



A STUDY ON PREVALENCE OF HYPERTENSION AND IT'S RISK FACTORS IN RURAL AREAS OF A TERTIARY CARE CENTRE IN KANPUR DISTRICT, UTTAR PRADESH, INDIA

Dr. Lakshmi Singh^{1*}, Dr. Ankita Tripathi², Dr. Malik Faizan Ahmad³, Dr. Tarun Kumar Singh⁴, Dr. Saurabh Singh⁵

¹Assistant Professor, Department of Community Medicine, Naraina Medical College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

²Associate Professor, Department of Microbiology, Naraina Medical College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

³Professor, Department of Community Medicine, Naraina Medical College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

⁴Associate Professor, Department of Forensic Medicine, Naraina Medical College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

⁵Associate Professor, Department of Surgery, Rama Medical College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

***Corresponding Author:** Dr. Lakshmi Singh
*Email ID: lakshmi.singh6481@gmail.com

ABSTRACT

Background: This study was carried out in health camps arranged in villages by medical college to find out the prevalence of hypertension in rural areas of Kanpur district.

Aim and Objective: To study the risk factors and prevalence of hypertension in rural areas of a Tertiary care centre in Kanpur.

Methodology: This was a cross sectional study carried out in village health camps organised by Naraina Medical College, Kanpur including individuals attending the health camps more than 20 years of age group by history taking and general physical examination with blood pressure recording, data was recorded and analysed by using MS Excel and jamovi software (2.4.8).

Results: This study highlights a substantial prevalence of hypertension (28.3%) among rural individuals attending a tertiary care centre in the Kanpur district of Uttar Pradesh, with a strong association observed with increasing age, male gender, diabetes, and lower socioeconomic status.

Keywords: prevalence, hypertension, rural, villages, risk

INTRODUCTION

Hypertension, often referred to as high blood pressure, ranks among the most common non-communicable diseases worldwide and poses a major risk for cardiovascular complications and death. Globally, cardiovascular disease accounts for approximately 17 million deaths a year, nearly one third of the total deaths. Of these, complications of hypertension account for 9.4 million deaths worldwide every year. Hypertension is responsible for at least 45% of deaths due to heart disease (total ischemic heart disease), and 51% of deaths due to stroke (1). Despite its extensive impact, hypertension frequently goes undiagnosed and untreated, particularly in rural and

underserved areas. A majority of the rural population in India have inadequate access to healthcare. Over half of the outpatient consultations are with indigenous and private practitioners, where regular screening for hypertension is not practiced. (2) In India, rural regions represent a significant segment of the population, where restricted access to healthcare services, low health literacy, and lifestyle habits exacerbate the increasing prevalence of hypertension. Kanpur district, situated in northern India, encompasses both urban and extensive rural areas. While health indicators in urban settings are often examined, research on the prevalence and factors contributing to hypertension in rural Kanpur is notably limited. Gaining insights into the epidemiology of hypertension in these environments is essential for devising effective public health strategies. This research aims to evaluate the prevalence of hypertension in the rural regions of Kanpur district using a cross-sectional methodology. The results will assist in identifying populations at risk and guiding efforts to enhance early detection, treatment, and prevention of hypertension within rural communities.

AIM AND OBJECTIVES

1. To identify the biosocial factors of hypertension in rural areas of Kanpur district.
2. To find the prevalence of hypertension in rural areas of Kanpur district
3. To find the association between various risk factors of hypertension.

MATERIAL AND METHODS

Study design: This was a community based cross sectional study.

Study area: Study was carried out in Maqsoodabad village of Family Adoption Programme of Naraina Medical College, Kanpur with a population of 4923 individuals.

Study population: Individuals more than 20 years of age were included in the study.

Study period: 1st January 2025 to 1st May 2025 (5 months)

Sample size: 456

Sampling technique = Non probability sampling

Consent: Informed consent was taken prior to history and examination of individual.

Ethical clearance: Taken from ethical committee of Naraina Medical college and Research Center, Kanpur, before starting the study. Data safety and confidentiality was also given due consideration.

Data collection: Data was collected by interviewing individuals more than 20 years of age group, coming in health camps organized in village every month as a part of FAP Programme, by the department of community medicine, Naraina Medical College, Kanpur. Sociodemographic history and general physical examination was done with vital check up, in health camp.

Blood pressure was measured by an electronic blood pressure monitor with a cuff of proper size to encircle 80% of the arm circumference. The blood pressure was taken in the right arm with the subject relaxed and comfortable. The blood pressure reading was taken after ensuring a gap of 30 minutes. Subjects were seated with their back supported and with their legs resting on the ground and in uncrossed position for 5 minutes. Two readings were taken 2 minutes apart and average of two readings was recorded.

Socio economic status of individuals was applied by modified BG Prasad Classification.

Data Analysis: Data was subjected to appropriate statistical analysis using Microsoft Excel and JAMOWI software (2.4.8). Prevalence of hypertension was presented in the form of frequencies and percentages. Statistical significance (chi-square test and P value) and strength of association was tested between hypertension and different variables used in the study.

RESULTS

The majority of individuals fall in the 40–70 age range, in which younger individuals (20–40) make up only about 13.4%. In this study, 91.2% were male while 8.8% female, reason being less females can visit health camps due to family and household work. Hindu (98.2%), with very small

representations of Muslims (0.2%) and Others (1.5%). Majority are from General caste (74.3%). OBC: 18.2%, SC: 6.6%, ST: 0.9%. Nuclear families dominate (60.3%), with significant numbers in Three Generation (20.4%) and Joint families (19.3%). Vegetarian constitutes 70%, and Non-vegetarian 30%. The education level is decent, with many graduates and skilled workers, although unemployment is high. Graduate 31%, High school 21.1%, Intermediate 19.3%, Illiterate population 8.6%. Most common occupations are Skilled worker 25.7%, Unemployed 19.3%, Professional 16.9%, Skilled agriculture 14.9% (table 1). A majority of the population (90.7%) belongs to the Middle, Upper Middle, or Upper classes, indicating relatively strong economic stability in the sample group. Upper Middle Class forms the largest group, comprising 44.4% of the total, suggesting a well-established, possibly semi-urban demographic with access to education, jobs, and services. (table 2) Only 9.2% of the population consumes alcohol.

TABLE 1: SOCIO - DEMOGRAPHIC PROFILE OF STUDY POPULATION (N=456)

VARIABLE	CATEGORY	NUMBER	PERCENTAGE
AGE IN YEARS	20-30	4	0.9
	30-40	57	12.5
	40-50	119	26.1
	50-60	123	27.0
	60-70	107	23.5
	70-80	37	8.1
	80-90	6	1.3
	>90	3	0.7
GENDER	MALE	416	91.2
	FEMALE	40	8.8
RELIGION	HINDU	448	98.2
	MUSLIM	7	0.2
	OTHER	1	1.5
CASTE	GENERAL	339	74.3
	OBC	83	18.2
	SC	30	6.6
	ST	4	0.9
TYPE OF FAMILY	NUCLEAR	275	60.3
	JOINT	88	19.3
	THREE GENERATION	93	20.4
DIET	VEGETERIAN	319	70
	NONVEGETERIAN	137	30
EDUCATION	PROFESSIONAL	33	7.0
	GRADUATE	141	31.0
	INTERMEDIATE	88	19.3
	HIGH SCHOOL	96	21.1
	MIDDLE SCHOOL	41	9.0

	PRIMARY SCHOOL	18	4.0
	ILLITERATE	39	8.6
OCCUPATION	PROFESSIONAL	77	16.9
	SEMI PROFESSIONAL	30	6.6
	SKILLED AGRICULTURE	68	14.9
	SKILLED WORKER	117	25.7
	SEMISKILLED WORKER	24	5.3
	UNSKILLED WORKER	29	6.4
	ELEMENTARY OCCUPATION	23	5.0
	UNEMPLOYED	88	19.3

TABLE 2: SOCIO ECONOMIC STATUS OF STUDY POPULATION ACCORDING TO B.G. PRASAD CLASSIFICATION(N=456)

VARIABLE	CATEGORY	NUMBER	PERCENTAGE
SES	LOWER CLASS	11	2.4
	LOWER MIDDLE	31	6.8
	MIDDLE	127	28.0
	UPPER MIDDLE	201	44.4
	UPPER	83	18.3

TABLE3: DISTRIBUTION OF RISK FACTORS OF HYPERTENSION(N=456)

VARIABLE	CATEGORY	NUMBER	PERCENTAGE
ALCOHOL INTAKE	YES	42	9.2
	NO	414	90.8
TOBACCO INTAKEIN ANY FORM	YES	91	20.0
	NO	365	80.0
DIABETES	YES	18	4.0
	NO	437	96.0
PHYSICAL ACTIVITY	REGULAR MILD PHYSICAL ACTIVITY AT HOME/WORK	169	37
	REGULAR	205	45

	MODERATE PHYSICAL ACTIVITY AT HOME/WORK		
	NO/SEDENTARY ACTIVITIES AT HOME/WORK	82	18
FAMILY H/O HYPERTENSION	YES	35	7.7
	NO	419	92.3
BMI	UNDERWEIGHT	32	7.0
	NORMAL	280	61.5
	OVERWEIGHT	122	26.8
	OBESE	21	4.6

TABLE 4: DISTRIBUTION OF BLOOD PRESSURE IN STUDY POPULATION(N=456)

VARIABLE	CATEGORY	HYPERTENSIVE	PERCENTAGE	NON HYPERTENSIVE	PERCENTAGE
GENDER	MALE	121	26.5%	295	64.7%
	FEMALE	8	1.8%	32	7.0%
TOTAL		129	28.3%	327	71.7%

TABLE 5: ASSOCIATION OF HYPERTENSION WITH DEMOGRAPHIC CHARACTERISTICS IN STUDY POPULATION(N=456)

VARIABLE	CATEGORY	HYPERTENSIVE	NON HYPERTENSIVE	CHI SQUARE	P VALUE
AGE IN YEARS	20-30	1	3	22.6	*0.002
	30-40	9	48		
	40-50	28	91		
	50-60	29	94		
	60-70	39	68		
	70-80	19	18		
	80-90	2	4		
	>90	2	1		
TOTAL		129	327		
GENDER	MALE	121	295	1.49	0.223
	FEMALE	8	32		
OCCUPATION	ELEMENTARY OCCUPATION	6	17		
	SKILLED	18	50	12.9	0.074

	AGRICULTUR E				
	UNEMPLOYE D	29	59		
	PROFESSION AL	20	57		
	SKILLED WORKER	35	82		
	SEMI PROFESSION AL	14	16		
	UNSKILLED WORKER	5	24		
	SEMI SKILLED WORKER	2	22		
TOTAL		129	327		
EDUCATI ON	PROFESSION AL	7	26	6.41	0.379
	GRADUATE	35	106		
	INTERMEDIA TE	26	62		
	HIGH SCHOOL	25	71		
	MIDDLE SCHOOL	17	24		
	PRIMARY SCHOOL	7	11		
	ILLETERATE	12	27		
TOTAL		129	327		

TABLE 6: ASSOCIATION OF HYPERTENSION WITH SOME OF ITS RISK FACTORS IN STUDY POULATION(N=456)

VARIABLE	CATEGORY	HYPERTENSION		CHISQUARE	P VALUE
		HYPERTENSIVE	NON HYPERTENSIVE		
ALCOHOL INTAKE	NO	112	302	3.39	0.066
	YES	17	25		
TOBACCO INTAKE	YES	29	62	0.718	0.397
	NO	100	265		
DIABETES	YES	12	6	13.5	*<0.001
	NO	117	320		

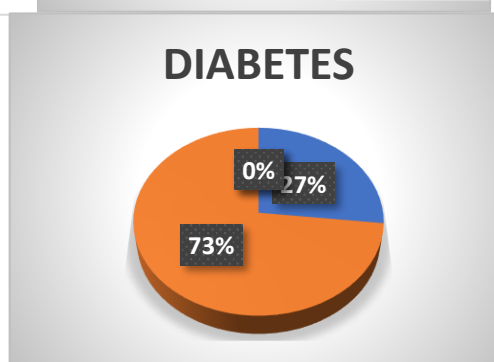
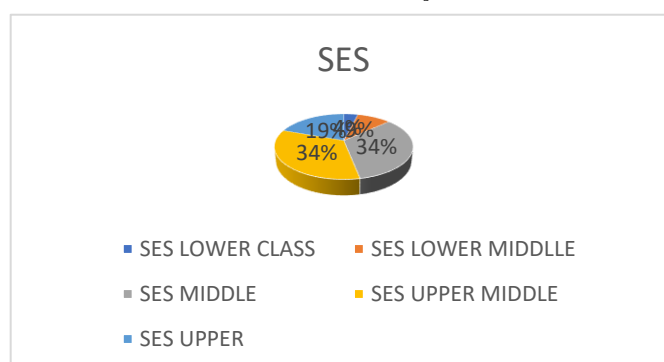
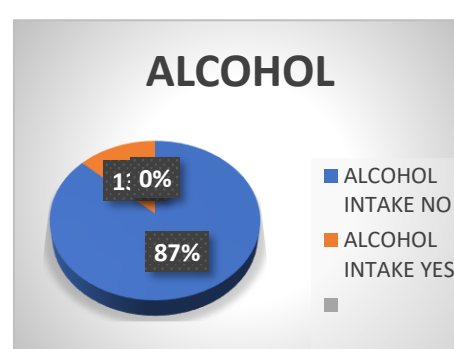
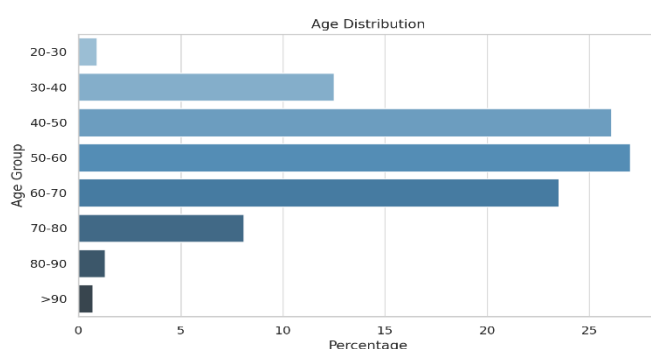
TABLE 7: ASSOCIATION OF HYPERTENSION WITH BMI IN STUDY POPULATION(N=456)

VARIABLE	CATEGORY	HYPERTENSION		CHI SQUARE	P VALUE
		HYPERTENSIVE	NON HYPERTENSIVE		
BMI	UNDERWEIGHT	11	21	1.54	0.673
	NORMAL	82	198		
	OVERWEIGHT	30	92		
	OBESE	6	15		

TABLE8: ASSOCIATION OF HYPERTENSION WITH SOCIOECONOMIC STATUS(N=456)

VARIABLE	CATEGORY	HYPERTENSION		CHI SQUARE	P VALUE
		HYPERTENSIVE	NON HYPERTENSIVE		
SES	LOWER CLASS	5	6	10.1	*0.040
	LOWER MIDDLE	12	19		
	MIDDLE	43	84		
	UPPER MIDDLE	43	158		
	UPPER	25	58		

FIGURES AND GRAPHS:



This indicates a predominantly non-drinking population (90.8%), which may be reflective of cultural or religious norms, or general health awareness. Almost 20% of individuals report using tobacco, meaning 1 in 5 are exposed to tobacco-related health risks. The prevalence of diabetes is low (4%), which may be related to lifestyle, diet, or relatively younger age distribution in the population. At least 45% engage in regular moderate physical activity, while 37% perform mild activity, and 18% are sedentary. A majority (61.5%) have a normal BMI, suggesting good nutritional balance. However, 26.8% are overweight, 4.6% are obese, 7% are underweight. (table 3). Overall 28.3% of the total sample population is hypertensive, while 71.7% is non-hypertensive. Males constitute the majority of hypertensive cases over 93% (121 out of 129). This may be due to higher exposure to risk factors such as tobacco use, occupational stress, or dietary patterns. (table 4) There is a statistically significant relationship between age and hypertension. Hypertension increases with age particularly high in age groups 40–70 years, as age is a well-established risk factor for high blood pressure due to vascular aging and cumulative lifestyle effects (p value=0.002). Certain occupations (e.g., unemployed, skilled workers) show higher hypertension rates. Suggests occupation-related stress, physical demand, or socioeconomic status might contribute to blood pressure differences (p value=0.074). (table 5) Hypertension was more prevalent among alcohol users (17 out of 42, or ~40.5%) compared to non-users (112 out of 414, or ~27%) (p value=0.066) A highly significant association exists between diabetes and hypertension. 12 out of 18 diabetics (66.7%) were hypertensive, compared to 117 out of 437 non-diabetics (26.8%). The significant p -value (0.040) for the Lower Middle SES group indicates that factors related to SES, such as income, access to healthcare, or lifestyle factors, may have a meaningful influence on whether individuals in this group are hypertensive or not (table 8).

DISCUSSION

This cross-sectional study aimed to assess the prevalence of hypertension in a rural village of Kanpur district, India, and to explore the associated demographic and lifestyle-related risk factors. The findings reveal that hypertension is a growing health concern even in rural settings, where historically it was considered less prevalent compared to urban areas. In this study prevalence of hypertension is 28.3%, in males it is 26.5% and in females it is 6.2%, however in a study by Praveer Saxena et al the prevalence of hypertension in the study population was found to be 21.2%. where the prevalence of hypertension in male was 23.1% and in female it was 19.3% (3) higher prevalence of hypertension was observed among females (18.3%) than males (15.8%) by P.S. Singh et al. (4) Majority of individuals belonged to upper middle class while in a study by Mahmood et al all of the respondents belonged to lower socioeconomic class applying Modified Prasad's classification. (5) the proportion of hypertension was found to be steadily increased with age similar findings were noted in a study by thakore et al (6) Certain occupations (e.g., unemployed, skilled workers) show higher hypertension rates, suggesting occupation-related stress, physical demand. In contrast, a study by Premkumar et al Economic index shows that half of the rural population with low economic status had normal BP readings. In contrast, only one third of people in high socio-economic strata living in the same villages enjoyed similar normal status. At the same time, half of the subjects with a high economic index were in preHTN status whereas a similar position was seen in only slightly above one-fourth of subjects in the low-economic strata. (7) Primary care physicians can enhance hypertension management by implementing regular screenings and promoting lifestyle modifications. Collaborating with local health authorities to improve community resources is essential, particularly in rural settings. By addressing socioeconomic and educational factors, family physicians can significantly improve patient outcomes and reduce the prevalence of hypertension in their communities (8).

CONCLUSION

This cross-sectional study highlights a substantial prevalence of hypertension (28.3%) among rural individuals attending a tertiary care center in the Kanpur district of Uttar Pradesh, with a strong

association observed with increasing age, male gender, diabetes, and lower socioeconomic status. The findings underscore the significant burden of undiagnosed and uncontrolled hypertension in rural settings, exacerbated by lifestyle factors such as tobacco use, physical inactivity, and overweight/obesity.

Despite relatively good education levels and economic stability among the participants, lifestyle-related risk factors remain prevalent, indicating a need for targeted public health interventions. The disproportionately low female participation emphasizes the ongoing barriers to healthcare access for women in rural areas.

Early identification, community-based screening, lifestyle modification, and integrated management of comorbidities are crucial to reducing the growing burden of hypertension in rural India. Strengthening primary healthcare services and increasing awareness through culturally sensitive health education programs can play a pivotal role in mitigating long-term cardiovascular risks in these populations.

RECOMMENDATIONS

1. Hypertension screening among age group 40-70 years
2. Organizing women-focused health camps and mobile screening units in rural areas could improve access for women constrained by household responsibilities.
3. Community-level health education on diet, stress, and physical activity should be implemented.
4. Local health workers and ASHA workers can promote accessible physical activity routines, especially among middle-aged and elderly populations.
5. Regular follow-up clinics at Primary Health Centres (PHCs).

LIMITATIONS

1. The study population was predominantly male (91.2%), which limits the generalizability of findings to the female population.
2. As a cross-sectional study, it captures associations but cannot establish causality.
3. Self-reported data may be subject to recall bias or social desirability bias.

ACKNOWLEDGEMENT

We would like to thank all the participants of this study who gave their valuable time.

AUTHORS CONTRIBUTION: All the authors had made substantial contribution to conception, design, data collection, analysis, and interpretation of data.

CONFLICT OF INTEREST: There is no conflict of interest.

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