

A population based study on hypertension among elderly in a slum in Chennai

Jagdeep Ramesh^{1,*}, Meriton Stanly²

¹Post Graduate, ²Professor, Dept. of Community Medicine, S.R. Medical College & Research Institute, Chennai, India

***Corresponding Author:**

Email: jagdepramesh@yahoo.co.in

Abstract

Introduction: Hypertension is a common Non - communicable disease and is a major contributor of morbidity and mortality in the elderly population. Hypertension can lead to complications like stroke, coronary heart disease, renal failure and death if not detected early and treated adequately.

Objectives: To estimate the prevalence of hypertension among elderly in a slum population in Chennai and to assess certain risk factors associated with hypertension.

Materials & Methods: This is a cross-sectional study which included 100 elderly people above 60 years in a slum of Urban Health Training Centre of Sri Ramachandra Medical College, Porur, Chennai. Details regarding education, income, personal habits, physical activity were obtained. The weight, height and blood pressure of all the participants were measured.

Results: The prevalence of hypertension was found to be 59% (95% CI 49% - 68%). As the BMI increases the prevalence of hypertension increases ($p=0.02$). Sedentary lifestyle ($p=0.038$) were associated with increase of prevalence of hypertension.

Conclusion: Our findings emphasize that hypertension is an important public health problem among the geriatric population and that there is definite need for regular screening for hypertension. Community health education and health promotion programs to encourage behavioral changes among the elderly will go a long way in the prevention of hypertension.

Keywords: Hypertension, Prevalence, Elderly, Non-Communicable Disease, Cross Sectional, Slum.

Introduction

Non communicable diseases (NCDs) such as hypertension account for increasing morbidity and mortality among the elderly. Hypertension is a major risk factor for coronary artery disease and stroke.^(1,2) Globally, 7.5 million deaths and 57 million DALYs are lost annually due to hypertension.⁽³⁾ Many developing countries including India are passing through a demographic transition with a gradual increase in the life expectancy of the people.⁽⁴⁾ The proportion of elderly population aged 60 years and above has gone up to 8.6% as per the current sample registration system report.⁽⁵⁾ The prevalence of NCDs such as Hypertension, diabetes and stroke is rising in most countries due to the increasing life expectancy of the people. Hypertension accounts for 57% and 24% of the stroke deaths and coronary heart disease (CHD) deaths in India.⁽⁶⁾ Prevention and treatment of hypertension is an important public health issue. There is a paucity of data on the prevalence of hypertension and its determinants among the elderly in urban slums and this study was done to assess the same among elderly in an urban slum in Chennai.

Objectives

1. To estimate the prevalence of hypertension among elderly in a slum population in Chennai.
2. To assess the following risk factors associated with hypertension.
 - i. Socio - Demographic factors.
 - ii. Personal habits namely Smoking, Tobacco chewing, Alcohol consumption.
 - iii. Physical activity.

iv. Co morbid conditions namely Diabetes.

v. Obesity (BMI).

Materials & Methods

Study design: A Population based cross-sectional study.

Study area: This study was conducted in the field practice area of Urban Health Training Centre at Thiruvanniyur, Chennai, Tamil Nadu. This UHTC is attached to Sri Ramachandra Medical College & Research Institute, Porur, Chennai.

Sample size: According to the Hypertension Study Group⁷ the prevalence of hypertension was 65% among the elderly population. By considering this value and an allowable error of 10%, the minimum sample size was 88. A slum was selected randomly and in that slum 100 elderly people aged 60 years and above were included in the study.

Tools for Data collection: The data collection tools included a pretested structured questionnaire, anthropometric measurements and clinical examination of the elderly.

Interview schedule was divided into the following: Questions on background data, socio - demographic factors, self-reported diabetes mellitus and clinical Examination of the elderly

Anthropometric Measurements included: Weight of the person, height and blood pressure measurement.

Weight: Weight was measured to the nearest 100 gm using a portable electronic weighing machine after removing heavy clothing, footwear and other accessories.

Height: This was measured with a portable stadiometer to the nearest 0.1 cm.

Blood Pressure Measurement: The systolic and diastolic blood pressure was measured in the sitting posture in the left upper arm. The arm was resting on the table at the heart level. The person was instructed to avoid eating, smoking or exercising for at least 30 minutes before the measurement⁸. Measurements were taken with a mercury sphygmomanometer. Two measurements of the blood pressure were done for each participant with an interval of at least of 5 minutes. The average of the 2 readings of SBP and DBP was done to describe the blood pressure of the participant

Definition

Hypertension: Hypertension is defined either as a SBP ≥ 140 mm Hg, and/or a DBP ≥ 90 mmHg, and/or treatment with antihypertensive medication (WHO-ISH guidelines & JNC-VI).^(9,10)

Body Mass Index (BMI): Calculated as weight (kg)/ht (m).⁽²⁾ According to the International Classification, individuals with a BMI 18.5-24.9 were classified as normal. Individuals with a BMI ≥ 25 were considered overweight and those with a BMI ≥ 30 were considered obese.

Personal Habits: Smokers, alcohol consumers or tobacco chewers were defined as those who ever smoked, consume alcohol or chew tobacco in their lifetime (present as well as in the past).

Physical activity was assessed by inquiring about the average activity done during work and leisure time. According, a person was considered to be sedentary when his work involved desk job, or mainly domestic activities like viewing television or reading and a person was considered to be active when he does home maintenance activities, washing linen/clothes by hand, cycling and carpentry.⁽⁷⁾

Institutional research Ethical (IEC) committee approval was obtained.

Statistical Analysis

Data analysis was done using SPSS version 16. Statistics including frequency, percentage, mean, 95% CI were done. Chi square test and odds ratio were estimated to observe the association between hypertension and other variables. A p-value less than 0.05 was considered statistically significant.

Results

This cross-sectional study included 100 elderly people aged 60 years and above from a slum of Urban Health Training Centre of Sri Ramachandra Medical College. Out of the 100 participants, 43% were males and 57% were females. The prevalence of hypertension was found to be 59%. The 95% confidence interval was 49% - 69%.

Based on the Modified BG Prasad socioeconomic status classification, 48% of the study population

belonged to class 4 and 41% were in class 3, followed by 8% in class 2 and 3% in class 5.

Out of the 100 participants, 47% had the habit of tobacco chewing and the remaining 53% did not chew tobacco. Out of the 43 male participants in the study, we found that 13(30.2%) were smokers and 9(20.9%) consumed alcohol.

We found that out of the 100 participants, 76% had a normal BMI, 24% were overweight with a BMI of > 25 .

Among the socio-demographic factors, we found that as the age advances the prevalence of hypertension increases and this was found to be statistically significant (chi square value: 3.86, df =1, p=0.049). We found that there is no statistically significant association between gender (p=0.503), socio-economic status (p=0.098) and hypertension.

Among the risk factors, we found that sedentary lifestyle (chi square value: 4.29, df =1, p=0.038) and obesity (chi square value: 5.3, df 1, p=0.02) were associated with an increased prevalence of hypertension. We found that there is no statistically significant association between smoking (p=0.924) and diabetes (p=0.286) and hypertension.

Discussion

The findings of our study revealed the high burden of hypertension among the elderly population. The overall prevalence of hypertension was found to be 59% in our study. This is in concurrence with a multi-centric study done by the Hypertension Study Group in India and Bangladesh which showed the overall prevalence of hypertension among the elderly to be 65%.⁽⁷⁾ Radhakrishnan S et al. reported the prevalence of hypertension to be 59% among the geriatric population in a rural community of Tamil Nadu.⁽¹¹⁾ Biswas D et al. reported an overall prevalence of 64% in a study in the geriatric population in a slum of Kolkata.⁽¹²⁾

The upward linear trend between age and the prevalence of hypertension was noted in our study. We found that the participants in the age group of 75 years and above had 3.2 times higher risk of having hypertension than those in the lower age group of 60-74 years and this was found to be statistically significant (p=0.049).

The proportionate increase in prevalence of hypertension among elderly was observed by Biswas D et al. among the geriatric population in a slum of Kolkata⁽¹²⁾ and similar findings were also reported by Ghoshetal⁽¹³⁾ from Bihar. Similar findings were observed in our present study.

In countries that are in post-transitional stage of economical development, consistently higher level of blood pressure has been observed among the lower socioeconomic groups. However, in countries that are pre-transitional or transitional, hypertension is noted in the upper socioeconomic groups.⁽³⁾ In this study, we

found that the participants belonging to the middle socioeconomic status had a 1.98 times higher risk of having hypertension than those belonging to the lower SES but this was not found to be statistically significant (p=0.098). Kalavathy et al. reported that socio-demographic variables such as gender and SES did not influence the prevalence of hypertension⁽¹⁴⁾ like our present study.

Smoking stimulates the sympathetic nervous system and causes the release of adrenaline which in turn causes hypertension. In the present study, we found that smoking is a risk factor for hypertension. This is in concurrence with the studies done by Kannan L et al. in the Kanchipuram District, Tamil Nadu⁽¹⁵⁾ and by Agarwal et al. from rural Maharashtra.⁽¹⁶⁾ About 30.2% of males were smokers and they are 1.1 times at risk of developing hypertension as compared to non-smokers. But the association was not statistically significant because our present study was done among smaller number of elderly population.

Regular exercise reduces the systemic vascular resistance and brings down the blood pressure. At least 30 minutes of brisk walking for 5 days a week is recommended to control hypertension.⁽¹⁷⁾ We found that a sedentary lifestyle was associated with an increased prevalence of hypertension.

Similar observations were made by Alam et al in his study done in Raipur.⁽¹⁸⁾ Obesity is a risk factor for hypertension and in our study we found that as the BMI increases the prevalence of hypertension increases. This is in concurrence with a study done by Kannan L et al. done in Kanchipuram District, Tamil Nadu¹⁵ and similar findings were reported by Alam et al from Raipur.⁽¹⁸⁾

We found that 17% of the participants had a self reported history of diabetes. Purty et al. reported diabetes mellitus in 8% of their study participants.⁽¹⁹⁾

We found that there is no statistically significant association diabetes and hypertension.

National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke (NPCDCS) has a scheme to screen the urban slum population for hypertension through the NCD clinics.^(20,21) Promotion of “opportunistic screening” of the elderly for hypertension during their routine visit to the PHCs and CHCs will help to identify more patients with this iceberg disease.

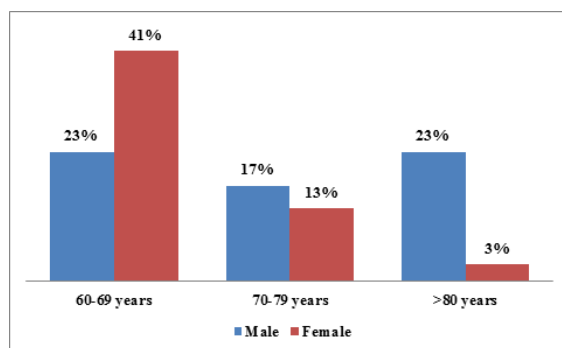


Fig. 1: Age and sex Distribution

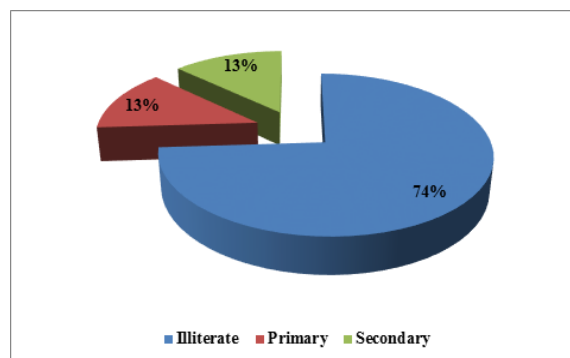


Fig. 2: Details of Educational Status

Table 1: Association between Hypertension & Demographic Characteristics

Particulars	Hypertension		Odds ratio	95% CI	p value
	Yes n (%)	No n (%)			
Age (years)					
75 & above	15 (78.9)	4 (21.1)	3.2	1.1- 0.3	0.049
60-74	44 (54.3)	37 (45.7)			
Sex					
Male	27 (62.8)	16 (37.2)	1.3	0.6 - 3.0	0.503
Female	32 (56.1)	25 (43.9)			
SES					
Middle	33 (67.3)	16 (32.7)	1.98	0.9 - 4.5	0.098
Lower	26 (51)	25 (49)			

Table 2: Association between Hypertension & Risk factors

Particulars	Hypertension		Odds ratio	95% CI	p value
	Yes n (%)	No n (%)			
H/o Smoking (males)					
Yes	8 (61.5)	5 (38.5)	1.1	0.3 - 4.1	0.924
No	18 (60)	12 (40)			
Activity					
Sedentary	34 (69.4)	15 (30.6)	2.4	1.04- 5.3	0.038
Active	25 (49)	26 (51)			
BMI					
Overweight	19 (79.2)	5 (20.8)	3.4	1.2 -10.1	0.02
Normal	40 (52.6)	36 (47.4)			
DM					
Yes	12 (70.6)	5 (29.4)	1.8	0.6 - 5.7	0.286
No	47 (56.6)	36 (43.4)			

Conclusion

We found that the prevalence of hypertension is high and this was associated with some modifiable risk factors. The overall prevalence of hypertension was found to be 59% in our study. Among the risk factors, we found that sedentary lifestyle, obesity and increasing age were significantly associated with an increased prevalence of hypertension. Our findings emphasize that hypertension is a common medical condition among the geriatric population. This calls for regular screening of the elderly for hypertension as an important public health measure.

Conflict of Interest: None

References

- Mahmood SS, Levy D, Vasan RS, Wang TJ. The Framingham Heart Study and the epidemiology of cardiovascular disease: a historical perspective. *The Lancet*. 2014 Mar 21;383(9921):999-1008.
- Russell V. Luepker. Heart Disease. In: Wallace RB. *Public Health and Preventive Medicine (Maxcy-Rosenau-Last Public Health and Preventive Medicine)*. 15th edn. McGraw Hill, 2007:1079.
- Park, K. Non-communicable diseases. In Park, K. eds. *Park's textbook of Preventive and Social Medicine*. 24th edn. Jabalpur M/S BanarsidasBhanot, 2015:391-395.
- Ponnapalli R, Ponnapalli KM, Subbiah A. Aging and the Demographic Transition in India and Its States: A Comparative Perspective. *International Journal of Asian Social Science*. 2013;3(1):171-93.
- Census of India: *Sample Registration System*. Available at: www.censusindia.gov.in/vital.../srs.../9chap%20%20%202011.pdf (Last accessed on January, 2017)
- Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, Prabhakaran D. Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *Journal of hypertension*. 2014 Jun 1;32(6):1170-7.
- Hypertension Study Group. Prevalence, awareness, treatment and control of hypertension among the elderly in Bangladesh and India: a multicentre study. *Bulletin of the World health Organization*. 2001;79(6):490.
- Clinical Anthropometric Biochemical (CAB) Manual. Available from: <http://www.rchiips.org/NFHS/NFHS4/manual/NFH S-4%20Biomarker%20Field%20Manual.pdf>. (Last accessed on January, 2017).
- Chalmers J, MacMahon S, Mancia G, Whitworth J, Beilin L. WHO-ISH Hypertension Guidelines Committee 1999 World Health Organization: International Society of Hypertension Guidelines for the Management of Hypertension. *J Hypertens*. 1999;17:151-85.
- The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood pressure. Available at: <https://www.nhlbi.nih.gov/health-pro/guidelines/archive/hypertension-jnc6> (Last accessed on January, 2017).
- Radhakrishnan S, Balamurugan S. Prevalence of diabetes and hypertension among geriatric population in a rural community of Tamilnadu. *Indian journal of medical sciences*. 2013 May 1;67(5):130.
- Biswas D, Gupta AD, Kumar A, Das S, Sahoo SK, Das MK, Pandey A. A study on hypertension in geriatric population in a slum of Kolkata. *International Journal of Medical Science and Public Health*. 2015;4(11):1527-31.
- Ghosh A, Sarkar D, Mukherji B, Pal R. Prevalence and risk correlates of hypertension among adult rural population in Bihar. *Annals of Tropical Medicine and Public Health*. 2013 Jan 1;6(1):71-75.
- Kalavathy MC, Thankappan KR, Sarma PS, Vasan RS. Prevalence, awareness, treatment and control of hypertension in an elderly community-based sample in Kerala, India. *National Medical Journal of India*. 2000 Jan 1;13(1):9-15.
- Kannan L, Satyamoorthy TS. An epidemiological study of hypertension in a rural household community. *Sri Ramachandra Journal of Medicine*. 2009 Jun;2(2):9-13.
- Agrawal VK, Bhalwar R, Basannar DR. Prevalence and determinants of hypertension in a rural community. *Medical Journal Armed Forces India*. 2008 Jan 31;64(1):21-5.
- Durai V, Muthuthandavan AR. Knowledge and Practice on lifestyle modifications among males with hypertension. *Indian Journal of Community Health*. 2015 Mar 31;27(1):143-9.

18. Alam M, Soni GP, Jain KK, Verma S, Panda PS. Prevalence and determinants of hypertension in elderly population of Raipur city, Chhattisgarh. *Int J Res Med Sci.* 2015; 3(3): 568-573.
19. Purty AJ, Bazroy J, Kar M, Vasudevan K, Zacharia P, Panda P. Morbidity pattern among the elderly population in the rural area of Tamil Nadu, India. *Turkish Journal of Medical Sciences.* 2006 Feb 27;36(1):45-50.
20. Park, K. Health Programmes in India. In Park, K. eds. *Park's textbook of Preventive and Social Medicine.* 23rd edn. Jabalpurl M/S BanarsidasBhanot, 2015:471-73.
21. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke (NPCDCS). Available at: mohfw.nic.in/index1.php?lang=1&level=3&sublinkid=3627&lid=2194. (Last accessed on January, 2017)