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## PREVALENCE OF HYPERTENSION AMONG 20-40 YEARS IN URBAN POPULATION CHIDAMBARAM

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### ABSTRACT

Hypertension is the commonest cardiovascular disorder and a major risk factor for stroke and myocardial infarction and its complications are increasing disproportionately in developing countries as they undergo demographic transition. An epidemiological shift in the prevalence of hypertension in developing countries as compared to developed countries has been observed. To find out the prevalence of hypertension among the age group of 20 – 40 years in urban population, Chidambaram. 2) To find out the association between hypertension and selected risk factors (age, sex, physical activity, obesity). A community based cross sectional study was done from January 2014 – December 2014 in Urban Population Chidambaram. 600 participants aged 20-40 years were enrolled into the study. Each study subject was interviewed and examined for raised blood pressure, data on risk factors including physical activity, obesity were also collected. Data were analysed by using SPSS version 20.0. The overall prevalence of hypertension was 20.8 % . Out of the study participants, 55.2% were females and 44.8% were males, 23.3% were obese and 77.3% were doing physical activity for 2 hours or more. The selected risk factors like heavy physical activity and obesity were found to be significantly associated with hypertension. Among the risk factors of hypertension, lack of physical activity and obesity were found to be more associated with hypertension in this group. Therefore health intervention measures are warranted emphasizing on modifiable risk factors such as exercise and obesity to prevent hypertension in younger population.

**Key words:** Cross-sectional study, Hypertension, Prevalence, Risk factors.

### INTRODUCTION

Hypertension is the commonest cardiovascular disorder and one of the major risk factors for cardiovascular mortality which accounts for 20-50% of all deaths [1]. Globally, the overall prevalence of hypertension or raised blood pressure in adults aged 25 and above was about 40% in 2008 [2]. It affects nearly 26% of the population worldwide [3]. Hypertension exhibits an iceberg phenomenon. Worldwide raised blood pressure is estimated to cause 7.5 million deaths and about 12.8% of the total of all annual deaths. It accounts for 3.7% of total DALYs. Prevalence rates of hypertension in urban Indian population to be 29-45% in men and 25-38% in women [4].

A study by Amrinder Singh et al in 2014, reported the prevalence of 10.7% and 19.8% in the age group of 20-29years and 30-39 years respectively. A meta-analysis of prevalence studies on hypertension in India from January 2000 to July 2012 revealed high prevalence of

hypertension in urban (40.8%) as well as rural population (17.9%). It is estimated that by 2020, Cardio vascular diseases will be largest cause of mortality and morbidity in India<sup>4</sup>. Hypertension is a major risk factor for cardiovascular disorders, stroke and myocardial infarction and its complications are increasing disproportionately in developing countries as they undergo demographic transition [4]. The risk factor for hypertension are basically of two types – non-modifiable (age, sex, genetic factors, ethnicity) and modifiable (obesity, salt intake, saturated fat, dietary fibre, alcohol, physical activity) [1].

An epidemiological shift in the prevalence of hypertension in developing countries as compared to developed countries has been observed [5]. This study was done to find out the prevalence of hypertension among 20-40 years age group in urban population, Chidambaram and the association between hypertension and selected risk factors like age, sex, physical activity and obesity.

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## METHODOLOGY

This community based cross sectional study was carried out among the age group of 20 – 40 years in urban population, Chidambaram between January 2014 to December 2014. Before the actual study, a pilot study was conducted between January 2014 to March 2014, and the prevalence was found to be 14%. Relative precision as 20%, the sample size was calculated using the following formula

$$n = Z^2 * p (1-p) / (Ep)^2$$

The sample size obtained was 589. However 600 subjects between 20-40 years has been selected for the study.

Out of the 33 wards in Urban Chidambaram , one ward(23)was selected randomly. Within the 23<sup>rd</sup> ward, 5 streets namely the V.O.C. street, Kotankudi st, Sathapadi st, Malavetti st, Venugopal pillai st., were covered under the study by house to house visit. The persons in each house, who were in the age group of 20-40 years and had given consent were taken as study participants. In the study, persons who were unavailable even after 2 visits were excluded. The basic demographic details and data on duration of physical activity were collected using a proforma. Their blood pressure and anthropometry were recorded using the following methods.

Blood Pressure was recorded by auscultatory method. Every individual was placed in a comfortable seating position with back supported well and uncrossed legs. The arm was supported at the level of right atrium. After the palpation of brachial artery in the anticubital fossa the chest piece of stethoscope was placed on. The cuff was placed in such a manner that the lower end was 2 to 3 cm above anticubital fossa to allow room for placement of chest piece. The cuff was inflated to 20 – 30 mm of Hg above the pressure at which the radial pulse disappeared to palpation. The cuff was gradually deflated at a constant rate of 2 – 3 mm of Hg per second. Systolic blood pressure was noted as the reading at which the first korotkoff sound heard and the diastolic blood pressure was noted at the point at which the sound disappeared. As per Joint National Committee (JNC) VII criteria, the subjects having systolic blood pressure = 140mmHg or <160 mmHg and / or diastolic blood pressure = 90 mmHg or <100 mmHg were categorized as of mild grade hypertension. Those having systolic blood pressure = 160 mmHg and 180 mmHg and / or diastolic blood pressure = 100 mmHg but <110 mmHg were categorized as of moderate grade of hypertension and those having systolic blood pressure ≥ 180 mmHg and diastolic blood pressure

≥ 110 mmHg were categorized as of severe grade of hypertension [6].

Height was measured without shoes, to the nearest 0.5 cm with participant standing erect against the wall with heels together and touching the wall, and head held in upright position. Weight was measured with minimum cloths and no footwear on a standardized weighing machine marked from 0 to 130 kg and was recorded to the nearest 0.5 kg. Body Mass Index (BMI) was calculated using the formula BMI = Weight (kg) / Height<sup>2</sup> (m). Subjects were classified according to BMI ≤ 25 as normal and >30 as obese. The same inch tape and Bathroom weighing machine was used by a single person throughout the study.

Physical activity is defined as any bodily movement produced by contraction of skeletal muscles that increases energy expenditure above resting levels and comprises routine daily tasks such as commuting, occupational tasks or household activities as well as purposeful health enhancing movements [7]. Taking routine sleep as 8 hours, the remaining 16 hours taken and with the help of a questionnaire the duration of no, mild to moderate and heavy physical activity were obtained from the study participants. Heavy physical activity includes sweating profusely, heavy breathing, definite raise in heart rate and verbal communication becomes difficult which includes running around a track, heavy manual labour or heavy weight lifting, walking upstairs, bicycling, brisk walking, gardening, heavy house work etc.

## RESULTS

Out of the 600 study participants, most of them (38.2%) belong to the age group of 35-40 years followed by 30-34 years (22.2%) and 25-29 years (21.8%). 55.2% of the study participants were females and 44.8% were males (Table: 1).

The prevalence of hypertension among 20-40 years age group was found to be 20.8% (Figure:1). Among hypertensives, majority of the study participants 64.8% (n=81)were in Stage 1(Table:2). 22.3 % (n=134) of the study participants were obese and 77.3% of the study participants were doing heavy physical activity for 2 or more hours (Table 3).

Obesity was found to be significantly associated with hypertension. When compared to non-obese individuals, obese individuals have 5.5 times risk of getting hypertension. The study participants who were doing heavy physical activity for 2 or more hours were having 0.56 times less risk of getting hypertension. (Table 4).

**Table 1. Age and sex wise distribution of the study participants**

Age	Male		Female		Total	
	N	%	N	%	N	%
20-24	51	19	56	16.9	107	17.8
25-29	53	19.7	78	23.6	131	21.8
30-34	62	23	71	21.5	133	22.2
35-40	103	38.3	126	38.1	229	38.2
<b>Total</b>	<b>269</b>	<b>44.8</b>	<b>331</b>	<b>55.2</b>	<b>600</b>	<b>100</b>

Majority of study population are in the age group of 35-40 yrs followed by 30-34 yrs.

**Table 2. Distribution of hypertension as per JNC VII criteria**

	Male		Female		Total	
	N	%	N	%	N	%
Stage 1	43	53.1	38	46.9	81	64.8
Stage 2	17	41.5	24	58.5	41	32.8
Stage 3	2	66.7	1	33.3	3	2.4
Total	62	49.6	63	50.4	125	100

Among the hypertensives, majority (64.8%) of the study participants were in Stage 1.

**Table 3. Distribution of risk factors among study participants**

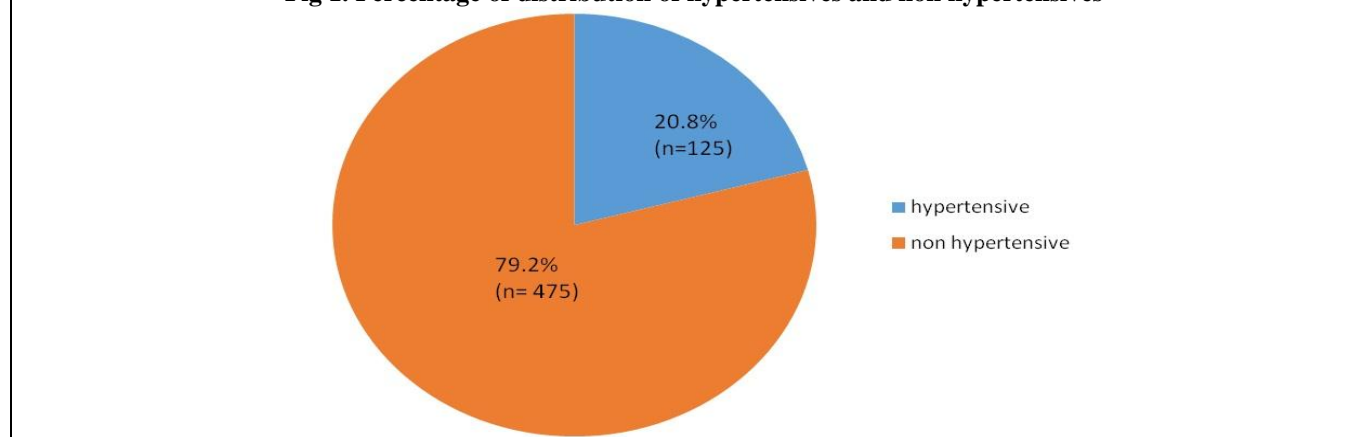
Risk factor	Male		Female		Total		
	N	%	N	%	N	%	
Sex	269	44.8	331	55.2	600	100	
Obesity	Yes	45	33.6	89	66.4	134	22.3
	No	224	48.1	242	51.9	466	77.7
Heavy Physical activity	≥2hrs	86	18.5	378	81.5	464	77.3
	<2hrs	39	28.7	97	71.3	136	22.7

22.3% of study participants were obese and 22.7% were doing heavy physical activity less than 2 hours.

**Table 4. Relationship of risk factors with hypertension**

Risk factor		Hypertensive		Non-hypertensive		X <sup>2</sup>	P value	OR	CI
		N	%	N	%				
Sex	M	62	23	207	77	1.5	0.22	1.3	0.859-1.891
	F	63	19	268	81				
Obesity	Yes	62	46.3	72	53.7	67.7	<0.05	5.5	3.579-8.477
	No	63	13.5	403	86.5				
Heavy Physical activity	≥2hrs	86	18.5	378	81.5	6.5	0.01	0.56	0.365-0.878
	<2hrs	39	28.7	97	71.3				

Obesity and heavy physical activity were significantly associated with risk of hypertension.

**Fig 1. Percentage of distribution of hypertensives and non hypertensives**

## DISCUSSION

### Prevalence of hypertension

The prevalence for our study between the age group 20-40 years was 20.8%, which was similar to a study done by Q Wei et al in 2015 in China which found a prevalence of 19.3% among the age group of 18-44 years [8]. Another study by Sanjeet Panesar et al in 2013 in Delhi stated that the prevalence of hypertension in the age group of 20 – 29

and 30 – 39 years was 5.7% and 19.3% respectively [9]. Similar study from Senegal by Soulemene Pessinaba et al in 2013 reported a prevalence of 23% among the age group 25-34 years in Sub-Saharan Africa [10]. Manimunda SP et al 2011 stated that the prevalence of hypertension among age groups of more than 20 years to be 20.7% in Andaman and Nicobar Islands [11].

### Age and hypertension

Our finding suggested that the risk of hypertension increases significantly with age which was similar to a study by Basu and Millet in 2013 in which stated that the risk of hypertension increases significantly with age with odds ratio of 4.6 with confidence interval 3.0 – 7.1 [12]. Similar results were found in study done by Soulemane Pessinaba et al in 2013 which showed that the hypertension was significantly associated with age (p value =0.001) in Senegal [10].

### Sex and hypertension

Our study finding states that male and female are equally prone to hypertension. A meta-analysis study SAARC 2014 [13] and NNMB rural report 2006 stated that the prevalence of hypertension in male is more than that of females [14]. In contrast, studies by Kusuma YS et al 2004 [15] and Tiwari et al 2008 reported an increased prevalence among females than that in males. NNMB tribal report 2009 in Tamilnadu stated that the prevalence of hypertension is almost equal in both males and females aged more than 20 years, which was 18.4% and 18.2% respectively [14].

### Obesity and hypertension

In our study obese persons were 5.5 times at higher risk of getting hypertension than non-obese person. This is similar to Basu and Millet study where obesity was significantly correlated with hypertension with odds ratio of 3.7 and confidence interval of 2.1-6.8. Another study from Kabul, Afghanistan in 2014 done by Khwaja Mir Islam Saeed et al stated that the obese persons were 2.08 times greater risk of hypertension than non-obese person with p value <0.001; confidence interval 1.50- 2.89 [16]. Similar study by Soulemane Pessinaba *et al.*, in 2013 in

Senegal revealed that obesity was significantly associated with hypertension with p value <0.001 [10].

### Physical activity and hypertension

In our study, the study participants who were doing heavy physical activity of 2 hours or more were having 0.56 times less risk of getting hypertension as compared to those who do heavy physical activity less than 2 hours which is statistically significant. Other studies done by David R. Basette Jr in 2002 in US stated that the hypertension prevalence was significantly less in most active group compared with their sedentary peer with OR = 0.73; confidence interval: 0.59 to 0.9 [17]. A study done by S.S.Reddy et al in 2005 in adults aged 20 to 60 years revealed that significantly higher proportion of hypertension (15.8%) was associated with lack of physical activity with OR= 2.4 (Confidence Interval = 2.0 – 2.8)<sup>18</sup>. A study done by Soulemane Pessinaba et al in 2013 in Senegal revealed that physical inactivity is significantly associated with hypertension with p value < 0.001.

### CONCLUSION

The present study found that the prevalence of 20.8% hypertension among 20-40 years age group. Among the risk factors of hypertension, lack of exercise and obesity were found to be more associated with hypertension in this group. Therefore health intervention measures are warranted emphasizing on modifiable risk factors such as exercise and obesity to prevent hypertension in younger population.

### CONFLICT OF INTREST

No conflict of interest

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