

An epidemiological study on hypertension and its dietary correlates in a rural population of Meerut

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ABSTRACT

Background: Hypertension is the commonest cardiovascular disorder accounting for 20-50% of all cardiovascular deaths and it is a major health problem affecting most of the countries in the world.

Objective: To find out the prevalence of hypertension and to assess the relation of dietary factors with hypertension

Methodology: A Community based cross-sectional study was conducted in rural field practice area of department of Community Medicine, Subharti Medical College, Meerut. A personal house to house visit was made to each household selected by systematic random sampling technique and data was collected using a predesigned and pretested interview and examination schedule All the members from selected households were included in the study. Hypertension was defined as Systolic BP \geq 140mmHg and/or diastolic BP \geq 90mmHg or subjects currently taking anti-hypertensive treatment. Total period of study was October 2009 to September 2011. Data was analysed in Microsoft excel using percentiles, Chi-square test and Chi-square test for trend.

Results: The overall prevalence of hypertension was found to be 18%. A significant association was found between hypertension and type of diet and additional salt intake while no significant association was observed with frequency of intake of junk food.

Conclusion: Prevalence of hypertension is found to be high (18%) so there is a need to create awareness about hypertension in the community.

Key words: Hypertension, Rural, Diet, junk food

Introduction:

Hypertension (HTN) or high blood pressure is a chronic cardiac medical condition in which the systemic arterial blood pressure is elevated. It means that the heart is having to work harder than it should to pump the blood around the body¹.

Hypertension is the commonest cardiovascular disorder accounting for 20-50% of all cardiovascular deaths and is also a leading cause of stroke, blindness, renal failure and congestive heart failure². Moderate elevation of arterial blood pressure leads to shortened life expectancy. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of associated health complications, although drug treatment may prove necessary in patients for whom lifestyle changes prove ineffective or insufficient³. Community survey in India have documented that between 3-6 decades prevalence of hypertension has increased by almost 30 times among urban dwellers and by about 10 times among rural inhabitants.

Various factors might have contributed to this rising trend like changing life style, environment, diet, stress, industrialization and urbanization etc. The prevalence rate of hypertension also varies widely in rural India because of different social, economical and cultural background.

The rural population constitutes about 70% of India's total population and community based studies to determine the prevalence and risk factors of hypertension in rural areas are fewer compared to those in urban areas and the criteria used to classify hypertension also differ among these studies

With increasing urbanization, industrialization and changing life style prevalence of hypertension is also likely to change with time in rural areas so present study was conducted with the aims and objective to find out prevalence and dietary risk factors associated with hypertension among adults aged \geq 20yrs in the rural population of Meerut district

Material and Method:

Study Area - The present study was conducted in the area of rural health and training centre Khajuri in Kila

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Parikshitgarh block which is rural field practice area of department of community medicine, Subharti Medical College. There are a total of 12 blocks in Meerut district and Kila Parikshitgarh constitutes one of those blocks.

Study population - All the adults aged ≥ 20 yrs residing in the study area

Period of study- November 2009 to September

Study design- Community based cross sectional study

Sample size – taking the prevalence of hypertension in rural areas of India as 15.74%⁴. the required sample size calculated was 636.

Sampling technique - There were five villages around the rural health and training centre Khajuri in Kila Parikshitgarh block. Out of five villages (Sona, Ikla, Badla, Khajuri, Alipur) two villages were selected randomly. The villages thus selected were Sona and Khajuri and the required sample was taken using systematic random sampling technique. For gathering the data a personal door to door visit was made to each household which was included through systematic random sampling and all the family members aged ≥ 20 yrs of selected family were included in the study and the required sample size was covered. If any adult aged ≥ 20 years was not found in a family or selected house was found locked then adjacent family was visited. After explaining about the purpose of the study written consent was obtained.

Inclusion criteria- All the members (male and female) who had completed 20 years of age at the time of data collection from the selected households were included in the study.

Exclusion criteria- Pregnant females, severely ill and bed ridden persons, individuals not found oriented to time, place and person and individuals staying in the area for less than six months were excluded from the study.

A pre designed semi structured schedule was used to elicit the necessary information.

Mercury sphygmomanometer (Diamond company, Pune) was used for measurement of blood pressure. The cuff was 15cm wide and 50cm long in size. BP measurement was done according to The Joint National Committee, USA on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC VII)⁵ guidelines and the subjects were categorized into different groups.

Hypertension was defined as a Systolic BP ≥ 140 mm Hg and/or a diastolic BP ≥ 90 mm Hg or current treatment with anti-hypertensive medication.

According to the dietary history subjects were categorized as follows-

Vegetarian: All those who never consumed non vegetarian food at any time in their life. **Non vegetarian**: All those who consume non vegetarian food items in their diet.

Salt intake habits: In this study amount of salt intake was estimated by dietary interview. An attempt was made to find out the average amount of daily salt intake by the family members by computing monthly consumption of salt in the family and dividing it by number of family members excluding infants and then dividing it by 30 to calculate the average daily intake in gm/person/day.

Additional salt intaker: One who adds salt to cooked food or other food items routinely.

Junk food: Food that is high in calories but low in nutritional content. It includes food items like burger, chowmein, Samosa, Cold drinks, paties etc.

Frequency of intake of junk food was defined as follows-

Daily- More than or equal to once a day, **Weekly** – Up to four times a week, **Monthly** – Less than four times a month, **None** – No intake of junk food

Statistical analysis: Data was analyzed using Microsoft excel and Epi info version 3.5.3 software. For proportions Chi square test was applied to find out significant association between independent and dependent variables. A p value of less than 0.05 was considered significant.

Results:

A total of 640 individuals were covered from rural population of the area through house to house visits.

Study sample characteristics:

In the present study 51.4% of the people were of 20 years of age and above. Out of these, percentage of males and females were 49.3% and 50.7% respectively. Literacy rate was higher in males (75.3%) than females (41.4%). About half of the individuals (50.6%) belonged to lower middle (IV) and lower class (V). 52.8% of the subjects were non vegetarians. Majority of the subjects (68.9%) were not taking additional salt

The present study revealed that prevalence of hypertension among the study population was 18% including 9.2% and 8.8% of subjects in hypertension stage I and II respectively. While 57.9% belonged to pre hypertensive stage and rest were having normal blood pressure. (table 1) The prevalence among males was 18.4% and among female was 17.6%. The difference was not statistically significant.

Table 1 Distribution of study subjects according to blood pressure status

Blood pressure status	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Normal	55	18.1	99	29.5	154	24.1
Pre hypertension	193	63.5	178	52.9	371	57.9
Hypertension stage I	32	10.5	27	8.1	59	9.2
Hypertension stage II	24	7.9	32	9.5	56	8.8
Total	304	100	336	100	640	100

The percentage of subjects in the age group of 20 to 30 years was lowest (15.7%) among hypertensive population whereas this percentage increased as the age advanced. The trend between increasing age and hypertension was found to be statistically significant. (table 2)

Table 2 Distribution of hypertensive subjects according to age

Age (years)	Normal		Hypertension		Total	
	No.	%	No.	%	No.	%
20-30	253	48.2	18	15.7	271	42.3
31-40	95	18.1	19	16.5	114	17.8
41-50	77	14.7	24	20.9	101	15.8
51-60	57	10.8	25	21.7	82	12.8
? 61	43	8.2	29	25.2	72	11.3
Total	525	100	115	100	640	100

χ^2 value for trend = 56.68, p value = 0.0001

A higher percentage of hypertensive subjects were non vegetarians (62.6%) in comparison to those having normal blood pressure (50.7%). A statistically significant association was found between type of diet and hypertension. (table 3)

Table 3 Distribution of hypertensive subjects according to type of diet

Type of diet	Normal		Hypertension		Total	
	No.	%	No	%	No.	%
Vegetarian	259	49.3	43	37.4	302	47.2
Non vegetarian	266	50.7	72	62.6	338	52.8
Total	525	100	115	100	640	100

χ^2 value = 5.4, df = 1, p value = 0.020

It was observed that there were almost equal percentages of unsaturated fat consumers and mixed oils & fat consumers in hypertensives and normotensive group. No

significant association was found between hypertension and type of oils and fat consumed.

A higher percentage of hypertensive subjects were taking additional salt (47%) in comparison to normotensives

(27.6%). A statistically significant association was found between hypertension and additional salt intake. (table 4)

Table 4 Distribution of hypertensive subjects according to additional salt intake

Additional salt intake	Normal		Hypertension		Total	
	No.	%	No.	%	No.	%
Yes	145	27.6	54	47.0	199	31.1
No	380	72.3	61	53.0	441	68.9
Total	525	100	115	100	640	100

χ^2 value = 13.88, df = 1, p value = 0.001

It was observed from this table that percentage of persons who do not consume junk food or take it monthly were higher among hypertensive subjects (78.5%) than

normotensives (73%) but no significant association was found between hypertension and frequency of intake of junk food. (table 5)

Table 5 Distribution of hypertensive subjects according to frequency of intake of junk food

Intake of junk food	Normal		Hypertension		Total	
	No.	%	No.	%	No.	%
Daily / Weekly	142	27	25	21.7	167	26.1
Monthly /none	383	73	90	78.3	473	73.9
Total	525	100	115	100	640	100

χ^2 value = 1.38, df = 1, p value = 0.24

Discussion:

The present study revealed that prevalence of hypertension among the study population was 18% including 9.2% and 8.8% of subjects in hypertension stage I and II respectively. These results are consistent with the findings of Non communicable disease risk factor survey of IDSP⁽⁶⁾, 2007-2008 phase I states of India which reported the prevalence of hypertension was varying from 17% to 21% in all the states with marginal rural- urban differences.

A lower prevalence of hypertension was observed in some studies. Todker et al⁽⁷⁾ found that prevalence of hypertension was 7.24% in rural Maharashtra and Malhotra et al⁽⁸⁾ reported a prevalence of 4.5% in rural population of North India. Agarwal et al⁽⁹⁾ reported that only 1.57% of rural population of Aligarh was hypertensive.

While a higher prevalence also has been reported in various studies. Singh et al⁽¹⁰⁾ reported 20.8% prevalence among the rural population of Moradabad. Prevalence was found to be 50.5% by Manimunda et al⁽¹¹⁾ among the aboriginal

Nicobarese tribe, living in Car Nicobar Island. Deshmukh et al⁽¹²⁾ in 2005 found 20.6% of population in rural area of Wardha was hypertensive. These differences may be due to difference in age groups studied, different study settings, due to time trend and also due to change in the diagnostic criteria over the years.

In this study a significant trend was observed between advancing age and hypertension. Similar trend was also observed in studies done by Dong et al⁽¹³⁾ in rural china, Agarwal et al⁽⁹⁾ in rural Aligarh, Deshmukh et al⁽¹²⁾ in rural Wardha, Patnaik et al⁽¹⁴⁾ in urban slum of Brahmapur, Orissa and Todkar et al⁽⁷⁾ in rural Maharashtra.

A significantly higher percentage of hypertensives were non vegetarians (62.6%) in comparison to normal group. Similar results were reported by Agarwal et al⁽⁹⁾ among the rural population of Aligarh in 1994 and Patnaik et al⁽¹⁴⁾ in Orissa.

While Vaidya et al⁽¹⁵⁾ in an eastern Nepal town population and Vimala⁽¹⁶⁾ in an urban population of Kerala found no relation between dietary habits and hypertension.

In index study a significant association was found between hypertension and additional salt intake. Similar results has been reported by Hazarika et al¹⁷ in Assam, Sadhukhan et al¹⁸, Todkar et al⁷ in rural Maharashtra and Vimala et al¹⁶ in urban population of Kerala. However no significant association was observed with frequency of intake of junk food. It may be due to the fact that availability of junk food was poor around the study villages.

Conclusion:

As the prevalence of hypertension is high in the area and about two third of population has blood pressure higher than normal, an appropriate intervention program should be launched with a aim to reduce the mean blood pressure of the population. The increasing trend of prevalence of hypertension with increasing age strongly suggest to implement a community based high risk screening program to prevent this modern epidemic of hypertension like non communicable diseases.

Moreover 57.9% of the population was in prehypertensive stage which although not a disease status but it is important to identify these individuals at high risk of developing hypertension. Advice on lifestyle and dietary modifications to those in prehypertensive stage will go in long way in preventing development of hypertension in people.

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