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Influence of Stress and Socio Demographic Factors on Hypertension among Urban Adults in North Karnataka

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Abstract

BACKGROUND: Hypertension, a major public health problem, is directly responsible for 57% of all stroke deaths and 24% of coronary heart disease related deaths in India. The prevalence of hypertension is increasing rapidly in developing countries more in urban areas due to changing life style and increasing longevity.

OBJECTIVES OF THE STUDY:

1. To find out the association of hypertension with age, sex, religion, education, occupation and socio economic status.
2. To study the influence of stress on hypertension

METHODOLOGY: Prevalence of hypertension among adults from the previous studies was found to be 35%. Sample size of 713 was calculated using the formula 4pq/L2 with 10% allowable error. Systematic random sampling was used. After taking informed consent, participants were interviewed using a pre tested questionnaire based on WHO STEPS approach for chronic disease risk factor surveillance.

Diagnostic criteria (based on JNC VII guidelines)

a.SBP ≥140mmHg and/or DBP ≥90mmHg and/or

b. Persons already on anti-hypertensive treatment.

STRESS- A short 4 item scale was made from (questions 2, 4, 5 and 10) Perceived Stress Scale- 10 item scale and PSS scores are obtained by reversing responses to the two positively stated items. Subjects who had a score of more than 4 were considered as having stress.

RESULTS: The hypertension prevalence was 37.6% .The prevalence increased with age. Males have shown higher prevalence of HTN (49.4%) compared to females (23%). Significant association was observed in people belonging to higher socio-economic class and among literates, more among professionals. A highly significant association was found between stress and hypertension.

CONCLUSION: Prevalence of hypertension among study subjects in urban field practice area is 37.6%. There is significant association of hypertension with age, socio economic status, literately, occupation and stress

KEYWORDS: Hypertension, Stress, sociodemography.

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INTRODUCTION

Hypertension is a condition characterized by rise in arterial blood pressure of the individual. It is one of the important risk factors for cardio-vascular mortality accounting for 20-30% of all deaths[1]. Hypertension is an iceberg disease. It is an interesting as well as a dangerous disease entity. It remains silent without any symptoms but causes continuous damage to person's cardio vascular system. For the same reason WHO has given the name "SILENT KILLER" as the disease does not cause any harm by itself but predisposes to other cardiovascular diseases like stroke, myocardial infarction etc. It is a major risk factor for cardiovascular disease, chronic renal disease and stroke[2].

INTERHEART study suggested that one of the major emphasis on research is to understand why currently known risk factors develop in some individuals and populations and to identify the approaches to prevent them or reduce their development.[3].

A spike in blood pressure is a direct result of stress and our body responds to physical or mental stress by releasing a surge of hormones, which results in faster heart rate, narrowing of blood vessels and increase in BP. According to American institute of stress, no definite link is found between hypertension and stress but long term elevated levels of stress have been found to be a strong predictor of future hypertension. As no other study has been conducted so far, this study was undertaken to find out the influence of stress on hypertension and to find out the socio demographic factors associated with hypertension[4]

OBJECTIVES OF THE STUDY:

1.To find out the association of hypertension with age, sex, religion, education, occupation and socio economic status.

2.To study the influence of stress on hypertension

METHODOLOGY

Study Setting: The study was undertaken in the urban field practice area of the Department of Community Medicine, Navodaya Medical College and Hospital, Raichur.

Study Population: The study population comprised of subjects aged 18 years and above residing in the urban field practice area of Navodaya Medical College and Hospital, Raichur.

Study Design: Community based cross sectional study.

Duration of study: August 2010 – September 2012 (2 years)

Diagnostic criteria:

Based on JNC VII criteria, a person was considered hypertensive if

1. SBP ≥140 and/or DBP ≥90 mmHg
2. Persons already on anti-hypertensive treatment

Inclusion Criteria: People aged 18 years and above who are the permanent residents in the urban field practice area of Navodaya medical College.

Exclusion criteria: **Pregnant** women, those not willing for the study and severely morbid patients

Sampling method: Prevalence of hypertension among adults from the previous studies was found to be 35%. Sample size of 713 was calculated using the formula 4pq/L2 with 10% allowable error. Systematic random sampling was used and after taking informed consent, participants were interviewed using a pre tested questionnaire based on WHO STEPS approach for chronic disease risk factor surveillance

Collection of data: Data was collected by interviewing the study subjects using a pre-tested questionnaire based on **WHO STEPS** approach for chronic disease risk factor surveillance.

Measurement of blood pressure: The study participants were made to sit comfortably for 5 minutes before BP was measured. Blood pressure was measured using the auscultator method with a standardized calibrated mercury column type sphygmomanometer and an appropriate sized cuff encircling at least 80% of the arm in the seated posture, with feet on the floor and arm supported at heart level. The first blood pressure measurement was recorded after obtaining socio-demographic information from the study subject, while the second was recorded after a brief clinical examination. The reading at which korotkoff sound was first heard was considered as systolic blood pressure and at which the korotkoff sound disappears was taken as diastolic blood pressure. We used the average of two readings of SBP and DBP to describe the blood pressure of the participant. In cases where the two readings differed by over 10 mm of Hg, a third reading was taken and average of the three measurements was taken.

STRESS-A short 4 item scale was made from (questions 2, 4, 5 and 10) Perceived Stress Scale- 10 item scale and PSS scores are obtained by reversing responses to the two positively stated items. (e.g., 0 = 2, 1 = 1, 2 = 0)

0 = Never 1 = Sometimes 2 = Often

Subjects who had a score of more than 4 were considered as having stress.

STATISTICAL ANALYSIS: Proportions, was used to find out the prevalence and Chi–square test was used to find the association between categorical variables.

RESULTS

Out of 713 adults screened for hypertension using JNC VII guidelines (SBP ≥140 mm Hg and/or DBP ≥90mm Hg) in our study, 268 were found to have hypertension giving a prevalence of 37.6%. In the present study the prevalence of hypertension was found to be increasing with age. The prevalence of hypertension was 11.8% in

the age group of 20-29yrs compared to 75% in those above 80yrs and the difference observed was highly significant (p<0.0001).

AGE IN years	HYPERTENSIVE (%)	NORMOTENSIVE(%)	TOTAL(%)	CHI SQUARE VALUE	p VALUE
<20	0	16 (100)	16		
20-29	17 (11.8)	127 (88.2)	144		
30-39	49 (34.3)	94 (65.7)	143	84.676	<0.001
40-49	66 (47.1)	74 (52.9)	140		
50-59	43 (39.4)	66 (60.6)	109		
60-69	62 (57.4)	46 (42.5)	108		
70-79	25 (55.6)	20 (44.4)	45		
>=80	6 (75)	2 (25)	8		
Total	268	445	713		
SEX	**HYPERTENSIVE(%)**	**NORMOTENSIVE (%)**	**TOTAL**		
Female	104 (27.3)	277 (72.7)	381	36.939	<0.001
Male	164 (49.4)	168 (50.6)	332		
Total	268	445	713		
RELIGION	**HYPERTENSIVE(%)**	**NORMOTENSIVE (%)**	**TOTAL**		
Hindu	184 (37.4)	308 (62.6)	492	0.507	0.776
Christian	14 (33.3)	28 (66.7)	42		
Muslim	70 (39.1)	109 (60.9)	179		
Total	268	445	713		
EDUCATION	**HYPERTENSIVE(%)**	**NORMOTENSIVE (%)**	**TOTAL (%)**		
Illiterate	85 (36.3)	149 (63.7)	234	21.318	0.001
Primary school	81 (41.5)	114 (58.5)	195		
Middle school	11 (64.7)	6 (35.3)	17		
High school	45 (36.6)	78 (63.4)	123		
Intermediate/post high school	15 (19)	64 (81)	79		
Graduate / post graduate	31 (47.7)	34 (52.3)	65		
Total	268	445	713		
Socio Economic Status	**HYPERTENSIVE(%)**	**NORMOTENSIVE (%)**	**TOTAL (%)**		
Class I	37(52.1)	34(47.9)	71	38.74	<0.001
Class II	90 (45.9)	106 (54.1)	196		
Class III	101 (40.7)	147 (59.3)	248		
Class IV	40 (20.2)	158 (79.8)	198		
Total	268	445	713		
OCCUPATION	**HYPERTENSIVE(%)**	**NORMOTENSIVE (%)**	**TOTAL (%)**		
Professional	5 (100)	0	5	9.37	0.05
Semi-professional	18 (29)	44 (71)	62		
Clerk/Shop owner/Farmer	94 (32.4)	196 (67.6)	290		
Skilled	50 (42.4)	68 (57.6)	118		
Semi-skilled	64 (39.3)	99 (60.7)	163		
Unskilled	37 (49.3)	38 (50.7)	75		
Total	268	445	713		

Table1-Association of hypertension with sociodemographic factors

Males have shown higher prevalence of HTN (49.4%) compared to females (27.3 %). There is highly significant association between HTN and sex (p<0.0001). Occurrence of HTN was more in people

belonging to class I SES (52.1%) followed by class II (45.9%) when compared to class III (40.7%) and class IV (20.2%). There is significant association between HTN and socio economic status (p=0.0001). In our study, those who had completed middle school showed a higher prevalence of HTN(64.7%), followed by graduates and postgraduates(47.7%) when compared to illiterates(36.3%) . Prevalence of HTN was highest among professionals when compared to other occupation and the difference observed was highly significant.prevalence of hypertension was 45% among those who had stress compared to only 27.9% in those who do not have stress.

Hypertensive (%)	Normotensive (%)	Total	Chi square	p value
179 (45.5)	215(54.6)	394	23.096	<0.001
89 (27.9)	230(72.1)	319		

Table2- Association of hypertension with stress

DISCUSSION

Prevalence of hypertension was 37.6%. The results can be compared with a study conducted by Gupta, R in Jaipur, in urban adults in 2002 showed prevalence of hypertension as 36% in men and 37% in women[5].

HTN and age:

Several studies have consistently demonstrated a positive relation between age and blood pressure. A study conducted by Patnaik N et in 2005, in an urban slum of Orissa found that Hypertension was significantly higher in persons of more than 40 years age[6].

A study conducted by Zachariah M G et al. in a middle-aged urban population in Kerala in 2003 also found that prevalence of hypertension was more in older age[7]. The findings of our study can be compared well with other studies.

HTN and sex: Males have shown higher prevalence of HTN (49.4%) compared to females (27.3 %). There is highly significant association between HTN and sex (p<0.0001).

Findings of our study can be compared with A study done by SS Reddy et al[1] in Tirupati in 2005 showed that in males, the proportion of hypertension was slightly higher (9.6%) compared to that in females (7.6%) but the difference was however not statistically significant. Studies done by Gupta VP[8] in Rajasthan and Mohan V.[9] in Chennai also showed that the prevalence in males was found to be more than females. On the contrary, studies by Malhotra P[10] in North India and Joseph A[11] in Trivandrum showed the prevalence in females to be higher than males.

Gilberts in South India in 1994, Shanthirani in 2003 have observed no significant difference in the prevalence of hypertension between the two genders.

HTN and socio economic status: Our study showed significant association between HTN and socio economic status (p=0.0001),which can be compared with study by Vikas K. Desai *et al* in Surat[12] in 2011 which also showed that Prevalence of hypertension was more among higher socio economic group. Studies by Gupta S. P. et al[13] in 1978 and Sharma B. K. *et al* [14] in 1985 also showed similar results.

Hypertension and education: Significant association was found between HTN and education (p=0.001) WHO –MONICA Project states that education is directly related to hypertension, illiterates being more susceptible which is in contrast to our study[15].

A study conducted by NC Hazarika[16] *et al* in Assam in 2003 showed that prevalence of hypertension was more among illiterates(36.6%)when compared to graduates(8.6%) p=0.13. A study done by Avadaiammal Vimala[17] *et al* in an urban population of Kerala in 2009 revealed that the prevalence of hypertension was less among educated persons (both men and women) when compared to less educated persons, but the difference was not statistically significant.

HTN and occupation Our study showed, prevalence of HTN was highest among professionals when compared to other occupation and the difference observed was highly significant (p<0.05)

Findings of our study can be comparable to study conducted by Shyamal Kumar Das[18] in Malda,West Bengal, in 2005 which showed significant relationship of hypertension with sedentary occupation. A study done by SS Reddy[1] et al.showed higher prevalence of hypertension in business occupation (15.2%) followed by skilled & semi-skilled (12.5%) and in professionals (11.1%)

Hypertension and stress: Our study has shown a significant association between hypertension and stress. (p<0.0001). A study done by Deswal BS[19] among the residents of Pune showed that the relative risk of developing hypertension in those who had stress and anxiety was 2.5 and2.43 times respectively. In a study conducted by Yadlapalli S Kusuma in 2009 on Perceptions on hypertension among migrants in Delhi, City life has been perceived as a major predisposing factor for developing hypertension. City life has been corroborated with pollution and adulteration of food, high fat diet along with physical inactivity and stress[20].

On the contrary, study conducted by Jean Pierre*et al* in 2004, to see the effect of job stress and stress BP reactivity, found that neither job strain nor stress BP reactivity was associated with an increase in the incidence of" "progression to HTN" (an increase in SBP or DBP >7 mmHg or a DBP >95 mmHg at the end of follow-up) [21]

The National CSI study did not show any clear impact of stress or personality type on blood pressure[22].

CONCLUSION. There is significant association of hypertension with age, sex, socio economic status, education and occupation. No association was found between HTN and religion. Stress shows a highly significant association with hypertension ($p<0.0001$). Practice of art through mental relaxation through our traditional teachings like yoga and meditation has to be promoted. This might help in bringing down the stress in our daily lives.

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