

# Frequency of Isolated Systolic Hypertension in Elderly Hypertensives

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## ABSTRACT

**Aim:** To study frequency of isolated systolic hypertension in elderly hypertensive.

**Design:** Descriptive study.

**Setting:** Department of medicine, POF Hospital Wah Cantt

**Duration of study:** For 3 month's period i.e. from 24th December 2009 to 24th March 2010.

**Method:** Total 148 cases, both male and female, of more than 50 yrs age were taken. Blood pressure of all these subjects were taken by standard sphygmomanometer on presentation and after 02 weeks while patient was lying comfortably for at least five minutes. Mean of two readings was taken as final blood pressure. These hypertensive patients of more than 50 years were enrolled from both, in-patients as well as out-patient department of POF Hospital Wah Cantt. A specially designed proforma was used to collect data by nonrandom probability sampling.

**Results:** Among the 148 cases, 24(16.2%) were found to have isolated systolic hypertension, 20(13.5%) were falling in the range of borderline isolated systolic hypertension, systolic diastolic hypertension was seen in 82(55.4%) of cases, and 8(5.4%) were found to have diastolic hypertension.

**Conclusion:** Frequency of isolated systolic hypertension was observed to be increasing in elder age group. As the frequency of systolic hypertension increases in elderly, the risk of stroke, cardiovascular diseases and ischemic heart disease also increases. Among blood pressure indices, systolic blood pressure remains main predictor of cardiovascular mortality, myocardial infarction, left ventricular hypertrophy and renal dysfunction. Cardiovascular risk increases progressively doubling for every 20/10 mm of Hg rise in blood pressure. Though the incidence is falling in West but is rising in Asia.

**Keywords:** Isolated systolic hypertension(ISH), borderline isolated systolic hypertension (BISH) isolated diastolic hypertension, systolic diastolic hypertension.

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## INTRODUCTION

Isolated systolic hypertension has been considered an important dilemma in the past few decades especially with reference to advancing age.<sup>1</sup> The pattern of blood-pressure elevation also changes with age. Before reaching 50 years of age, most people with hypertension have elevated diastolic pressure. After the age of 50 years, as systolic pressure continues to rise and diastolic pressure tends to fall, isolated systolic hypertension predominates<sup>1</sup>.

Structural and functional changes in the arterial tree resulting in increased arterial stiffness and augmented systemic vascular resistance contribute to the development of isolated systolic hypertension in elderly persons<sup>2</sup>.

Among blood pressure indices, systolic blood pressure remains main predictor of cardiovascular mortality, myocardial infarction, left ventricular hypertrophy and renal dysfunction<sup>3,4</sup>. Cardiovascular risk increases progressively doubling for every 20/10mmHg rise in blood pressure<sup>1</sup>. Though the incidence is falling in West but is rising in Asia.

In Pakistan every third person above age of 45 years has hypertension.<sup>5</sup>, while In USA, 30% individuals above the age of 30 are hypertensive without treatment. The rates of blood pressure screening in Pakistan are worryingly low, calling for the establishment of a nationwide Programme to improve detection, awareness and treatment of hypertension.<sup>6</sup> Therefore it is essential to detect and treat hypertension. More aggressive intervention approaches and therapeutic strategies are needed for effective control of blood pressure and reduction of cardiovascular risk factors in hypertensive elderly patients. This fact prompted me to work over this study, so patients can be provided primary prevention regarding this and effective reduction of cardiovascular events can be implicated.

The newest hot issue in the field of hypertension relates to oldest isolated systolic hypertension (ISH) in the elderly. Hypertension itself is defined as a systolic pressure of 140mmHg or greater or a diastolic pressure of 90mmHg or greater while patient lying comfortably<sup>7</sup>. Which is further categorized into isolated systolic hypertension, borderline isolated systolic hypertension, diastolic hypertension and systolic diastolic hypertension.

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Isolated systolic hypertension (ISH) is defined as systolic blood pressure greater than 160 mm of Hg with the diastolic blood pressure of less than 90 mmHg<sup>8,9</sup>. Borderline systolic hypertension (BISH) is defined as systolic blood pressure of >140 mm Hg but <160 mmHg with diastolic blood pressure of <90 mmHg<sup>10,11</sup>. Isolated diastolic hypertension (IDH) is defined as a diastolic blood pressure of greater than 90 mm of Hg with the systolic blood pressure below 160 mmHg.

The pattern of blood-pressure elevation varies with age in most populations<sup>12</sup>. Most people have diastolic hypertension before reaching 50 years of age<sup>13</sup>. After the age of 50 years, systolic pressure continues to rise and diastolic pressure tends to fall, so isolated systolic hypertension predominates in elderly.

## RESULTS

In this study total of 148 hypertensive patients were included of which 86 (58.1%) were male and 62 (41.9%) were females (as evident in Table 1). No patient lost the follow up during this study. In this study only 24 patients (16.2 %) had isolated systolic hypertension, 17 patients (11.5%) were falling in the range of borderline systolic hypertension, 85 patients (57.4%) were having both systolic and diastolic hypertension, only 8 patients (5.4%) were suffering from isolated diastolic hypertension and 14 patients (9.5%) were controlled on treatment (as obvious in Table III). In this study 64.2% patients were in the fifth decade of life, 31.8% patients were in the sixth decade of life, 2% patients were in seventh decade, only 2% patients were in 8<sup>th</sup> decade (as given in Table II)

**Statistics** Variables in studied sample:

Table 1: Gender distribution

N	Gender	BP	Age in years
Valid	Male	148	148
Missing	Female	0	0

Valid	Frequency	%	Valid%	Cumulative Percent
Male	86	58.1	58.1	58.1
Female	62	41.9	41.9	100.0
Total	148	100.0	100.0	

Table II: Age distribution: Age in years

Valid (Yrs)	Frequency	%	Valid%	Cumulative Percent
51-60	95	64.2	64.2	64.2
61-70	47	31.8	31.8	95.9
71-80	3	2.0	2.0	98.0
81-90	3	2.0	2.0	100.0
Total	148	100.0	100.0	

Table III: Frequency of different types of blood pressure

Valid	Frequency	%	Valid%	Cumulative Percent
SBP	24	16.2	16.2	16.2
Borderline SBP	17	11.5	11.5	27.7
Both SBP/DBP	85	57.4	57.4	85.1
DBP	8	5.4	5.4	90.5
Controlled on treatment	14	9.5	9.5	100.0
Total	148	100	100	

SBP=Systolic blood pressure

DBP=Diastolic blood pressure

## DISCUSSION

The study showed increasing frequency of systolic hypertension with age (Fig. 1) In fifth decade the most frequent form of hypertension is combined systolic diastolic hypertension but with advancing age the trend is switched over to systolic and borderline systolic variants of hypertension. There is a dip in frequency between age of 70 to 80 years, this may be because of decrease availability in total number of patients in this age group (as evident in Table 2) seeking medical advice in our community. Another reason of less number of patients available in this age group is increase number of sufferer from cardiovascular events with increase morbidity and mortality risks which may again be secondary to isolated systolic hypertension. While estimating frequency of isolated systolic hypertension we only considered those having isolated systolic hypertension at time of examination. It may be possible that the patients controlled on treatment may have been suffering from ISH at the time of initial diagnosis. This could underestimate those truly having systolic hypertension. Increasing data from both national and international studies have shown strong link between advancing age and isolated systolic hypertension. Countries with an ageing population in developed countries will be expected to have a higher prevalence of hypertension than a developing country with a younger population such as in ours.

The National Health Survey of Pakistan (1990-4) highlighted the enormous burden of hypertension in Pakistan<sup>16</sup>. The overall prevalence of hypertension in Pakistanis aged 15 years and above was 19%<sup>17</sup>. Twenty two percent of the urban Pakistani population over the age of 15 years, and a third of those aged 45 years and above, had hypertension<sup>16</sup>. It clearly shows a linear relation between age and systolic blood pressure.<sup>17</sup> The age-standardized prevalence varied strikingly, from 17.3 to 25.3% in men and from

9.9 to 41.4% in women, among the various ethnic groups, being highest in Balochi women and lowest in Sindhi women<sup>18</sup>. Higher prevalence of hypertension in the urban dwellers is due to an excess of obesity in this population<sup>16</sup>.

Our data is also comparable to those in Indian studies where significant work has been done in finding the frequency and pattern of distribution of systolic blood pressure.

Study conducted in Parsi community of Bombay<sup>20</sup> showed the prevalence of ISH using the SHEP criteria was 6.9% (men: 3.6% women: 9.7%). Prevalence using the JNC VI criteria was 15% in men and 23.3% in women with mean prevalence being 19.5%. This prevalence was not age standardized among those suffering from HT, the proportion having ISH progressively increases with age. In those  $\geq 60$  years, ISH (using the SHEP criteria) comprised 53.2% of hypertensive (men 37.5%; women 60.8%) and using the new criteria comprised 73% of those with HT (men 69.3%; women 75.3%). Corresponding figures in those  $\geq 70$  years are 65.5%- men 51.2%, women 71.7%, using the SHEP criteria and 79.8%-men 75.6% and women 82.1%, using the new criteria. (SHEP criteria defines ISH as systolic blood pressure of more than 160mmHg while new criterion defines systolic hypertension of more than 140mmHg)<sup>20</sup>.

In Hypertension in the elderly population of Assam Study, ISH was detected in 13.2% males and 10.31% females among hypertensive<sup>21</sup>. In study of another data from prevalence and risk factors of hypertension in a selected South Indian population, isolated systolic hypertension was found in 15.1% out of which 14.9% male and 15.3% females<sup>23</sup>.

High prevalence of systolic hypertension at advanced age had been documented in few recently conducted surveys from India such as from Parsi community in Western India (73% in age group equivalent to 70 years), among Kerallite (51.8%) from South India, Assamese (63.63% for people above 60 years of age) from North eastern India and among elderly participants from WHO sponsored multicenter study in Southeast Asia (65%) as compared to an age specific prevalence rate of 64% in seventh to eighth decade in the urban community survey in India<sup>22</sup>.

International data also suggests that prevalence of hypertension, increases with age, affecting up to two third of people over 60 years of age.<sup>12</sup> Without treatment, approximately 30% of people over the age of 20 years in the United States have hypertension.

In the Framingham Heart Study, hypertension eventually developed in more than 90% of the participants who had had normal blood pressure at the age of 55 years<sup>14</sup>. Based on NHANES II data,

blacks have a higher prevalence than whites (38% vs. 29%) and men show a higher prevalence than women (33% vs. 27%). These data again confirm the tendency for the prevalence of hypertension to increase with age in the U.S. population--this holds true for blacks, whites, men, and women<sup>15</sup>.

As reported by Franklin et al, in USA about 56% of untreated hypertensive patients have isolated systolic hypertension after 50 years of age and more than 90% individuals who are above 80 years of age have isolated systolic hypertension.<sup>1</sup> This data figures out only untreated hypertensive, this is in contrast to our study where we included hypertensive on treatment. In addition to other flaws mentioned below this again can be a reason for gap in ours and studies from west.

In the nationally representative National Health and Nutrition Examination Survey (NHANES) III,<sup>19</sup> the objective was to observe patterns of systolic and diastolic hypertension by age and to determine when treatment and control efforts should be recommended. Percentage distribution of 3 blood pressure subtypes (isolated systolic hypertension, combined systolic/diastolic hypertension, and isolated diastolic hypertension) was categorized for uncontrolled hypertension (untreated and inadequately treated) in two age groups (ages  $<50$  and  $\geq 50$  years). Overall, isolated systolic hypertension was the most frequent subtype of uncontrolled hypertension (65%). Most subjects with hypertension (74%) were  $\geq 50$  years of age, and of this untreated older group, nearly all (94%) were accurately staged by systolic blood pressure alone, in contrast to subjects in the untreated younger group, who were best staged by diastolic blood pressure. Furthermore, most subjects (80%) in the older untreated and the inadequately treated groups had isolated systolic hypertension and required a greater reduction in systolic blood pressure than in the younger groups (-13.3 and -16.5mmHg versus -6.8 and -6.1mmHg, respectively;  $P=0.0001$ ) to attain a systolic blood pressure treatment goal of  $<140$ mmHg<sup>13</sup>.

Comparison of prevalence of hypertension in different populations: (this prevalence is not age standardized in all studies)

	Our Study	India Parsi Community South India Assam	South East Asia (age specific) 7 <sup>th</sup> to 8 <sup>th</sup> decade	USA
Prevalence	16.2%	6.9%	65%	57%
		11.5%		
		15.1%		

There is wide discrepancy in prevalence of hypertension from Indian Subcontinent as well. This variation may be because our study was age specific, finding the prevalence in elderly. Secondly unlike our study most of them studied prevalence in uncontrolled hypertensive. There is difference in our data as compared to data from western countries in frequency of isolated systolic hypertension, this may be because, in our study most patients were in the fifth and sixth decade of life and very few patients were available in later age groups but in west survival rate is high, most patients are alive in the later age groups constituting a broad population group. Overall prevalence of hypertension and diabetes mellitus is high in developing countries with cardiovascular events and worse outcomes, so very less number of patients survive late age group. Another difference is the accessibility to medical advice which is not available to elderly population in Pakistan, mostly because of ignorance, poor socioeconomic status and lack of awareness as compared to west.

There were a number of limitations to our study as it was done only on 148, cases of hypertensive elders, in one centre i.e., POF Hospital Wah Cantt. It may not be truly representative of disease burden elsewhere in Pakistan but gives an estimate and to think about non-communicable disease in developing countries like Pakistan.

There are 2 important findings of the study; First ISH is one of the frequent form of hypertension. Second frequency of isolated systolic hypertension increases with age, Results of my study are also favoring it

## CONCLUSION

Isolated systolic hypertension occurs increasingly in patients with advancing age as the frequency of isolated systolic hypertension in patients observed was which is associated with increase cardiovascular mortality and morbidity. (Risk factor identification and their elimination or improvement should be done).

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