



Prevalence of Risk Factors of Hypertension in Village Mirzapur, Aligarh

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Authors' contributions

This work was carried out in collaboration between all authors. Authors AA and NF designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors MSS and NK managed the data collection and analysis. Authors SA and MTK managed the data acquisition and entry. All authors read and approved the final manuscript.

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ABSTRACT

Background: The risk factors of many non-communicable diseases including hypertension are similar and include increasing age, a high salt intake, sedentary lifestyle, obesity and tobacco addiction. Due to the epidemiological transition in countries like India, many of these risk factors are on the rise. For the control and treatment of hypertension, these factors must be managed and prevented.

Aim: The aim of this study is to determine the prevalence of risk factors of hypertension, and to evaluate the association between these factors and prevalence of hypertension.

Materials and Methods: This was a cross sectional study, conducted in the month of December, 2015 at Mirzapur, a village in Aligarh District, Uttar Pradesh. The study population comprised of all the residents of the village ≥ 40 years of age, on the day of survey after prior consent. The data entry and other statistical calculations were done through SPSS version 20 and MS- Excel.

Results: The study included 160 people above 40 years of age. The prevalence of sedentary lifestyle was 36.3%, obesity- 23.1% and average salt intake- 7.23 (2.60) grams. The tobacco

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addiction level, including both smoked and smokeless forms were found to be very high-45.6% in this study. Increasing age and obesity were significantly associated with hypertension.
Conclusion: There is a substantial prevalence of risk factors of hypertension in India that may be the reason behind the increase in non-communicable diseases.

Keywords: Hypertension; village; adoption; India.

1. INTRODUCTION

The New World Syndrome and shift towards sedentary behavior in developing countries like India is leading to an increased prevalence of non-communicable diseases, that are likely to cause an immense socio-economic burden in future [1]. The four non-communicable diseases-cardiovascular disease, cancers, respiratory diseases and diabetes account for 80% of all non-communicable deaths [2]. Among the different contributors to the cardiovascular diseases, hypertension is the commonest, and accounts for 9.4 million deaths worldwide, directly or due to complications [3]. The prevalence of hypertension in India shows an increasing trend from 6.6% to 36.4%, from 1988 to 2003 [4]. Different studies in India have shown a varied prevalence ranging from 14% in Chennai [5] to 54.5% in Kerala [6].

The risk factors of many non-communicable diseases including hypertension are similar and include increasing age, a high salt intake, sedentary lifestyle, obesity and tobacco addiction. Due to the epidemiological transition in countries like India, many of these risk factors are on the rise. For the control and treatment of hypertension, these factors must be managed and prevented. A weight reduction of 10 kg can reduce blood pressure by 5-20 mm, adoption of dietary changes by 2-14 mm Hg, regular physical activity (30 minutes/day for most days a week) by 4-9 mm and restriction of alcohol by 2-4 mm Hg [7].

In the rural areas of India, these risk factors and prevalence of hypertension have been poorly studied due to limited health care facilities and research. The present study was conducted in the village of Mirzapur in Aligarh. This village is adopted by the Aligarh Muslim University for inclusive development. This study was the assessment phase for the project on mass management of hypertension; conducted in order to steer the next phase of the project. The prevalence of hypertension was found to be 41.9% in this phase and has been published earlier [1]. This research had two objectives: 1.

To determine the prevalence of risk factors of hypertension in the village, and, 2. To find the association between the risk factors and prevalence of hypertension.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This was a cross sectional study, conducted in the month of December, 2015. The study design was chosen due to its appropriateness to the research objectives. The study was conducted at Mirzapur, a village in Tehsil Koil, Aligarh District, Uttar Pradesh. It is about 6-7 kilometers from J.N. Medical College, Aligarh Muslim University, Aligarh. The village Mirzapur is one of the five villages adopted by the Aligarh Muslim University for inclusive development. Uttar Pradesh (UP) is the most populous state of India and Aligarh is one of its largest cities, located in western UP, about 150 kilometers from Delhi. Aligarh is the 55th largest city in India, according to the 2011 census and has about 1199 villages⁸. The village Mirzapur has a population of 1457, according to Census, 2011 [8], with a higher population of under-5 children than the country average.

2.2 Study Population and Data Collection

The study population comprised of all the residents of the village ≥ 40 years of age, on the day of survey after prior consent. The data was collected through a door to door household survey. Out of a total of 223 households in Mirzapur, 211 households could be surveyed, out of which 108 households were found to have eligible population for the survey. The exclusion criteria for the survey were: 1. Those who did not give consent for the survey, and, 2. Those who were not present in the village on two consecutive day visits by the survey team. The study tools included a questionnaire, and an automated blood pressure instrument. The questionnaire was designed for the survey purposes and consisted of questions on age, sex, diet (vegetarian or non-vegetarian), salt intake, lifestyle, obesity and tobacco addiction. The questionnaire was pilot tested in 20 people

after which, necessary changes were made to improve brevity, reliability & feasibility of the questionnaire. A two-day training on the study tools and data entry was given to the two data collection teams, each comprising of a resident Doctor and a medico-social worker. The definitions of the different variables were taken as follows:

Age: Self reported age was taken as final age, unless the individual had any government identity card like Voter ID card or Adhaar Card. In case of conflict the age in the identity card was taken as final.

Sex: Based on self report.

Diet: Non consumption of any and all forms of meat and egg was taken as vegetarian diet.

Salt Intake: The salt intake was taken as the net per capita consumption of salt in preparation and cooking the food, as well as accounting for the salt added on the food served on the table.

Lifestyle: Active lifestyle was defined as moderate to vigorous physical activity/brisk walking for 30 minutes daily on at least 7 days/week, failing which the lifestyle was considered sedentary.

Obesity: A body mass index (BMI) of more than 30 was taken as obese according to the guidelines for hypertension management by the National Rural Health Mission (NRHM guidelines) [9], The height was measured by a stadiometer and the weight was measured by a digital weighing scale. The instruments were calibrated daily before the survey.

Tobacco Addiction: Any form of regular tobacco intake in the form of both smoking and smokeless tobacco was taken as tobacco addiction.

The automatic blood pressure monitors that were used for the survey were Omron Model HEM-8712, an arm circumference based monitor with a cuff size of 22-32 cm. The instrument was calibrated and validated on the morning of each day of the survey. The blood pressure was measured on the right arm, in the sitting position and hypertension was diagnosed if the systolic blood pressure was ≥ 140 mm Hg and/or a diastolic blood pressure ≥ 90 mm Hg on an average of two readings on three consecutive visits for 3 days, based on the National Rural

Health Mission (NRHM guidelines) [9], The patients already diagnosed for hypertension irrespective of their blood pressure status were counted as hypertensives.

2.3 Data Management

The data collection was done by trained Doctors, who were trained for the research as well as for adherence to the national guidelines⁸ for management of hypertension. The data entry was done in both SPSS version 20 and MS-Excel. The data entry and checking was done before the analysis. The prevalence of categorical data was measured in percentages and proportions and for continuous data- means \pm Standard Deviations (SD) was calculated. Confidence interval of means was calculated by the SPSS, whereas those of proportions were calculated by modified Wald method which is considered more accurate [10]. The association of the variables with hypertension was analyzed by chi-square 2 tailed testing.

2.4 Ethical Considerations

The study was approved by an academic board of studies. Counseling, health education and relevant advices were offered to all the participants. All the hypertensives were reviewed and referred to JN Medical College, Aligarh. Those who need specialized care due to any other medical reason were counseled to visit the JN Medical College, Aligarh. The study did not involve or consider any funding or intervention from companies/organizations with any conflict of interest. The study is also considering to enroll all these patients for the next phase of community based intervention to control hypertension in the residents of Mirzapur.

3. RESULTS

The study included 160 people above 40 years of age. The mean age of the study population was 54.08 (± 11.52) years. 38.1% of the study population belonged to age group 40-49 years & 50- 59 years whereas 23.8% of them were of age 60 years and above. Among the study population, the proportion of females was higher (63.1%) as compared to males (36.9%), largely because many males were not present at their households during the time of the survey, which also impacts the total population of the study population. A majority of them were non-vegetarians (73.8%), and the mean salt intake among the study sample was 7.23 (± 2.60)

grams. Most of study participants had active life style (63.8%) and 23.1% of the participants were obese. 49.4% of the study population were home makers followed by laborer/ farmer (26.9%) and business & service (22.5%). 45.6% of the study population had tobacco addiction whereas no addiction was observed in 54.4% of them. The prevalence of hypertension in the study population was 41.9% with MBP 100.03 mm. (Table 1).

The prevalence of hypertension was significantly associated with increasing age, with 55.7% hypertensives among those above 60 years as compared to 28.9% in those between 40-49 years (Table 2). The study had more female participants (63.1%) than males (36.9 %), but the association with hypertension was not significantly different between the two sexes. The mean salt intake was 7.23±2.58 g in the hypertensives as opposed to 7.22±2.63 in the normotensives, without any significant difference between them. About 38.8% of the participants

had an active lifestyle, 23.1% were obese and 45.6% were addicted to tobacco. However, on statistical analysis the only significant association with hypertension was obesity (Table 2).

4. DISCUSSION

This study was conducted to find out the prevalence of risk factors of hypertension and their association with hypertension in the study area. In the study, the prevalence of sedentary lifestyle (36.3%) and obesity (23.1%) are substantial. The average salt intake in the present study is also very high with a mean level of 7.23(2.60). Some other studies conducted in different parts of India report a higher salt intake (9-12 g) than the present study [11]. Nevertheless, the average salt intake in this study is higher than the recommended level of 5 grams. The tobacco addiction level, including both smoked and smokeless forms were found to be very high- 45.6% in this study.

Table 1. Descriptive statistics of the sample

Variable	N (160)	Mean ± SD/ %	95% CI
Age group		54.08±11.52	52.28-55.87
40-49	61	38.1%	30.96-45.85
50-59	61	38.1%	30.96-45.85
≥ 60	38	23.8%	17.79-30.94
Sex			
Male	59	36.9%	29.78-44.58
Female	101	63.1%	55.42-70.22
Dietary habit			
Vegetarian	42	26.3%	20.02-33.59
Non-vegetarian	118	73.8%	66.41-79.98
Salt intake (grams)		7.23±2.60	6.82-7.64
Lifestyle			
Active	102	63.8%	56.05-70.80
Sedentary	58	36.3%	29.20-43.95
Obesity status			
Non-obese	123	76.9%	69.73-82.76
Obese	37	23.1%	17.24-30.27
Occupation			
Labourer/Farmer	43	26.9%	20.59-34.25
Business & service	36	22.5%	16.69-29.60
Homemaker	79	49.4%	41.73-57.85
Tobacco addiction			
Not addicted	87	54.4%	46.64-61.90
Addicted	73	45.6%	38.10-53.36
Prevalence of hypertension	67	41.9%	34.51-49.60
Mean Blood Pressure (MBP)		100.03±13.17	97.98-102.09
Systolic Blood Pressure (SBP)		131.34±20.12	128.19-134.48
Diastolic Blood Pressure (DBP)		84.38±11.60	82.57-86.19

Table 2. Association of risk factors with hypertension

Variable	Hypertension		Normotension		Statistical results
	n	Mean/ %	n	Mean/ %	
Age group					
40-49	34	28.9	27	71.1	$\chi^2 = 8.271$, df = 2, p = 0.016
50-59	22	36.1	39	63.9	
≥ 60	11	55.7	27	44.3	
Sex					
Male	24	40.7	35	59.3	$\chi^2 = 0.055$, df = 1, p = 0.815
Female	43	42.6	58	57.4	
Dietary habit					
Vegetarian	22	52.4	20	47.6	$\chi^2 = 2.583$, df = 1, p = 0.108
Non-vegetarian	45	38.1	73	61.9	
Salt Intake (grams)	67	7.23±2.58	92	7.22±2.63	t = 0.002, df = 157, p = 0.998
Lifestyle					
Active	40	39.2	62	60.8	$\chi^2 = 0.818$, df = 1, p = 0.366
Sedentary	27	46.6	31	53.4	
Obesity status					
Non-Obese	45	36.6	78	63.4	$\chi^2 = 6.114$, df = 1, p = 0.013
Obese	22	59.5	15	40.5	
Occupation					
Labourer/Farmer	16	37.2	27	62.8	$\chi^2 = 1.579$, df = 2, p = 0.454
Business & service	14	36.8	24	63.2	
Homemaker	37	46.8	42	53.2	
Tobacco addiction					
not addicted	40	46.0	47	54.0	$\chi^2 = 1.318$, df = 1, p = 0.265
Addicted	27	37.0	46	63.0	

As far as the association with hypertension is concerned, hypertension was found to be significantly associated with obesity and increasing age in this study. Age has been reported as a significant predictor of hypertension by many different studies [12,13,14], and this may be due to the physiological changes leading to hardening of arteries in the elderly population. Obesity was also found to be associated with hypertension in many other studies [12,13,14].

No significant association was found between occupation or tobacco addiction with prevalence of hypertension, similar to the other studies [14,15]. Though sedentary lifestyle was reported to be associated with hypertension in some studies [14], it was non significant in the other studies [15], similar to the present study. High salt intake was not found to be significantly associated with hypertension in the present study as opposed to other studies [16,17], but this difference may be due to the overall high intake

of salt in the study population in both normotensives and hypertensives.

The study also had a limitation- other risk factors like alcohol use, stress, dyslipidemia, metabolic syndrome were not included in this survey because of operational limitations. The high prevalence of these adverse risk factors in a rural area does not augur well for the future of the country, given the fact that these factors are associated with not only hypertension but also other non-communicable diseases. As discussed elsewhere in the paper targeting these risk factors are important to reduce the blood pressure of the affected individuals. The study also has another limitation- the salt intake is calculated on the basis of the family utilization of salt and does not take into account the individual variances like salt added on the table.

5. CONCLUSION

There is a substantial prevalence of risk factors of hypertension and other non communicable

diseases in India that may be the reason behind the increase in non-communicable diseases. The New world syndrome with a tendency towards sedentary lifestyle is now spreading towards the rural areas of the country also. In the villages of India, adopted by parliamentarians and higher institutions like AMU- these factors must be studied and should be targeted through different measures, in order to curb the rise in non-communicable diseases in the country.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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