A study of risk factors and complications in elderly hypertensive subjects

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Background: Hypertension among the elderly is a major, highly prevalent yet treatable cardiovascular disease. Aims & objectives: Study aims to highlight the risk factors for hypertension in the elderly in an urban setup for the benefit of improving quality of life and also reduce the incidence of the cardiovascular related complications. Methodology: This is a Cross-sectional observational study. Included 125 study subjects based on selection criteria. The selected patients were subjected to a preformed and pretested schedule of questions pertaining to the risk factors. Results: Among the known hypertensive patients above 60 years of age, 125 subjects were included in the study. Smoking (62%), alcohol consumption (21%), family history of hypertension (26%), family history of diabetes (70%) were statistically significant risk factors observed for the development of hypertension. Conclusion: Sedentary lifestyle (physically less active) and anthropometric measures like overweight and obesity, abnormal waist circumference, and abnormal waist hip ratio were all identified as remarkable risk for hypertension. Myocardial infarction (20%), stroke (14%), and heart failure (12%) were the chart buster complications of hypertension in the vulnerable geriatric population.

Keywords: Elderly, hypertension, risks, waist circumference and waist hip ratio

Introduction

Aging is a natural, predictable process of human lifecycle and brings along two inevitable events: physiological vitality decline and progression of senile changes. The term “geriatric” refers to elderly person having 60 years of age and above. Among the degenerative diseases of old age, hypertension is rightly pointed out as an important cause of cardiovascular related morbidity and mortality. As number of senior citizens in India is rising rapidly, hypertension is surfaced as a grave threat to public health management. In the WHO health report (1998), hypertension was globally ranked fourth common disease and alarmingly higher cases of hypertension all across the world has been reported, around 69 million or more. Almost half of the elderly population living in India is said to be hypertensive. Hypertension stood second to rheumatic heart disease among the most prevalent cardiovascular crisis encountered in rural and urban India. Hypertension is defined as a blood pressure (BP) ≥140 mm Hg and/or a diastolic ≥90 mm Hg (WHO‑ISH guidelines). When the systolic BP is equal to or greater than 140 mm Hg (with a diastolic BP 90 mm Hg), isolated systolic hypertension (ISH) is said to be present and is common among the geriatric patients. Hypertension is observed as a raised systolic BP with normal or lowered diastolic BP because of stiffening of the large arteries (arteriosclerosis) in the older adults. Hypertension among elderly has proven to be multifactorial in etiology. Impaired autoregulation of the blood flow of target smooth muscle cells, increased resistance to the minute arteries (arterioles) and decreased compliance of the arterial wall contribute to the development of hypertension.
organs, diminished vascular elasticity, baroreceptor reflex tampered, cardiac remodeling, hypertrophy and reduced diastolic function of the left ventricle, renal dysfunction are present. Any rapid and sharp fall in BP may result in compromised circulation to these organs; therefore, lowering BP must be done with utmost caution and scrupulously, avoiding any excessive BP fall. Apparently sustained and long-term BP control is distinctly effective in averting cardiovascular mishaps and organ damage progression. Hypertension is fairly asymptomatic, typically detectable, rampant, often easily manageable but if left untreated may result in dire complications. When compared to normotensives, hypertensives face doubles the risk for having any peripheral arterial occlusive disease, thrice higher chance for coronary heart disease, four times for developing congestive heart failure and seven times more warned for impending stroke.[7] Epidemiological studies concluded powerful, consistent, continuous graded, predictive, independent, and etiologically significant link between both systolic and diastolic blood pressure (DBP) shooting up and mortality. When systolic BP rise by every 20 mm Hg or DBP by 10 mm Hg, the mortality from ischemic heart disease, stroke is nearly doubled and is presumed to experience 60% increased risk of death over a 2-year period.[8] These persistent risks may be seen for longer periods, sometimes even in the ninth decade of life. This study was undertaken in the elderly hypertensives to understand the risk profile and complications to achieve a better understanding and management of this public health problem. In the urban settings of Andhra Pradesh, most of the elderly patients prefer private family physician for any immediate and urgent medical care. So, knowing the risk factors in the development of hypertension in a particular target population will be handy for the treating family physician as a guide in deducing the treatment modalities. Such a list may prove useful to the clinicians in suggesting the adoption of preventive life style measures in specific geriatric community like those residing in the cities.

**Material and Methods**

This cross-sectional observational study was conducted in Swatantra Multispecialty Hospital from September 2013 to May 2015 after obtaining necessary ethical committee approval from the local IEC. Among the known hypertensive patients above 60 years of age attending the outpatient and inpatient departments and willing to give informed consent, 125 study subjects were selected to be included in the study. Patients below 60 years, psychiatric patients were excluded. The selected patients were subjected to a preformed and pretested schedule of questions pertaining to the risk factors. After explaining the relevant study details, informed consent was obtained at the study onset. Biochemical profiling and other confirmatory diagnostic investigations were carried out. Study subject were later subjected to clinical examination for evaluation of clinical profile of the patients. 17-03-2016.

Evaluation of family history for hypertension or diabetes mellitus, social habits like smoking, drinking alcohol, lifestyle preferences of physical activity/inactivity, obesity evaluation, waist circumference, waist hip ratio measurement were the parameters used for assessing the risk factors in the elderly hypertensive in the current study. Evaluation for complications of hypertension was also done. Descriptive data was presented as frequencies, percentagess, means, and standard deviations. For analysis of categorical data, Chi-square test was used. P value < 0.05 was considered statistically significant.

**Results**

Among the 125 patients included in the study, 82 (66%) were males and 43 (34%) were females. Occupation statistics was topped by farmers 62 (50%), 26% were housewives, while 8% were teachers. Biochemical parameters like lipid profile (LDL, HDL), blood urea, serum creatinine, urine albumin, random blood sugar, urine sugar, were estimated and were found normal in >55% of the cases. 26 (21%) of the patients had history of consumption of alcohol. 32 (26%) of the patients had family history of hypertension. Diabetes family history was seen in 88 (70%) of the patients. Only 44 (47%) had moderate physically activity routine, whereas 66 (53%) of the patients had a sedentary life style. On anthropometric evaluation of the patients, 73 (58.4%) had normal weight, 47 (37.6%) of the patients were overweight, and 5 (4%) of the patients were obese. Abnormal waist circumference was observed in 91 (72.8%) while 34 (27.2%) of the patients had normal waist girth. 16 (12.8%) patients had normal waist hip ratio, whereas 109 (87.2%) patients were abnormal waist hip ratio [Table 1]. Myocardial infarction (20%), stroke (14%), and heart failure (12%) were the chart buster complications of hypertension in the vulnerable geriatric population. Chronic renal disease (4.8%), retinopathies (4.8%) were the less common hypertension complications observed in this study. Smoking is an undisputable risk factor was present among the vast majority 78 (62%) of the patients despite the advancing age. 26 (21%) of the patients were alcohol drinkers, undoubtedly all males and hence male gender was highly statistical associated with consumption of alcohol. 88 (70.4%) of the patients had family history of diabetes of whom 56 (44.8%) were males and 32 (25.6%) were females but no statistical association of gender was found with family history of diabetes. 5 (4%) of the patients were obese of whom 3 (2.4%) were females and 2 (1.6%) were males. Obesity had no statistical association with gender. 91 (72.8%) of the patients had abnormal waist circumference of whom 55 (44%) were males and 36 (28.8%) were females. There was statistical association of gender with waist circumference. Family history of hypertension is a significant risk factor for development of hypertension. Smoking, alcohol consumption, family history of hypertension was statistically significantly associated with hypertension. Family history of diabetes was not statistically significant risk factor for development of hypertension. Physical inactivity and anthropometric measures like obesity, waist circumference, and waist hip ratio were all identified as risk factors for hypertension. 12 (9.6%) patients had chronic kidney disease of whom 6 (4.8%) were males and 6 (4.8%) were females. 19 (15.2%) patients had heart failure of whom 15 (12%) were males and 4 (3.2%)
were females. 37 (29.6%) patients had myocardial infarction of whom 25 (20%) were males and 12 (9.6%) were females. No statistical association of gender was observed with occurrence of complications.

### Discussion

Geriatric age group is the most rapidly growing segment of our population, and the magnitude of hypertension related morbidity, mortality among the elderly is not generally much appreciated. Typically, elderly patients have systolic BP elevation with low diastolic BP (due to “stiff arteries”). Multiple comorbidities make management very challenging in the elderly. Multiple trials have reported that not only is it safe to treat hypertension in the elderly, but also that will decrease stroke, myocardial infarction, and overall mortality. The risk factor concept implies that a person with one risk factor is more likely to develop complications than a person with no risk factor. The presence of multiple risk factors in the same patient further accelerates the incidence of complications pertaining to elderly hypertensives. Hence it is important to identify the major risk factors so that future preventive measures can be taken in the form of lifestyle modification and pharmacotherapy. In the present study, 32 (26%) had family history of hypertension. Study done at national level by Priyanga Ranasinghe et al. demonstrated that patients having a family history of showed higher prevalence of hypertension (29.3%, n = 572/1951) than those without (24.4%, n = 616/2530) (P < 0.001). In a study done to evaluate the impact of family history on hypertension by Otaki Y, Gransar H, Berman...
In another study in Jordan, smokers had a relatively spiked BP than the non-smoking folks. Men usually smoke more than ladies and there is dose-dependent relationship between cigarette smoking and elevated blood pressure. \(^{17}\) A study done by Ohmori S, Kiyohara Y, Kato I, et al. in Japan suggested that consumption of alcohol regularly was significantly co-related with an higher risk of landing up in hypertension. The longitudinal Japanese studies and cross-sectional studies in China and Korea resulted in similar findings. Alcoholics among older Japanese men notably showed a raised BP, whereas restricted alcohol consumption was linked to a reduced BP.\(^ {18,19}\) Generally, men drink more alcohol than women; therefore, the risk for developing hypertension is linear with alcohol dose intake. In our study, 73 (58.4\%) of the patients were normal weight. 47 (37.6\%) of the patients were overweight. 5 (4\%) of the patients were obese. Overweight and obese have been identified as a risk factor for hypertension by many studies. The American Heart Association Professional Education Committee of the Council for High Blood Pressure Research, recently stressed upon advancing age and obesity being the two strongest etiological factors in developing uncontrolled hypertension.\(^ {20,21}\) 34 (27.2\%) of the patients were normal by waist circumference. 91 (72.8\%) of the patients were abnormal by waist circumference. In a study conducted by Arlappa et al., among 1,104 elderly hypertensive, 87\% of men and 77\% of women, respectively had abnormal WC.\(^ {21}\) In this study, 16 (12.8\%) of the patients were normal by waist hip ratio and 109 (87.2\%) of the patients were abnormal by waist hip ratio. 51.5\% of the elderly had more than normal waist hip ratio as reported in a study done by P.R. Deshmukh et al.\(^ {22}\) In our study, 66 (53\%) of the patients had sedentary physical activity and it was highly statistical associated with gender. 59 (47\%) of the patients had moderate physical activity. Physical activity as a risk factor has been identified as an important modifiable lifestyle risk factor for hypertension as well as may lifestyle diseases. In recent large prospective U.S. population-based studies including the Nurses Health Study II, the Aerobics Center Longitudinal Study (ACLS), and Coronary Artery Risk Development in Young Adults (CARDIA) study data reveal that physical activity that is self-reported may be associated inversely with prospects for landing in hypertension. Agarwal et al. also observed 58\% of the geriatric population studied were sedentary, thus supporting our study finding as “physical inactivity or marked sedentary habits” a notable risk factor for increased BP.\(^ {23}\) In our study, 48 (38\%) patients had stroke. 37 (30\%) patients had myocardial infarct. 19 (15\%) patients had heart failure. 12 (10\%) patients had chronic kidney disease. 9 (7\%) patients had retinopathy. The prevalence of CKD was same among both males and females. The other complications like heart failure, MI, retinopathy, and stroke are higher among men when compared to females [Figures 1 and 2]. There was no statistical association between gender and complications suggesting that there is no preponderance of gender for occurrence of complications. A population-based study done in northern India among 362, 30\% of the study subjects had some abnormality in ECG revealing associated coronary heart disease. 40 subjects (11.05\%) had complications such as MI and stroke.\(^ {24}\)

**Conclusion and Summary**

Hypertension is a known risk factor for cardiovascular disease (CVD) that is rather modifiable. The Framingham Heart Study data concluded that noticeable rise in systolic or DBP can actually accentuate cardiovascular morbidity in those aged 65 and above.\(^ {25}\) Family history of hypertension is a significant risk factor for development of hypertension. Smoking, alcohol consumption was statistically significantly associated with hypertension. Family history of diabetes was not statistically significant risk factor for hypertension. Physical inactivity and anthropometric measures like obesity, waist circumference, and waist hip ratio were all identified as risk factors for hypertension. Identification and management of these risk factors in larger population is essential in understanding, management, and preventing complications of hypertension in the elderly.
125 patients in the study, 32 (25.6%) patients had family history of hypertension out of whom 22 (17.6%) were females and 10 (8%) were males of gender was highly statistical associated with family history of hypertension. Vast majority of the patients 78 (62%) were smokers and smoking was a strong risk factor presented. 26 (20.8%) of the patients were consumers of alcohol who were all males and male gender was highly statistical associate of with consumption of alcohol. 91 (72.8%) of the patients had abnormal waist circumference of whom 55 (44%) were males and 36 (28.8%) were females. There was statistical association of gender with waist circumference. The major limitations of the study are the restricted study subjects selected from a limited resource hospital only and time constraint. This is also subjected to Berkisonian bias as different hospitals have different admission rates.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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