Research Article

Prevalence and determinants of hypertension in elderly population of Raipur city, Chhattisgarh

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ABSTRACT

Background: Demographic transition across globe leading towards greying of population. Worldwide, raised blood pressure is estimated to cause 12.8% of the total annual deaths. This account for 3.7% of total DALYs. Several community-based studies have served to emphasize that hypertension is rapidly emerging as a major public health problem. However, only a few of these studies included elderly people. The objectives of the present study were to evaluate the prevalence and factors influencing hypertension among elderly population of Raipur city.
Methods: This community based cross-sectional study was carried out in capital of Chhattisgarh, including urban and slum area from July 2013 to June 2014. Multistage simple random sampling methods were used. Study population comprises of all elderly 60 years and above residing in the study area for at least one year. A total of 640 subjects were included in study.
Results: The overall prevalence of hypertension in present study was 50%, prevalent among females (55.49%), shows a significant positive association with body mass index, physical activity and age up to old age group (75-84) yrs. Surprisingly inverse association was observed with alcohol (P <0.001) and smoking (P <0.05) status.
Conclusion: Our findings emphasize the public health importance of hypertension in the elderly in Raipur city, and need to strengthen the national programme for hypertension. From a public health perspective, there is definite need for screening of elderly.

Keywords: City, Determinants, Elderly, Hypertension, Prevalence

INTRODUCTION

With time demographic transition is going on across globe resulting greying of population. From 1950 to 2050, the world population will have increased by a factor of 3.6; those 60 and over will have increased by a factor of 10; and those 80 and over by a factor of 27.[1] India is in Demographic transition phase and is expected to be next greying country very soon in the world. As Per available data from SRS, the % of elderly population (60+) has gone up from 6 to 8 percent respectively during 1991 to 2011, and it would be 19.1% in 2050.[3] The increase in elderly population will impose a greater burden on the already outstretched health services in the country. Elderly are most susceptible to long term illness. Of particular importance after the age of 40, are the degenerative diseases of the heart and blood vessels.[2] World Health Organization (WHO) has drawn attention to the fact that Coronary Heart Disease (CHD) is our modern "epidemic" not an unavoidable attribute of ageing. In early nineties CHD was epidemic in developed and well performing countries, but now a days developing countries are catching up due to modernization of society. Cardiovascular diseases (CVD) are responsible for about 25% of the Disability Adjusted Life Year lost (DALYs) due to non-communicable

disease in South East Asia Region (SEAR) countries. Of these Ischemic Heart Diseases (IHD) account for about 40% of DALYs lost, cerebrovascular diseases about 19%. The incidence of CVD is greater in urban area than in rural area. In India mortality from common CVD are, about 1.2 million IHD and 0.8 million stroke cases. The present mortality rate are the consequences of previous exposure to behavioural risk factors such as inappropriate nutrition, insufficient physical activity and increased tobacco consumption. Overweight, central obesity, high blood pressure, dyslipidaemia, diabetes and low cardio-respiratory fitness are among the biological factors contributing principally to increased risk. The blood pressure is the single most useful test for identifying individuals at high risk of developing CHD. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all annual deaths. This account for 57 million DALYs or 3.7% of total DALYs. The risk of CVD doubles for each incremental increase of 20/10 mmHg of blood pressure. As per community based survey carried out by ICMR during 2007-08, under state based Integrated Disease Surveillance Project (IDSP) Phase I, prevalence of hypertension was varying from 17-21% in all the state, with marginal rural-urban difference. Prevalence was increasing with age.[4] Similar study made across India and Bangladesh reported a significant prevalence of hypertension. Chhattisgarh is a young growing industrial state, rapidly going urbanization has induced western lifestyle, which makes vulnerable to population for developing cardio-vascular disease. Several community-based investigations have served to emphasize that hypertension is rapidly emerging as a major public health problem also in developing countries.[5] However, only a few of these studies included elderly people, and fewer still have focused exclusively on this segment of the population. The objectives of the present study were to evaluate the Prevalence and determinants of hypertension among elderly individuals residing in the capital of Chhattisgarh.

METHODS

A cross-sectional community based study was conducted in the urban & slum area of Raipur city (C.G.) from July 2013 to June 2014. Multi stage simple random sampling technique was used for data collection. The list of eight zone and 77 wards of Raipur city was obtained from the municipal corporation, Raipur, Chhattisgarh. Out of eight zone, four zones were selected by simple random technique. Out of four zones, from each, four wards were selected by simple random technique. From each ward, one slum area and one urban area were included in the study using simple random technique. A total of 32 areas were included in this study. Sample size were calculated by using statistical formula, $n = Z^2 1\text{-}/2 \, P \, (1\text{-}P)/d^2$.

P = Morbidity problems (50%), d = Absolute precision (4%), Confidence level =95%.

As there was no baseline study in Raipur, therefore a figure of 0.5(50%) was used to estimate the P. This is the 'safest' choice for the population proportion, since the sample size required is largest when P= 0.5(50%) [6]. A total of 600 figures come. For making uniformity 20 subjects from each of 32 areas were selected that comes 640. Therefore a total 640 subjects were included in study. Door to door survey was conducted.

Inclusion criteria: All elderly persons in the age group of 60 years and above who were residing in the study area for at least one year, and willing to participate in study without compulsion.

Exclusion criteria: Those who were not willing to participate in study.

Help of trained Mitanin and Angawadi worker was obtained to ensure better response and co-operation from the community. Briefing was made before survey to Mitanin and Angawadi worker. The information thus collected was recorded on predesigned and pretested proforma. Data was compiled and processed and analysed in MS Excel software. Chi-square test was applied and odd ratio was calculated. P value of <0.05 was considered statistically significant for interpretation of finding.

Definition of hypertension, smoking, alcoholics, physical activity, obesity

The hypertension status and blood pressure distribution of the study sample were assessed using standard criteria formulated by seventh Joint National Committee on Detection, Evaluation and Treatment of Hypertension (JNC-VII).[7]

We defined hypertension as either an SBP ≥140 mmHg, and/or a DBP ≥90 mmHg, and/or treatment with antihypertensive medication or any documentary evidence if available with subject. In order to avoid misclassification of non-hypertensive individuals taking cardiovascular medications for indications other than hypertension were not considered as hypertensives unless until they had documentary evidence of hypertension.

Smoking: According to World Health Organization 2002, Smokers were broadly divided into: Current smoker: Current smoker is someone who, at the time of survey, smokes any tobacco product either daily or occasionally in past twelve month. Ex-smoker: Are people who were former daily or occasional smokers, but have stopped smoking at least one year previously. Non-smoker: Non-smoker is individuals who have never smoked at all.

According to YARHS 2002-2003, alcoholics are classified as follows

Current alcoholics: Are those who consumed one or more alcohol containing drinks in the three months preceding the survey daily or occasionally. Ex-alcoholic: Are those

who have ever drunk alcohol, but did not consume any drinks during the three months preceding the survey. Non- alcoholics or life time abstainer: Are those who have never consumed any type of alcohol.[8]

Physical activity: It was calculated using Gupta and Malhotra, 1975 for Occupational activity and Grieg et al., 1980 for Non occupational activity. The grades of occupational and non-occupational activity were added up to give a total physical activity score and was further divided into light, moderate or heavy physical activity as follows: For light, moderate and heavy physical activity total grade score would be 1or 2, 3 or 4, 5 or 6 respectively.[9,10]

Obesity: It was determined by Quetlet's index (Body mass index) as follows: Quetlet's Index (BMI) = Weight/Height2. Weight was taken in kilograms (Kgs) and height in meter, rounding off to nearest ½ a kg and ½ a cm respectively.

RESULTS

Study sample characteristics

In present study, total 640 subjects were interviewed and examined. The demographic and clinical characteristic of the subject are shown in (Table 1). Overall there were more female than male (sex ratio 1.39). The majority (81.71%) of the participants belongs to young old (81.71%) followed by old (17.81%). The majority of the subjects were literate (69.06%) and most of them were educated up to higher secondary (40.15%). Majority

(57.19%) belong to middle SES and Hindu religion. Participants were equally distributed from both urban and slum area.

Table 1: Background characteristics of study population.

Background characteristics	Number	Percentage
Age (year)		
60-74	523	81.71
75-84	114	17.81
≥85	3	0.46
Sex		
Male	267	41.71
Female	373	58.28
Education		
Illiterate	198	30.93
Up to primary	84	13.12
Up to higher secondary	257	40.15
Graduation & above	101	15.78
Socio-economic status		
Upper	72	11.25
Middle	299	57.19
Lower	269	46.84
Religion		
Hindu	601	93.90
Muslim	33	5.15
Christian	6	0.93
Place of residence		
Urban	320	50
Slum	320	50

Table 2: Gender related characteristics of the study Population.

Variable	Male No. (%)	Female No. (%)	Total No. (%)	Chi square test, df, P value.	Odd ratio (OR)
Body mass index (BMI) (kg/m^2)					
Under weight (<18.50)	20 (30.76%)	45 (69.23%)	65 (10.15%)		1.42
Normal (18.5-24.99)	165 (42.41%)	224 (57.58%)	389 (60.78%)	X^2=45.78, df=4, P <0.0001	2.35
Overweight (≥25)	32 (33.33%)	64 (66.66%)	96 (15%)		1.6
Pre-obese (25-29.99)	40 (83.33%)	8 (16.66%)	48 (7.5%)		16
Obese (≥30)	10 (23.80%)	32 (76.19%)	42 (6.56%)		1
Physical activity					
Light	127 (31.05%)	282 (68.94%)	409 (63.90%)		0.27
Moderate	120 (60.30%)	79 (39.69%)	199 (31.09%)	X^2= 53.08, df=4, P <0.0001	0.91
Heavy	20 (62.5%)	12 (37.5%)	32 (5%)		1
Alcohol status					
Current alcoholic	50 (76.92%)	15 (23.07%)	65 (10.15%)		1.17
Ex- alcoholic	17 (73.91%)	6 (26.08%)	23 (3.59%)	X^2=49.77, df=2, P <0.0001	1
Non alcoholic	200 (36.23%)	352 (63.76%)	552 (86.25%)		0.20
Smoking status					
Current smoker	68 (56.19%)	53 (43.80%)	121(18.90%)		1
Ex-smoker	41 (29.49%)	98 (70.50%)	139 (21.71%)	X^2=18.97, df=2, P <0.0001	0.32
Non smoker	158 (41.57%)	222 (58.42%)	380 (59.37%)		0.55

About 3/5th of people (60.78%) have BMI within normal range, females were more overweight and obese than male (P <0.05) (Table 2). About 3/5th (63.90%) of the subject reported sedentary life style and most of them were females. Both alcohol and smoking practice were common among males.

Prevalence of hypertension and its determinants

The overall prevalence of hypertension in present study was 50% (Table 3), more among females (55.49%).

Prevalence of hypertension shows a significant positive association with body mass index, physical activity and age up to old age group (75-84) years.

Surprisingly inverse association was observed with alcohol (P <0.001) and smoking (P <0.05) status. There was no significant variation with place of residence. People belong to middle socio-economic status was more (57.19%) hypertensive followed by lower and upper (P <0.001).

Table 3: Prevalence of hypertension and its determinants in study population.

Background characteristics	Background characteristics		Chi square test, df, P value	Odd ratio (OR)
	Present (320)	Absent (320)		
Age (year)				
60-74	247 (47.22%)	276 (52.77%)	X^2=9.836, df=2, P <0.007	1.7
75-84	72 (63.15%)	42 (36.84%)		3.4
≥85	1 (33.33%)	2 (66.66%)		1
Sex				
Male	113 (42.32%)	154 (58.55%)	X^2=10.803, df=1, P <0.001	0.58
Female	207(55.49%)	166 (44.50%)		
Place of residence				
Urban	159 (49.68%)	161 (50.31%)	X^2=2.068, df=1, P >0.05	0.97
Slum	161 (50.31%)	159 (49.68%)		
Socioeconomic status (Kuppuswamy's socio-economic status scale)				
Upper	23 (31.94%)	49 (68.05%)	X^2=16.64, df=2, P <0.001	1
Middle	171 (57.19%)	128 (42.80%)		2.84
Lower	126 (46.84%)	143 (53.15%)		1.87
Alcohol status				
Current alcoholic	28 (43.07%)	37 (56.92%)	X^2=26.10, df=2, P <0.001	∞
Ex-alcoholic	0	23 (100%)		1
Non-alcoholic	292 (52.89%)	260 (47.10%)		∞
Smoking status				
Current Smoker	60 (49.58%)	61 (50.41%)	X^2=11.75, df=2, P <0.05	1.96
Ex-smoker	29 (33.33%)	58 (66.66%)		1
Non-smoker	231 (53.47%)	201 (46.52%)		2.29
BMI				
Under weight (<18.50)	15 (23.07%)	50 (76.92%)	X^2 = 73.51, df=4, P <0.001	0.03
Normal (18.5-24.99)	169 (43.44%)	220 (56.55%)		0.08
Overweight (≥25)	69 (71.87%)	27 (28.12%)		0.26
Pre-obese (25-29.99)	29 (60.41%)	19 (39.58%)		0.16
Obese (≥30)	38 (90.47%)	4 (9.52%)		1
Physical activity				
Light (n=409)	224 (54.76%)	185 (45.23%)	X^2=11.07, df=2, P <0.05	2.31
Moderate (n=199)	85 (42.71%)	114 (57.28%)		1.42
Heavy (n=32)	11 (34.37%)	21 (65.62%)		1

DISCUSSION

Demographic and clinical characteristics

Greying of the population in India is likely to be an increase in the burden of hypertension and related cardiovascular diseases. In present study there were more female than male (sex ratio 1.39). Similar gender composition was reported in study by Kalavathy MC et al., Baliga SS et al., Quasem I et al., Pooja and Yashoda Mittal.[11-14] Like other study done by Kalavathy MC et al., Quasem I et al., present study had maximum percentage

of young old followed by old and very old. The majority of the subjects were literate (69.06%) and most of them (57.19%) belong to middle SES and Hindu religion. Similar trend was observed in another study.[11,13] Unlike study done by Kalavathy et al., Quasem I et al., Pooja and Yashoda Mittal, present study was carried out in equal number of subject from urban and slum area of a city. In present study body mass index is differ to other study in having two third of population within normal range and female were more overweight and obese than male.[13] Like other studies majority (63.90%) of the subject reported sedentary life style and maximum were females.[13] Both smoking rate and alcohol intake were more in male. A striking difference was observed in grading of smoking, moderate (52.45%) and heavy (55.55%) smoking practice were more common in females. Similar trend of smoking was observed in another study.[11,13,15]

Prevalence and determinants of hypertension

About half (50%) of study population were hypertensives and shows statistically significant gender difference, prevalent among females and shows an increasing trend across 6th to 8th decade of life. Similar trend was reported by Baliga SS et al., Kalavathy MC et al.[11,12] Similar findings were observed in the US NHANES III Survey-and the "Egyptian National Hypertension Project" but are lower than the rates reported in some other surveys of elderly individuals in Europe and South America.[15-17] A meta-analysis in Africa reported prevalence of hypertension reaching 70% in an urban Tanzanian population aged more than 70 years.[18,19]

Present study shows a positive association with Body Mass Index (BMI), physical activity and age up to old age group (75-84) years. In another study across India and Bangladesh among elderly reveals statistically significant positive association between prevalence of hypertension and physical activity, body mass index, level of education, place of residence and smoking status.[13] Smoking and residence in an urban area have been associated with a higher prevalence of hypertension in several prior investigations in India and abroad.[20-23] Kalavathy MC et al. reported, socio-demographic variables (such as religion, SES, education) did not influence the hypertension status of men or women in their study while non-smoker was associated with an 80% lower odds of having elevated blood pressure.[11] Surprisingly unlike other study, inverse association was observed with alcohol and smoking status in present study.

CONCLUSIONS

About half (50%) of the population were hypertensives, prevalent among females (55.49%). There was significant positive association with BMI, Physical activity and age up to old age group (75-84) years. Our findings emphasize the public health importance of hypertension in the elderly in Raipur city, and need to strengthen the national health programme for hypertension. From a public health perspective, there is definite need for screening of elderly.

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