

Undiagnosed hypertension and associated factors among adults in the urban field practice area of AIIMS Raipur: A community-based screening survey

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ABSTRACT

Introduction: Undiagnosed hypertension (HTN) increases the risk of severe consequences such as chronic kidney disease (CKD), hypertensive retinopathy, heart failure, and stroke. Population-based screening can be used to expose the hidden diseased mass with active disease. Thus, a screening survey was conducted to estimate the proportion of people with HTN among apparently healthy adults of age ≥ 30 years residing at the urban field practice area (UHTC) of AIIMS, Raipur, and also determine the predictors of undiagnosed HTN among the study participants. **Methodology:** This was a community-based cross-sectional study conducted over 2 months duration in the Ramnagar area, which comes under the urban field practice area of AIIMS Raipur using the STEPS tool is an acronym of study tool provided by WHO i.e. STEPwise approach to NCD risk factor surveillance consisting of three steps viz. questionnaire for behavioural risk factors, physical measurements and biochemical measurements. **Results:** In this study, 24.2% (95% confidence interval [CI]: 20.1–28.2) of participants screened positive for HTN. The proportion of males who screened positive for HTN was 28.8% (95% CI: 22.6–35), whereas the proportion of females who screened positive for HTN was 19.6% (95% CI: 14.3–25). In this study, elderly (>60 years), male gender, daily tobacco use, greater waist circumference (male >90 cm and female >80 cm), and daily salt intake of more than 5 g were found to have higher odds of having HTN. **Conclusion:** The prevalence of undiagnosed HTN in the UHTC of AIIMS Raipur was quite high.

Keywords: Cross-sectional study, risk factors, screening, STEPS, undiagnosed hypertension

Introduction

Hypertension (HTN) is the leading metabolic risk factor for the development of cardiovascular disease and the most important cause of premature death worldwide.^[1] According to the

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World Health Organization (WHO) 2021 datasheet, currently, 1.28 billion adults have HTN worldwide, most (two-thirds) of them living in low- and middle-income countries.^[2] According to the National Family Health Survey (NFHS-5) data, in India, the estimated prevalence of high blood pressure (BP) amongst India's adult population aged ≥ 15 years in 2019–2021, in males and females, were 24.0% and 21.3%, respectively^[3] with no significant difference in the prevalence of HTN in urban and rural settings and this indicates the severity of situation everywhere in India.

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Like other non-communicable diseases (NCDs), HTN is an iceberg disease where symptoms remained silent for a long period; however, the disease continues to progress inside.^[4] Undiagnosed HTN increases the risk of severe consequences such as chronic kidney disease (CKD), hypertensive retinopathy, heart failure, and stroke.^[5] Therefore, HTN-like diseases require regular screening for their early detection and management. Under the NCDs such as National Program for Prevention and Control of Cancer, Diabetes, Stroke and Cardio-vascular diseases programs, efforts have already been taken to screen for NCDs such as HTN, DM, and cervical cancer in all adults aged ≥ 30 years by accredited social health activist (ASHA) through door-to-door surveys all over India.^[6] Population-based screening can be used to expose the hidden diseased mass with active disease and the prevalence of undiagnosed HTN can be calculated.^[7] The prevalence of undiagnosed HTN in a study by Zhang *et al.*^[8] in China was 12.3%, whereas in the neighbouring country, Bangladesh, the prevalence of undiagnosed hypertension was 11.1%.^[9] Similarly, in India, Kar *et al.*^[10] (2014–2015) did a cross-sectional study in the urban slums of Puducherry using the WHO STEPS tool on 2,399 adults and found that the prevalence of undiagnosed hypertension among men and women was 26.1 and 19.8%, respectively. In a study by Marmot *et al.*,^[11] it was found that social determinants are major contributors to the causation of NCDs and it is a more important contributor to NCDs (including HTN) than other major behavioral risk factors. Social determinants of health can affect the behavioral choices of an individual, Social determinants of health can affect the behavioural choices of an individual. For instance, low income leads to consumption of a diet poor in nutrition. For example, intake of food rich in saturated fatty acids, low fruits and vegetables consumption are a risk factor for NCD. Apart from this, low socio-economic status leads to stress which in turn indulges them to high risk behaviours like smoking, binge alcohol intake. Literature also shows that stress is more in low income individual compared to others.^[12] Seventy-five percent of hypertensive people are in low- and middle-income settings.^[13] Among these people, healthcare-seeking behavior is very less, which further aggravates the severity of the situation.

In light of the above, this study was conducted to estimate the proportion of people with undiagnosed HTN among apparently healthy adults of age ≥ 30 years to find the association between undiagnosed HTN with selected socio-demographic variables and other independent variables among study participants residing at the urban field practice area of AIIMS, Raipur.

Methods and Materials

Study design and duration

This was a community-based cross-sectional study conducted over 2 months duration, from December 1, 2020, to January 31, 2021.

Study setting

This study was conducted in Ramnagar, which comes under the urban field practice (UHFC) area of AIIMS Raipur. The total

estimated population in this area is around 26, 525. Under two wards of this area, 17 areas/nagars are present.

Study population

Participants selected for this study were healthy adults aged ≥ 30 years of the urban field practice area of AIIMS, Raipur, who were residing in the area for at least 6 months preceding the date of the survey and voluntarily gave consent to participate in the study, whereas all individuals who are already diagnosed/known cases of HTN, females who were *P*regnant or individuals who had an acute illness or those who were not able to comprehend the questionnaire were excluded from the study.

Sample size

For sample size calculation in this study, *P* was taken as 50%, as there was a paucity of data on the prevalence of undiagnosed HTN in Raipur, the absolute error of 5% was used, and $Z = Z$ statistic for a level of 95% confidence interval (1.96) applied. Finally, with consideration of 10% non-responder, our final sample size became 422.

Study tool and sampling technique

The instrument that was employed for the screening survey was the “WHO NCDs STEPS” surveillance questionnaire (version 3.2).^[14] with some local modifications in it. The instrument consists of four main sections—socio-demographic characteristics, STEP-1, STEP-2, and STEP-3. Socio-demographic information included name, age, sex, religion, marital status, caste, type of family, and residence, whereas in STEP-1 information was collected on behavioral risk factors such as tobacco use, alcohol use, and physical activity of the selected participants. In STEP-2, physical measurements, that is, weight (in kg), height (in cm), body mass index (BMI) (kg/m^2), waist circumference (in cm), and BP (mm of Hg) of participants were measured. In the last step, that is, STEP-4 or for biochemical measurement, we measured the random blood sugar (RBS) using a glucometer. The pretested questionnaire was used for a face-to-face interview.

In the study area, there are two wards, ward 24 and ward 25. The total number of houses in the two wards was 3,241 and 1,032, respectively. Thus, households were proportionately selected from wards 24 and 25 in a ratio of 3:1. Thus, 317 households were selected randomly from ward 24, and 105 households were selected randomly from ward 19. The first street was selected using a rotating water bottleneck; then, the first house was randomly selected and houses were further visited consecutively in the right direction from the randomly selected first house. Only one participant was selected from each house. In the case of more than one adult of age ≥ 30 years present in a house, the participant was selected using the kish grid or kish selection grid is a method for selecting members within a household grid. In the case of a multi-floor house with multiple dwelling units, the order of selection of houses was from bottom to top. If no one was present in the selected house, the next house to the previously selected house was selected for data collection.

Materials used in this study

Blood pressure was measured with a standard aneroid sphygmomanometer, which was standardized and checked regularly to minimize errors. After resting for 5 min, BP was recorded in the sitting position in the right arm supported at the level of the heart. Three BP measurements were taken at 5–6 min intervals each. The final reading was recorded as the average of the last three readings. A standard stethoscope, that is, Littman Classic II S.E., was used to record BP. An analog weighing machine was used to measure the weight of the subjects. Weight was measured in kilograms using an analog weighing machine with an accuracy of 100 g. It was calibrated and checked regularly. A stiff and non-elastic measuring tape was employed to measure height with the least count of 0.1 cm. Another non-elastic measuring tape was used to measure the waist circumference. Waist circumference was measured as the smallest horizontal girth between the costal margins and the iliac crests at minimal respiration using a non-stretchable measuring tape. RBS glucometer and lancet strip were used to measure the random plasma sugar of the participants.

Operational definitions used in this study

1. Hypertension

All those apparently healthy adults with systolic BP >140 mm of Hg and diastolic BP >90 mm of Hg were considered as “**screened positive for HTN/undiagnosed HTN**” (JNC-VII) (12).

2. Tobacco Use:

- i. **Current tobacco user:** if consumed tobacco in the past 30 days in any form
- ii. **Past tobacco user:** if not smoked tobacco in the last 30 days
- iii. **Never used:** those who had never used tobacco in any form (smoked/smokeless)

3. Alcohol Use:

- i. **Current alcoholics:** those who consumed one or more drinks containing alcohol in the last 3 months preceding the survey, daily, or occasionally.
- ii. **Ex-alcoholics:** those who have ever drunk alcohol but did not consume any drinks during the 3 months preceding the survey.
- iii. **Non-alcoholics or lifetime abstainers:** those who never had consumed any type of alcohol in his/her life

4. Diet:

- i. **Inadequate fruit consumption:** means consumption of fruits ≤ 5 servings.
- ii. **Inadequate vegetable consumption:** means consumption of vegetables ≤ 5 servings
- iii. **One standard serving of fruits/vegetables** is equivalent to 80–100 g.

Roughly, one serving of vegetables/fruits is equivalent to 1 full cup of raw vegetables or half a cup of cooked vegetables.

5. Physical Activity:

- i. **Adequate physical activity:** if an individual is spending ≥ 150 min in doing moderate level physical activity or ≥ 75 min of the vigorous level of physical activity weekly.
 - ii. **Inadequate physical activity:** if an individual is spending ≤ 150 min in doing moderate level physical activity or ≤ 75 min of the vigorous level of physical activity weekly.
6. **Excess salt consumption:** consumption of salt >5 g.
7. **BMI index:** In this study, the Asian cut-off was used to categorize an individual according to their BMI
- i. **Overweight:** all those with BMI ≥ 23 kg/m²
 - ii. **Obesity:** all those with BMI ≥ 25 kg/m²
8. **Obesity according to waist circumference criteria:** all males and females with central obesity/waist circumference >90 cm and >80 cm

Statistical analysis

The collected information was entered in MS Excel for coding and further transported to IBM SPSS version 20 for cleaning and analysis. Descriptive statistics were performed frequencies and graphs for categorical variables and the mean was calculated (95% CI) for continuous variables. The Chi-square test of significance was used to find the association between dependent and independent variables. Then, independent variables with P value < 0.05 were transported for multivariate logistic regression to control the confounders and calculate the odds ratio and predict the strength of association with a 95% confidence interval. Model fit was decided by the Hosmer and Lemeshow goodness of fit test.

Ethical considerations

Ethical clearance was obtained from the Institute Ethics Committee, AIIMS, Raipur, with Ref. no. 749 IEC-AIIMSRPR/2019 dated 23.09.2019. The participants were enrolled in the study after obtaining written informed consent. Confidentiality of the information was assured throughout the data collection process.

Results

Socio-demographic characteristics of respondents

A total of 422 individuals were approached for screening. The overall response rate for the three steps was 100%, 100%, and 97.3%, respectively. Out of 422 participants, 50.7% were females, and 49.3% were males. The mean age of study participants in this study was 44.1 ± 11.8 years. Further, 77.5% were literate, whereas 22.5% of participants were illiterate. Details of the socio-demographic profile are listed in [Table 1].

Blood pressure status of respondents and screening result

Out of 422 participants who got screened, 24.2% (95% CI: 20.1–28.2) participants were found to be screened positive

Table 1: Socio-demographic profile of study participants

Variables	Male (n=208) n (%)	Female (n=214) n (%)	Both sexes (n=422) n (%)
Age categories (in years)			
30–45	128 (61.5)	131 (61.2)	259 (61.4)
46–60	59 (28.4)	57 (26.6)	116 (27.5)
>60	21 (10.1)	26 (12.1)	47 (11.1)
Religion			
Hindu	202 (97.1)	206 (50.6)	407 (96.7)
Muslim	4 (1.9)	7 (3.3)	11 (2.6)
Christian	0 (0)	1 (0.5)	1 (0.2)
Sikh	2 (1.0)	0 (0)	2 (0.5)
Education			
Literate	177 (85.1)	150 (70.1)	327 (77.5)
Illiterate	31 (14.9)	64 (29.9)	95 (22.5)
Socio-economic Status			
Upper	0 (0)	0 (0)	0 (0)
Upper middle	16 (7.7)	4 (1.9)	20 (4.7)
Lower middle	47 (22.6)	44 (20.6)	91 (21.6)
Upper lower	123 (59.1)	118 (55.1)	241 (57.1)
Lower	22 (10.6)	48 (22.4)	70 (16.6)
Caste			
General	22 (10.6)	39 (18.2)	61 (14.5)
OBC	170 (81.7)	161 (48.6)	331 (78.4)
SC	7 (3.4)	4 (1.9)	11 (2.6)
ST	9 (4.3)	10 (4.7)	19 (4.5)
Marital status			
Married	199 (95.7)	175 (81.8)	374 (88.6)
Unmarried	6 (2.9)	8 (3.7)	14 (3.3)
Divorced	0 (0)	3 (1.4)	3 (0.7)
Separated	1 (0.5)	5 (2.3)	6 (1.4)
Widowed	2 (1)	23 (10.7)	25 (5.9)
Type of family			
Nuclear	104 (50)	99 (46.3)	203 (48.1)
Extended	104 (50)	115 (53.7)	219 (51.9)

for HTN. The proportion of participants who were screened positive for HTN among males was more, that is, 28.8% (95% CI: 22.6–35) when compared with females where 19.6% (95% CI: 14.3–25) participants were screened positive for HTN.

In this study, the overall mean systolic and diastolic BP among study participants were 126.3 mm of Hg (124.4–128.2) and 82.4 mm of Hg (81.3–83.6), respectively. The mean systolic BP for men was 127.6 mm of Hg (95% CI: 125.0–130.3), whereas the mean systolic BP for women was 124.9 mm of Hg (95% CI: 122.2–127.6). Similarly, the mean diastolic BP for men was 84.6 mm of Hg (83.0–86.2), whereas the mean diastolic BP for females in this study was 80.3 mm of Hg (95% CI: 78.6–81.9).

Association between screened positive HTN with various socio-demographic factors

In this study, the socio-demographic factors found to be significantly associated with screened positive HTN were age, sex, and type of family with $P < 0.05$ [Table 2]. The proportion of participants who screened positive for HTN mostly belonged to the age group of >60 years (46.8%) and age was found to be

a statistically significant factor for screened positive HTN in this study ($P < 0.05$). More males (28.8%) were found to be screened positive for HTN compared to females (19.6%) and gender was found to be significantly associated with screened-positive HTN in this study ($P < 0.05$). The proportion of participants who screened positive for HTN was higher among those belonging to lower (32.9%) and upper-lower socioeconomic status (24.1%) and it was found to be significantly associated with screened positive HTN ($P < 0.05$).

Association of screened positive HTN with various behavioural risk factors

The proportion of participants who screened positive for HTN was higher among those who were daily tobacco users (31.5%) compared to non-tobacco users (14.3%). Even 15% of the ex-tobacco users were found screened positive for HTN and tobacco use was found to be significantly associated with screened positive HTN ($P < 0.001$). Other behavioural risk factors found significantly associated with HTN were obesity, waist circumference, BMI, physical activity, salt use, and RBS >140 mg/dL ($P < 0.05$) [Table 2]. In this study, 32.5% of obese, 21.2% of overweight, 19.5% of normal weight, and 10.5% of underweight participants were found to be screened positive for HTN and BMI was found to be significantly associated with screened positive HTN. Also, 29.6% of study participants whose waist circumference was more than the gender-specific cut-off value was found to be screened positive for HTN, whereas 14.5% of study participants whose waist circumference was less than the WHO recommended value were found to be screened positive for HTN, and waist circumference was found to be strongly associated with screened positive HTN ($P < 0.001$). Salt consumption of >5 g was found to be significantly associated with screened positive HTN, where 27.9% of participants who were consuming salt more than 5 g were found to be screened positive for HTN, whereas 14.5% of those participants who were not consuming salt more than >5 g screened positive for HTN. Similarly, physical activity of ≥ 150 min/week was found to be significantly associated with screened-positive HTN. Also, 35.8% of participants who were doing physical exercise <150 min/week were found to be screened positive for HTN and 21.4% of participants who were having a physical activity ≥ 150 min were found to be screened positive for hypertension in this study.

Estimation of odds ratio of screened positive HTN for different variables

Multi-variate logistic regression was further performed for quantification of association for independent variables, which was found significantly associated with screened positive HTN [Table 3]. It was seen, compared to females, the odds of HTN among males were higher (OR: 2.001 [95% CI: 1.164–3.455]), and this association was found to be statistically significant ($P < 0.05$). With increasing age, the likelihood of screened positive HTN results is also seen to be increasing. Compared to those who were consuming tobacco daily,

Table 2: Percentage distribution of screened positive hypertension by socio-demographic and lifestyle factors

Variables	Screened positive hypertension				Total (n)	P
	Present		Absent			
	n	%	n	%		
Age (in years)						
30-45	37	14.3	222	85.7	259	
46-60	43	37.1	73	62.9	116	0.001*
>60	22	46.8	25	53.2	47	
Sex						
Male	60	28.8	148	71.2	208	
Female	42	19.6	172	80.4	214	0.031*
Family type						
Nuclear	38	18.7	165	81.3	203	
Extended	64	29.2	155	70.8	219	0.012*
Education						
Literate	24	25.5	70	74.5	94	0.785
Illiterate	78	23.8	250	76.2	328	
Caste						
General	10	16.4	51	83.6	61	0.331
OBC	87	26.3	244	73.7	331	
SC	2	18.2	9	81.8	11	
ST	3	15.8	16	84.2	19	
Socio-economic status						
Upper middle	5	25	15	75.0	20	0.166
Lower middle	16	17.6	75	82.4	91	
Upper lower	58	24.1	183	75.9	241	
Lower	23	32.9	47	67.1	70	
Marital status						
Married	93	24.9	281	75.1	374	0.046*
Unmarried	0	0.0	14	100.0	14	
Divorced/separate	0	0.0	9	100.0	9	
Widowed	9	36	16	64.0	25	
Tobacco consumption						
Never	23	14.3	138	85.7	161	0.001*
In past	3	15.0	17	85.0	20	
Daily	76	31.5	165	68.5	241	
Alcohol consumption						
Alcoholic	38	30.2	88	69.8	126	
Ex-alcohol	4	36.4	7	63.6	11	0.770
Non-alcoholic	60	21.1	225	78.9	285	
BMI (kg/m ²)						
Underweight (<18.5)	4	10.5	34	89.5	38	
Normal (18.5–22.9)	29	19.5	120	80.5	149	0.006*
Overweight (23–24.9)	14	21.2	52	78.8	66	
Obesity (>25)	55	32.5	114	67.5	169	
Waist circumference (in cm)						
Female Male						
<80	22	14.5	130	85.5	152	0.001*
<90						
>80	80	29.6	190	70.4	270	
>90						
Salt						
>5 g	85	27.9	220	72.1	305	
<5g	17	14.5	100	85.5	117	0.005*
Physical Activity						
≥150 min	73	21.4	268	78.6	341	
<150 min	29	35.8	52	64.2	81	0.009*
Total	102	24.2	320	75.8	422	

*P value <0.05 for significance

Table 3: Estimation of the odds ratio of screened positive hypertension for different variables

Variables	Odds ratio	95% CI	P
Age (years)			
30–45	0.223	0.107–0.462*	0.000*
46–60	0.649	0.310–1.359	0.252
>60	1		
Sex			
Male	2.001	1.164–3.455*	0.012*
Female	1		
Family type			
Nuclear	0.641	0.381–1.079	0.094
Extended family	1		
Tobacco consumption			
No	0.487	0.268–0.887*	0.019*
Used to do in past	0.650	0.170–2.482	0.528
Daily	1		
Waist circumference (in cm)			
Female Male			
<80	0.457	0.222–0.938*	0.033*
<90			
>80	1		
>90			
BMI (kg/m ²)			
Underweight	0.442	0.117–1.666	0.228
Normal weight	0.628	0.324–1.216	0.168
Overweight	0.599	0.283–1.268	0.180
Obesity	1		
Physical activity			
>150 min	0.754	0.422–1.347	0.339
<150 min	1		
Salt			
>5 g daily	2.154	1.142–4.065*	0.018*
<5 g daily	1	1	

*P<0.05

those who never had tobacco comparatively had lower odds to give screened positive results for HTN (0.487 [95% CI: 0.268–0.887]), and this association was found to be statistically significant ($P < 0.05$). Similarly, compared to those who had a waist circumference more than the prescribed cut-off value by the WHO (male >90 cms and female >80 cms), participants with a waist circumference less than the prescribed cut-off value had lower odds to give screened positive results for HTN (0.457 [95% CI: 0.222–0.938]) and this association was found to be statistically significant ($P < 0.05$). Those consuming daily salt of >5 g seen to have 2.2 (95% CI: 1.142–4.065) higher odds of giving screened positive results for HTN compared to those consuming daily salt of less than 5 g and this relation was found to be statistically significant ($P < 0.05$).

Discussions

A community-based, cross-sectional study was conducted among adults aged ≥30 years in the urban field practice area of AIIMS, Raipur. In this screening survey, 25% of the participants were screened positive for HTN. Studies from different parts of India reported the prevalence of undiagnosed HTN to be around 15–20%.^[15-17]

Around 28.8% of males and 20% of females were found to be screened positive for HTN in our study. Similar findings were obtained in the studies conducted by Banerjee *et al.*^[15] where higher proportions of men were found to have undiagnosed HTN than women (26.1 vs. 19.8%).

In this study, elderly (>60 years), male gender, daily tobacco use, greater waist circumference (male >90 cm and female >80 cm), and daily salt intake of more than 5 g were found to be the independent determinants of undiagnosed HTN. Bhansali *et al.*^[16] reported age, male gender, urban residence, generalized obesity, diabetes, alcohol consumption, physical inactivity, and daily salt intake (>6.5 g) were significantly associated risk factors for HTN. Kar *et al.*^[10] found that adults who were unskilled labourers, belonging to below the poverty line, and those with education less than middle school had a higher chance of remaining a case of undiagnosed HTN. Thakur *et al.*^[17] conducted a STEPS survey in Punjab state where they found that people with higher education, general caste, women gender, increasing age, divorced/widowed and job in the non-government sector had higher odds of having HTN. A recent STEPS survey by Sivanantham *et al.*^[18] in Kerala state found that male gender, urban residence, increasing age (45–69 years), less education (i.e. primary education and less) and widowed/separated had a significant risk of having HTN.^[18]

The overall mean systolic and diastolic BP among study participants was 126.3 mm of Hg and 82.4 mm of Hg, respectively. Kokane *et al.* in their study reported similar findings.^[19] Although a study by Sivanantham *et al.* reported that the mean systolic and diastolic BP among study participants were a little higher than in our study (130.4 mm Hg and 84.9 mm of Hg).^[18]

There are certain limitations of this study. The first limitation included results that could not be generalized all over the state, as the sample was taken from a particular section of Raipur city where most people of low-socioeconomic status dwelled. The Recall bias could be a problem in this study. The possibility of white-coat HTN in some of the cases could be present. No attempt was made to assess target organ damage. The chances of social desirability in responses could be a possibility. No follow-up of participants was done further, either at UHTC or at home. Though the STEPS surveillance tool was used in this study but with various local modifications in it because time and manpower were limited.

Conclusion and Recommendation

The prevalence of undiagnosed HTN in the urban slums of Central India was 24.4%. Also, the prevalence of NCD-related high-risk behaviours such as the use of tobacco products and physical inactivity was seen to be quite high among study participants. Thus, this demands immediate attention towards increasing the health-seeking behaviour among the individuals dwelling in the urban slums of central India. The primary care physicians and family physicians at their level can use the opportunity to generate awareness among the slum dwellers

regarding HTN, its risk factors, and complications arising out of it. Healthcare facilities in urban slums of cities should be strengthened to actively take and manage screened-positive cases of HTN and give them access to free medication.

Highlights

One out of every four urban slum dwellers is hypertensive. This highlights the need for active screening and case finding in these urban slums in a developing country such as India where risk factors such as tobacco use, alcohol use, and stress are more among the population compared to others.

Novelty

The study sample population is slum dwellers, and most Indian studies are based on urban and rural areas. Most studies are focused on generating evidence on the prevalence of HTN. This study took efforts to find the prevalence of undiagnosed HTN in central India.

Ethical considerations

Ethical clearance was obtained from the Institute Ethics Committee, AIIMS Raipur, with Ref. no. 749 IEC-AIIMSRPR/2019 dated 23.09.2019. The participants were enrolled in the study after obtaining written informed consent. Confidentiality of the information was assured throughout the data collection process.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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