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**Original Research Article**

# A cross sectional study on prevalence of hypertension and its associated risk factors among rural adults in Kanchipuram district, Tamil Nadu

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## ABSTRACT

**Background:** Hypertension is one of the non-communicable diseases, which is an important global public health problem and also the most leading cause for cardiovascular disease in both developed and developing countries. The aim and objectives of the study were to estimate the prevalence of hypertension and to assess the associated risk factors among adults of rural population.
**Methods:** A community based cross sectional study was done on 225 study subjects, using systemic random sampling method at Kancheepuram district, Tamil Nadu.
**Results:** The study included 225 participants of which 53% were male and 47% were female. The overall prevalence of hypertension among the study population was 26.2%. Risk among male was greater than female (OR=1.390). Factors like age, body mass index, diet, family history of hypertension had significant association ($p<0.05$) with hypertension.
**Conclusions:** Regular screening for hypertension among adults should be done in the general OPD as well as in health camps so that they have a knowledge regarding their own blood pressure status. Among those who already have hypertension, anti -hypertensive drugs, timely blood pressure check-up, screening for cardio vascular diseases and self-care management of hypertension need to be promoted.

**Keywords:** Hypertension, Prevalence, Risk factors, Rural adults

## INTRODUCTION

Hypertension is one of the non-communicable diseases, which is most significant global public health problems and also the most common cardiovascular disease crisis in both developed and developing countries. WHO has termed hypertension as the "Silent Killer". Frequency of hypertension varies from 10–15% in rural and 25–30% in urban population.[1] Hypertension is considered more important because of its high frequency of morbidity and mortality related to cardiovascular and kidney disease. It is the leading risk factor for mortality and ranked 3rd as a cause of disability adjusted life years.[2]

Hypertension prevalence is reported all around the world. Increasing pattern of growth among population each year with advanced tech growth has brought down the work opportunity and increased stress among younger generation has led to increase in prevalence of hypertension.

In India, 2.3 million cardiovascular deaths has been reported out of 9 million total deaths in the year 1990, in

that 1.2 million death of all death due to coronary heart disease and 0.5 million of death due to stroke. By the year 2020 it has been predicted that there will be increase of cardiovascular death by 111% in India.[3]

Hypertension is considered as an iceberg disease because its unknown morbidity exceeds the known morbidity. Vast range of risk factors in relation to essential hypertension ranging from genetic to lifestyle.[4] The present study was done to estimate the prevalence of hypertension and to assess the associated risk factors among adults of rural population.

## METHODS

The study was a community based cross sectional study conducted between June 2014 and December 2014 among selected villages in Kanchipuram district, Tamil Nadu. Line listing of adults of aged 18 years and above in the study villages was done and that constituted the sampling frame of study. A total of 225 individuals were included in the study. Systemic random sampling method was used to select the study subjects. Those adults who are non-cooperative or refused to participate in the study were not included in the study. Those individuals who are not present on two repeated visits were excluded from the study. Pregnant women were excluded in the study.

The WHO STEPS questionnaire was used for the study which consists of core and expanded questions in it for non-communicable disease (NCD) assessment. This questionnaire was administered to one person at a time and pretested. The questionnaire was altered according to local cultural and influences. The questionnaire consists of information regarding socio demographic profile, anthropometric measurement, history about smoking, alcohol consumption, dietary habit and physical activity. For physical examination, standardized calibrated mercury sphygmomanometer, stethoscope, weighing machine and measuring tape were used.

All the adults aged 18 years and above who were selected for the study were enlisted. During the visit the adults has been screened and administered the questionnaire for hypertension. Height, weight, waist circumference and blood pressure were measured and recorded. The respondents selected for study were asked to refrain from tea, coffee, alcohol, smoking, physical exercise and consuming food for at least half an hour before each visit. They were asked to empty bladder and relaxed before blood pressure recording. Subsequent visits were made to cover the respondents who were not available in previous visit and if not able to contact them for more than three visits, the subjects were excluded from the study.

An informed and written consent was taken from the individuals who are willing to participate in the study. Confidentiality of the respondents was maintained. SPSS version 21 was used throughout the study for analysis of the data collected.

## RESULTS

Out of 225 respondents included, 59 (26.2%) of them were hypertensive, of which 47 (79.6%) are known case of hypertension and 12 (20.4%) were newly diagnosed as hypertension. 32 (14.1%) of the study group were in high normal stage (pre hypertensive). The proportion of hypertension showed increased trend with age. Prevalence of hypertension was high among age group 51 to 60 years (40.7%), No individuals in the age group 18 to 20 were found to be hypertensive. More than 60% of prevalence was observed in individuals aged 40 to 60. Majority of the hypertensive subjects belonged to socio economic class III (35.5%), followed by class IV (32.2%), class II (20.3%), class V (6.7%) and Class I (5%) respectively. The prevalence was high among lower middle and upper lower class 67.8%. Though the proportion of hypertension was high among males (29.1%) as compared with females (22.8%), it was not statistically significant ($p>0.05$).

Statistically significant difference ($p<0.05$) were found in the prevalence of hypertension between individuals with a high BMI (33%) as compared to those with a normal or low BMI. Out of 225 individuals, 115 (51.1%) of individuals had normal/expected weight, 17 (7.6%) were under weight, 64 (28.4%) were pre-obese, 21 (9.3%) were class I obese and 6 (2.7%) were class II obese. Only 2 (0.8%) individuals were in class III obesity.

The prevalence of hypertension was higher 32.4% among those who were in the habit of smoking tobacco. Out of 225 individuals, 70 (31.1%) were found to be consuming alcohol. Among those who consume alcohol, 18 (30.5%) had hypertension. 18.6% of individuals had positive history of hypertension, risk of developing of hypertension among those individuals who gave positive history of stress person is greater than those who did not, the difference were significant ($p<0.005$). These differences were found to be statistically significant. Risk of hypertension is greater among study participants with positive family history of hypertension than those who gave negative family history to hypertension OR=2.283, 95% CI: 1.062, 4.894 and the difference are statistically significant as p value is 0.02. In dietary pattern assessment, mixed diet consumption among the study participants is 94.2% (n=212), of which 24.5% of them were found to be hypertensive. There is association and statistical significance between mixed diet and hypertension in the present study OR=0.279, with 95% CI of 0.079, 0.976 respectively, with P value of 0.02. In this study 32.4% of the study participants gave positive history of fruit consumption. It is seen that those who consumed fruits regularly (at least once a week) had 61% less chance of developing disease than those participants who do not consume fruits at all. The difference is statistically significant is p value is <0.05.

**Table 1: Socio demographic profile in relation to hypertension.**

| Variable | Category | No. of Individuals | Percentage (%) | No. of hypertensive | Percentage (%) |
|---|---|---|---|---|---|
| **Gender** | Male | 120 | 53 | 35 | 29.1 |
| | Female | 105 | 47 | 24 | 22.8 |
| **Age in years** | < 20 | 06 | 2.7 | - | - |
| | 21-30 | 31 | 13.8 | 02 | 3.4 |
| | 31-40 | 48 | 21.3 | 07 | 11.9 |
| | 41-50 | 54 | 24 | 14 | 23.7 |
| | 51-60 | 51 | 22.7 | 24 | 40.7 |
| | 61-70 | 26 | 11.5 | 10 | 17 |
| | > 70 | 09 | 04 | 02 | 3.3 |
| **Occupation** | Government | 02 | 0.9 | - | - |
| | Non government. | 42 | 18.7 | 7 | 16.6 |
| | Self employed | 74 | 32.9 | 23 | 31 |
| | Student | 8 | 3.6 | - | - |
| | Home maker | 79 | 35.1 | 23 | 29.1 |
| | Retired | 12 | 5.3 | 06 | 50 |
| | Unemployed | 08 | 3.6 | - | - |
| **Type of family** | Nuclear | 169 | 75 | 39 | 23 |
| | Joint | 23 | 10 | 10 | 43.4 |
| | Extended | 33 | 15 | 10 | 30.3 |
| **Marital status** | Married | 162 | 72 | 42 | 25.9 |
| | Unmarried | 25 | 11.1 | 03 | 12 |
| | Widow/widower | 37 | 16.4 | 13 | 35 |
| | Divorced | 1 | 0.4 | 01 | 100 |

**Table 2: Association of hypertension with selected variable.**

| Risk factor | Hypertensive | | Not hypertensive | | OR | 95% C.I | | P value |
|---|---|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | | | | |
| **Family h/o HT** | 17 | 42 | 25 | 141 | 2.283 | 1.062 | 4.894 | 0.02 |
| **Smoking** | 12 | 47 | 25 | 141 | 1.440 | 0.626 | 3.281 | 0.34 |
| **Alcohol intake** | 18 | 41 | 52 | 114 | 0.962 | 0.480 | 1.981 | 0.90 |
| **BMI– above normal** | 31 | 28 | 62 | 104 | 1.857 | 1.019 | 3.384 | 0.04 |
| **Stress** | 41 | 18 | 85 | 81 | 2.171 | 1.105 | 4.215 | 0.01 |
| **Mixed diet** | 52 | 07 | 160 | 06 | 0.279 | 0.079 | 0.976 | 0.02 |

*C.I – Confidence interval, OR – odds ratio, BMI – Body Mass Index.

## DISCUSSION

Hypertension is a major public health problem in India and globally. The prevalence of hypertension in developing countries like India has an increasing trend. The overall prevalence of hypertension in the present study was observed as 26.2% i.e. 59 participants among 225 study participants. Out of 59 hypertensive patients 79.6% of them were known cases of hypertension and the remaining 20.4% were newly diagnosed cases of hypertension. The prevalence of hypertension among males in the study is 29.1% and the prevalence of hypertension among females is 22.8%. Studies similar to this setting and objective have been done at various rural areas. Khanam et al conducted a study following the WHO STEPS approach, and observed a prevalence of 31.9% pre hypertensive and 16% of hypertensive.[5] In this study the prevalence of disease was greater in males when compared with females. Similar findings were observed in studies such as Prabakaran et al (29.3%), Sundar et al (21.5%) with a high prevalence of hypertension among males as compared to females.[6,7]

Positive correlation was found with risk factors such as increasing age, higher Body Mass Index, consumption of mixed diet, increased stress level, decreased fruit consumption, positive family history to hypertension, and history of smoking. It is observed that the hypertension prevalence was highest among the 51-60 years of age group (i.e. 40.7%). There was increasing trend of hypertension with advance in age. Govindan et al, Hasan et al also observed the increasing trend of blood pressure with increasing age with a highest recorded blood pressure in the age group between 51-75 years.[8,9]

The present study showed a positive statistically significance between Body Mass Index and hypertension (p value of 0.042). Similar results were observed in various studies done by Alam et al, Srikanth et al, Gupta et al and Prashant et al.[10-13] A study done by Sachdev et al showed there was positive association with BMI and hypertension with a p value of less than 0.001.[14]

Prevalence of smoking among study participants was found to be 16.4%. Among smokers 32.4% of them had hypertension. Association was found in the studies conducted by Malhotra et al with no statistical significance.[15] Khan et al, Gupta et al in their studies showed positive association with smoking and the disease.[12,16]

Prevalence of alcohol consumption among the study participants in the present study was 31.1%, and among those who had disease 30.5% gave positive history of alcohol consumption. Trailokya et al, Manimunda et al, and Khan et al also in their study observed alcohol consumption as one of the major risk factor for hypertension and the alcohol consumption among hypertensive participants varied from 13 to 54%.[16-18] It is observed that mixed diet consumption among the study participants is 94.2% (n=212), of which 24.5% of them were found to be hypertensive. There is association and statistical significance between mixed diet and hypertension in the present study ($p<0.05$). Bartwal et al also in their study observed association between the disease and non-vegetarian consumption.[19] Sagare et al had significant association between essential hypertension and mixed diet which correlates with the present study.[4]

The prevalence of family history of hypertension among study participants was 18.6%. Risk of hypertension is greater among study participants with positive family history of hypertension than those who gave no family history of hypertension (odds ratio=2.283) and the difference was statistically significant ($p<0.05$). Srikanth and Kulkarni, Mahajan et al, Rajasekar et al in their study Hasan et al observed 12% of study participants gave positive family history which is similar to the present study Bartwal et al, Gupta et al also observed significant association between hypertension and positive history to family history.[9,11,17,20,21] So for effective control of disease in this community, health education and awareness about hypertension need to be high priority.

## CONCLUSION

The study showed that the prevalence of hypertension was 26.2%. Risk factors like male gender, obesity, family history, mixed diet, and stress had association with the disease. And the difference of association between the specific risk factor and hypertension was significant in the study. The following recommendations are given for prevention and control of the disease. Health promotion and health education regarding hypertension at community level and individual level to be strengthened through public private partnership. Health workers from both sectors may be identified to promote the same. Modifiable risk factors like diet, sedentary life style, stress, consumption of alcohol and smoking can be detected in a larger population through regular screening in the general OPD as well as with through health camps. Prevention of disease can be done with timely screening of high risk groups. Among those already have hypertension anti -hypertensive drugs, timely blood pressure check-up, screening for cardio vascular diseases and self-care management of hypertension need to be promoted. Conservative measures for treatment like practice of yoga, regular exercise and diet in those with mild disease can be promoted. Written information regarding disease symptoms and complications in the form of pamphlets, brochures can be distributed to the patients. A family member can be identified to make sure the patient is taking medication regularly and attending the NCD clinic regularly. Tracking of blood pressure in those children who have family history of blood pressure can be done through school health camps. Further study is required for longitudinal follow up of the risk factors that were related to hypertension to assess the true risk factor.

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