

A cross-sectional study on prevalence of hypertension and risk factors associated with hypertension in a rural area of North Kerala

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ABSTRACT

Background: Hypertension (HTN) is the leading cause of cardiovascular disease (CVD) and deaths due to CVD globally. HTN is a major public health concern in India both in urban and rural areas and is increasing at an alarming rate due to change in dietary patterns and lifestyle. The common risk factors associated with HTN were smoking, overweight, physical inactivity, alcohol consumption, diabetes, and family history. Due to inadequate access to health-care facilities at rural areas, the early screening and treatment of HTN are not done regularly, so we conducted this study. **Objectives:** To determine the prevalence of HTN and risk factors associated with it in the rural community of North Kerala. **Materials and Methods:** Community-based cross-sectional study was conducted at selected gram panchayath in rural field practice area of a private medical college. Sample size was 200 and convenient sampling method used. Data were collected visiting homes and blood pressure measured with mercury sphygmomanometer by descriptive statistics and Chi-square-test were used to analyze the data. **Results:** Among 200 participants, 52.5% and 47.5% were females and males, respectively. The overall prevalence of HTN was 21% and risk factors associated were male gender, aged ≥ 45 years, lack of exercise, obesity and high waist circumference. **Conclusion:** About 15.5% of cases were newly diagnosed for HTN. The risk factors identified were male gender, aged ≥ 45 years, lack of exercise, high body mass index and central obesity. Addressing these risk factors as earliest by health education regarding lifestyle changes and early detection and treatment initiation for HTN will decrease the burden of HTN and other non-communicable diseases.


KEY WORDS: Hypertension; Prevalence; Risk Factors; Rural; Kerala

INTRODUCTION

High blood pressure (BP) or hypertension (HTN) is the leading cause of cardiovascular disease (CVDs) and deaths due to CVD globally. HTN accounts for 9.4 million deaths worldwide every year due to CVD and its complications and HTN itself is responsible for about 45% deaths due to heart disease and 51% of deaths due to stroke.^[1,2]

Low- and middle-income countries (LMIC) have about one-third of CVD deaths every year which is due to inability to access primary health-care facilities which are key to early diagnosis and treatment of the HTN and its complications. Because of this unequitable distribution of primary health-care facilities in LMIC, HTN and its complications will be detected late in the course of disease and die in younger age from CVD.^[1,2]

The World Health Organisation statistics 2015 reports that the prevalence of HTN among adults (≥ 18 years) in India is 25.35% (25.9% males and 24.8% females).^[3] HTN is a major public health concern in India both in urban and rural areas. The systemic reviews of the pooled epidemiological studies of India show HTN prevalence of 29.8%, whereas

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it was 33.8% in urban areas and 27.6% in rural areas of India.^[4]

The prevalence of HTN among the rural population is increasing at an alarming rate due to change in dietary patterns and lifestyle. According to few studies conducted in rural and urban parts of India, risk factors associated with HTN were smoking, overweight, physical inactivity, alcohol consumption, diabetes, and family history^[5-9]

Due to inadequate access to health-care facilities at rural areas, the early screening and treatment of HTN are not done regularly, so we conducted this study with an objective to determine the prevalence of HTN and risk factors associated with it in a rural community of North Kerala.

MATERIALS AND METHODS

Study Design

A community-based cross-sectional study was conducted.

Study Setting

Study was conducted in a selected gram panchayath in rural field practice area of a private medical college.

Study Population

The people those who aged 18 years and above in the rural field practice area were included in the study.

Inclusion Criteria

The people who were aged 18 years and above and those who were willing to participate were included in the study.

Exclusion Criteria

The people with pregnancy and those who were not willing to participate were excluded from the study.

Study Duration

2 months (June - July 2016).

Sample Size

The prevalence of HTN in rural South Indian community according to systemic review by Anchala et al. were 21.1%,^[4] and this was taken for calculating sample size with the absolute precision at 6%, alpha 5% with design effect of 1, the sample size derived was 178 which was calculated using the open Epi (version 3.03). Considering the non-response rate of 10%, sample of 200 was collected.

Sampling Method

A convenient sampling method was used to collect data. The data were collected by house-to-house visit with the help of health workers and Anganwadi workers.

Data Collection

Ethical clearance was obtained from the Institutional Ethics Committee. Data were collected after explaining the purpose of the study and taking informed written consent from persons willing to participate in the study. The data were collected using a pro forma containing basic sociodemographic details and measurement of BP. BP was measured twice with mercury sphygmomanometer by following all the standard protocol of seventh report of the Joint National Committee (JNC) on prevention, detection, evaluation, and treatment of high BP (JNC VII) and used the cut of systolic BP (SBP) ≥ 140 mm Hg or diastolic BP (DBP) ≥ 90 mm Hg as hypertensive as per JNC VII guidelines.^[10]

Data Analysis

Data were entered in Microsoft Excel; descriptive statistics were analyzed in the form of proportions, means and standard deviation and association were analyzed by Chi-square test and Fischer's exact test using Epi data analysis V2.2.2.182.

RESULTS

Sociodemographic Details

A total of 200 persons were participated in the study and mean age of the participants was 50.99 ± 15.05 years. Among the study subjects, 52.5% (105) and 47.5% (95) were females and males, respectively. Among the participants, most of them were Hindus (97.5%), 99% were married, 58.5% were illiterate, 33.5% and 46% were housewives and farmers, respectively (Table 1).

Among the study population, 65% of them told that their main mode of mobility for daily activities (going to work, shopping of household items, etc.) was walking, 5% and 4.5% of them told that there was a history of HTN and diabetes mellitus in their family, respectively. Around 6.5% of them are known diabetics. About 7% of them were smokers, 26% were using alcohol, and only 1% were doing regular exercise (Table 1).

Incidence and Prevalence of HTN

Among 200 participants, 6.5% (13) people were known cases of HTN before the study itself, 15.5% (29) were newly diagnosed with HTN after screening and the overall prevalence of HTN in the study population was 21%

(42), among them 27.4% and 15.2% males and females, respectively. The mean SBP and DBP of the participants were 126.4 ± 16.2 mm of Hg and 80.9 ± 10.1 mm of Hg, respectively. Among the hypertensives, the proportion of HTN was more among the age group of 60-69 years (38.8%), graduates (47.3%), overweight and obese people (body mass index [BMI] and waist circumference) (Tables 2 and 3).

Table 1: Sociodemographic profile of the participants based on the gender distribution

Sociodemographic profile	Gender n (%)		Total n (200)
	Male (95)	Female (105)	
Age group (in years)			
25-29	2 (66.7)	1 (33.3)	3
30-39	22 (39.3)	34 (60.7)	56
40-49	20 (50.0)	20 (50.0)	40
50-59	16 (69.6)	7 (30.4)	23
60-69	21 (42.9)	28 (57.1)	49
70 and above	14 (48.3)	15 (51.7)	29
Religion			
Hindus	94 (48.2)	101 (51.8)	195
Others	1 (20)	4 (80)	5
Marital status			
Married	94 (47.5)	104 (52.5)	198
Not married	1 (50.0)	1 (50.0)	2
Education status			
Illiterate	51 (43.6)	66 (56.4)	117
Primary school	16 (45.7)	19 (54.3)	35
High school	13 (56.5)	10 (43.5)	23
Graduation	13 (68.4)	6 (31.6)	19
Postgraduation	2 (33.3)	4 (66.7)	6
Habits			
Smoking	8 (57.1)	6 (42.9)	14
Alcohol	36 (69.2)	16 (30.8)	52
Exercise	2 (100)	0	2
Total	95	105	200

Risk Factors of HTN

In our study, the risk factors studied were gender, age <45 years and above 45 years, education status, smoking, alcohol consumption, daily exercise, BMI, and waist circumference. Among these factors, male gender, aged 46 years and above, lack of exercise, obesity, high waist circumference were found to be statistically associated with HTN (Table 3).

In our study, males were at more risk of having HTN than females and it was statistically significant. People aged more than 45 years were more at risk of developing HTN than people aged <45 years, those who does not do any daily exercise were at more risk in developing HTN than those who does, obesity was statistically significant risk factor for HTN and high waist circumference (central obesity) was also a risk factor in developing HTN (Table 3).

DISCUSSION

In our study, the overall prevalence of HTN among the study population was 21%, and newly diagnosed HTN was 15.5% and the proportion was more among the age group of 60-69 years, overweight and obese people. The risk factors associated with HTN in our study were male gender, aged more than 45 years and above, lack of exercise, obesity, high waist circumference. Alcohol intake and tobacco usage were not associated with HTN in our study.

The prevalence of HTN was slightly lower to WHO statistics 2015 for India which was 25.35% and very less to the study done by Chow et al. which showed the prevalence of 30.7% for India (Rural-31.5%).^[3,11] The systemic reviews of pooled epidemiological studies of India done by Anchala et al. showed a prevalence 27.6% for rural areas of India which was higher than our study, and the same study showed a prevalence of 21.1% for rural areas of South India which was similar to our study.^[4] A study conducted by Galav et al. in the rural areas of Rajasthan was found prevalence of HTN as 18.7%; study done by Kokiwar et al. in rural part of Central India showed

Table 2: Distribution of screened population and HTN according age and sex

Age group (in years)	Male		Female		Total		SBP in mm Hg	DBP in mm Hg
	Screened population (n)	Prevalence (%)	Screened population (n)	Prevalence (%)	Screened population (n)	Prevalence (%)	Mean±SD	Mean±SD
18-29	2	0	1	0	3	0	116±10.4	70±0.2
30-39	22	31.8	34	8.8	56	17.9	124.1±13.2	81.1±9.1
40-49	20	15	20	0	40	7.5	121.1±13.5	79.4±9.1
50-59	16	31.2	7	0	23	21.7	131.3±18.3	82.4±12.6
60-69	21	52.4	28	28.6	49	38.8	129.6±17.3	83.4±11.3
≥70	14	0	15	33.3	29	17.2	129.6±19.1	78.3±7.8
Total	95	27.4	105	15.2	200	21	126.4±16.2	80.9±10.1

SBP: Systolic blood pressure, DBP: Diastolic blood pressure, SD: Standard deviation, HTN: Hypertension

Table 3: Risk factors associated with among the study population

Factors	HTN		Total n	P value
	Yes (42)	No (158)		
Gender				
Male	26	69	95	0.027
Female	16	89	105	
Age group				
<45 years	12	80	92	0.008
46 years and above	30	78	78	
Education status*				
Illiterate	22	95	117	0.56
Primary school	7	28	35	0.56
High school	4	19	23	0.55
Graduation	9	10	19	0.05
Postgraduation	0	6	6	1
Smoking*				
Yes	4	10	14	0.334
No	38	148	186	
Alcohol consumption				
Yes	10	42	52	0.441
No	32	116	148	
Daily exercise*				
Yes	2	0	2	0.043
No	40	158	198	
BMI [§]				
Underweight	3	26	29	0.74
Normal	10	56	66	1
Overweight	6	28	34	0.77
Obese	23	48	71	0.027
Waist circumference - male [§]				
Normal	10	56	66	<0.0001
Central obesity	16	13	29	
Waist circumference - female ^{§*}				
Normal	0	39	39	<0.0001
Central obesity	16	50	66	

[§]Cut off for South Asian population was used, *Fischer's exact test was used, BMI: Body mass index

a prevalence of 19.04% and a study done in rural areas of South India by Yuvaraj et al. found a prevalence of 18.3% which are all slightly similar to the prevalence of HTN found in our study.^[5,12,13] A few studies conducted in rural areas of Jaipur by Kumar et al. in Central India by Bhadoria et al. in rural Delhi by Kishore et al. and in Maharashtra by Todkar et al. found a prevalence of HTN as 13.17%, 14.8%, 14.1% and 7.24%, respectively, which were very much lower compared to our study.^[6,7,9,14] This increase in the prevalence of HTN was may be due to rural population changing their traditional lifestyle to urban lifestyle.

The prevalence of HTN among males and females was 27.4% and 15.2%, respectively, which was higher for males in our study compared to other studies.^[5,12,13] but it was very much low for males compared to study done by Kishore et al.^[9] The proportion of HTN was more among the 60-69 years age group which was slightly higher compared to studies done by Yuvaraj et al. and Kumar et al.^[13,14] and was similar to other studies.^[5,12] However, in our study, the proportion of hypertensives among 30-39 years age group which was slightly higher compared to other studies and it is alarming since younger age group people are developing HTN which is a matter of concern for public health.^[5,7,9,12-14] The alarming rise of the prevalence of HTN among the younger adults is of great concern for public health.

Like in our study, male gender was at risk for HTN in study done by Kishore et al.,^[9] but gender was not associated in some studies conducted in other rural parts of India.^[5,6]

Age more than 45 years was associated with risk of HTN in our study which was similar to other studies.^[6,9] Alcohol intake and tobacco usage were not associated in our study with HTN which was very much contrast to other studies.^[6,7,9]

Lack of exercise or sedentary life, high BMI and central obesity or higher waist circumference were associated with HTN in many studies and which was similar to our study,^[5-7,9] which time and again proves that these lifestyle changes were leading risk factors for development of HTN and other non-communicable diseases, and this is a matter of concern since these changes happening at brisk phase even in rural areas which were not so in past decades.

The strength of the study was doing visiting houses to collect data rather than using hospital data. Limitations of the study were using of the convenient sampling method.

From our study, we can see that prevalence of HTN was increasing in rural areas, and the common risk factors identified for development of HTN were male gender, aged more than 45 years and above, lack of exercise or sedentary lifestyle, high BMI, and central obesity. Addressing these risk factors as early as possible at the primary level by giving health education will decrease the burden of HTN and other non-communicable diseases.

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