

Prevalence of Hypertension among Urban Adult Population (25-64 years) of Nellore, India

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Abstract

Background: Hypertension is an important public health problem, which is common, asymptomatic, readily detectable, having preventable risk factors and often lead to lethal complications if left untreated. **Objectives:** To estimate prevalence of hypertension and its associated risk factors. **Methods:** This cross sectional study was conducted in an urban locality, Nellore city during 2008-09. The sample size was 933 in the age group of 25-64years. Simple random sampling method was used for selecting households and one member from each household was selected. Risk factors were recorded. Joint National Committee (JNC) VII criteria

was used to define hypertension. **Results:** The prevalence of hypertension was 29.3 % with 95% CI: 26.4%-32.3% (M: 30.9% & F: 27.7%) The independent risk factors of hypertension were age (OR-1.07), extra salt intake (OR-2.15), vegetable intake less than five serving per day (OR-2.91), high body mass index (OR-2.09), high waist circumference (OR-1.55), and low physical activity (OR-2.68). **Conclusion:** Policy with multiple integrated approach is needed to detect, treat and prevent, hypertension effectively.

Key Words: Body Mass Index, Hypertension, JNC, Prevalence

Introduction

High Blood Pressure or Hypertension is one of the most important preventable causes of premature death worldwide. Even a blood pressure at the top end of the normal range increases the risk [1]. Many who are afflicted feel no discomfort until a medical crisis i.e. a heart attack, the rupture of a blood vessel in the brain or a stroke - strikes. As a consequence, high blood pressure is often called the "Silent Killer" [2].

Over 1 billion people are living with high blood pressure. In 2008, globally, the overall prevalence of high

blood pressure in adults aged 25 and above was around 40%. In the South-East Asia Region, 36% of adults have hypertension [3]. In India, raised blood pressure increased from 5% in the 1960s to nearly 12% in 1990s, to more than 30% in 2008 [4].

Ageing population, rapid urbanization and transition from agrarian life to a wage-earning, modern city life are reported as major contributors to increased blood pressure in urban areas. Understanding the role of these risk factors is the key to develop a clear and effective strategy for improving community health [5]. Hence this community based study on prevalence of hypertension and its associated risk factors was taken up.

Material and Methods:

This study was conducted in urban Nellore, the Coastal District of Andhra Pradesh. This cross sectional study was conducted from June 2008 to May 2009 after Institutional Ethics Committee's approval. The sample size of 933 was calculated using the prevalence rate of 16% with 15% acceptable (allowable) error at 95% confidence level. Both males and females aged more than 24-64 years included and pregnant women were excluded. People who migrated from rural area were included once they completed 6 months of life there.

A proforma was devised using STEPS approach of WHO questionnaire, Integrated Disease Surveillance Project (IDSP) and Indian Council for Medical Research (ICMR), New Delhi. The questionnaire consisted of two parts. In first part socio demographic data of the family and in the second part individual data were collected.

Each household was considered as sampling unit. Firstly 950 houses were selected randomly from 5902 houses obtained from Urban Health Center of Narayana Medical College, Nellore. From each house one eligible person was selected for the study by using random method. Data collection was done, after obtaining informed written consent.

Where ever possible, all physical measurements conducted in a private area. Height and weight were measured by using stadiometer and calibrated weighting machine respectively. Waist girth was measured using a non-stretchable fiber measuring tape as the smallest horizontal girth between the costal margins and the iliac crests at minimal respiration [6].

Measurement of blood pressure (BP) was carried out on each participant by using the standard technique [7]. It was measured in left arm in the sitting position on the upper arm with the arm supported, with the palm facing upward. Mercury column Sphygmomanometer (Diamond Co. Industrial Electronics and Allied Products, Electronic Cooperative Estate, Pune, Maharashtra, India.) was used to measure the BP. The average value of two consecutive BP readings was taken in to account for this study purpose. In case where the

initial two readings differ by over 10 mm of mercury, a third reading was obtained and the last two measurements were averaged [6]. All the instruments had been calibrated daily before starting the survey.

A subject was considered hypertensive if one had an average systolic blood pressure (SBP) of 140 mmHg or diastolic blood pressure (DBP) of 90 mmHg, or if he or she was using antihypertensive medication with normal or high BP. The diagnosis and classification of hypertension was done according to the JNC-VII report [9]. Body mass index (BMI) was calculated using the formula: weight (Kg)/height (m²). Generalized obesity was defined using the new WHO Asia Pacific guidelines i.e. BMI ≥ 25 kg/m² and abdominal obesity as waist circumference ≥ 90 cm for men and ≥ 80 cm for women [9].

The data were analyzed by using SPSS 12th version (SPSS Inc., Chicago II, USA). Difference of blood pressure between the risk factor groups were examined using the test of ANOVA. Multiple logistic regression was carried out to identify the independent contribution of the factors, hypertension as the dependent variable and the various risk factors as independent variables. Probability value < 0.05 was considered as significant.

Results:

Among 933 study subjects, 463 (49.6%) were males and 470 (50.4%) were females. Among them 273 were found to be hypertensive as seen in table-1. The prevalence of hypertension was 29.3 % with 95% CI: 26.4%-32.3% (Male 30.9% & Female 27.7%). The prevalence of pre-hypertension was 22.3% (95% CI: 19.8%-25%). Among 273 hypertensive subjects, 78 (28.57%) had already diagnosed with hypertension and on anti-hypertensive medication. From those taking hypertension medication, 34 (43.59%) were had BP more than or equal to 140/90.

Univariate analysis of risk factors for high systolic blood pressure showed statistically highly significant association with age, education, extra salt intake, vegetable consumption less than five servings/day, current smoker, current alcoholic,

high body mass index, high waist circumference, and physical inactivity. Age, sex, extra salt intake, current smoker, current alcoholic, high body mass index, high waist circumference, vegetable consumption more than five servings and physical inactivity were statistically highly significant with diastolic

blood pressure. Occupations, family history of hypertension, fruit consumption more than five serving/day were not associated significantly with high systolic as well as diastolic blood pressure as seen in table 2.

Table 1: Prevalence of Hypertension of Study Subjects (n=933)

Criteria	SBP (mmHg)	DBP (mmHg)	Frequency	Percentage (%)
Normal	<120	And <80	452	48.4
Pre-Hypertension	120-139	Or 80-89	208	22.3
Stage I -Hypertension	140-159	Or 90-99	149	16
Stage II- Hypertension	≥160	Or ≥100	46	4.9
Hypertensive on Treatment	Any	Any	78	8.4
Total			933	100

Table 3 shows the multivariate analysis of association of risk factors and hypertension. The independent risk factors of hypertension were age, extra salt intake, vegetable intake less than five serving per day, high body mass index, high waist circumference, physical inactivity. As the age advanced blood pressure increased 1.07 times. Study subjects consuming extra salt are 2.15 times at risk of having hypertension as compared to subjects' not consuming extra salt. A smoker was 1.92 times more at risk of having hypertension as compared to non-smokers. However in the present study this was not statistically significant. Alcoholics are 1.88 times more at risk of having hypertension as compared to non-alcoholic. However in the present study this was not statistically

significant. Study subjects with overweight and obese are 2.09 times at risk of having hypertension as compared to subjects with normal weight. Abdominal obesity was 1.55 times at risk of having hypertension as compared to subjects without abdominal obesity. Study subjects consuming vegetable less than 5 serving per day were 2.91 times at risk of having hypertension as compared to subjects consuming vegetables more than 5 servings per day. Moderate physical activity were 1.73 times at risk of having hypertension and subjects with low physical activity are at 2.68 times more risk of having hypertension to compare with subjects with high physical activity.

Table 2. Univariate Analysis of Risk Factors for Systolic and Diastolic Blood Pressure of Study Subject (n=933)

Risk Factors	SBP		DBP	
	F value	Significance	F value	Significance
Age	0.39	0.00(S)	0.19	0.00(S)
Sex	0.19	0.55(NS)	0.11	0.00(S)
SES	0.00	0.84(NS)	0.01	0.62(NS)
Education	0.13	0.00 (S)	0.02	0.40(NS)
Occupation	0.07	0.02(NS)	0.01	0.56(NS)
Family History of Hypertension	0.01	0.76(NS)	0.04	0.14(NS)
Extra salt intake	0.12	0.00(S)	0.18	0.00(S)
Current smoker	0.13	0.00 (S)	0.16	0.00(S)
Current alcoholic	0.13	0.00 (S)	0.18	0.00(S)
BMI	0.20	0.00 (S)	0.18	0.00(S)
Waist Circumference	0.27	0.00 (S)	0.20	0.00(S)
Fruits <5 Serving	0.05	0.09(NS)	0.02	0.50(NS)
Vegetable <5 Serving	0.16	0.00 (S)	0.13	0.00(S)
Physical Activity	0.21	0.00 (S)	0.18	0.00(S)

S- Significant NS- Not Significant

Discussion

In the present study, the overall prevalence of hypertension was 29.3%. Non-Communicable Diseases (NCD) Risk factor profile study conducted in Tirupathi and Nellore showed a prevalence of 20% [10]. Another study conducted in Tirupati in the age group of 20 years above reported prevalence of 26.06% in 2006 [11]. A study at Lucknow in 2003, showed the prevalence of hypertension 32.2% and pre-hypertension, 32.3% in the age group of 30 years and above in high income group [12]. A study conducted at Ballabgarh town in Faridabad district of Haryana in the

age group of 15 to 64 years in 2003-04 reported 23.1% of prevalence in males and 15.7% in females [13]. A prevalence of 20% in the age group of 20 years and above in 2001 and 21.6% in 2003 was recorded at Chennai [14]. A Nationwide prevalence of 29.3% in men and 25.2% in women was reported in 2006 in the age group of 20 to 70 years [15]. Recent studies using revised criteria (BP \geq 140 and/or 90mmHg) have shown a high prevalence of hypertension among urban adults: men 30%, women 33% in Jaipur (1995), men 44%, women 45% in Mumbai (1999), men 31%, women 36% in Thiruvananthapuram (2000),

Table 3. Multiple Logistic Regression Analysis of Risk Factors of Hypertension (n=933)

Variables	B	Odds Ratio	95.0% C.I. for Odds Ratio		Sig.
			Lower	Upper	
Age	0.06	1.07	1.05	1.08	0.00(S)
Extra salt intake					
No		1.00			
Yes	0.77	2.15	1.50	3.09	0.00(S)
Current smoker					
No		1.00			
Yes	0.65	1.92	0.92	4.01	0.08(NS)
Current alcoholic					
No		1.00			
Yes	0.63	1.88	0.76	4.67	0.17(NS)
BMI					
Normal		1.00			0.00(S)
Over weight	0.74	2.09	1.25	3.48	0.00(S)
Obese	0.74	2.09	1.28	3.41	0.00(S)
Waist circumference					
No		1.00			
Yes	0.44	1.55	1.03	2.34	0.03(S)
Veg. Serving					
>5		1.00			
<5	1.07	2.91	1.51	5.63	0.00(S)
Physical activity					
Severe		1.00			0.00(S)
Moderate	0.55	1.73	1.09	2.76	0.02(S)
Low	0.98	2.68	1.63	4.39	0.00(S)

S- Significant NS- Not Significant

14% in Chennai (2001), and men 36%, women 37% in Jaipur (2002).¹⁰ World Health Organization (WHO) and Indian Council for Medical Research (ICMR) - NCD risk factor surveillance reported the prevalence of 26% among the industrial population in ten centers in India and 25.4% in Chennai [16]. Surveys from South East Asia Region by STEPS approach shows the prevalence in Sri Lanka is 7.8%, Thailand 22.4%, India 24.3% and Myanmar 25% [17].

The present study shows that as age advances blood pressure also advances 1.07 times and it was one of the independent risk factors of hypertension and in another study conducted at Chennai [16]. The prevalence of hypertension among males and females was not statistically significant in this study, but it was contradictory with Chennai study [14]. This study found out the positive association of extra salt intake with hypertension and it was one of the independent predictors of it. Study subjects consuming extra salt are at 2.15 times risk of having hypertension as compared to subjects' not consuming extra salt. This was supported by Tirupati study [18]. A Chennai study showed that salt added at table (> 1 teaspoon/day) showed two fold higher risk for hypertension (odds ratio [OR]: 2.059), compared to zero added salt taken as reference [19].

Vegetables intake more than five servings per day had a positive association with hypertension in this study. Only 5.14% were consuming more than five servings of fruits per day. Fruit intake is not statistically significant with hypertension in this study. A review of 250 observational studies estimated that increased consumption of fruits and vegetables is associated with a 16 per cent lower risk of cardiovascular deaths [20]. In this study, there was a positive correlation between hypertension with obesity and it was one of the independent risk factors of hypertension. This study shows that the risk of getting hypertension in overweight persons is almost equal to that of obese persons. Studies done in Chennai [16] and Tirupati [18] showed similar finding.

The prevalence of abdominal obesity was 46.62%, using South Asian guidelines in this study. The prevalence of hypertension is positively correlated with abdominal obesity. The Chennai study [14] showed that persons with abdominal obesity are 2.17 times at risk of having hypertension. Study subjects with moderate or low physical activity were at risk of having hypertension when compared to subjects with high physical activity. A study conducted at East Delhi in 2001, showed significant association between hypertension and exercise status [21]. In the present study, alcohol intake was positively associated with the prevalence of hypertension and multiple logistic regression analysis showed that alcoholics and smokers were 1.88 times and 1.92 more at risk respectively. Earlier studies have shown higher risk among smokers contrary to this finding [16, 18]. Hence studies are recommended with higher sample size and analysis shall be restricted to male population predominantly.

The prevalence of hypertension was high in the study area and it was associated with various risk factors. Hence it is necessary to increase the public awareness about hypertension detection and care. It may be either mass or individual approach. Creation of awareness about risk factors and hypertensive complications through mass media approaches with posters or pamphlets, television, radio and press, conducting rallies. Encourage intake of high quantity of vegetables and fruits along with regular diet are essential. Salt reduction campaigns may be organized to help the public to take low salt or avoid extra salt. Restriction of eating foods having high salt like processed food, fast foods are to be encouraged. It is better to provide facility for outdoor recreational sports and leisure time activities and advice moderate intensive exercise like 30-45 minutes brisk walking for 4-5 days a week. The health system should be strengthened to undertake the overall prevention and care for hypertension under National Non-Communicable Diseases control programmes. The control of hypertension should fit to overall policy of health promotion aimed at control of several lifestyle diseases.

Source of funding: Pyramid Social Welfare Trust, Bommidi, Tamilnadu, India.

Source of conflict: None

Acknowledgement: The authors acknowledge the faculty of Narayana Medical College, Nellore, A.P., India for their support and the participants of this study for their patience time to participate in this study.

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Date of Submission:	07-06-2013
Date of Peer Review:	08-06-2013
Date of Acceptance:	13-06-2013
Date of Publication:	30-06-2013