

Prevalence of hypertension and its risk factors among adults in central Kerala

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Introduction: High blood pressure is both preventable and treatable. Community based studies on the prevalence of hypertension is now necessary to assess the prevalence of hypertension & its risk factors. Epidemiological studies to assess the prevalence of hypertension are essential to plan preventive strategies & promote the health of population. A study of the prevalence of hypertension among adults (>19 years), the association between socio-demographic and behavioral risk factors in hypertension and the treatment seeking behavior in the population in Thrissur district of Kerala was conducted. **Methods:** In this community based cross sectional study, 740 adults were studied for 1 year. The sampling technique used was Multi Stage Cluster sampling. Using standard questionnaire and interview, information was collected. Blood pressure was measured twice in each subject using a mercury sphygmomanometer adopting standardized techniques and their averages were taken. **Results:** Maximum prevalence of hypertension was in the age group 50-69 years, showing increasing trend after 40 years onwards. Of the hypertensives 43.9% were males. Among the hypertensive group, 227(79%) had an educational qualification of 12th standard and below. Statistically significant associations of hypertension were found with educational status and BMI. **Conclusion:** We conclude that age group and education status were associated with hypertension

Keywords: Hypertension, Risk factors, Central Kerala

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Introduction

High blood pressure (BP) is a major public health problem in developing countries around the world and is one of the most important modifiable risk factor for cardiovascular diseases. Hypertension increases the risk of heart attacks, strokes and kidney failure.

According to the World Health Statistics by WHO [1], in terms of attributable risk raised blood pressure is the foremost factor among all behavioral and physiological risk factors globally. In India cardiovascular diseases, of which hypertension is a major risk factor, are estimated to be responsible for 1.5 million deaths annually [2].

Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India[3]. Prevalence of hypertension in India is reported as ranging from 10% to 30.9% [4]. High blood pressure is both preventable and treatable. Community based studies on the prevalence of hypertension is now necessary to assess the prevalence of hypertension and its risk factors.

Community based studies on the prevalence of hypertension among adult population are less in Kerala & none have been reported from Thrissur district. Epidemiological studies to assess the prevalence of hypertension are essential to plan preventive strategies and promote the health of population [1].

Aims & Objectives

01. To study the prevalence of hypertension among adults (>19 years) in Thrissur district of Kerala
02. To study the association between socio-demographic & behavioral risk factors in hypertension
03. To study the Treatment seeking behavior in the population.

Materials and Methods

Study design: Community based cross-sectional study

Study setting: Thrissur district, Kerala

Study period: The study was conducted for a period of one year

Study population: Inclusion criteria:

- Adults of age more than 19 years permanently residing in Thrissur for a period of at least 6 month
- Those who gave consent to participate in the study

Sample size:

Sample size was calculated using the formula $n = \frac{4pq}{d^2} \times 2$

Where: 2 is design effect for considering cluster sampling

P= 23% (prevalence of hypertension in India[1])

Q=100-p with 20% allowable error and significance level of 5 %

Sample size was found to be 669. To account for the 10% drop-out rate, it was decided to include 740 adults

Sampling technique: Multi-stage cluster sampling

Villages were considered as clusters. The sampling was done in 2 stages. In the first stage, two taluks were selected from five taluks of Thrissur district randomly. In the second stage, 20 villages were randomly selected from two taluks.

Sampling unit was a household. To obtain required sample size, 35 persons were included in each cluster. Considering 10 % drop-out rate, 37 persons were included from each cluster. In each village, the first household was selected randomly. Next to this house, 37 consecutive household were studied. One person was selected from each household using Kish table method.

Methodology

A pre-tested semi-structured and interviewer-administered questionnaire was administered. BP was recorded by the doctor with a mercury column sphygmomanometer using a standardized technique, twice with a five minute interval; in sitting position on the right arm and after rest.

The average of two values was taken. The first and the fifth Korotkoff sounds were taken as indicative of the systolic and diastolic blood pressure respectively. Average of two readings of systolic and diastolic blood pressure was used as the blood pressure of the participant.

Data Collection tools

The data was collected using the following methods after informed consent.

- Interview method using a schedule
- Anthropometric measurement
- Blood pressure measurement

Study Variables

- Socio-demographic variables such as age, sex, religion, educational status, occupation, marital status, socio-economic status
- Behavioral risk factors: tobacco smoking and chewing, fruit and vegetable consumption, physical activity, dietary factors
- Anthropometry: height, weight, BMI and waist circumference
- Any associated co-morbidities
- Treatment seeking pattern

Operational definition-systolic BP ≥ 140 mmHg & Diastolic BP ≥ 90 mm of Hg[5]

Data Analysis- Data was coded & entered in MS Excel & analyzed using SPSS 20.0

Ethical Issues- The ethical clearance was obtained from the Institutional Ethical Committee and Institutional Review board of our medical college.

Results

A cross sectional study was conducted among 738 subjects aged >19 years in Thrissur district.

Age wise distribution: Out of 738 subjects, 25.2% belonged to 40-49 years age group.

Gender wise distribution: 67.17% of subjects were females. Religion: Out of 738 subjects, predominant faith was Hinduism.

Educational status: 45.9% were having secondary education. 4.8% had no formal education.

Occupation: 53.9% were house wives.

Socioeconomic status: 68.7% of the study subjects belong to APL families.

Marital status: Married subjects constituted 89.7%.

Status of spouse: 75.7% of subjects are staying with their spouses.

Type of Family: Majority (62.2%) belonged to nuclear families.

Body Mass Index: 52% of study participants were in obese group.

Table-1: Distribution of subjects according to body mass index

Body Mass Index (n=631)	No (%)
Obese	328(52)
Over weight	114(18.1)
Normal	143(22.7)
Underweight	46(7.3)
Total	631

- Family history of chronic non-communicable disease: 30% of subjects were having no family history of any chronic non communicable disease, 39% of them have a family history of HTN and other NCDs, 16.9% subjects have family history of hypertension alone.

- Treatment seeking behavior:

01. Co-morbidities: (52.43%) have at least one self reported co morbid condition. Among these commonest co morbidities were diabetes mellitus(94), cardiovascular accidents(7), hypercholesterolemia(71) and bronchial asthma(24).

02. System of medicine sought: 79.4% adopted Modern Medicine for treatment.

03. Service utilization: Out of the total subjects, 43.2% were utilizing services from private hospitals.

- Total Prevalence of hypertension among subjects: 287 subjects(38.9%) among the total study population were hypertensive [95% Confidence interval(35.4- 42.4)]

Bivariate analysis

Table No-2: Association between age group and hypertension

Age group	HTN (%)	Normal (%)	Total
19-29	9(13.8)	56(86.2)	65
30-39	24(19.2)	101(80.8)	125
40-49	60(32.2)	125(67.2)	186
50-59	65(45.8)	77(54.2)	142
60-69	67(57.3)	50(42.7)	117
70-79	51(65.5)	28(35.4)	79
80-89	11(48.8)	13(54.2)	24
Total	287(39.5)	451(60.5)	738

Maximum prevalence of hypertension was in the age group 50-69 years, showing increasing trend after 40 years onwards.

X² value 82.59 p value (.000) that is <0.05 which is significant.

Table No-3: Gender v/s hypertension

Gender(n=728)	HTN %	Normal %	Total
Male	105(43.9%)	134(56.1%)	239
Female	182(37.2%)	307(62.9%)	489
Total	287	441	728

43.9% of males were hypertensive. Value 3.148X² p (value)[s3] 0.076, not significant. p value<0.05 is taken as significant.

Table No-4: Educational status v/s hypertension

Educational status(n=728)	HTN %	Normal %	Total
12th standard and below	227(79)	320(58.5)	547
Above 12th standard	60(21)	121(66.9)	181
Total	287	441	728

Among the hypertensive group, 227(79%) had an educational qualification of 12th standard and below. X² 3.97 p value=0.05

Odds ratio 1.4 (1.005-2.06)

There was a significant association among educational status and hypertension

Table No 5: Body mass index (BMI) v/s hypertension

Body Mass index (n=629)	Hypertension	Normal	Total
Obese	259(79%)	69(21)	328
Over weight	90(79.6%)	23(20.4)	113
Normal	126(88.1%)	17(11.9)	143
Under weight	41(91.1%)	4(8.9)	45
Total	516(82%)	113(18)	629

X² 8.63 Df 3 p value is 0.03. There is statistically significant association between BMI and hypertension as p<0.05

Table No 6: Smoking v/s hypertension

Status (N=656)	Hypertension	Normal	Total
Smokers	34(44.16%)`	43(55.84%)	77
Non smokers	226(39.03%)	353(60.97%)	579
Total	260	396	656

X² 0.74 p value is 0.38, not significant odds ratio: 1.23(0.76-1.9)

Table No 7: Physical exercise v/s hypertension

Status (N=697)	Hypertension	Normal	Total
Exercise(+)	86(37.5%)	143(62.5%)	229
No Exercise(-)	187(40.13%)	279(59.87%)	456
Total	273	422	695

Among 229 exercised subjects 86 were hypertensives. X² 0.426 p value is 0.513, not significant.

Odds ratio: 0.89 (0.64-1.2)

Table No 8: Diet pattern v/s hypertension

Status (N=697)	Hypertension	Normal	Total
Vegetarian	33(53.23%)	29(46.7%)	62
Mixed	238(37.48%)	397(62.52%)	635
Total	271	426	697

Among vegetarians 53.2% had hypertension while 46.7%were normal. X² 5.8

P value 0.015, which is significant

Odds ratio: 1.89(1.12-3.20)

Table No 9: Added salt intake v/s hypertension

Status (N=686)	Hypertension	Normal	Total
Added salt intake	118(34.81%)	221(65.19%)	339
No added salt intake	169(43.3%)	221(56.7%)	347
Total	287	442	686

Among 339 using added salt in diet, 118were hypertensive and 221 were normotensive.

X² 5.37. p value is 0.02 odds ratio: 0.69(0.51-0.94)

Discussion

Total Prevalence of Hypertension: Total prevalence of hypertension in our study was 38.9%. In a study by Gupta a high prevalence of hypertension was observed among urban adults [3]. In a multicentric study in Bangladesh and India the overall prevalence of hypertension was 65% [6]. According to Anil Bindhu et al [7] the overall prevalence of hypertension in rural Thiruvananthapuram was 36%. In a population based study by Addo et al in Ghana prevalence of hypertension was higher in urban areas than in rural areas [8].

Sex and Prevalence of Hypertension: In our study 43.9% males were hypertensive and 37.2% females were hypertensive. In the study by Gupta [3] 30% of males and 33% of females in Jaipur had high prevalence of hypertension. In his study he mentioned that 31% of males and 36% of females in Thiruvananthapuram had high prevalence of hypertension. According to the multicentric study by the Hypertension Study Group [6] prevalence of hypertension did not differ significantly between sexes which was in contrast to our study.

In a study by Gupta on prevalence and determinants of hypertension in the urban population [9] isolated systolic hypertension was present in 7% of men and 2% of women, isolated diastolic hypertension was present in 65% of men and 57% of women and definite hypertension was present in 16% of men and 24% of women. According to Anil Bindhu et al [7] prevalence of hypertension in a rural area in Thiruvananthapuram was found to be 37.9% in males and 35% in females. In a longitudinal study of risk factors of hypertension and their relation to cardiovascular disease by Wang et al [10] there was no sex difference in hypertension which is dissimilar to our study.

Age and Prevalence of Hypertension: In our study maximum prevalence of hypertension was observed in 50-69 age group. In a study by Laxmaiah [11] risk of hypertension was 6-8 times high in elderly people which compares favorably to our study. Similarly in the study by Addo et al prevalence of hypertension increased with increasing age [8]. In a community based study in Uganda by Wamala et al [12] hypertension is associated with older age. In a study by Wang [10] et al systolic hypertension was positively associated with age.

Educational Status and Prevalence of Hypertension: In our study we observed a statistically significant association between educational status and hypertension. In the study by Hypertension Study Group conducted in Bangladesh and India [6] higher educational status correlated with increase in hypertension which was similar to our study. In the community based study in Uganda by Wamala [12] hypertension is associated with having attained tertiary education.

Body Mass Index and Prevalence of Hypertension: In our study we observed a statistically significant association between body mass index and hypertension. In the multi centric study by the Hypertension Study Group [6] high body mass index correlated positively with high prevalence of hypertension. In the study by Gupta et al on prevalence and determinants of hypertension in urban population [9] high body mass index was found to be independently associated with high prevalence of hypertension. In the study by Anil Bindhu et al [7] the risk of hypertension was 73.8% more in people with high body mass index which was similar to our study.

According to the Hypertension in Diabetes Study (HDS) I [13] the hypertensive patient had a greater body mass index than the normotensive patient.

Smoking and Prevalence of Hypertension: In our study we observed that 44.16% of the smokers were hypertensive and smoking was not observed to be a risk factor for hypertension. In a study among tribal population in India by Laxmaiah et al [11] those using tobacco for smoking were at higher risk of hypertension compared to non smokers which is not similar to our study. In another study on prevalence of hypertension [9] smoking was independently associated with high prevalence of hypertension. In the Strong Heart Study by Wang et al [10] systolic blood pressure was negatively associated with smoking.

Physical Exercise and Prevalence of Hypertension: In our study we observed no association between physical exercise and prevalence of hypertension. According to the study by Gupta [3] there is a strong correlation between changing lifestyle factors and increase in hypertension. In the study by Hypertension Study Group [6] physical activity was inversely related to the prevalence of hypertension. In a study on physical activity in prevention and treatment of hypertension in obese by Fagard [14], the weighted net reduction of blood pressure in response to dynamic physical training averaged 3.4/2.4 mmHg which appeared to be unrelated to initial body mass index and to its training induced changes.

It was found by Fagard [14] that exercise was less effective than diet in lowering blood pressure and adding exercise to diet did not appear to further reduce blood pressure. In a study in Australia by Halbert et al [15] aerobic exercise training reduced systolic blood pressure by 4.7 mmHg and diastolic blood pressure by 3.1 mmHg compared to non exercising control group. The blood pressure reduction seen with aerobic exercise training was independent of the intensity of exercise sessions per week.

Dietary Salt Intake and Prevalence of Hypertension: In our study we observed no correlation between added salt intake and prevalence of hypertension. The study in Ghana by Addo et al [8] found that high blood pressure was associated with increased salt consumption. A study on dietary approaches to treat and prevent hypertension by Lawrence et al [16] found that in hypertensive patients already on drug therapy a

Reduced salt intake could further lower blood pressure. In a study by SK Ha [17] on dietary salt intake and hypertension, moderate reduction of salt intake was an effective measure to reduce blood pressure. Reduction in dietary salt from 9-12g/day to the recommended level of less than 5-6 g/day will have major beneficial effects on cardiovascular health [17].

Conclusion

We conclude that age group and education status were associated with hypertension. We recommend further detailed studies in this area.

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