International Journal of Community Medicine and Public Health
Sheth AM et al. Int J Community Med Public Health. 2016 Jul;3(7):1866-1871
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20162057

Research Article

Prevalence and factors affecting hypertension among old age population in rural area

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Received: 18 May 2016
Accepted: 09 June 2016

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ABSTRACT

Background: India, in the associated epidemiological transition, is facing a double burden of communicable and non-communicable diseases. Old age is not a disease in itself, but the elderly are vulnerable to long term diseases of insidious onset like hypertension. Due to deficit of regular screening and unawareness about complications of long term high blood pressure in old age in rural area the large number of population remain undiagnosed so they might suffer from the long term complications of hypertension. The main objectives of the study were to determine prevalence of hypertension among old age population and to study the factors affecting the hypertension.
Methods: It was a cross sectional study conducted in rural area of Vadodara district, Gujarat, India from October 2012 to March 2013. The study participants were old age group population with age more than or equal to 60 completed years. A sample size of 600 was obtained using hypothesis testing method. Using simple random sampling, 6 talukas were selected and from each, 4 villages were chosen. From each village, 25 study participants were included by house to house survey.
Results: Prevalence of hypertension was 42.7%, significantly higher in age group more than 80 years (61%) and females (48%). Hypertension was significantly associated with current alcohol and tobacco consumption. Education, living arrangements, marital status and working status were significantly affecting hypertension.
Conclusions: Specific screening programmes are needed for early detection and control to avoid further complications. Geriatric health care should be integrated in the general health system up to primary health care level.

Keywords: Hypertension, Old age, Addictions, Prevalence

INTRODUCTION

Aging is a universal process. In the words of Seneca "old age is an incurable disease". But more recently Sir James Sterling Ross commented “your do not heal old age, you protect it, you promote it and you extend it”. These are in fact the principles of preventive medicine.[1]

A man’s life is normally divided in to five main stages namely infancy, childhood, adolescence adulthood and old age. Ageing is an integral part of the growth and development which is terminated by death. The elderly people are the precious asset for any country. With their rich experience and wisdom they contribute their strength for the substance and the progress of the nation.[2]

Total population in India is 1028.61 million and old age population (≥60 years) is 7.46% that is 76.73 million (NFHS III). About 48.2% of elderly persons were women-out of whom 55% were widows. A total of 73% of the elderly persons were illiterate and dependent on physical labor. One third was reported to be living below the poverty line (i.e. 33% of the older persons were in vulnerable situation without adequate food, clothing or shelter). About 90% of elderly were from the

unorganized sector i.e. they have no longer sources of income.[3]

From the morbidity point of view, almost 50 per cent of the Indian elderly have chronic diseases and 5% suffer from the immobility. A major component of the burden of illness for the elderly derives from the prevalent chronic diseases. India, in the associated epidemiological transition, is facing a double burden of communicable and non-communicable diseases.[4] Old age is not a disease in itself, but the elderly are vulnerable to long term diseases of insidious onset such as cardiovascular illness, CVA, cancers, diabetes, musculoskeletal and mental illnesses.

Blood pressure and aging

It is a common and mainly justifiable argument that blood pressure rises with age. Epidemiological studies have indeed demonstrated that mean blood pressure increases with age, not only in old age but also in young adults.[5-11]

Blood pressure might not increase in *all* people but increasing pressure in a subgroup of individuals leads to an increase in mean blood pressure in the population.[18] However, blood pressure does not seem to increase indefinitely. DBP has been shown to decrease in old age whereas SBP continues to rise leading to an increasing prevalence of isolated systolic hypertension and an increasing PP.[5,6,8-10,12,13] The blood pressure changes in old age can be attributed to stiffening of large, *central*, arteries, encompassing vessel wall changes such as increased amounts of collagen, decreased content and increased destruction of the elastic protein elastin, calcification and possibly also to alterations in vascular smooth muscle tone.[14,15]

Hypertension is a threat to life at all ages and both sexes, it is one of the leading cardiovascular disorders and important risk factor for coronary artery diseases, cerebrovascular diseases and cardiac failure in elderly patient. Early detection and treatment of hypertension can significantly reduce cardiovascular and cerebrovascular related mortality along with improvement in quality of life.[16]

Rationale

Due to deficit of regular screening and unawareness about complications of long term high blood pressure in old age in rural area the large number of population remain undiagnosed so they might suffer from the long term complications of hypertension.

This study will also extend previous research regarding prevalence of blood pressure in old age. This study will offer the opportunity to account for numerous socio demographic factors and addictions in old age group to explore relationship between blood pressure and various factors affecting it.

METHODS

Study population

This cross sectional study was carried out in villages of Vadodara district, Gujarat, India. The study participants were geriatric age group population with age more than or equal to 60 completed years. Those persons who were comatose, non-cooperative, totally deaf or dumb, uncomfortable with Hindi, Gujarati or English language, having past history of stroke, and known case of psychiatric or neurological disease (schizophrenia, Parkinsonism, epilepsy) were excluded from the study.

Study duration

The study was conducted from October 2012 to March 2013.

Sample size calculation

The sample size for the present study was calculated using the hypothesis testing method at 95% confidence interval, with an allowable error of 3%. Various earlier studies revealed that the prevalence of hypertension among the old age people in rural areas of Gujarat state was around 14-16%. Hence a prevalence of 15% was assumed for the purpose of computing the size of the sample required for the present study. Considering a 10% non-response rate, the total sample size calculated for the study was 622 elderly subjects aged 60 years and above. After data validation and data cleaning, 600 subjects were included in the analysis of the study.

Sampling technique

6 talukas were selected by simple random sampling from total 12 talukas of the Vadodara district. From each of these talukas, 4 villages were selected by simple random technique using random number generation. From each of the selected village, 25 study participants were selected conveniently by house to house survey. Survey was started from the right hand side of the Village Panchayat Office. The village next to that in random list was selected to fulfill the study subjects, if study participants were not enough in a selected village.

Measurement tools

Initially blood pressure was measured by random zero mercury sphygmomanometer and stethoscope in sitting position in right brachial artery after 5 minute rest. A total of 3 measurements were taken during the interview at an interval of 10 minutes each. Mean of all three readings was taken for analysis. Korotkoff sound 1 and 5 were considered as systolic and diastolic blood pressure respectively. Pulse pressure was calculated as the

difference between systolic and diastolic blood pressure. Mean arterial blood pressure was calculated by using following formula: DBP+1/3 pulse pressure. Measurement of blood pressure of all participants was done by single investigator. The Joint National committee 7 (JNC 7) classification for the hypertension were used in the study.[17]

Data analysis

The data was entered in MS Excel 2007. Quantitative variables are presented through mean, standard deviation and range. Qualitative variable are analyzed through Chi-square test.

Ethical consent

Ethical consent was obtained from Institutional Ethical Committee

Definition of prevalence of hypertension

All the study subjects who were detected hypertensive (as per JNC 7) at the time of measurement, irrespective of their past history, were considered to be the 'cases' while calculation of prevalence of hypertension.

RESULTS

Overall prevalence of high blood pressure among study participants was 42.7%. As shown in Table 1, high blood pressure is more prevalent in age group above 80 years and it was statistically significant (p value<0.05). Prevalence of hypertension in male and female participants was 38.9% and 48.5% respectively and it was statistically significant (p<0.05).

Table 1: Prevalence of hypertension among study participants according to age and sex (N=600).

Characteristics	Hypertension		*P* value
	Present (N=256)	Absent (N=344)	
Age group			
60-69	198(46.8%)	225 (53.2%)	
70-79	28 (21.9%)	100 (78.1%)	0.00
≥80	30 (61.2%)	19 (38.8%)	
Sex			
Male	142(38.9%)	223(61.09%)	0.02
Female	114(48.5%)	121(51.48%)	
Total prevalence	256(42.7%)	344 (57.3%)	

Table 2 shows addictions among geriatric age group. 143 (23.8%) of study subjects had ongoing habit of smoking, whereas 382 (63.6) never ever smoked. The prevalence of hypertension among those who smoke currently (59.4%) and those smoked in the past (44.0%) was higher than those who never smoked (36.1%). This difference was found to be statistically significant. Smokeless forms of tobacco like Gutka, Mava, Pan etc. was consumed currently by 241 (49.5%) study subjects. The prevalence of hypertension in those who current consumed smokeless tobacco (52.4%) was significantly higher than those who never consumed smokeless tobacco (29.4%). Current alcohol consumption is pretty low in our study (32.0%). 60.0% participants had never consumed alcohol in the past. The prevalence of hypertension was significantly higher in current alcohol consumption group (62.5%) as compared to other two groups.

Table 2: Addictions among study participants and its relation with hypertension (N=600).

Addictions	Hypertension present (N=256)	Total	*P* value
Smoking habit			
Never	138 (36.1)	382	
Current	85 (59.4)	143	**0.00**
Past	33 (44.0)	75	
Smokeless tobacco use			
Never	72 (29.4)	241	
Current	156 (52.5)	297	**0.00**
Past	28 (45.1)	62	
Alcohol consumption			
Never	114 (31.6)	360	
Current	120 (62.5)	192	**0.00**
Past	22 (45.8)	48	

Table 3: Prevalence of hypertension in relation to socio - demographic characteristics of study population (N=600).

Characteristics	Hypertension present (N=256)	Total	*P* value
Education status			
Illiterate	103 (48.3)	213	**0.00**
Literate	153 (39.5)	387	
Working status			
Working	57 (35.8)	159	**0.04**
Not working	199 (45.1)	441	
Marital status			
Married	218 (49.4)	441	
Unmarried	0 (0.0)	18	**0.00**
Separated/ divorced	0 (0.0)	10	
Widow/ widower	38 (29.0)	131	
Living arrangement			
Living alone	10 (15.4)	65	
Living with spouse	37 (28.21)	131	
Living with children	28 (29.8)	94	**0.00**
Living with spouse and children	181 (58.4)	310	

Table 3 shows the relation of various socio-demographic variables and prevalence of hypertension. Statistically significant association was found between the socio-demographic variables (education, marital status, current working status and living arrangement) and the prevalence of hypertension. Prevalence of various other morbidities among study participants according to their history and records is described in Table 4. Prevalence of musculoskeletal problems was highest at 64.9%. Prevalence of depression was quite high (54.2%). Prevalence of overall diabetes in study participants was found to on lower side at 18.7%. Visual impairments, dental and hearing problems were prevalent as 34.5%, 34.2% and 14% respectively.

Table 4: Prevalence of other co-morbid conditions among study participants (N=600).

Morbidities	Overall prevalence rate (n=600)	Prevalence among male (n=365)	Prevalence among female (n=235)
Diabetes	112 (18.7%)	64 (17.5%)	48 (20.4%)
Musculoskeletal problems	389 (64.9%)	220 (60.3%)	169 (71.9%)
Dental problems	205 (34.2%)	121 (33.2%)	84 (35.7%)
Vision problems	207 (34.5%)	94 (25.8%)	113 (48.1%)
Hearing problems	84 (14.0%)	47 (12.9%)	37 (32.9%)
Respiratory problems	158 (26.3%)	120 (32.9%)	38 (16.2%)
Cardiovascular problems	75 (12.5%)	47 (12.9%)	28 (11.9%)
Gastrointestinal problems	113 (18.8%)	57 (15.6%)	56 (18.8%)
Genitourinary problems	66 (11.0%)	48 (13.2%)	18 (7.7%)
Obesity (BMI ≥ 23)*	277 (46.2%)	152 (41.6%)	125 (53.19%)
Depression (GDS ≥ 5)^	325 (54.2%)	146 (40.0%)	179 (76.2%)
Poly-pharmacy	180 (30%)	123 (33.7%)	57 (24.3%)

*BMI = Body mass index, ^GDS = Geriatric depression scale.

DISCUSSION

Hypertension is an important cause of morbidity and mortality in the elderly population and is a risk factor for many other diseases. Present study reports a prevalence rate of hypertension as 42.7% which compares well with other studies carried out by Kokiwar et al at rural community of central India (38.1%) and Agrawal et al from Rajasthan (42.1%).[16,18] In the study done by Swami et al revealed 58% of prevalence of hypertension in urban and rural areas of Chandigarh and among which 61.3% prevalence in urban geriatric subjects and 36.7% prevalence in rural elderly subjects.[19]

Prevalence of hypertension in present study was as high as 48.5% in females compared to males 38.9%. Similar findings were reported by Hazarika NC et al and Malhotra P et al while Gupta R et al and GuangHui Dong et al found it was more in males. Wilmanska et al and Gupta et al also observed the similar finding of high prevalence of hypertension in females (48.4%) than in males (47.5%).[20-25]

Common observation from previous studies was that prevalence of hypertension increase with age.[16,20-23] Age probably represents an accumulation of environmental influences and the effect of genetically programmed senescence in body systems.

Agarwal et al, Singh et al have reported the positive association between tobacco use and hypertension.[16,26] These studies support the present study.

Khalid et al found that higher prevalence of hypertension was among illiterate persons (33%).[27] In our study too, higher prevalence of hypertension is seen in illiterate subjects. Kalavathy et al observed higher prevalence of hypertension in the widows.[28] Deshmukh et al observed that hypertension is more prevalent in sedentary occupations.[29]

A high prevalence of co-morbid conditions were observed (particularly musculo-skeletal problems, depression, obesity, vision problems) unlike any other previous study. Prospective studies are required to examine the exact nature of these conditions and their association with age and sex.

CONCLUSION

The prevalence of hypertension in the elderly population of this study is quite high, with increase in prevalence with advancing age. Prevalence of hypertension was significantly associated with consumption of alcohol and tobacco. Specific screening programmes are needed for early detection and control to avoid further complications. IEC activities should be started to create awareness about healthy lifestyle and measures like

restriction of smoking and alcohol. It is very essential that geriatric health care should be integrated in the general health system up to primary health care level.

With more studies like the current study, in the community-dwelling elderly, it is hoped that a truer picture of associated co-morbidity in the elderly in India will emerge and lead to a substantial overhaul in the current delivery of care to these individuals, whose wellness and disability play a major role in determining the health and wellbeing of the society in general.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sheth AM, Jadav PA. Prevalence and factors affecting hypertension among old age population in rural area. Int J Community Med Public Health 2016;3:1866-71.