



Prevalence, Awareness and Control of Hypertension in Chennai - The Chennai Urban Rural Epidemiology Study (CURES – 52)

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Abstract

Objective : To study the prevalence, awareness and control of hypertension in Chennai representing Urban South India.

Methods : The Chennai Urban Rural Epidemiology Study (CURES) is one of the largest epidemiological studies on diabetes carried out in India, where 26,001 individuals aged ≥ 20 years were screened using systematic random sampling method. Every tenth subject recruited in Phase 1 of CURES was requested to participate in Phase 3 of CURES and the response rate was 2,350/26,001 or 90.4%. An oral glucose tolerance test was performed in all individuals except self-reported diabetic subjects. Anthropometric measurements and lipid estimations were done in all subjects. Hypertension was diagnosed in all subjects who were on drug treatment for hypertension or if the blood pressure $\geq 140/90$ mmHg.

Results : Hypertension was present in 20% [men:23.2% vs. women:17.1%, $p < 0.001$] of the study population. Isolated systolic hypertension (Systolic BP ≥ 140 and Diastolic BP < 90 mmHg) was present in 6.6% while isolated diastolic hypertension (DBP ≥ 90 and SBP < 140 mmHg) was present in 4.2% of the population. Among the elderly population (aged ≥ 60 years), 25.2% had isolated systolic hypertension. Age, body mass index, smoking, serum cholesterol and triglycerides were found to be strongly associated with hypertension. Among the total hypertensive subjects, only 32.8% were aware of their blood pressure, of these, 70.8% were under treatment and 45.9% had their blood pressure under control.

Conclusion : Hypertension was present in one-fifth of this urban south Indian population and isolated systolic hypertension was more common among elderly population. Majority of hypertensive subjects still remain undetected and the control of hypertension is also inadequate. This calls for urgent prevention and control measures for hypertension. ©

INTRODUCTION

Hypertension is becoming an important public health problem worldwide. A recent report on the global burden of hypertension indicates that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025.¹ Subjects with hypertension are known to have a two-fold higher risk of developing coronary artery disease (CAD), four times higher risk of congestive heart failure and seven times higher risk of cerebrovascular disease and stroke compared to normotensive subjects.² Hypertension has

been identified as one of the leading risk factors for mortality, and is ranked third as a cause of disability-adjusted life-years.³ Existing data suggests that the prevalence of hypertension has remained stable or has decreased in economically developed countries during the past decade, while it has increased in developing countries.⁴ However, the increase in the prevalence rates of hypertension needs to be quantified so as to plan for effective prevention strategies which are urgently needed in developing countries.

Given the rising prevalence of hypertension in developing countries undergoing epidemiological transition like India, increased awareness, treatment, and control of high blood pressure are critical to the reduction of cardiovascular disease risk and prevention of the associated burden of illness. This study was undertaken with the objective to gather both epidemiological data and data on awareness and control of hypertension in Chennai which represents urban

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Received : 1.2.2007; Accepted : 15.3.2007

#Rapid Publication

south India. Such studies are a crucial step in the design of hypertension prevention and control programs at a national level.

Study Design

The Chennai Urban Rural Epidemiology Study (CURES) is a large cross-sectional study done on a representative population of Chennai (formerly Madras) city in southern India with a population of about 5 million people. The detailed study design of CURES is described elsewhere⁵ and the sampling frame is shown in our website <http://www.drmoahansdiabetes.com/mdrf/CURES.pdf>.

Phase 1 of CURES was conducted in the field, and involved a door-to-door survey of 26,001 individuals ≥ 20 years of age drawn randomly from 46 of the 155 corporation wards in Chennai. A detailed questionnaire was administered to all study subjects to collect information regarding demographic, socio-economic, behavioural and health status. A fasting capillary blood sugar, blood pressure and basic anthropometric measures were done in all individuals.

Phase 2 of CURES deals with studies of the prevalence of microvascular and macrovascular complications of diabetes. Phases 1 and 2 are not discussed further in this article.

In **Phase 3** of CURES, every tenth subject recruited in Phase 1 ($n=2600$) was invited to our centre for detailed anthropometric measurements and biochemical tests. Of these, 2350 participated in the present study (response rate: 90.4%). This sample is thus representative of the Chennai population.

All the study subjects underwent an oral glucose tolerance test (OGTT) using 75gm glucose load, except self-reported diabetic subjects, for whom fasting venous plasma glucose was measured. The fasting blood sample was taken, after ensuring 8 hours of overnight fasting, for estimation of plasma glucose and serum lipids using a Hitachi 912 Autoanalyser (Roche Diagnostics GmbH, Mannheim, Germany) utilizing kits supplied by Boehringer Mannheim (Mannheim, Germany). Glycated hemoglobin (HbA1c) was measured by the High Pressure Liquid Chromatography (HPLC) method using the Variant machine (BIORAD, Hercules, California). Anthropometric measurements including weight, height, waist and hip measurements were obtained using standardized techniques as given below.

Height was measured with a tape to the nearest cm. Subjects were requested to stand upright without shoes with their back against the wall, heels together and eyes directed forward.

Weight was measured with a traditional spring balance that was kept on a firm horizontal surface. Subjects were asked to wear light clothing and weight was recorded to the nearest 0.5 kg.

Body mass index (BMI) was calculated using the

formula: $\text{weight (Kg)}/\text{height (m)}^2$.

Waist circumference: Waist was measured using a non-stretchable measuring tape. The subjects were asked to stand erect in a relaxed position with both feet together on a flat surface; one layer of clothing was accepted. Waist girth was measured as the smallest horizontal girth between the costal margins and the iliac crests at minimal respiration.

Blood pressure was recorded in the sitting position in the right arm to the nearest 2mmHg using the mercury sphygmomanometer (Diamond Deluxe BP apparatus, Pune, India). Two readings were taken 5 minutes apart and mean of two was taken as the blood pressure.

The institutional ethical committee approval was obtained and informed consent was obtained from all study subjects.

Definitions

Hypertension: Hypertension was diagnosed based on drug treatment for hypertension or if the blood pressure was greater than 140/90 mmHg – Joint National Committee 7 (JNC VII) Criteria.⁶

Diabetes: Diagnosis of diabetes was based on WHO Consulting group criteria, i.e. 2 hour post load plasma glucose [2hr PG] ≥ 200 mg/dl (≥ 11.1 mmol/l). Impaired glucose tolerance (IGT) was diagnosed if the 2hr PG was ≥ 140 mg/dl (≥ 7.8 mmol/l) and < 200 mg/dl (< 11.1 mmol/l) and normal glucose tolerance (NGT) if 2hr PG was < 140 mg/dl (< 7.8 mmol/l).⁷

Dyslipidemia: National Cholesterol Education Programme (NCEP) guidelines⁸ were used for definition of dyslipidemia.

Hypercholesterolemia : Serum cholesterol levels ≥ 200 mg/dl (≥ 5.2 mmol/l) or drug treatment for hypercholesterolemia.

Hypertriglyceridemia : Serum triglyceride levels were ≥ 150 mg/dl (≥ 1.7 mmol/l) or drug treatment for hypertriglyceridemia.

Low HDL cholesterol : HDL cholesterol levels were < 40 mg/dl (< 1.04 mmol/l) for men and < 50 mg/dl (< 1.3 mmol/l) for women.

Obesity : Generalized obesity was defined using the new WHO Asia Pacific guidelines⁹ i.e. BMI ≥ 25 kg/m² and abdominal obesity as waist circumference ≥ 90 cm for men and ≥ 80 cm for women.

Statistical Analysis

Statistical analyses were performed using SPSS windows version 10.0 software (SPSS Inc., Chicago, Illinois). Student's *t* tests were used for continuous variable and chi square test for proportions. Multiple logistic regression analysis was done using hypertension as the dependent variable and the various risk factors as independent variables. P value < 0.05 was considered significant.

RESULTS

Distribution of systolic and diastolic blood pressure:

The mean systolic BP for men and women were 121 and 117 mmHg respectively. The 25th percentiles of systolic BP for men and women were 110 and 105 mmHg, 50th percentiles, 120 and 115 mmHg, 75th percentiles, 130 and 120 mmHg and the 90th percentiles 141 and 140 mmHg respectively. The mean diastolic BP for men and women were 76 and 73 mmHg respectively. The 25th percentiles of diastolic BP for men and women were 70 and 65 mmHg, the 50th percentiles were 75 and 72 mmHg, 75th percentiles were 81 and 80 mmHg and the 90th percentiles were 90 and 88 mmHg respectively.

Prevalence of hypertension:

The overall prevalence of hypertension in the study population was 20% (469/2350) and this was higher in men than in women (men: 23.2%, women: 17.1%, $p < 0.001$). The prevalence of self-reported hypertension was 6.6% (154/2350) (men: 7.9%, women: 5.3%, $p < 0.007$). Figure 1 shows the genderwise prevalence of hypertension across different age groups. The prevalence of hypertension steadily increased with age in both sexes and was 3.8% in men and 3.1% in women at the age group of 20-29 years, which increased rapidly and reached a prevalence of 50.8% in men and 51% in women at the age of 60 years and above [men: trend chi square 120.1, $p < 0.001$; women: trend chi square 166.9, $p < 0.001$].

Table 1 shows the general characteristics of the study subjects. Hypertensive subjects were older, had significantly higher body mass index, waist circumference, waist-to-hip ratio, serum cholesterol, serum triglycerides, LDL cholesterol and HbA1C levels compared to normotensive subjects.

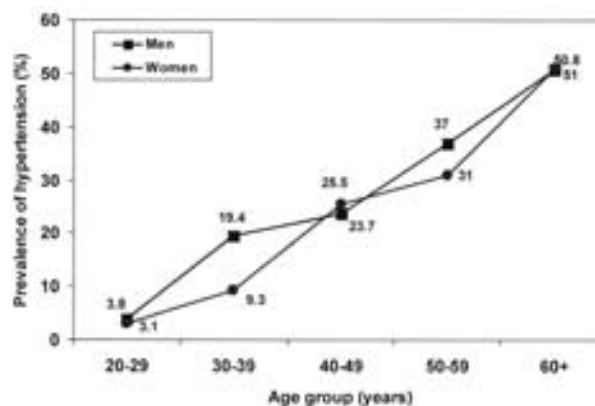
Age-specific estimates of the distribution of BP

Table 1: Clinical and demographic characteristics of the study subjects

Variable	Normotensives (n=1881)	Hypertensives (n=469)	P value
Age (yrs)	37 ± 12	49 ± 13	<0.001
Male n (%)	842 (44.8)	254 (54.2)	<0.001
BMI (kg/m ²)	22.5 ± 3.9	24.3 ± 3.7	<0.001
Waist circumference (cm)	82.1 ± 11.2	88.7 ± 10.6	<0.001
Hip circumference (cm)	93.1 ± 8.9	95.9 ± 8.5	<0.001
Waist-to-hip ratio	0.88 ± 0.09	0.93 ± 0.09	<0.001
Total cholesterol (mg/dl)	176 ± 38	193 ± 38	<0.001
Serum triglycerides (mg/dl)	117 ± 77	157 ± 100	<0.001
HDL cholesterol (mg/dl)	43 ± 10	43 ± 10	0.982
LDL cholesterol (mg/dl)	110 ± 33	119 ± 34	<0.001
HbA1C	5.9 ± 1.3	6.7 ± 1.8	<0.001

according to the classification system recommended by the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNC-VII) are presented in Figure 2. The overall prevalence of prehypertension, stage 1 hypertension and stage 2 hypertension were 36.1%, 15.1% and 4.9% respectively. The prevalence of prehypertension, stage 1 and stage 2 hypertension increased with increasing age. (Age: 20-29 years, prehypertension 33.1%, stage 1 hypertension 3.2% and stage 2 hypertension 0.2%; 30-39 years, 35.4%, 11.7% and 2.3%; 40-49 years: 40.5%, 18.3% and 6.4%; 50-59 years: 39.4%, 25.8% and 8.4%; 60+ years: 30.6%, 34.2% and 16.7%). Trend chi square, p value - prehypertension: 0.787, $p = 0.375$; stage 1 hypertension: 163.4, $p < 0.001$; stage 2 hypertension: 107.2, $p < 0.001$). Men had higher prevalence of hypertension compared to women (Prehypertension: men 37.9%, women 34.5%, $p = 0.09$; stage 1 hypertension: men 17.6%, women 12.9%, $p < 0.05$; stage 2 hypertension: men 5.6%, women 4.2%, $p = 0.15$).

The study population were categorized as normotensives (SBP < 140 mm Hg and DBP < 90 mm Hg), treated hypertensives (hypertensives under anti-



Hypertension: SBP ≥ 140 and / or DBP ≥ 90 mm Hg

Fig. 1 : Prevalence of hypertension by sex and age among the Chennai population

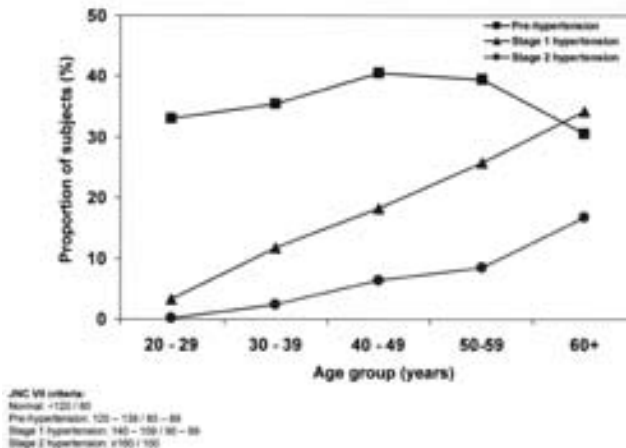


Fig. 2 : Percentage distribution of blood pressure levels of Chennai population based on JNC VII criteria

hypertensive drugs) and untreated hypertensives. The mean BP among the general population was SBP: 119 ± 18 mmHg, DBP: 74 ± 11 mmHg; among normotensives it was SBP: 113 ± 12 mmHg, DBP: 71 ± 9 mmHg, among treated hypertensives it was SBP: 137 ± 22 mmHg, DBP: 83 ± 11 mmHg and among untreated hypertensives it was SBP: 143 ± 28 mmHg, DBP: 87 ± 13 mmHg.

Prevalence of isolated systolic and isolated diastolic hypertension:

Based on the JNC-VII classification, isolated systolic hypertension (SBP ≥140 and DBP <90 mm Hg) was present in 6.6% of the subjects (6.9% of men and 6.2% of women) while isolated diastolic hypertension (DBP ≥90 and SBP <140mm Hg) was present in 4.2% of the subjects (5.4% of men and 3.1% of women) (Fig. 3). As age increased, the prevalence of isolated systolic hypertension increased at a slower pace until the age of 50 years, after which (i.e., age ≥50 years), it increased dramatically yielding a prevalence of 11.9% (men: 10.9%, women: 13.1%) at the age group of 50-59 years and 25.2% (men: 21.4%, women: 30.2%) at the age of 60 years and above. Women had a higher prevalence of isolated systolic blood pressure after the age of 40 years compared to men. The prevalence of isolated diastolic hypertension also increased but at a slower pace until the age of 50 years but decreased thereafter. Women had a lower prevalence of isolated diastolic blood pressure compared to men across all age groups.

Risk factors for hypertension

Table 2 shows a multivariate logistic regression

analyses on the risk factors for hypertension. As independent variables, gender (men versus women), age (15-year increments), obesity (WHO Asian guidelines), abdominal obesity (WHO Asian guidelines), smoking (yes versus no), serum cholesterol (≥200 mg/dl versus <200 mg/dl) and triglycerides [≥150 mg/dl versus <150 mg/dl] were included, with hypertension as the dependent variable. The odds ratios for age ranged between 3.52 (95% CI: 2.61 – 4.74) and 13.45 (95% CI: 8.70 – 20.78), which shows the strong association of age with hypertension. Compared to those below 35 years, subjects between 35-49 years were at 3 times higher risk of hypertension; subjects between 50-64 years at >8 times higher risk while those above 65 years were at >13 times higher risk of hypertension. The odds ratio

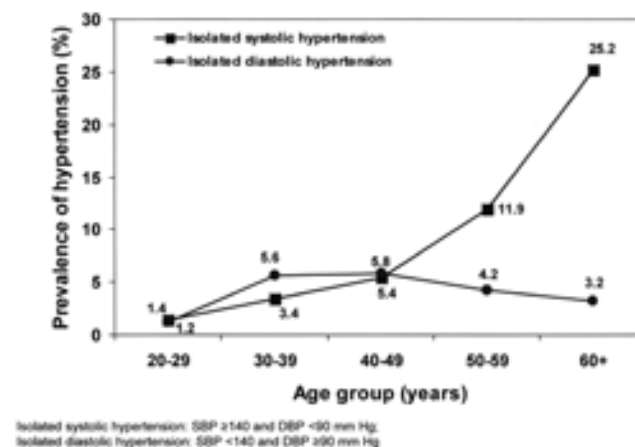


Fig. 3 : Prevalence of isolated systolic and diastolic hypertension by different age group among the Chennai population

Table 2 : Multivariate regression analysis for association of various risk factors with prevalence of hypertension

Variable	n	Prevalence			Multivariate logistic regression		
		%	95% CI	P (X ²)	OR	95% CI	P
Gender							
Men	1096	23.2	20.7 – 25.7	<0.001	1		<0.001
Women	1254	17.2	15.1 – 19.3		0.69	0.56 – 0.84	
Age (yrs)							
20 – 34	941	7.0	5.4 – 8.6	<0.001	1		
35 – 49	877	21.0	18.3 – 23.7		3.52	2.61 – 4.74	<0.001
50 – 64	411	38.4	33.7 – 43.1		8.26	6 – 11.37	<0.001
65 +	121	50.4	41.5 – 59.3		13.45	8.7 – 20.78	<0.001
Body mass index (kg/ m ²)							
Normal (< 23)	1215	14.4	12.4 – 16.4	<0.001	1		
Overweight (23–24.9)	472	22.5	18.7 – 26.3		1.72	1.32 – 2.26	<0.001
Obese (≥25)	657	28.5	25.0 – 32.0		2.37	1.87 – 2.99	<0.001
Abdominal obesity							
No	1165	14.0	12.0 – 16.0	<0.001	1		
Yes [WC: ≥90 (m); ≥80 (f)]	1126	26.1	23.5 – 28.7		2.17	1.76 – 2.69	<0.001
Smoking							
No	1910	18.7	17.0 – 20.4	0.001	1		
Yes	437	25.6	21.5 – 29.7		1.50	1.18 – 1.91	0.001
Serum cholesterol (mg/dl)							
Normal	1726	16.6	14.8 – 18.4	<0.001	1		
Hypercholesterolemia	621	29.3	25.7 – 32.9		2.08	1.68 – 2.58	<0.001
Triglycerides (mg/dl)							
Normal	1753	16.6	14.9 – 18.3	<0.001	1		
Hypertriglyceridemia	589	30.2	26.5 – 33.9		2.18	1.75 – 2.7	<0.001

OR – Odds ratio; CI – Confidence Interval; X² – Chi square

for hypertension in those with obesity ranged from 1.72 (95% CI: 1.32 – 2.26) to 2.37 (95% CI: 1.87 – 2.99). The multivariate regression analysis also revealed abdominal obesity (OR: 2.17, 95% CI: 1.76 – 2.69, $p < 0.001$), smoking (OR: 1.50, 95% CI: 1.18 – 1.91, $p < 0.001$), serum cholesterol [OR: 2.08, 95% CI: 1.68 – 2.58, $p < 0.001$] and serum triglycerides (OR: 2.18, 95% CI: 1.75 – 2.70, $p < 0.001$) to be strongly associated with hypertension.

Prevalence of metabolic abnormalities

The prevalence of metabolic disorders like diabetes, obesity, hypercholesterolemia, hypertriglyceridemia, abdominal and general obesity were higher in subjects with hypertension compared to normotensive subjects [hypertensive subjects versus normotensives - diabetes: 31.8% vs 11.6%; IGT: 17.9% vs 8.8%; hypercholesterolemia: 38.8% vs 23.4%; hypertriglyceridemia: 38% vs 22%; abdominal obesity: 64.3% vs 45.4%; general obesity: 40% vs 25.2%].

Awareness and control of hypertension

Of the total hypertensive subjects, 469 / 2350 (i.e. 20%), the proportion of subjects with self-reported hypertension was 154 (representing 32.8% of the total hypertensive subjects). Of the 154 known hypertensive subjects, 109 (70.8%) were under treatment for hypertension. However, of these 109 individuals, only 50 (45.9%) had blood pressure under control (i.e. $< 140/90$), which represents 15.4% of the total hypertensive group (Fig. 4). Treatment and control were more common among men than among women. 75.9% of men and 64.2% of women were taking prescribed medication to lower their BP, of which, only 47% of men and 44.2% of women achieved BP control.

A similar analysis was done among the diabetic population. Of the total diabetic subjects ($n = 365$), 149 (40.8%) had hypertension. The difference between prevalence of hypertension among diabetic (40.8%, 149/365) and non diabetic subjects [16.1%, 320/1985] reached statistical significance ($p < 0.001$). 56.4% of the diabetic population had undiagnosed hypertension. Of the known diabetic hypertensive subjects, 69.2% were on treatment for hypertension and of these 51.1% had their blood pressure under control. Thus overall, only 22.1% of the diabetic hypertensive subjects had their blood pressure under control. Among the diabetic population, treatment of hypertension was more common among men (men: 75.7% vs women: 60.7%) while the control

of blood pressure was more common among women (men: 46.4% vs women: 58.8%).

DISCUSSION

The overall prevalence of hypertension in this representative urban population of Chennai which is representative of urban south India is 20% - thus one fifth of the adult population ≥ 20 years of age now have hypertension. Various studies in developing countries estimated a prevalence rate of hypertension among urban population ranging from 1.24% in 1949 to 36.4% in 2003.¹⁰ The difference in prevalence rates could be due to different cut points used in defining the level of hypertension and also differing age groups constituting the study population. The prevalence of hypertension in Jaipur representing an urban north Indian population aged 20 years and above was 30% in men and 33% in women using JNC V criteria.¹¹ The prevalence of hypertension in the urban population of West Bengal, representing eastern India was reported to be 24.9%, based on JNC VII criteria.¹² The prevalence of hypertension among the urban population of Trivandrum city in Kerala in the south western India was reported to be 33.5% in the age groups between 45 and 64 years.¹³ The prevalence rates reported in the present study are therefore comparatively lower than that reported in other studies. This is similar to the findings of the World Health Organization (WHO) and Indian Council of Medical Research (ICMR) non-communicable disease (NCD) risk factor surveillance where the prevalence of hypertension among the industrial population was 26% in all ten centres in India¹⁴ and 25.4% in Chennai.¹⁵

Isolated systolic blood pressure was present in 25.2% (21.4% of men and 30.2% of women) among the elderly study population (aged 60 years and above). Among the general population, isolated systolic and isolated diastolic blood pressure was present in 6.6% and 4.2% of the study population respectively. Women had a higher prevalence of isolated systolic blood pressure and lower prevalence of diastolic pressure compared to men. The SHEP (Systolic Hypertension in the Elderly Program) study showed that this type of high blood pressure is more common in older adults, especially in older women.¹⁶ Moreover, after menopause, there is a sharp increase in the prevalence of hypertension in women to levels that equal or surpasses that of men; this suggests that ovarian hormones participate in the protection afforded to premenopausal women.¹⁷ These may be the reasons for higher prevalence of isolated hypertension among older women in the present study.

The present study had shown a large proportion of sample population in the prehypertensive group. Even at the youngest age group studied (20-29 years), the proportion of subjects with prehypertension was 33%, which is very high. In recognizing 'prehypertension'

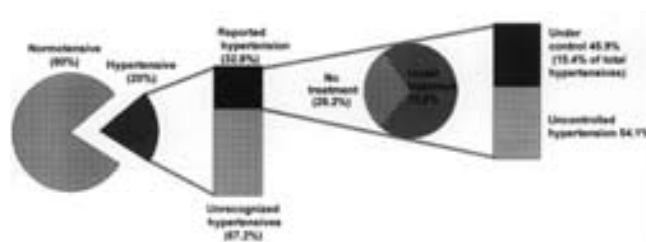


Fig. 4 : Prevalence of hypertension and control among the Chennai population

as a clinical condition, JNC VII pointed out that BP related mortality is linear and that higher BP levels within what was earlier called 'high normal' or 'normal' range is associated with increasing morbidity and mortality.¹⁸ In the US population ≥ 20 years of age, 36% (62 million) had high-normal blood pressure or greater (systolic / diastolic blood pressure $\geq 130 / \geq 85$ mm Hg). Of the adult population of the NHANES in US, 61% has prehypertension or hypertension using the JNC VII definition.⁶ The Trial of Preventing Hypertension (TROPHY) study¹⁹ on individuals with high normal BP suggests clearly that the risk of cardiovascular disease begins to rise before the diagnosis of hypertension is evident. Ours is the first population based study to our knowledge to report on prevalence of prehypertension in India i.e. after the JNC VII report was published.

Various risk factors have been associated with hypertension in epidemiological surveys. In the CUPS study, reported by us earlier from Chennai, age, body mass, waist hip ratio and glucose intolerance had a significant association with hypertension.²⁰ The significant determinants of hypertension in the urban population of Jaipur were age, smoking and body mass index.¹¹ In another study conducted in urban North Indians, age, higher body mass index, central obesity and higher socioeconomic status (SES) were independently and strongly associated with hypertension in both sexes, while higher dietary fat, salt intake and lower physical activity were weakly but significantly associated with higher prevalence and level of hypertension.²¹ These findings were consistent with the present study findings which revealed that age, body mass index, smoking, serum cholesterol and triglycerides to be strongly associated with hypertension.

The 'rule of halves' for hypertension states that: 'half the people with high blood pressure are not known, half of those known are not treated and half of those treated are not controlled'. If this rule is valid, then only one in eight of the hypertensive population would be receiving optimal treatment. An attempt was made to assess the applicability of the rule of halves in the urban south Indian population in this study. Among the hypertensive subjects, 32.8% were aware of the condition, of whom 70.8% of them were on treatment and of these only 45.9% had their blood pressure under control i.e. ($< 140/90$), which represents 15% of the total hypertensive group. Among the diabetic population with hypertension, 43.6% were aware of the condition of whom 69.2% had undergone treatment for it and of these 51.1% were under control, which represents 22% of the total diabetic hypertensive group. Thus the 'rule of halves' is still valid in urban south India as far as hypertension is concerned. The present study shows a general improvement in detection, treatment and control of hypertension compared to earlier studies in Chennai.²² However, 85% of hypertensive subjects

and 78% of diabetic hypertensive subjects still have not achieved adequate control, which underscores the urgent need to develop national strategies for prevention and treatment of hypertension in India.

Although effective therapy has been available for more than 50 years,⁶ most persons with hypertension do not have their blood pressure under control. The US Department of Health and Human Services National health objectives for 2010²³ include reducing the proportion of adults with high blood pressure to 16% (US baseline: 28%; CURES: 20%), increasing the proportion of adults with hypertension who are taking action to control it to 95% (US baseline: 82%; CURES: 71%), and increasing the proportion of adults with controlled BP to 50% (US baseline: 18%; CURES: 15%). The results of the present study shows that compared to the US population, there is long way to go to accomplish the goal of optimal control among the south Indian population. Undoubtedly a similar situation exists in other parts of the country as well. It took at least 30 to 40 years of sustained effort to substantially improve hypertension detection and control in western countries, and the rates are still far from optimal.²⁴ It is therefore obvious that considerable effort is needed to prevent or reduce the increasingly large burden of disease related to increasing rates of hypertension in countries in epidemiological transition, such as India.

Acknowledgement

We are grateful to the Chennai Willingdon Corporate Foundation, Chennai for the financial support provided for the study. We thank the epidemiology team members for conducting the CURES field studies. This is the 52nd publication from CURES (CURES – 52).

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Announcement

Rabindranath Tagore Oration - 2008



Suggestions are invited from members for the following assignments so as to reach Dr. Sandhya Kamath, Hon. General Secretary not later than **31st July, 2007**.

Rabindranath Tagore Oration (2008)

The prescribed nomination/application is available from the API Office. Persons are selected from the recommendations received from Fellows of Indian College of Physicians. The recommendations for the above assignment must be accompanied with reasons for recommending a particular person showing the value of his/her research and eight copies each of three of his/her best publications. All relevant papers in connection with the suggestions, such as the bio-data, list of publications etc., should be submitted in 8 sets by the proposer. The recipient of the above oration should deliver a lecture pertaining to his/her work at the CME of Annual Conference in January 2008 at Kochi. The orator should be of any subject in the discipline of Medicine.

A person who has received an API/ICP oration in the past is not eligible for any oration. The member of the Governing Body of API and the Members of the Faculty Council of ICP are not eligible to received any oration.

The complete application form for the above oration should reach Dr. Sandhya A Kamath, Hon. General Secretary of API/ICP, at Unit No. 6 and 7, Turf Estate, Opp. Shakti Mill Compound, Off. Dr. E Moses Road, Near Mahalaxmi Station West, Mumbai 400 011. Tel. 022 66663224 Fax : 24920263, not later than **31st July, 2007**.

Dr. Sandhya Kamath
Hon. General Secretary