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## **GLOCALIZATION OF RISK FACTORS OF HYPERTENSION AND PREHYPERTENSION. THE FUTURE OF CARDIOVASCULAR PROTECTION.**

**Background.** Mortality from cardiovascular disease (CVD) increased from 21% to 25% which is lower than death rate of 29.1 reported by Singh et al in 2005. In various studies, the prevalence of hypertension (>140/90 mmHg) in India has been reported to be 22-30% among urban subjects and 10 to 15% among rural subjects above 20 years of age. There has been a marked increase in the prevalence of hypertension as well as mean systolic and diastolic blood pressures in the last three decades in India. Similar trends have been observed among most of the developing populations of the world. Increased intake of salt and alcohol, sedentary behaviour and obesity appear to be major risk factors of pre-hypertension and hypertension causing increased burden of hypertension in most countries of the world.

**Methods. Internet search and discussion with experts.** Results. According to 2001 census, of 600 million adults in India, 420 million were rural and 180 million, urban. The absolute number of hypertensives (>140/90) would be 31.5 million rural and 34 million urban, (total=65.5 million). Stage 1, hypertension (>140-159/90-99) 45.5 million and prehypertension (130-139/85-89) with 20% prevalence; 50 million. Almost half of the population of the world above 25 years have either prehypertension or hypertension. The Five City Study shows a high prevalence of prehypertension and hypertension among Indian urban population from five different regions of India. The prevalence of prehypertension shows greater rates in south (women 31.5%, men 35.1%) and west India (women 30.0%, men 34.7%) compared to north (women 24.6%, men 26.7%) and east India (women 20.9%, men 23.5%) as well as central India (women 25.8%, men 28.3%). The overall prevalence of prehypertension (27.2 vs 30.0%,  $P < 0.02$ ) and hypertension (27.2 vs 30.6%,  $P < 0.02$ ) after pooling of data from the five cities, were significantly greater among men compared to women. Among total number of subjects ( $n=6940$ ), the prevalence of prehypertension and hypertension, respectively were similar (28.6 vs 28.9%). In majority of the studies on prevalence of hypertension from India, prehypertension has not been reported. The JNC-7 introduced the term prehypertension to designate individuals, whose systolic blood pressure are in the range of 120-139 mm Hg and diastolic in 80-89 mm Hg range. According to these criteria, the burden of prehypertension in United States appears to be approximately 70 million and in India 100 million among subjects aged 20 years and above. In elderly subjects and in those whose blood pressures are in the range of 130-139/85-89 mm Hg, the rate of progression of prehypertension to hypertension may be relatively rapid. In the Framingham study, the blood pressures progressed over 4 years to hyper-

tensive levels in 17.6% subjects between 30-64 years of age and in 23.5% of those more than 65 years of age. Interestingly, in the subgroup of subjects with blood pressures 130-139/85-89 mm Hg range, the incidence of hypertension was 37.3% and 49.5% for above age groups, respectively. In view of this evidence related to progression, annual or bi-annual monitoring of blood pressures among prehypertensive subgroup appears to be quite appropriate, because these subjects with high normal blood pressures may be the target for treatment.

The prevalence of hypertension according to WHO/ISH criteria (>140/90 mm Hg) was significantly higher in Trivandrum in south India (women 31.9% men 35.5%) and Mumbai in west India (women 29.1%, men 35.6%) compared to Moradabad in north India (women 24.5%, men 27.0%) and Kolkata in east India (women 22.4%, men 24.0%). In Nagpur, central India (women 24.9%, men 29.1%), the prevalences were not significantly different from those observed at Moradabad. In earlier studies in 1970s, according to reviews, the prevalence of hypertension were 1.7 to 3.6% in rural areas and 3.9 to 7.0 in urban areas. There has been a marked increase of five to seven fold, in the prevalence of hypertension as reported in different studies in the urban population of India in the last three decades. In western India, the prevalence of hypertension (>140/90 mmHg) was 30.5% (18). In a south Indian urban population, the prevalence of hypertension (>160/95 mm Hg) was 19.0%. After pooling of data in all five cities, the prevalence rates as well as mean systolic and diastolic blood pressures showed a significant increase with increase in age and the trends were significant. Men had a significantly higher prevalence in the age range, 25-54 years, there after that the prevalence rates were comparable in both sexes. The global burden of hypertension study reviewed data from all the published studies, and estimated that more than quarter of the world's adult population had hypertension in 2000, which would increase to 29% by the year 2025. Increased intake of salt, alcoholism, sedentary behavior, obesity, tobacco and lack of fruits, vegetable intake may be the common risk factors of increase in blood pressures.

**Conclusions.** Prehypertension and hypertension have become major global problems of the world. Increased intake of salt, alcoholism, sedentary behavior, obesity, stress, disruption of sleep, tobacco and lack of fruits, vegetable and whole grains in the diet appear to be important risk factors of prehypertension and hypertension and for the future of the cardiovascular protection in the world.

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