



PREVALENCE OF HYPERTENSION AMONG POPULATION OF SULTANPUR KUNHARI AND ITS SURROUNDING AREA, HARIDWAR, UTTARAKHAND, INDIA

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ABSTRACT

The average prevalence of hypertension in India is 25% in urban and 10% in rural inhabitants. Prevalence of hypertension has been found to increase in traditional populations undergoing innovation. There is a strong correlation between changing lifestyle factors and increase in hypertension. Objectives: 1. To study prevalence of hypertension among population of Sultanpur Kunhari and its surrounding area, Haridwar Uttarakhand. 2. To study association between various factors and hypertension in a rural community of the study area. A community based cross sectional study was carried out in the selected area for the study. The cross sectional field study involved 500 respondents, aged 30 years and above using simple random sampling technique. A study instrument which included behavioral risk factor questionnaire (Tobacco use, alcohol consumption and type of diet) and physical measurements of height, weight, waist circumference, hip circumference and blood pressure was used to collect data. Chi-square test and regression analysis were used to analyze data. The overall prevalence of hypertension was found to be 11%. It was higher in females (12.1%) than males (10%). It was seen that prevalence of hypertension increased with age. Prevalence of hypertension was significantly higher among individuals, aged 40 years and above, with high body mass index and increased waist hip ratio, ($P < .05$). The prevalence of hypertension is high and is associated with socio-demographic factors. Hence there is need for primordial prevention efforts on large scale.

KEY WORDS: Prevalence, Hypertension, socio-demographic factors

INTRODUCTION

Dubey VD carried out one of the earliest study in India (1964), documented 4% prevalence of hypertension (criteria: $> 160/95$) amongst industrial workers of Kanpur¹. In 1984, Wasir HS et al reported 3% prevalence of hypertension (criteria: $> 160/95$) in Delhi². During 1984-87 Gopinath et al reported the prevalence of hypertension in Delhi (criteria: $\geq 160/90$) to be 11% among males and 12% among females in the urban areas and 4% and 3% respectively in rural areas³. Another two studies carried out in rural areas of Haryana (1994-95) demonstrated 4.5% prevalence of hypertension⁴ while urban areas of Delhi had a higher prevalence of 45% during 1996-97⁵.

In the ICMR study in 1994 involving 5537 individuals (3050 urban residents and 2487 rural residents) demonstrated 25% and 29% prevalence of hypertension (Criteria: $\geq 140/90$ mm of Hg) among males and females respectively in urban Delhi and 13% and 10% in rural Haryana⁶.

Gupta R from Jaipur, through three serial epidemiological studies (Criteria: $\geq 140/90$ mm of Hg) carried out during 1994⁷, 2001⁸ and 2003⁹ demonstrated rising prevalence of hypertension (30%, 36%, and 51% respectively among males and 34%, 38% and 51% among females).

From south India, Kutty VR in 1991 carried out hypertension prevalence study (criteria: $\geq 160/95$ mm of Hg) in rural Kerala in the 20 plus age group and the prevalence was found to be 18%¹⁰. Later studies in Kerala reported 37% prevalence of hypertension among 30-64 age groups in 1998¹¹ and 55% among 40-60 age groups during 2000¹². A higher prevalence of 69% and 55% was recorded among elderly populations aged sixty and above in the urban and rural areas respectively during 2000¹³.

Few studies on prevalence on hypertension are available from eastern Indian population. In 2002, Hazarika et al reported

61% prevalence among man and women aged thirty and above in Assam¹⁴.

Few studies were carried out comparing different socio economic groups. The initial study from urban Chennai, Mohan et al reported 8.4% prevalence of hypertension among men and women aged 20 years and above and belonging to the low socio economic group (based on household income, occupation and dietary pattern)¹⁵. Misra et al reported 12% prevalence of hypertension in the slums of Delhi¹⁶.

As mentioned above, rural areas in India are in transitional phase. This increases the risk of conditions like hypertension in rural areas. Even today there is scarcity of the studies in rural areas of India. With this background, present study has been undertaken to study the prevalence of hypertension in Sultanpur Kunhari and its surrounding area, Haridwar Uttarakhand, its associated factors as well as to increase the awareness on importance of lifestyle modifications among rural dwellers of central India.

METHODOLOGY

A community based cross sectional survey was carried out in the age group of 30 years and above to investigate the prevalence of hypertension and its risk factors among residents of the rural community. The present study was a cross sectional study which was undertaken to study the prevalence of hypertension in the study area and to find out its association with risk factors and to create awareness in study group about hypertension, its risk factors and its complications.

World Health Organization has reported that the prevalence of hypertension among adults of developing countries ranges from 10% to 20%¹⁷. Gupta R in his meta-analysis of prevalence of hypertension in India reported that prevalence rate of hypertension for rural people ranged from 1.99% in 1958 to 21.2% in 1994¹⁸. Based on these reports, a sample

size of 500 was calculated considering a prevalence of hypertension as 15%, and an allowable error of 15%.

Anthropometric measurements viz. height, weight waist circumference and hip circumference were recorded as per standard guidelines laid down by World Health Organization (WHO)¹⁹. Using height and weight, Body Mass Index (BMI) was calculated and subjects were classified into categories of normal, overweight and obese, based on their BMI²⁰. Central obesity was calculated by estimating waist hip ratio (WHR). WHR more than or equal to 0.95 in males and 0.85 in females was taken as the cut off point for diagnosing central obesity. Socio – economic status (SES) was calculated based on Prasad's scale of social stratification for rural areas. It is based on per capita income per month in Indian Rupees²¹.

Measurement of Blood Pressure

B.P. was recorded by auscultatory method. A number of factors related to the subject can cause significant variations in measurement of blood pressure. These include room temperature, exercise, alcohol or nicotine consumption, positioning of the arm, muscle tension, bladder distension, talking and background noise. Keeping these factors in mind the volunteers were asked to remove all clothing's that cover the location of cuff placement. Every individual was placed in a comfortable seating position with back supported well and uncrossed legs. The arm was supported at the level of right atrium i.e. midpoint of sternum.

After the palpation of brachial artery in the antecubital fossa the chest piece of stethoscope was placed on. Every subject instructed not to roll up the sleeve because it has tourniquet effect above the blood pressure cuff. The cuff was placed in such a manner that the lower end was 2 to 3cm above the antecubital fossa to allow room for placement of chest piece.

The cuff was inflated to 20-30mmHg above the pressure at which the radial pulse disappeared to palpation. The cuff was gradually deflated at a constant rate of 2-3 mmHg per second. Systolic blood pressure was noted as the reading at which the first Korotkoff sound heard and the diastolic blood pressure was noted at the point at which the sound disappeared. As per WHO criteria the subjects having systolic blood pressure =140 mmHg or <160mmHg and / or diastolic blood pressure =90mmHg or <100mmHg were categorized as of mild grade hypertension. Those having Systolic blood pressure =160mmHg and <180mmHg and / or diastolic blood pressure =100mmHg but <110mmHg were categorized as having moderate grade of hypertension and those having Systolic blood pressure ≥180mmHg and diastolic blood pressure ≥110mmHg were categorized as of severe grade of hypertension.

Three blood pressure readings were recorded at more than one weak intervals and the average of three taken into account for determination of prevalence of hypertension. Those who were taking antihypertensive drug considered as hypertensive because in prevalence study both old and new cases are considered. The uncontrolled hypertensives were categorized as per their recorded B.P. at the time of examination.

Data analysis

The collected data and results were evaluated and presented in form of tables and figures in accordance to the purpose of the study. It was a prevalence study and direct comparison with the previous studies was made. Imparting the knowledge about hypertension, its complications and risk factors, and

how it can be controlled and deferred at individual and community level, the protocol came to an end.

RESULTS AND DISCUSSION

The prevalence of hypertension has been increasing in India. The average prevalence of hypertension in India is 25% in urban and 10% in rural inhabitants. Factors which are attributable to these changes are rapid urbanization, lifestyle changes, and dietary changes and increased life expectancy⁷. In the present study we carried out that the overall prevalence of hypertension was 11%. This was more in females (12.1%) compared to males (10%) and this difference was statistically significant ($p < 0.001$). Sex wise distribution revealed 54% male and 46% female in studied sample. Age wise distribution revealed that 250(50%), 88(17.2%), 72(14.4%) and 90(18%) were in age group of 30-35, 36-40, 41-45 and of 46-50 respectively (Table 1, Fig. 1). As per inclusion criteria only the subjects of above 30 years of age were included in the study. The distribution of general population according to age is as 52%, 20%, 15% and 13% in age groups 30-35, 36-40, 41-45 and 46-50 years respectively. In studied sample the percentage of volunteers was decreasing as the age advances in comparison to general population.

In the studied sample volunteers were enquired about their addictive habits and categorized as alcoholic, smoker, tobacco chewer, alcoholic and tobacco chewer, alcoholic and smoker, smoker and tobacco chewer and combination of all three and observed prevalence was as 80(16%), 60(12%), 22(4.44), 30(6%), 35(7%), 23(4.6%) and 10(2%) respectively. 240(48%) volunteers had no addiction of any types (Table 2).

In the studied sample comprised of 90% married and 10% unmarried. Under study sample consisted of the volunteers of >30 years of age. This is the usual age for marriage and all volunteers in the said age groups are supposed all might have married; the higher percentage of married may be because of this fact. In studied sample distribution of subjects according to family type revealed that there were 125(25%) and 375(75%) of nuclear and of joint family respectively. higher percentage were from joint family. Family type is closely related to emotional make up.

According to BMI, the sample size of 500 volunteers, was categorized as underweight, normal, overweight and obese, and 18(3.6%), 250(50%), 180(36%) and 52(10.4%) volunteers were found in each category respectively. Overweight and obese patients are more prone to develop hypertension and other cardiovascular diseases²².

In the present study 500 subjects were included, 55(11%) of them were found hypertensive on the basis of mean of the three consecutive weekly readings. The prevalence was found to be 11%, as shown in table no.3. The observed prevalence was in concordance with the reported prevalence of 11% from Jaipur urban area in Gupta R study⁸. Misra *et al* reported the prevalence as 12% from urban population¹⁶. The little difference between the prevalence of the reference studies and of present study may be attributed to the large sample size and characteristics of the under study population in the reference studies. The prevalence of hypertension in rural areas of Tamil Nadu in the age group of 45 – 60 years was 33%²³.

Prevalence of hypertension was significantly higher in females than males. Similar findings were reported by Hazarika NC *et al*¹⁴ and Malhotra P *et al*⁴. But Gupta R *et al*⁷ and Guang Hui Dong *et al*²⁴ found it more in males. All the

studies agree with the fact that prevalence of hypertension increased with age²³. Age probably represents an accumulation of environmental influences and the effect of genetically programmed senescence in body systems²⁵. In the present study family history of hypertension, diabetes mellitus was present in 12% and in 5% respectively. The family history of hypertension, diabetes mellitus, hypertension and diabetes and hypertension as well as obesity was found in 5%, in 16%, in 2% and in 12% respectively. In 65% there was no family history of any disease/condition.

In our study we found that increased body mass index and waist to hip ratio were significantly associated with hypertension. Similar findings were reported by other authors²⁶. World Health Organization study group (1985) has stated that obesity reduces the number of insulin receptors on target cells but in most cases it produces insulin resistance through post receptor changes²⁶. Upper social class, tobacco use, sedentary activities were significantly associated with hypertension in the study population. Similar finding was reported by Malhotra P et al⁴. Prevalence of hypertension was significantly high among diabetics who were also reported by Yadav S et al. We found a negative association between alcohol intake and hypertension. But Malhotra P et al in their study found that it was positively associated with hypertension⁴.

CONCLUSION

There is a strong correlation between changing lifestyle factors and increase in hypertension. Prevalence of hypertension and pre-hypertension is high in the present study which supports the increasing trend in the rural communities of India which are under the epidemiological transition. Hence identification of subjects with pre-hypertension around 30 years of age and using high risk strategy of prevention of hypertension among them is important in the prevention of hypertension in rural societies to prevent the emerging pandemic of hypertension. The present study reveals that the family history of DM, obesity and hypertension were the contributing factors for the occurrence of hypertension. The overall prevalence of hypertension was found to be 11%. Prevalence of hypertension was significantly higher among individuals, aged 40 years and above, with high body mass index and increased waist hip ratio, ($P < .05$).

RECOMMENDATION

All the volunteers including non hypertensive were educated about hypertension, its risk factors and its complications as per the primordial and primary prevention guidelines. A nutrition assessment should be done at diagnosis and at least once a year thereafter by a registered dietitian experienced with diabetes and adolescent nutrition. The assessment includes an evaluation of typical food intake and eating habits in addition to identifying the many factors that influence food intake. A 24-hour dietary recall and an age appropriate nutrition questionnaire are useful tools to obtain this information. Then an initial meal plan can be determined and adjustments in total energy intake may be made to allow for stage of growth and activity level. Information about family support and barriers to learning will help the dietitian individualize the educational experience. Use body mass index to assess physical growth. A teen with weight loss prior to diagnosis often needs additional calories for catch-up growth. Once healthy weight gain has occurred, it is important to check the meal plan 3-4 weeks after diagnosis

and decrease total food intake, if necessary, to prevent excess caloric intake and unwanted weight gain. Total energy and protein requirements can be estimated by a combination of typical food intake and the Recommended Dietary Allowances.

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Table 1: Distribution of Subjects according to Age (n=500)

Age (in year)	No. of Subjects	Percentage (%)
30-35	250	50
36-40	88	17.2
41-45	72	14.4
46-50	90	18
Total	500	100

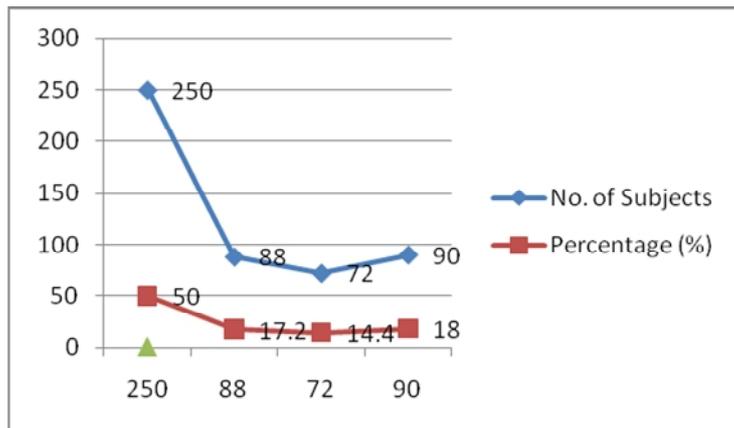


Figure 1: Distribution of Subjects according to Age (n=500)

Table 2: Prevalence of Subjects according to Addictive Habits (n=500)

Addictive Habits	No. of Subjects	Percentage (%)
Alcoholic	80	16
Smoker	60	12
Tobacco Chewer	22	4.4
Alc+tob	30	6
Alc+smok	35	7
Smok+tob	23	4.6
Alc+smok+tob	10	2
Non addictive	240	48
Total	500	100

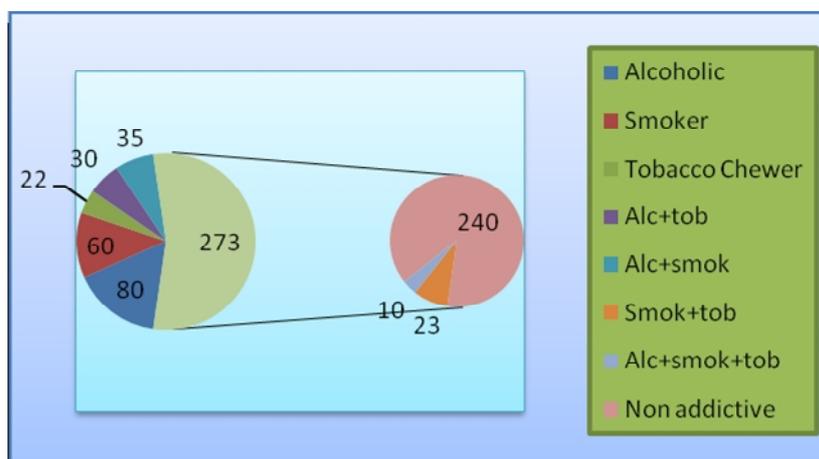


Figure 2: Prevalence of Subjects according to Addictive Habits (n=500)

Table 3: Prevalence of Subjects according to Hypertension Status (n=500)

Hypertension Status	No. of Subjects	Percentage (%)
Normal	445	89
Hypertensive	55	11
Total	500	100

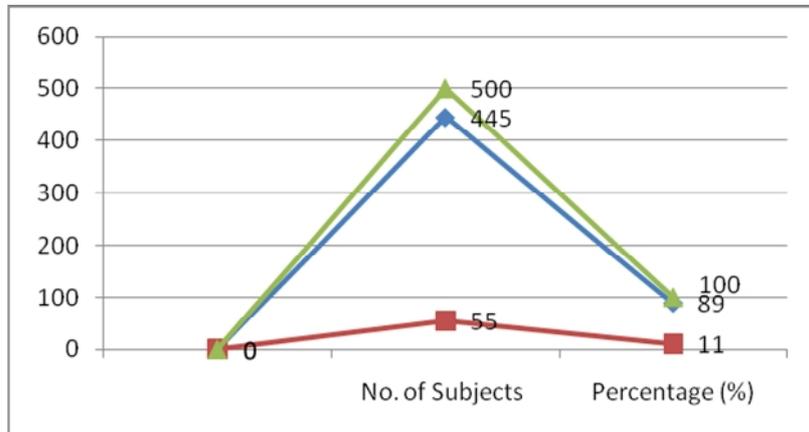


Figure 3: Prevalence of Subjects according to Hypertension Status (n=500)

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