

**PREVALENCE OF PREHYPERTENSION AMONG ADULTS ATTENDING RURAL COMMUNITY HEALTH CENTRE, SOUTH KERALA, INDIA**M. C. Vasantha Mallika<sup>1</sup>, Siva Sree Ranga M. K<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

M. C. Vasantha Mallika, Siva Sree Ranga M. K. "Prevalence of Prehypertension among Adults Attending rural Community Health Centre, South Kerala, India". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 14, February 16; Page: 2241-2246, DOI: 10.14260/jemds/2015/325

**ABSTRACT:**

**BACKGROUND:** High Blood Pressure is one of the important risk factors for cardiovascular diseases worldwide. It is estimated that Hypertension, the silent killer, is responsible for fifty percent of cardiovascular deaths. In India, studies show steadily increasing prevalence of Hypertension since 1950 leading to deaths among young people. Scanty data exist regarding prevalence of Pre hypertension among poor and ignorant population attending rural health facilities like Community Health Centres. **OBJECTIVES:** To determine Prevalence of Prehypertension among adults attending outpatient department of CHC, Vellarada and to identify the risk factors. **METHODOLOGY:** Cross sectional study was conducted during a period of three months from 18<sup>th</sup> January 2010 among 18100 adults of 18 years and above attending CHC, Vellarada, a village situated 40 kilometres away from Thiruvananthapuram and nearer to Tamilnadu. Pretested questionnaire-based information was collected about diet, physical activity, and tobacco use and alcohol consumption. Standardized techniques were used for data on BP, weight, height and lipid profile. Using JNC-7 criteria, Prehypertension was defined as Systolic BP 120-139 mmHg and Diastolic BP 80-89 mm Hg. Statistical analysis was done using SPSS package. **RESULTS:** Prevalence of Hypertension was 35.14% (men 35.9%, women 34.6%) and Prehypertension 40.9% (men 40.56%, women 41.1%). On multivariate logistic regression analysis, Prehypertension showed significant positive association with BMI >23kg/m<sup>2</sup> (OR 1.79), age (OR 1.74), Serum Triglyceride >150 mg/dl (OR 2.2) and HDL cholesterol <40mg/dl (OR 1.48). **CONCLUSION:** High prevalence of pre hypertension and associated risk factors among young, economically productive group of rural population needed targeted interventions to reduce cardiovascular risk. It is beneficial if every health facility makes attempts for routine BP recording of young people so that prehypertensives may be subjected to life style modifications to prevent morbidity and mortality due to hypertension and prehypertension.

**KEYWORDS:** CHC, Prehypertension, JNC-7 Criteria, Blood Pressure.

**INTRODUCTION:** Several research studies reveal that morbidity and mortality from cardiovascular diseases are common in individuals with high blood pressure or hypertension.<sup>2-8</sup> High blood pressure is a silent killer and is responsible for fifty percent of cardiovascular deaths. High blood pressure is an important public health problem in India also.

The term 'Prehypertension'<sup>9</sup> was coined in 1939 in the context of early studies linked with High Blood Pressure recorded for Life insurance purposes to subsequent morbidity and mortality.

According to JNC 7 Criteria,<sup>10</sup> Prehypertension is defined as Systolic BP 120- 139 mm Hg and Diastolic BP 80- 89 mm Hg. There are a few data about the impact of prehypertension on cardiovascular disease incidence.<sup>11</sup> Studies show that Prehypertension is more prevalent in diabetic than nondiabetic participants.<sup>12</sup> Impaired glucose tolerance or impaired fasting glucose also greatly

## ORIGINAL ARTICLE

---

increase the cardiovascular disease risk in prehypertensive people. Obesity is associated with high prevalence of hypertension and diabetes.

To prevent the occurrence of hypertension in high risk groups JNC 7<sup>10</sup> recommends life style modifications. Life style modifications recommended by the JNC 7 are:

- Weight Reduction if overweight.
- Limitation of Alcohol intake.
- Increased Aerobic Physical Exercise (30-50minutesdaily).
- Reduced Sodium Intake (< 2.4 gm daily).
- Adequate dietary potassium (>120mmol/day).
- Cessation of Smoking.
- DASH Diet<sup>13</sup> (Diet rich in fruits, vegetables, low- fat dairy products & reduced saturated and total fats).

In India, studies show steadily increasing prevalence of Hypertension since 1950 leading to cardiovascular deaths among young people. Recent studies have shown a high prevalence of hypertension among adults in both urban and rural areas.<sup>2</sup>

The risk of cardiovascular disease in the individuals with prehypertension was observed to increase with presence of risk factors such as obesity and dyslipidaemia. Scanty data exist on the prevalence of Pre hypertension among poor and ignorant population attending rural health facilities like Community Health Centres in India.

Hence the present study was conducted with the objectives:

1. To determine Prevalence of Prehypertension among adults attending outpatient department of CHC, Vellarada, Thiruvananthapuram District.
2. To identify the risk factors of Prehypertension.

### **METHODOLOGY:**

**Study Design:** Cross Sectional Study.

**Study Area:** Community Health Centre, Vellarada.

**Study Population:** Adults of the age group 18-59 years attending Outpatient department of CHC, Vellarada, Thiruvananthapuram district, Kerala, South India during the study period. The study area is about forty kilometers away from Thiruvananthapuram city and nearer to Panachamoodu, an area close to Tamil Nadu state.

**Study Duration:** 3 months from 18-01-2010.

**Study Tool:** Using a Pretested questionnaire, data were collected on Diet, Physical Activity, consumption of Tobacco & Alcohol and Socio demographic characteristics after obtaining consent from the participants. Height and Weight were measured using standardized techniques and Body Mass Index for each participant was calculated using the formula,  $BMI = \text{Weight in kilograms} / \text{Height in meter}^2$

- Blood Pressure was measured on the left arm in a sitting position after 5 minutes of rest in a quiet room using reliable sphygmomanometer. Those participants showing Systolic BP 120- 139 mm Hg and Diastolic BP 80- 89 mm Hg are considered as Prehypertensives as per JNC 7 criteria.<sup>10</sup>

## ORIGINAL ARTICLE

- Prehypertensives were repeated for second BP measurement for confirmation.
- Standardized techniques were used for collecting data on lipid profile.

Participants who were not willing for examination were excluded from the study.

Statistical Analysis was done using SPSS -12 Package.

**RESULTS AND DISCUSSION:** 18100 Adults of the age group 18-59 years attending Outpatient department of CHC, Vellarada, Thiruvananthapuram district, Kerala, South India were subjected to anthropometric measurements, Blood Pressure measurement, estimation of fasting Lipid profile after entering the socio-demographic details in the pre tested questionnaire.

Study Population	Number	Percentage
Males	6665	36.8
Females	11435	63.2
	18100	100

**Table 1: Distribution of Study Population**

- Total adults studied - 18100.
- No. of Prehypertensives - 7402(40.9 %).
- Prehypertensives (Males) - 2703(40.56 %).
- Prehypertensives (Females) - 4699(41.1 %).
- Prevalence of Prehypertension - 40.9 %.
- Population prevalence - 40.2 to 41.6 % (95% C.I).

Prevalence of Prehypertension in the present study is 40.9 %

National & International Studies show similar prevalence of prehypertension among adult population.<sup>14,16</sup> A study conducted in rural Africa by Stewart de Ramiraz et al shows a prevalence of 44%. Study conducted in North India by Prabhakaran. D et al and a study by Yadav. S. et al<sup>16</sup> reported a prevalence of 44% and 47% respectively.

The overall prevalence of prehypertension was high (80%) in a study conducted among a healthy adult military population in India.<sup>17</sup> A survey conducted in nine States of India by the National Nutrition Monitoring Bureau reported the pooled estimate of prehypertension in rural men to be about 45 per cent.<sup>18</sup> A few studies from different regions of India have showed the prevalence of prehypertension in the range of 40-60 per cent.<sup>18,19</sup>

Category	Component of category	Prehypertensive group Number Percentage		'Z'	Significance
Age	< 40	3713	39.7	3.42	P < 0.001
	≥ 40	3689	42.2		
Gender	Male	2703	40.6	0.610	P > 0.05
	Female	4699	41.1		

## ORIGINAL ARTICLE

BMI	≥ 23	5627	76.2	158.8	P < 0.001
	< 23	1775	16.6		
STG	≥ 150	5924	80.6	117.7	P < 0.001
	< 150	1478	13.7		
HDL	≤ 40	5428	72.1	89.38	P < 0.001
	> 40	1974	18.7		

**Table 2: Characteristics of the Pre hypertensive Group**

Presence of pre hypertension showed significant association with advancing Age, high Body Mass Index, high Serum Tri Glyceride and low High Density Lipid levels. On multivariate logistic regression analysis, Prehypertension showed significant positive association with BMI >23kg/m<sup>2</sup> (Odds Ratio 1.79), Age (Odds Ratio 1.74), Serum Triglyceride >150 mg/dl (Odds Ratio 2.2) and HDL cholesterol <40mg/dl (Odds Ratio 1.48). Many other National and International studies<sup>17</sup> show almost similar findings.

Prehypertension showed significant positive association with Salt restricted diet (Odds ratio 2.18), but negative association with tobacco use and alcohol consumption in our study.

**CONCLUSION:** The rural population attending a Community Health Centre in South Kerala showed a prevalence of Prehypertension 40.9%. This high prevalence of Prehypertension and associated risk factors among young and economically productive group of rural population needed targeted Interventions to reduce cardiovascular risk.

**RECOMMENDATIONS:** It is beneficial if every health facility makes attempts for routine BP recording of very young people also so that prehypertensives may be detected early and subjected to early lifestyle modifications<sup>3,11</sup> recommended by JNC 7 criteria to prevent morbidity and mortality due to pre hypertension and hypertension. Also health education among school children will be highly useful to prevent obesity and associated complications such as hypertension, diabetes, coronary artery disease and cancer.

**ACKNOWLEDGEMENTS:** The investigators acknowledge with a great sense of gratitude the co-operation of all the participants and the assistance of Ms. Sumi. S. Y and Ajitha. K, the trained JPHNs who helped in collecting data.

### REFERENCES:

1. Gupta R. Trends in hypertension epidemiology in India. *J Hum Hypertens* 2004; 18: 73–78.
2. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Rocella EJ, Joint National Committee on Prevention Detection, Evaluation and Treatment of High Blood Pressure. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*. 2003; 42: 1206–1252.
3. Collins R, Peto R, MacMahon S, Hebert P, Fiebach NH, Eberlein KA, Godwin J, Qizilbash N, Taylor JO, Hennekens CH. Blood pressure, stroke, and coronary heart disease. Part 2, Short-term reductions in blood pressure: overview of randomised drug trials in their epidemiological context. *Lancet*. 1990; 335: 827–838.

## ORIGINAL ARTICLE

---

4. Anonymous. Blood pressure, cholesterol, and stroke in eastern Asia. Eastern Stroke and Coronary Heart Disease Collaborative Research Group. *Lancet*. 1998; 352: 1801–1807.
5. Van den Hoogen PC, Feskens EJ, Nagelkerke NJ, Menotti A, Nissinen A, Kromhout D. The relation between blood pressure and mortality due to coronary heart disease among men in different parts of the world. Seven Countries Study Research Group. *N Engl J Med*. 2000; 342: 1–8.
6. Lee ET, Welty TK, Fabsitz R, Cowan LD, Le NA, Oopik AJ, Cucchiara AJ, Savage PJ, Howard BV. The Strong Heart Study. A study of cardiovascular disease in American Indians: design and methods. *Am J Epidemiol*. 1990; 132: 1141–1155.
7. Stamler J, Stamler R, Neaton JD. Blood pressure, systolic and diastolic, and cardiovascular risks. US population data. *Arch Intern Med*. 1993; 153: 598–615.
8. MacMahon S, Peto R, Cutler J, Collins R, Sorlie P, Neaton J, Abbott R, Godwin J, Dyer A, Stamler J. Blood pressure, stroke, and coronary heart disease. Part 1, Prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. *Lancet*. 1990; 335: 765–774.
9. Vasan RS et al, *N Engl J Med* 2001; 345: 1291-7.
10. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure: The JNC 7 Report. *JAMA* 2003; 289: 2560-72.
11. Ying Zhang, Elisa T. Lee, Richard B. Devereux, Jeunliang Yeh, Lyle G. Best, Richard R. Fabsitz, Barbara V. Howard. Prehypertension, Diabetes, and Cardiovascular Disease Risk in a Population-Based Sample. The Strong Heart Study.
12. Arauz-Pacheco C, Parrott MA, Raskin P. The treatment of hypertension in adult patients with diabetes. *Diabetes Care*. 2002; 25: 134–147.
13. DASH: Dietary Approaches to stop Hypertension: JNC7. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation & Treatment of High Blood Pressure.
14. Stewart de Ramirazetal. Prevalence & correlates of hypertension in Rural Africa. *Journal of Human hypertension Rural Africa*. 2010(24) 786-795.
15. Prabhakaran. Detal. Cardiovascular risk factor prevalence among men in a large industry of Northern India. *Natl Med J India* 2005; 18: 59-65.
16. Yadav. S. Boddula R, Genitta G, Bhatia V, Bansal B, KongaraS, et al. Prevalence & risk factors of pre-hypertension & hypertension in an affluent North Indian population. *Indian J Med Res* 2008; 128: 712-20.
17. Sougat Ray, Bharati Kulkarni\* & A. Sreenivas\* Prevalence of prehypertension in young military adults & its association with overweight & dyslipidaemia. (Received May 18, 2010) *Indian J Med Res* 134, August 2011, pp 162-167.
18. National Nutrition Monitoring Bureau (NNMB). Diet and nutritional status of population and prevalence of hypertension among adults in rural areas, NNMB Technical Report 24: Hyderabad: NNMB; 2006. p. 35-7.
19. Deepa R, Shanthirani CS, Pradeepa R, Mohan V. Is the 'rule of halves' in hypertension still valid? - Evidence from the Chennai Urban Population study. *J Assoc Physicians India* 2003; 51: 153-7.

**AUTHORS:**

1. M. C. Vasantha Mallika
2. Siva Sree Ranga M. K.

**PARTICULARS OF CONTRIBUTORS:**

1. Associate Professor, Department of Community Medicine, Dr. SMCSI Medical College, Karakonam, Thiruvananthapuram, India.
2. Assistant Professor, Department of Anatomy, Dr. SMCSI Medical College, Karakonam, Thiruvananthapuram, India.

**FINANCIAL OR OTHER****COMPETING INTERESTS:** None**NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. M. C. Vasantha Mallika,  
Siva Sri Sadanam,  
Vellarada-695505,  
Thiruvananthapuram District,  
Kerala, South India.  
E-mail: dr.mcvasanthamallika@gmail.com

Date of Submission: 17/01/2015.  
Date of Peer Review: 18/01/2015.  
Date of Acceptance: 07/02/2015.  
Date of Publishing: 13/02/2015.