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Original Research Article

Behavioural risk-factors of hypertension and its knowledge in rural South India: a cross-sectional study

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ABSTRACT

Background: India, a lower middle-income country with a population of more than 1 billion is undergoing a rapid epidemiological transition characterized by an increased prevalence of non-communicable diseases. It is estimated to account for 10.8% of all deaths and 4.6% of all disability-adjusted life years in India. Hence this study is carried out to assess the socio-demographic profile and risk factors associated with hypertension (HTN) in rural India. and to determine the association between risk factors and hypertensive status.
Methods: This is a community-based cross-sectional study in Shivamogga taluk of Karnataka from May-September 2023. Based on 2011 census, Shivamogga taluk has 117601 households bearing population of 507324 and sex-ratio 987 per 1000 males, 36.4% of population lives in urban area and 63.6% in rural area. Ayanur and Matthur are rural field practice area of SIMS having population of 3605 and 3144 respectively. The multi-stage random sampling method is used to study 430 study participants.
Results: The study comprised of 430 participants, 162 (37.67%) were among the age group of 50-65 years, 223 (51.86%) were hypertensives and 306 (71.16%) stated that HTN adversely effects health of an individual. 381 (88.6%) opined that reducing salt intake in the diet can significantly reduce the development of HTN in an individual.
Conclusions: HTN is a behavioural disease that is increasing day by day and there is no much difference between people living in urban/rural areas. Hence, this needs to be addressed at a primitive level to decrease the prevalence of NCD's by promoting health, adopting healthy lifestyles and adherence towards medications.

Keywords: HTN, Risk factors, Knowledge, Medications, Rural community

INTRODUCTION

India, a lower middle-income country with a population of more than 1 billion is undergoing a rapid epidemiological transition characterized by an increased prevalence of non-communicable diseases. HTN is an important public health problem in both urban and rural areas of India. It is estimated to account for 10.8% of all deaths and 4.6% of all disability-adjusted life years in India.[1] The prevalence of HTN was found to have increased with age among both genders, particularly after 45 years of age.[2]

The world health organization states that a significant percentage of non-communicable diseases are preventable by addressing four main behavioural risk factors: physical inactivity, unhealthy diet, tobacco use and alcohol consumption.[2] Patients with HTN need to have necessary skills and knowledge to take care of themselves, to define their condition, to understand and estimate potential risk factors and to appreciate how far lifelong medical control

can help.[3] Low level of knowledge and awareness about blood pressure are also important factors for not adhering to anti-hypertensive drugs leading to uncontrolled HTN.[4] By considering increase in prevalence of HTN in rural areas (men-12.6%, women-8.5%), importance of modifiable behavioural risk factors, HTN knowledge in prevalence and control of HTN, present study aimed to examine these constructs among rural Indian communities.[5]

Objectives

Objectives were to assess the socio-demographic profile and risk factors associated with HTN in rural India and to determine the association between risk factors and HTN status of an individual.

METHODS

Place of study

Study carried out at Ayanur and Matthur, rural field practice area of Shimogga institute of medical sciences (SIMS).

Duration of study

Study conducted from June to September 2023.

Study design

Community based cross-sectional study design was used.

Sample size

Based on data from NFHS-5, prevalence of HTN in rural India is 22.7 and in Karnataka is 25.5. Overall prevalence of HTN is 29.2.[5] Sample size is calculated using epi-info software with formula-$4pq/d^2$ with allowable error of 15%, sample size is estimated to be 430.

This is a community-based study in Shivamogga taluk of Karnataka. Shivamogga district has total 7 taluks and itself is a big taluk having 209 villages. Based on 2011 census, Shivamogga taluk has 117601 households bearing population of 507324 and sex-ratio 987 per 1000 males.36.4% of population lives in urban area and 63.6% in rural area.[6] Multistage random sampling method is used to study 430 study participants. Initially, 2 villages are randomly selected from Shivamogga taluk by lottery method. After selecting the villages, a unique number was given to each household in 2 villages and another random draw is made to select sample households. A final lottery process is conducted to select study participants among those in household who are 30 years and above.

Inclusion criteria

Those who are above 30 years diagnosed with or without HTN and are willing for study after obtaining consent.

Exclusion criteria

Those who are not available at their house during data collection after 3 visits.

Data analysis

Data is entered in MS-Excel and later imported to SPSS Software. It is analyzed using descriptive statistics and results represented in the form of frequencies and percentages. Chi-square test is applied to determine the association between variables using SPSS V 21 software.

RESULTS

The study was carried out in rural field practice area of SIMS, Shivamogga for a period of 4 months to know the prevalence of HTN, socio-demographic profile, risk-factors and knowledge about HTN. The prevalence of HTN in rural India was found to be 51%, 162 (37.62%) belonged to the age-group of 50-65 years. 251 (58.37%) are females and 95 (22.09%) did not have basic education (Table 1).

Various modifiable risk-factors for HTN like usage of tobacco, alcohol, physical inactivity, obesity, increased salt intake, distance to the nearest health care provider were assessed, 68 (15.81%) were smokers and 74 (17.2%) were using smokeless tobacco and 105 (24.41%) were alcoholics, 205 (47.67%) performing physical activity of >600 MET and 223 (51.86%) hypertensives (Table 2).

Knowledge about HTN and its impact on health and disease were assessed, 306 (71%) had opinion that HTN adversely affects health and 275 (63.95%) opined that getting treatment for HTN reduces likelihood of other diseases. Risk factors like alcohol consumption, overweight, physical inactivity and limiting salt consumption's knowledge and the prevalence of HTN in a rural community was assessed (Table 3).

Association between risk-factors of HTN and knowledge about HTN was determined by chi-square test and $p<0.05$ is considered to be significant. We found significant association between education status of the household and development of HTN ($p=0.0000$). As level of schooling increases, occurrence of HTN in them decreases which means greater level of education helps in having a good knowledge about the disease and hence they can adopt some preventive measures. There is a significant association between usage of smokeless tobacco and HTN occurrence ($p=0.0000$). Tobacco consumption effects on cardiovascular system and thus leading to coronary artery disease secondary to HTN. There is also a significant association between alcohol use and HTN state ($p=0.011$). Like tobacco, even alcohol has its impact on cardiovascular system. Intake of fruits/ vegetables in diet has its impact on HTN state, ($p=0.042$). Consumption of fruits/vegetables of >5 servings/day can significantly reduce the occurrence of development of HTN (Table 4).

Table 1: Distribution of age among study subjects, (n=430).

Age group (in years)	N	Percentage (%)
30-45	102	23.72
46-50	72	16.74
50-65	162	37.67
>65	94	21.86

Mean age=48.8±1.089 SD years.

Table 2: Socio-demographic details of study participants, (n=430).

Socio-demographic factors		N	Percentage (%)
Gender	Male	179	41.62
	Female	251	58.37
Religion	Hindu	384	89.3
	Muslim	46	10.69
	Christian	00	0.1
Education	Literate	335	77.91
	Illiterate	95	22.09
Occupation	Farmer	240	55.81
	Non-farmer	190	44.18
Marital status	Unmarried	18	4.18
	Married	354	82.32
	Divorced/separated	04	0.93
	Widow/widower	54	12.55

Table 3: Distribution of risk factors for HTN in study subjects, (n=430).

Risk factors		N	Percentage (%)
Smoking	Current smoker	68	15.81
	Non-smoker	362	84.18
Smokeless tobacco	User	74	17.2
	Non-user	356	82.8
Alcoholism	Alcoholic	105	24.41
	Non-alcoholic	325	75.58
Intake of fruits and vegetables	<5 servings/day	162	37.67
	>5servings/day	268	62.32
Physical activity	>600 MET	205	47.67
	<600 MET	224	52.09
BMI (kg/m^2)	Underweight	39	9.06
	Normal	249	57.91
	Overweight	129	30
	Obese	13	3.02
Regular health check-up	Yes	358	3.25
	No	72	16.74
Last time BP measured	>3 months	369	85.81
	6 months	15	3.48
	1 year	26	6.04
	First time	20	4.65
Hypertensive	Yes	223	51.86
	No	162	37.67
	Unaware	45	10.46
On medications	Yes	223	51.86
	No	107	24.88
Distance from home to public health facility	<5 km	259	60.23
	>5 km	171	39.76

Table 4: Knowledge of risk factors and consequences of HTN among individuals with HTN who were aware and unaware of their hypertensive status, (n=430).

Knowledge of HTN and consequences of HTN		N	Percentage (%)
How does HTN affect one's health?	Adversely affects	306	71.16
	No idea	124	28.83
Treating HTN reduces likelihood of other diseases?	Yes	275	63.95
	No	155	36.04
Treating HTN reduces likelihood of	Heart disease	82	19.06
	Stroke	95	5.34
	Both heart disease and stroke	186	43.25
	Heart disease and cancer	45	10.46
	Don't know	94	21.86

Table 5: Association between risk-factors of HTN and their hypertensive state.

Risk factors		Hypertensive state		Total n=385 (%)	X^2, p value, df
		Yes, n=223 (%)	No, n=162 (%)		
Education	No schooling	73 (32.7)	14 (9.9)	89 (23.1)	49.33, 0.000, 6
	Less than primary school	60 (26.9)	34 (21)	94 (24.4)	
	Primary school completed	47 (21.1)	37 (22.8)	84 (21.8)	
	Secondary school	14 (6.3)	16 (9.9)	3 (7.8)	
	High school	24 (10.8)	39 (24.1)	63 (16.4)	
	College/degree	5 (2.2)	19 (11.7)	24 (6.2)	
	Post-graduation	0	1 (0.6)	1 (0.3)	
Occupation	Farmer	133 (59.6)	87 (53.7)	220 (57.1)	1.351, 0.245, 1
	Non-farmer	90 (40.4)	75 (46.3)	165 (42.9)	
Smokeless tobacco	User	60 (26.9)	11 (6.8)	71 (18.4)	25.24, 0.000, 1
	Non-user	163 (73.1)	151 (93.2)	314 (81.6)	
Alcohol use	User	64 (28.7)	28 (17.3)	92 (23.9)	6.724, 0.011, 1
	Non-user	159 (71.3)	134 (82.7)	293 (76.1)	
Intake of fruits and vegetables	<5 servings/day	75 (33.6)	71 (43.8)	146 (37.9)	4.143, 0.042, 1
	>5 servings/day	148 (66.4)	91 (56.2)	239 (62.1)	
BMI (kg/m^2)	Underweight	22 (9.9)	17 (10.5)	39 (10.1)	1.193, 0.75, 3
	Normal	129 (57.8)	92 (56.8)	221 (57.4)	
	Overweight	64 (28.7)	50 (30.9)	114 (29.6)	
	Obese	8 (3.6)	3 (1.9)	11 (2.9)	

DISCUSSION

HTN: a global public health challenge

HTN, also known as high blood pressure is a major public health concern affecting over one billion individuals worldwide. It is a silent killer, often presenting with no symptoms yet significantly increasing the risk of cardiovascular diseases like heart attacks, strokes, and kidney failure.

In our study, mean age of study participants was 48.8±1.089 SD years. The prevalence of HTN in rural community was found to be 51% which is more than twice as per NFHS-5 data. It was found that there was very fair knowledge about the risk factors of HTN and its early detection and treatment. A community based cross-sectional study on knowledge of risk factors for HTN in rural India by Doreen et al also found that 132 (641) were aware and 218 (641) were unaware of their hypertensive state and median age of participants was 60 years.[7]

Kumar et al report that in India, 3.78 million (40.4%) deaths in 1990 were due to chronic diseases while this figure is expected to reach 7.63 million (66.7%) by 2020.[8] The prevalence of HTN was higher among smokers (41.3%) as compared to non-smokers (25.4%) and among obese (58%) compared to overweight (37.1%) and normal (25.3%) in a study conducted in Uttarakhand, India.[9] In our study, we found that 60 (27%) of hypertensives were smokers and 64 (28%) of hypertensives were alcoholics, 64 (28%) of hypertensives were overweight which seriously depict that HTN is a lifestyle disease. Ganesh et al found that factors such as being older, currently using

alcohol, having less than 7 servings of fruits in a week, a moderate stress level and waist circumference more than 90 cm were associated with a higher prevalence rate of HTN among a sample of male police personnel residing in urban Puducherry, India.[10]

Bartwal et al found that the prevalence of HTN was 41.7% and there is a relationship of HTN with increase in age, family history of HTN, increase in salt intake, consuming mixed diet, increase in waist circumference, waist-hip ratio and body mass index.[11] In our study, we found the prevalence of HTN in rural community was 51% and is associated with tobacco/alcohol consumption.

Kokiwar et al found that while factors such as upper social class, sedentary physical activity, tobacco use, and diabetes had a significant association with HTN, alcohol intake was not related to HTN among rural communities of central India.[12] In our study, we found a significant association with factors like education status, usage of tobacco/alcohol, intake of >5 servings of fruits and vegetables with development of HTN.

A study by Taye et al in East Africa stated that 67.7% of the respondents was knowledgeable about life style modification and majority (92%) of them knew that HTN has another disease consequences and 41% of them mentioned heart disease as the main consequence of HTN.[13] In our study, 306 (71.2%) of them had knowledge about adverse effects of HTN on health and 64% of them stated that taking prompt treatment of HTN can reduce the likelihood of other diseases, 44% of them opined that getting treated for HTN at a right time can significantly reduce the development of heart disease and stoke in future.

Aubert et al reported that most people had enough knowledge but only a few were motivated and wished and attempted to have change, very few had translated into practice by engaging themselves in a new behaviour. In our study, we found a significant association between knowledge about HTN; its treatment reducing likelihood of other diseases among hypertensive (p=0.001).[14]

There is a negative association between BMI of an individual an hypertensive state (p=0.75) and also physical activity and HTN state (p=0.680). However, NCDs like HTN are mainly a lifestyle disease where we can see modifiable risk factors as the main culprit. But, in our study as there was a lack of knowledge about the disease and its risk factors including behavioural/life style pattern need to be stressed. This is more accomplished by doing qualitative research.

Limitations

There are some potential limitations of the present study to be considered while interpreting the results. Our findings are also limited to the similar populations and not generalizable to India as a whole. There is no standard instrument to assess the knowledge about HTN in our population, hence used existing literature to design a questionnaire which is not validated but was pretested by pilot study.

CONCLUSION

HTN has been perceived as a common and serious problem in the community. The study concludes that awareness and knowledge about HTN and its consequences are inadequate in these communities. Inaccurate public understanding of HTN and its consequences contributes to low levels of perceived susceptibility, seriousness and self-efficacy to bring lifestyle changes in preventing HTN. There was felt need for awareness campaigns along with screening for HTN and this may help implementing the prevention and control activities by addressing the above gaps by the health system. The prevalence in the rural communities has also increased due to delay in diagnosis and treatment, poor accessibility to health care services, lack of knowledge about the disease and gradually influenced by urban living.

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