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Original Research Article

Prevalence of hypertension among the rural population of Mehsana district of North Gujarat region, India

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ABSTRACT

Background: High blood pressure is considered both a disease and a risk factor, especially for cardiovascular diseases, and is one of the most serious public health problems. To find out the prevalence of hypertension among the rural population of Mehsana district of North Gujarat region, India.
Methods: This was cross sectional study and conducted in rural areas of Mehsana district of Gujarat during January 2019 to June 2019. People living rural areas were selected by stratified random sampling. They were screened for hypertension by JNC VII criteria using sphygmomanometer after written and informed consent. Data was entered in Microsoft excel and analysis was done using statistical package for the social sciences (SPSS) statistical package.
Results: Out of total 602, majority 293 (48.7%) subjects had normal blood pressure with mean age of 25.28±16.62 years, 271 subjects (45.0%) had pre hypertension with mean age of 40.30±14.32 years. Out of total, 25 (4.2%) subjects had hypertension stage 1 with mean age of 45.82±11.48 years and 13 (2.2%) subjects had hypertension stage 2 with mean age of 53.77±16.02 years. Out of total 271 subjects who had pre hypertension, 150 (55.3%) were males. Hypertension stage 1 and 2 were almost equally distributed among both gender. A blood pressure category and gender difference was statically significant. Out of total 38 hypertensive subjects, 19 (50%) subjects were in the age group of 40-59 years.
Conclusions: Prevalence of hypertension among rural population was 6.4%.

Keywords: Prevalence, Hypertension, Rural population, Systolic, Diastolic

INTRODUCTION

Hypertension is a chronic condition of concern due to its role in the causation of other non-communicable diseases like coronary heart disease, stroke and other vascular complications. In the era of socio-economic and epidemiological transition of population, it is the commonest cardiovascular disorder and emerged as major public health problem. It is one of the major risk factors for cardiovascular mortality. Hypertension alone accounts for 20-50 per cent of all deaths.[1]

Hypertension as it could be described as "sleeping snake" which bites when it wake up. As long as it sleeping one does not bother but when it bites, it bites with venoms, thereby ending the various disabilities and even death in large percentage of the cases.[2,3]

High blood pressure is considered both a disease and a risk factor, especially for cardiovascular diseases, and is one of the most serious public health problems. Today, 25% of the world's population suffers from this disease and it has been estimated that this figure will have risen by 60% by 2025, reaching a prevalence of 40%. In addition to deaths due to circulatory system diseases, the socioeconomic burden of hypertension is high, with productive lives cut short through temporary or permanent disability.[4,5]

The prevalence will increase even further unless broad and effective preventive measures are implemented. Epidemiological studies to assess the prevalence of hypertension are essential to plan preventive strategies and promote the health of these populations. Though several studies have been carried out among the general population in India but very few studies have been conducted among rural population.

The present study will be conducted to find out the prevalence of hypertension among the rural population of Mehsana district of North Gujarat region, India.

METHODS

This was cross sectional study and conducted in rural areas of Mehsana district of Gujarat during January 2019 to June 2019. People living rural areas were selected by stratified random sampling. They were screened for hypertension by JNC VII criteria using sphygmomanometer. After written and informed consent was obtained, detailed personal, past and family history was taken. Their anthropometric measurements and detailed physical and clinical examination were done. Before conducting the study approval was obtained from institutional ethical committee for human research. Data safety and confidentiality was also given due consideration. The file containing identity related details was kept password protected and the filled performa were kept in lock with key accessible only to researcher. Sample size was calculated with the following assumptions. The prevalence rate of hypertension was taken 22.8% from the previous study by Parikh et al.[6] Sample size was estimated at 5% level of significance with an allowable error of 20%. The calculated sample size was 602. Data was entered in Microsoft excel and analysis was done using statistical package for the social sciences (SPSS) statistical package. Parameters such as rate, ratio and percentages were calculated. In order to have valid interpretation of rates, 95% confidence intervals (CI) were calculated. To test the significance of the difference among the statistical parameters in different subsets of population, suitable statistical tests were applied. They included Chi-square test and Z-test.

RESULTS

Out of 344 subjects who had normal systolic blood pressure 210 (61.0%) were female and 134 (39.0%) were male while out of 228 subjects who had pre hypertension according to systolic blood pressure, 134 (57.9%) were males. Hypertension according to systolic blood pressure, stage 1 and 2 were equally distributed among both gender. A pressure category according to systolic blood pressure and gender difference was statically significant ($p<0.00001$) (Table 1).

Out of 337 subjects who had normal diastolic blood pressure 199 (59.0%) were females while out of 231 subjects who had pre hypertension according to diastolic blood pressure, 125 (54.1%) were males. Hypertension according to diastolic blood pressure, stage 1 and 2 were almost equally distributed among both gender. A blood pressure category according to diastolic blood pressure and gender difference was statically significant ($p<0.05$) (Table 2).

Out of total 320 females, majority 180 (56.3%) females had normal blood pressure. Out of total 320 females, 121 (37.8%) females had pre hypertension followed by 12 (3.8%) and 7 (2.2%) females had hypertension stage 1 and hypertension stage-2. Out of total 282 males, majority 113 (40.1%) males had normal blood pressure. Out of total 282 males, 150 (53.2%) males had pre hypertension followed by 13 (4.6%) and 6 (2.1%) males had hypertension stage 1 and hypertension stage-2 respectively. Out of 293 subjects who had normal blood pressure 180 (61.4%) were females. Out of total 271 subjects who had pre hypertension, 150 (55.3%) were males. Thus prevalence of pre hypertension was more among males than females. Hypertension stage 1 and 2 were almost equally distributed among both gender. A blood pressure category and gender difference was statically significant ($p<0.05$) (Table 3).

Out of total 564 subjects with normal blood pressure, majority 199 (35.3%) were in the age group of 20-39 years , 158 (28.0%) subjects were in the age group of 40-59 years followed by 143 (25.4%) and 64 (11.3%) subjects were in the age groups of <20 years and ≥60 years respectively. Out of total 38 hypertensive subjects, 19 (50%) subjects were in the age group of 40-59 years followed by 10 (26.3%) and (23.7%) subjects were in the age groups of ≥60 years and 20-39 years respectively. The difference between age groups and blood pressure category was significant ($p<0.0001$) (Table 4).

Out of total 602, majority 293 (48.7%) subjects had normal blood pressure with mean age of 25.28±16.62 years. Out of total, 271 subjects (45.0%) had pre hypertension with mean age of 40.30±14.32 years.

Out of total, 25 (4.2%) subjects had hypertension stage 1 with mean age of 45.82±11.48 years and 13 (2.2%) subjects had hypertension stage 2 with mean age of 53.77±16.02 years (Table 5).

Table 1: Distribution of the study population according to gender and categories of systolic blood pressure.

Category (blood pressure (mmHg) systolic)	Gender		Total (%)
	Females (%)	Males (%)	
Normal (<120)	210 (65.6)	134 (47.5)	344 (57.1)
Pre hypertension (120-139)	96 (30.0)	132 (46.8)	228 (37.9)

Continued.

Category (blood pressure (mmHg)	Gender		Total (%)
Hypertension stage-1 (140-159)	9 (2.8)	11 (3.9)	20 (3.3)
Hypertension stage-2 (≥160)	5 (1.6)	5 (1.8)	10 (1.7)
Total	320 (100)	282 (100)	602 (100)

Figures given in parentheses are percentages; Chi square: 20.357; degree of freedom: 3; p<0.0000001

Table 2: Distribution of the study population according to gender and categories of their diastolic blood pressure.

Category (blood pressure (mmHg) diastolic)	Gender		Total (%)
	Females (%)	Males (%)	
Normal (<80)	199 (62.2)	138 (48.9)	337 (56.0)
Pre hypertension (80-89)	106 (33.1)	125 (44.3)	231 (38.4)
Hypertension stage-1 (90-99)	11 (3.4)	15 (5.3)	26 (4.3)
Hypertension stage-2 (≥100)	4 (1.3)	4 (1.4)	8 (1.3)
Total	320 (100)	282(100)	602 (100)

Figures given in parentheses are percentages; Chi square: 10.86; degree of freedom: 3; p<0.05

Table 3: Distribution of the study population according to gender and categories of their blood pressure.

Category (blood pressure (mmHg) systolic diastolic)	Gender		Total (%)
	Females (%)	Males (%)	
Normal (<120) (<80)	180 (56.3)	113 (40.1)	293 (48.7)
Pre hypertension (120-139) (80-89)	121 (37.8)	150 (53.2)	271 (45.0)
Hypertension stage-1 (140-159) (90-99)	12 (3.8)	13 (4.6)	25 (4.2)
Hypertension stage-2 (≥160) (≥100)	7 (2.2)	6 (2.1)	13 (2.2)
Total	320 (100)	282 (100)	602 (100)

Figures given in parentheses are percentages; Chi square: 10.86; degree of freedom: 3; p<0.05; *here if systolic and diastolic blood pressure felled into different categories, the higher category had been selected to classify the individual's blood pressure

Table 4: Table distribution of the study population according to age group and categories of their blood pressure.

Age group (years)	Category (blood pressure (mmHg) systolic diastolic)		Total (%)
	Normal or pre hypertensive (<140) (<90) (%)	Hypertensive (≥140) (≥90) (%)	
<20	143 (25.4)	0 (0.0)	143 (23.7)
20-39	199 (35.3)	9 (23.7)	208 (34.5)
40-59	158 (28.0)	19 (50.0)	177 (29.4)
≥60	64 (11.3)	10 (26.3)	74 (12.3)
Total	564 (100)	38 (100)	602 (100)

Figures given in parentheses are percentages; Chi square: 31.30; degree of freedom: 4; p<0.0001

Table 5: Distribution of the study population according to mean age group ± standard deviation and categories of their blood pressure (n=602).

Category (blood pressure (mmHg) systolic diastolic)	No. of the subjects (%)	Age (in years)	
		Mean	SD
Normal (<120) (<80)	293 (48.7)	25.58	16.62
Pre hypertension (120-139) (80-89)	271 (45.0)	40.30	14.32
Hypertension stage-1 (140-159) (90-99)	25 (4.2)	45.82	11.48
Hypertension stage-2 (≥160) (≥100)	13 (2.2)	53.77	16.02
Total	602 (100)		

Figures given in parentheses are percentages.

DISCUSSION

Hypertension is the commonest cardiovascular disorder affecting about 20% adult populations worldwide. It is an important risk factor for cardiovascular mortality.[7] Reports suggest that the prevalence of hypertension is rapidly increasing in developing countries and is one of the leading causes of death and disability in developing countries.[8] Cardiovascular diseases are projected to cause 4.6 million deaths in India by 2020.[9]

In our study, out of total 602, majority 293 (48.7%) subjects had normal blood pressure followed by 271 subjects (45.0%) had pre hypertension followed by 25 (4.2%) subjects had hypertension stage 1 and 13 (2.2%) subjects had hypertension stage 2.

The prevalence of hypertension in India is reported as ranging from 10 to 30.9%.[10] The average prevalence of hypertension in India is 25% in urban and 10% in rural inhabitants.[11] There is a strong correlation between changing lifestyle factors and increase in hypertension. The rural populations being the marginalized and vulnerable communities in India face considerable disparity as compared to urban populations in terms of health facilities, education and economic pursuits.[12] Prevalence of hypertension has been found to increase in rural populations undergoing modernization. Recently, a study conducted among labour population of Gujarat reported prevalence of hypertension to be 16.9% as per World Health Organization (WHO) criteria.[13] The prevalence will increase even further unless broad and effective preventive measures are implemented. Epidemiological studies to assess the prevalence of hypertension are essential to plan preventive strategies and promote the health of these populations.

Dubey carried out one of the earliest study in India (1954), documented 4% prevalence of hypertension (criteria >160/95) amongst industrial workers of Kanpur.[14] In 1984, Wasir et al reported 3% prevalence of hypertension (criteria ≥160/95) in Delhi.[15] During 1984-87 Gopinath and Chadha et al reported the prevalence of hypertension in Delhi (criteria ≥160/90) to be 11% among males and 12% among females in the urban areas and 4% and 3% respectively in rural areas.[16,17] Another two studies carried out in rural areas of Haryana (1994-95) demonstrated 4.5% prevalence of hypertension (JNC V criteria) while urban areas of Delhi had a higher prevalence of 45% during 1996-97.[18,19]

In our study, out of total 564 subjects with normal blood pressure, majority 199 (35.3%) were in the age group of 20-39 years, 158 (28.0%) subjects were in the age group of 40-59 years followed by 143 (25.4%) and 64 (11.3%) subjects were in the age groups of <20 years and ≥60 years respectively. Out of total 38 hypertensive subjects, 19 (50%) subjects were in the age group of 40-59 years followed by 10 (26.3%) and (23.7%) subjects were in the age groups of ≥60 years and 20-39 years respectively. The difference between age groups and blood pressure category was significant (p<0.0001).

In our study, the proportion of hypertension was found to increase steadily with the increase in age. These findings are coherent with study carried in rural Wardha.[20] Such changes of blood pressure with age might be due to changes in vascular system i.e. atherosclerotic changes in blood vessels. Age related increase in risk of hypertension varies considerably depending on an individual's stage of life, gender, race, initial level of blood pressure and exposure to environmental factors.[21]

CONCLUSION

Prevalence of hypertension among rural population was 6.4%. The proportion of hypertension was found to increase steadily with the increase in age.

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