%)	67 (55.8%)	91 (23.2%)			

[#]Per capita monthly income of the family. *Statistically significant, *P*<0.05

Table 2: Gender-wise distribution of study participants according to BMI classification

Gender	BMI classification (as per Asian criteria*)					Total (*n*=392)
	Underweight (<18.5)	Normal range (18.5–22.9)	Overweight (23.0–24.9)	Obese class I (25.0–29.9)	Obese class II (≥30)	
Male	16 (04.1%)	44 (11.2%)	27 (06.9%)	26 (06.6%)	13 (03.3%)	126 (32.1%)
Female	34 (08.7%)	87 (22.7%)	41 (10.5%)	64 (16.3%)	40 (10.2%)	266 (67.9%)
Total	50 (12.8%)	131 (33.4%)	68 (17.3%)	90 (23.0%)	53 (13.5%)	392 (100%)

Table 3: Gender-wise distribution of study participants according to hypertension classification

Gender	Hypertension classification (as per JNC-8 criteria*)					Total (*n*=392)
	Normal	Prehypertension	Hypertension stage 1	Hypertension stage 2	Hypertensive crisis	
Male	34 (08.7%)	35 (08.9%)	34 (08.7%)	16 (04.1%)	7 (01.8%)	126 (32.1%)
Female	86 (21.9%)	81 (20.7%)	55 (14.0%)	28 (07.1%)	16 (04.1%)	266 (67.9%)
Total	120 (30.6%)	116 (29.6%)	89 (22.7%)	44 (11.2%)	23 (05.9%)	392 (100%)

Table 4: Association between hypertension status and associated risk factors in the study participants

Risk factor*	Subgroups	Hypertension status		Total (*n*=392)	Chi-square	Odds ratio
		Hypertensive (*n*=272) *n* (%)	Normotensive (*n*=120) *n* (%)			
Obesity	Obese	167 (61.4%)	44 (36.7%)	211 (53.8%)	20.4898	2.747
	Nonobese	105 (38.6%)	76 (63.3%)	181 (46.2%)		
Alcohol intake	Alcoholic	202 (74.3%)	26 (21.7%)	228 (58.2%)	94.6666	10.433
	Nonalcoholic	70 (25.7%)	94 (78.3%)	164 (41.8%)		
Physical inactivity	Present	158 (58.1%)	106 (88.3%)	264 (67.3%)	34.63464	0.183
	Absent	114 (41.9%)	14 (11.7%)	128 (32.7%)		
Stress and strain	Present	154 (56.6%)	56 (46.7%)	210 (53.6%)	34.6364	1.491
	Absent	118 (43.4%)	64 (53.3%)	182 (46.4%)		
Headache[$]	Present	212 (77.9%)	24 (20.0%)	236 (60.2%)	116.674	14.133
	Absent	60 (22.1%)	96 (80.0%)	156 (39.8%)		
Unhealthy diet[#]	Present	148 (54.4%)	24 (20.0%)	172 (43.9%)	40.0405	4.774
	Absent	124 (45.6%)	96 (80.0%)	220 (56.1%)		

P=0.00001*, at 95% CI. [$]Occipital headache; [#]high salt intake, high saturated fat, low fiber diet; *statistically significant

distribution (males 46% and females 48%); 109 (21.6%) had stage I hypertension, 45 (9.34%) had stage II hypertension, and 72 were taking medication. Only 55 (11.4%) people had normal BP, whereas 201 (41.7%) were pre-hypertensives. The prevalence of hypertension was reported to be 34.8% (95% confidence interval (CI) 33.5–34.9) in urban slums in southern India. Among individuals with hypertension, 66.9% were aware of their condition. 53% of hypertensive people were obese, 25.1% had diabetes, and 14% had a history of hospitalization for high BP.[21]

Many studies have revealed that young adults believe hypertension originates in old age and that taking medicine makes them feel older. Hypertension treatment and control did not vary significantly across gender, marital status, education, and occupation groups.[22] In the present study, of those individuals who were found to have raised BP (272 (69.4%)), only 67 (24.6%) are aware of their hypertension condition, and the rest (205 (75.5%)) are unaware of their hypertensive status.

Anchala R *et al.*[23] conducted a systematic review and meta-analysis on hypertension in India and discovered that the prevalence of hypertension awareness was 25.3% (21.4–29.3). A similar study conducted in Kerala (South India) by Vimala A *et al.*[20] found that only 81 (16.8%) hypertensive patients and 33% of hypertensive individuals were aware of their disease. Education plays an important role in increasing patients' understanding of high BP and can contribute to adherence to treatment.[24]

Risk factors for hypertension

A variety of cross-sectional and longitudinal studies conducted in various groups have shown an association between obesity and the prevalence of hypertension and cardiovascular events.[25] Obesity has been identified as a risk factor for hypertension. The prevalence of abdominal obesity in India was determined to be 40% in women and 12% in men, according to NFHS-5 data (2019–2021).[26] Similar studies reported a higher prevalence of obesity among African women.[27] In the present study, it was observed that obesity or obese were higher in females than in males, such as overweight (10.5% in females and 6.9% in males), obese class 1 (16.3% in females and 6.6% in males), and obese class 2 (10.2% in females and 3.3% in males) as per the BMI Asian classification. There was a significant association found between obesity and hypertension in females.

Furthermore, age was discovered to be an essential risk factor for hypertension. A few other research studies found that increasing age was positively associated with hypertension. With increasing age, the aorta and artery walls will be stiffened and this contributes to the high prevalence of hypertension in older age groups.[2] In the present study, obesity is the most common risk factor for hypertension in this group, accounting for 167 (61.4%), followed by alcoholic drinking (228 (58.2%)), physical inactivity (158 (58.1%)), stress and strain factors (154 (56.6%)), and eating an unhealthy diet (148 (54.4%)). These were significantly associated with the hypertension status of the study participants ($P < 0.05$). As hypertension is a multifaceted illness, research on related risk factors is essential to its management. As a result, knowing the incidence of disease in a certain location is critical for an appropriate disease control strategy.

Healthcare personnel play a vital role in educating patients about the consequences of high BP and encouraging them to take their prescriptions on a regular basis. To guarantee that patients take their medications on a daily basis, healthcare providers should cultivate positive relationships with them. If the patient takes his or her medication on a daily basis, give him or her good feedback and appreciation. Instead of criticizing those who do not take medication on a daily basis, show empathy, try to understand the patient's cause for not taking medication on a regular basis, and explore solutions.[28]

Recommendations

Salt reduction strategies: It is advised that adults consume less than 5 gm/day, and it should be iodized and fortified with iodine. Regular physical activity should be advised to all individuals to keep themselves healthy and fit. Health education should be given by experts and should emphasize the negative impacts of a sedentary lifestyle, overweight and obesity, increased salt and alcohol consumption, and other factors. It is recommended to follow the Dietary Approaches to Stop Hypertension (DASH) diet, which is a diet high in potassium, calcium, magnesium, and fiber. Individuals over the age of 30 years undergo opportunistic screening to determine their risk of disease. Mental stress counseling reduces hypertension, such as physical exercise, positive social contact, and meditation.

Limitation of the study: There are various sources of errors that have been identified in the recording of BP, such as observer errors in hearing acuity and interpretation of Korotkoff sound, instrumental errors, that is, cuffs that do not encircle in the obese patient, and subjective errors such as patients taking antihypertensive medication, white coat syndrome, fear, and anxiety. No investigation was performed to diagnose the hypertension; only screening of patients was performed.

Conclusion

Hypertension is a preventable disease. We cannot treat the cause; we only try to control high BP within a normal range. The prevalence of hypertension cannot be controlled, but morbidity due to hypertension can be controlled. It helps reduce the incidence of strokes and other complications. Regular screening after 30 years of age, following a low-salt diet, and keeping oneself active with regular exercise remain mainstays for its prevention. Adherence to medication and regular checkups are essential after being diagnosed with hypertension.

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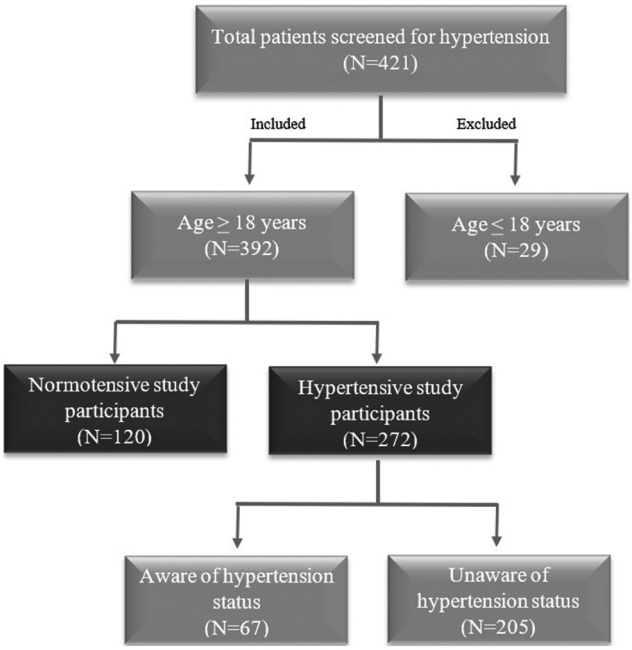
Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has given his/her consent and other clinical information to be reported in the

journal. The patients understand that their names and initials will not be published and that due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Flow diagram for the selection of study participants



Total hypertensive subjects = new identified hypertension (151) + prediagnosed hypertension (54) = 272

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Conflicts of interest

There are no conflicts of interest.

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