

A STUDY ON THE PATTERN OF BLOOD PRESSURE AND ITS CO-RELATES AMONG THE PATIENTS ATTENDING THE GERIATRIC CLINIC OF GAUHATI MEDICAL COLLEGE AND HOSPITAL, GUWAHATI

Shashanka Shekhar Chakraborty¹, Jutika Ojah²

¹Assistant Professor, Department of Community Medicine, Gauhati Medical College, Guwahati.

²Professor and HOD, Department of Community Medicine, Gauhati Medical College, Guwahati.

ABSTRACT

BACKGROUND

All over the world, the geriatric population is growing continuously and it is projected that by the year 2025 majority of the elderly population will be residing in the developing countries, especially India. Cardiovascular Diseases (CVD) are the major cause of death among the elderly population in which High Blood Pressure plays an important role.

AIM

To study the pattern of Blood Pressure and its co-relates among the elderly patients attending the Geriatric Clinic.
Setting: Hospital-based Cross-sectional study.

MATERIALS AND METHODS

All the patients those who attended the Geriatric Clinic during the study period were taken. Predesigned, pretested interview schedule was used to collect the information from the patients and also to note down the physical examination findings.

STATISTICAL ANALYSIS

Chi-squared test, t-test were done. Odds ratio with 95% CI was calculated wherever applicable.

RESULTS

Among all the patients, 16.04% were found to be hypertensive. Prevalence is found to be highest among those in the age group of 75 years or more. Hypertension was found to be 17.81% among the male patients compared to 12.89% among the females. Hypertension was found to be significantly associated with increasing age, family type and socio-economic status ($p < 0.05$). Hypertension was also found to be significantly associated with co-relates like age, non-vegetarian diet, history of alcohol intake, history of smoking, history of use of chewable tobacco ($p = 0.0031$, $p = 0.0017$, $p < 0.0001$, $p = 0.0121$). There was significant difference in mean BP between the normotensive and hypertensive patients across all the age groups in both males and females. There was significant association between BMI and hypertension in both males and females.

CONCLUSION

The blood pressure pattern among the geriatric population tends to increase with increasing age and other behavioural risk factors.

KEYWORDS

Hypertension, Geriatric, BMI, Smoking, Blood Pressure.

HOW TO CITE THIS ARTICLE: Chakraborty SS, Ojah J. A study on the pattern of blood pressure and its co-relates among the patients attending the geriatric clinic of Gauhati Medical College and Hospital, Guwahati. *J. Evolution Med. Dent. Sci.* 2016;5(47):3011-3016, DOI: 10.14260/jemds/2016/701

INTRODUCTION

Elderly or old age consists of ages nearing or surpassing the average life span of human beings. The boundary of old age cannot be defined exactly, because it does not have the same meaning in all societies. People can be considered old, because of certain changes in their activities or social roles. Also old people have limited regenerative abilities and are more prone to disease, syndromes and sickness as compared to other adults. India is in demographic transition phase and is expected to be next greying country very soon in the world.

As per United Nations Population Division (2011), the share of India's population aged 60 and older is projected to climb from 8% in 2010 to 19% 2050 within a span of four decades.⁽¹⁾ With the increasing trend in the life expectancy, there have been increased morbidities among the geriatric age group. Chronic diseases (NCDs) like Cardiovascular Diseases, Hypertension, Diabetes, Cancer, Joint Pain are the major morbidities found among the elderly.⁽²⁾ In India, NCDs were found to be responsible for 53% of total deaths and 44% of Disability Adjusted Life Years (DALY) lost among the elderly.⁽³⁾

Of all the non-communicable diseases, the degenerative diseases of heart and blood vessels are of utmost importance.⁽⁴⁾

Hypertension, a key NCD risk factor appears to be increasing in prevalence, possibly associated with development, urbanization and lifestyle changes.⁽⁵⁾ Hypertension is a modifiable risk factor for Cardiovascular Disease (CVD). Data from the Framingham Heart Study showed increasing cardiovascular morbidity with increasing systolic or diastolic pressure in those aged 65 and over.⁽⁶⁾ Hypertension prevalence increases with age and is a readily treatable risk factor for the most common causes of morbidity

Financial or Other, Competing Interest: None.

Submission 26-04-2016, Peer Review 20-05-2016,

Acceptance 26-05-2016, Published 13-06-2016.

Corresponding Author:

Dr. Shashanka Shekhar Chakraborty,

Department of Community Medicine,

Gauhati Medical College (5th Floor),

Narakasur Hilltop,

P.O. Indrapur,

Bhangagarh,

Guwahati-781032.

E-mail: drshashank79@gmail.com

DOI: 10.14260/jemds/2016/701

and mortality in older age: stroke, ischaemic heart disease, renal insufficiency and dementia.^{(7),(8),(9)} The accelerating epidemic of hypertension in India was documented by studies done at various places across the country.⁽¹⁰⁾ Hypertension being one of the leading cause of morbidity as well as mortality, especially among the elderly persons the present study was being undertaken to know the pattern of hypertension and its co-relates among the elderly patients attending the geriatric OPD.

MATERIALS AND METHODS

Study Design

Hospital-Based Cross-Sectional Study.

Study Area

Geriatric OPD, Gauhati Medical College, Guwahati.

Study Period

1st May, 2015 to 31st August, 2015.

Study Population

All the patients attending the Geriatric OPD of Gauhati Medical College and Hospital during the study period. Patients aged ≥ 60 years were considered as Geriatric patients.

Sampling Technique

All the patients who attended the OPD between 10 am and 12 pm during the study period were selected purposively.

Sample Size

A total of 910 patients were selected using the above mentioned technique.

Study Variables

Age, Gender, Religion, Marital Status, Family Type, Socioeconomic Status, Literacy, Diet, Alcohol Intake, Smoking, Tobacco use, BMI were included in the study.

Marital Status

Currently married persons living with spouse were considered married. Never married, Divorced and Widower were considered as single.

Socioeconomic Status

Determined based on Modified Kuppuswamy Classification for Socioeconomic Status (SES).

Diet

Those who have never consumed fish, meat, egg or consume occasionally (<once weekly) were considered as Vegetarians. Those who consume regularly (\geq once weekly) were considered Non-Vegetarians.

Alcohol Intake

Those who have been consuming alcohol currently or had consumed alcohol regularly (\geq once a week) were considered as Alcohol Intake positive. Others were considered as negative.

Smoking

Those who currently smoke or quit smoking within 10 years were considered as smokers. Others were considered as non-smokers.

Tobacco Use (Smokeless)

Persons using any form of smokeless tobacco for at least 1 year were considered as positive and rest as negative.

Hypertension

Hypertension was defined as per JNC 8 guidelines. Any person having Systolic BP ≥ 140 mmHg and/or Diastolic BP ≥ 90 mmHg were considered as Hypertensive and rest were considered as Non-Hypertensive.⁽¹¹⁾

BMI

Body Mass Index was calculated by using Quetelet's Index. BMI of 18.5 to 24.99 were considered having normal BMI, <18.5 as Underweight and ≥ 25 as Overweight.⁽¹²⁾

Study Tools Used

A predesigned and pretested Interview Schedule was used containing both open-ended and close-ended questions, Sphygmomanometer, Stethoscope, Bathroom Weighing Scale, Stadiometer. All the instruments were calibrated once weekly during the duration of data collection.

Ethical Consideration

The purpose of seeking information and examination was explained in detail individually to all the participants. Informed verbal consent was obtained from each participant prior to asking question and examination. Informed verbal consent was felt to be sufficient, as the study did not involve any sort of investigation/intervention. So Institutional Ethical Approval was not sought. Patient's consent was recorded by the interviewer in the schedule and duly signed.

The data collected were presented and considered in totality and was not linked to individual participant. As a part of follow-up action, individual patients were informed their BP status and intervention thereof. Measurement of Blood Pressure: BP was measured in sitting position. Two readings were taken 15 minutes apart. Averages of the two readings were considered as the Blood Pressure. Measurements were done by the Resident doctors and Interns posted in the OPD. All the resident doctors and interns were briefed about the correct BP measurement technique to maintain the consistency.

Inclusion Criteria

All the patients who attended the Geriatric Clinic with unknown BP status between 10 am and 12 pm on the week days during the period of study were included in the study.

Exclusion Criteria

Patients already under antihypertensive medications, patients with history of being diagnosed with hypertension previously and under irregular medications, patients with history of cardiac and renal disorders, patients attending in a moribund condition, patients with history of any known psychological/psychiatric disorder were excluded from the study.

Data Analysis

Data collected were entered into MS-Excel Sheet. Data were analysed for proportion, mean, standard deviation. Significance were tested using chi-squared test, t-test wherever applicable. Risk against each of the risk factors was

estimated calculating Odds Ratio (OR) with 95% Confidence Interval (CI).

RESULTS

A total of 910 numbers of patients who met both inclusion and exclusion criteria were analysed, out of which 16.04 % (13.71-18.59) were found to be suffering from hypertension (Table#1). The prevalence of Hypertension was found to be highest (23.5%) among the age group of >75 years and lowest (12.5%) among the age group of 60-65 years. Among the male participants, the high BP was found to be higher (17.8%) compared to the females, where the prevalence was found to be 12.9%. High BP was found to be more among the currently married individuals (19.2%) compared to those who are

currently single (4.2%) (Never Married, Widower, Divorced/separated).

Table#2 reveals that among the various variables, age, religion, family type, marital status, socioeconomic status, literacy status is significantly associated (p<0.05) with hypertension, whereas no significant association (p>0.05) was found between Hypertension and Gender.

Among the different risk factors studied, non-vegetarian diet [OR: 1.94 (1.25-3.01)], Alcohol Intake [OR: 2.02 (1.30-3.12)], Smoking [OR: 2.31 (1.61-3.33)] and Tobacco Use [OR: 1.6 (1.11-2.33)], all were found to significantly associated with Hypertension, out of which Smoking was found to be highly significant (p<0.0001) (Table#3).

Status	Number (N)	Percentage (95% CI)
Hypertensive	146	16.04 (13.71-18.59)
Non-Hypertensive	764	83.96 (81.41-86.29)
Total	910	100

Table 1: Hypertensive Status among the Respondents

Variables	HTN		Non-HTN		Total		P value
	N	%**	N	%**	N	%**	
Age							
60-65	70	47.9%	490	64.1%	560	61.6%	P=0.0027*
66-70	56	38.4%	196	25.7%	252	27.7%	
71-75	12	8.2%	52	6.8%	64	7.0%	
>75	8	5.5%	26	3.4%	34	3.7%	
Gender							
Male	104	71.2%	480	62.8%	584	64.2%	P=0.0524
Female	42	28.8%	284	37.2%	326	35.8%	
Religion							
Hindu	118	80.8%	548	71.7%	666	73.2%	P=0.0003*
Muslim	22	15.1%	210	27.5%	232	25.5%	
Christian	4	2.7%	4	0.5%	8	0.9%	
Jain	2	1.4%	2	0.3%	4	0.4%	
Marital Status							
Married	138	94.5%	582	76.2%	720	79.1%	P<0.0001*
Single	8	5.5%	182	23.8%	190	20.9%	
Family Type							
Nuclear	122	83.6%	174	22.8%	296	32.5%	P<0.0001*
Joint	24	16.4%	590	77.2%	614	67.5%	
Socio-Economic Status							
Upper class	34	23.3%	62	8.1%	96	10.5%	P<0.0001*
Upper middle class	69	47.3%	332	43.5%	401	44.1%	
Middle class	30	20.5%	230	30.1%	260	28.6%	
Lower middle class	12	8.2%	119	15.6%	131	14.4%	
Lower class	1	0.7%	21	2.7%	22	2.4%	
Literacy Status							
Illiterate	4	2.7%	158	20.7%	162	17.8%	P<0.0001*
Primary school	42	28.8%	376	49.2%	418	45.9%	
High school	46	31.5%	162	21.2%	208	22.9%	
Higher secondary	30	20.5%	50	6.5%	80	8.8%	
Graduate	24	16.5%	18	2.4%	42	4.6%	

Table 2: Distribution of Hypertensive Status of the Respondents According to Various Variables

*statistically significant **column percentage

Variables	HTN N	Non-HTN N	Total N	OR (95%CI)	P value
Diet					
Non-Vegetarian	118	523	641	1.94 (1.25-3.01)	P=0.0031*
Vegetarian	28	241	269		
Alcohol Intake					
Yes	34	100	134	2.02 (1.30-3.12)	p=0.0017*
No	112	664	776		
Smoking					
Yes	92	324	416	2.31 (1.61-3.33)	P<0.0001*
No	54	440	494		
Tobacco Use (Smokeless)					
Yes	96	416	512	1.61 (1.11-2.33)	p=0.0121*
No	50	348	398		

Table 3: Distribution of the Respondents According to the Different Risk Factors

*statistically significant

Age Group (In Years)	SBP			DBP		
	HTN (Mean±SD), N	Non HTN (Mean±SD), N	t value	HTN (Mean±SD), N	Non-HTN (Mean±SD), N	t value
60-65	151.33±20.80, 42	129.84±13.00, 286	4.604***	92.10±5.78, 42	80.5±6.62, 286	8.421***
66-70	147.13±19.48, 46	128±8.69, 126	4.547***	90.09±6.65, 46	80.97±6.75, 126	5.65***
71-75	145.5±6.40, 8	128.5±10.89, 48	4.363**	90.5±3.42, 8	80.13±8.84, 48	4.171**
>75	145.5±5.26, 8	127.5±11.65, 20	3.977**	87.5±3, 8	79.5±7.69, 20	2.8*

Table 4: Distribution of SBP and DBP with Ages (Male)

*p<0.05, **p<0.01, ***p<0.001

Age Group (In Years)	SBP			DBP		
	HTN (Mean±SD), N	Non-HTN (Mean±SD), N	t value	HTN (Mean±SD), N	Non-HTN (Mean±SD), N	t value
60-65	144.3±12.49, 28	127.56±14.33, 204	4.615***	93.7± 6.46, 28	79.92±6.28, 204	7.509***
66-70	154.8±5.02, 10	130.43±13.13, 70	7.72***	93.6±4.34, 10	81.62±8.48, 70	4.965***
71-75	161±26.87, 4	135.0±7.07, 4	1.323	97± 7.07, 4	89.0±0.0, 4	-----
>75	-----	130.0±0.0, 6	-----	-----	83.0±4.24, 6	-----

Table 5: Distribution of SBP and DBP with Ages (Female)

*p<0.05, **p<0.01, ***p<0.001

The highest mean Systolic BP among the male participants was found to be 151.33±20.80 mmHg among the hypertensives compared to 129.84±13.00 mmHg among the non-hypertensive in the 60-65 years' age group (Table#4). The highest Diastolic BP was found to be 92.10±5.78 mmHg in the hypertensives compared to 80.5±6.62 mmHg among the non-hypertensives in the same age group (Table#4).

Table#4 also reveals that there is significant difference in both mean Systolic and mean Diastolic BP between the hypertensive group and non-hypertensive group, among males, across all the age groups (p<0.05).

The highest mean Systolic BP among the female participants was found to be 154.8±5.02 mmHg among the hypertensives compared to 130.43±13.13 mmHg among the non-hypertensive in the 66-70 years' age group (Table#5). The highest Diastolic BP was found to be 97±7.07 mmHg in the hypertensives compared to 89.0±0.0 mmHg among the non-hypertensives in the 71-75 years' age group (Table#5).

Table#5 also reveals that there is significant difference in both mean Systolic and mean Diastolic BP between the hypertensive group and non-hypertensive group, among males, across all the age groups (p<0.05).

BMI	HTN		Non-HTN		Total		OR (95% CI)	P value
	n	%	n	%	n	%		
<18.5	12	11.5%	108	22.5%	120	20.5%	0.4865 (0.2546-0.9297)	P=0.0292*
18.5-24.99	74	71.2%	324	67.5%	398	68.2%	Ref	---
≥25	18	17.3%	48	10%	66	11.3%	1.6419 (0.9032-2.9848)	P=0.1039

Table 6: Distribution of Hypertensive Status of the Respondents According to BMI (Male)

*statistically significant

BMI	HTN		Non-HTN		Total		OR (95% CI)	P value
	n	%	n	%	n	%		
<18.5	2	4.8%	60	21.1%	62	19%	0.2125 (0.0495-0.9125)	P=0.0372*
18.5-24.99	32	76.2%	204	71.8%	236	72.4%	Ref	---
≥25	8	19%	20	7.1%	28	8.6%	2.55 (1.0361-6.2760)	P=0.0416*

Table 7: Distribution of Hypertensive Status of the Respondents According to BMI (Female)

*statistically significant

Among the Male participants, underweight (BMI <18.5) was found to be protective against Hypertension [OR: 0.4865 (0.2546-0.9297)] and was found to be statistically significant. Increased risk was found [OR: 1.6419 (0.9032-2.9848)] with overweight (BMI≥25), but was not found to be statistically significant (Table#6).

Among the Male participants, underweight (BMI <18.5) was found to be protective against Hypertension [OR: 0.2125 (0.0495-0.9125)] and was found to be statistically significant. Increased risk was found [OR: 2.55 (1.0361-6.2760)] overweight (BMI≥25), which was also found to be statistically significant (Table#6). So, it can be inferred from the above observations that BMI is found to be inversely related to Blood Pressure.

DISCUSSION

The overall prevalence of hypertension among the study subjects (N=910) was found to be (n=146) 16.04%. This was found to be less compared to the similar studies done in other setting elsewhere.^{(13),(14),(15),(16)} These differences in the result could be attributed to the different study designs and settings adopted in the different studies. And also the fact that in the present study, already diagnosed cases of hypertension have been excluded and only the persons with unknown BP status were considered, which might have resulted in lower prevalence compared to the other studies. So in such a setting and design, even a prevalence of 16.04% has to be taken as high.

Increasing age, family type, marital status, socio-economic status and literacy rate have found to be significantly associated with high BP, which is consistent with other studies done elsewhere.^{(17),(13),(16)}

There is a significant association between High BP and Non-Vegetarian Diet, Alcohol Intake, Smoking and Tobacco Use. These findings are also somewhat similar to the earlier studies done.^{(13),(14),(17)}

From Table#4, among the male respondents it is seen that with increase in age group, the mean blood pressure systolic or diastolic decreases among both hypertensive and non-hypertensive. The difference between the means of the blood pressure among hypertensive and non-hypertensive is significant in all age groups, but the significance slightly

decreases with increasing age. Highest mean SBP was found in the age group of 60-65 years, followed by 66-70 years' age group among those who were hypertensive. Among the hypertensive, the DBP was found to be highest in the 60-65 years' age group. This finding was also somewhat similar to the findings of the studies done by Hazarika et al⁽¹³⁾ and Rashid AK et al.⁽¹⁵⁾

From Table#5, among the female respondents it was found that seen that both systolic and diastolic blood pressure increases with higher age group among both hypertensive and non-hypertensive. The difference between the means of the blood pressure among hypertensive and non-hypertensive group is highly significant in the 60-65 and 66-70 years' age group. This finding was somewhat similar to the finding of Hazarika et al.⁽¹³⁾

From Table#6 and Table#7, it was found that among both males and females, lower BMI somewhat protects against high BP and higher BMI increases the risk to an extent. It can also be found that the risk of having hypertension significantly increases with the increase in BMI. These findings are also quite similar to studies done by Hazarika et al⁽¹³⁾, Rashid al⁽¹⁵⁾ and Alam et al.⁽¹⁴⁾

CONCLUSION

The finding of quite a high percentage (16.04) of elderly having high BP among those with previously unknown BP status indicates that more extensive screening activity is needed, especially among the middle aged adults and elderly population, so that the hypertensives could be identified as early as possible to prevent serious complications. As high BP was found to be significantly associated with modifiable risk factors like diet, alcohol intake, smoking and tobacco usage, more extensive BCC should be carried out among the middle aged and elderly persons to avoid and modify these risk factors.

LIMITATIONS

As the study was conducted among the patients attending the Geriatric Clinic of the hospital, due to paucity of time other risk factors like physical activity, waist-hip ratio could not be assessed. Family history of hypertension was not taken into final consideration, because of the fact that most of the

respondents were not aware of their parents' BP status. Lipid profile and blood sugar, although very relevant in this study, could not be assessed because of shortage of time as the entire data collection was done inside the OPD.

STRENGTHS

The study could be completed within a relatively short period, as the study setting was hospital based. Gauhati Medical College Hospital being the largest tertiary care centre in the entire North-East region with patients coming from several parts of the region, the study finding could provide us with fair idea of the Blood Pressure pattern among the geriatric population of the region. The study highlights the fact that even after the age of 60 years, there was 16.04% of the subject who were diagnosed with hypertension for the first time, which may be considered quite high.

RECOMMENDATION

Effective hypertension screening programme should be put in place to detect Hypertension among the adult population (>30 years), so that all the cases could be detected as early as possible and provide effective treatment. This will not only bring down the load of hypertension among the geriatric population, but also help in a long way to prevent the long-term complications of Hypertension.

ACKNOWLEDGEMENT

I would like to express my sincere thanks to Prof. Nilakshi Goswami, Department of Geriatric Medicine, GMCH, for allowing us to conduct the study in the Geriatric Clinic. I would also like to thank the Medical Officers and Resident Doctors of the Department of Geriatric Medicine for their co-operation and invaluable help during entire period of data collection. I would also like to thank the staff of Geriatric Clinic for their co-operation during the study.

REFERENCES

1. India's aging population. Population reference bureau. [Online] March 2012. [Cited: March 02, 2015.] <http://www.prb.org/Publications/Reports/2012/india-older-population.aspx>. (Accessed on 02/03/2015, 6.45 pm).
2. Jeyalakshmi S, Chakrabarti S, Gupta N. Situation analysis of the elderly in India. New Delhi : Ministry of Statistics and Programme Implementation, Government of India, 2011;p 18.
3. Srinath Reddy K, Shah B, Varghese C, et al. Responding to the threat of chronic diseases in India. *Lancet* 2005;366(9498):1744-9.
4. Park K. Preventive medicine and geriatrics. Textbook of preventive and social medicine. Jabalpur: M/s banarsidas bhanot, 2015;23rd ed:p 594-6.
5. Yach D, Hawkes C, Gould CL, et al. The global burden of chronic diseases: overcoming impediments to prevention and control. *JAMA* 2004;291(21):2616-22.
6. Vokonas PS, Kennel WB, Cupples LA. Epidemiology and risk of hypertension in the elderly: the framingham heart study. *J Hypertens Suppl* 1988;6(1):S3-9.
7. Steyn K, Sliwa K, Hawken S, et al. Risk factors associated with myocardial infarction in africa the interheart study. *Circulation* 2005;112:3554-61.
8. Ferri CP, Schoenborn C, Kalra L, et al. Prevalence of stroke and related burden among the older people of latin America, India and China. *J Neurol Neurosurg Psychiatry* 2011;82(10):1074-82.
9. Ikeda N, Saito E, Kondo N, et al. What has made the population of Japan healthy? *Lancet* 2011;378(9796):1094-105.
10. Gupta R. Trends in hypertension epidemiology in India. *J Hum Hypertens* 2004;18(2):73-8.
11. Kayce B, Twigg J, Orlin BR. Hypertension: the silent killer: updated JNC-8 guideline recommendations. Alabama: Alabama Pharmacy Association 2015;p 4.
12. World health organization. WHO international. [Online] WHO. [Cited: May 13, 2015.] www.who.int/bmi/index.jsp?introPage=intro_3.html. (Accessed on 13/05/2015, 10.30 am)
13. Hazarika NC, Biswas D, Mahanta J. Hypertension in the elderly population of Assam. *Journal of the Association of Physicians of India* 2003;51:567-73.
14. Naushad Alam, Gopal Prasad Soni, Kamlesh Kumar Jain, et al. Prevalence and determinants of hypertension in elderly population of Raipur city, Chhattisgarh. *International Journal of Research in Medical Sciences* 2015;3(3):568-73.
15. Rashida AK, Azizah AM. Prevalence of hypertension among the elderly malays living in rural malaysia. *Australasian Medical Journal* 2011;4(6):283-90.
16. Chinnakali P, Bharathy Mohan, Ravi Prakash Upadhyay, et al. Hypertension in the elderly: prevalence and health seeking behaviour. *North American Journal of Medical Sciences* 2012;4(11):558-62.
17. Manimunda SP, Sugunan AP, Benegal V, et al. Association of hypertension with risk factors & hypertension related behaviour among the aboriginal nicobarese tribe living in car nicobar island, India. *Indian Journal of Medical Research* 2011;133(3):287-93.