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Association of Hypertension with Behavioural Risk Factors in Adults in a Rural Area of Jharkhand

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Abstract: *India witnessing an increasing trend in the number of people suffering from hypertension. Behavioural risk factors for hypertension are widely prevalent in all societies in our country. This study was done to describe the association between selected behavioural risk factors and hypertension in a rural community in Jharkhand. A descriptive cross sectional study in rural field practice area of RIMS was conducted. Total 500 people were interviewed from the area. Subjects 20 years and above were taken for study from both sex. Pre-tested semi structured questionnaire were used for data collection. Template was generated in MS excel and data analysis was done using SPSS software. Prevalence of hypertension and pre hypertension found to be 19.8% and 27.6% respectively. Among tobacco users 24.4% of the subjects were found to be hypertensive as compared to 16.0% among non-users (p value-0.018). Higher prevalence of hypertension was noted among subjects with mild physical activity than those with moderate to severe activity but this association was not significant (p value-0.107). Hypertension was significantly associated with tobacco consumption and sleep duration but not with physical activity and alcohol consumption of the subjects.*

Key words: *Hypertension. Risk factor, Rural area, Adults*.

I. Introduction:

In the present era of urbanization and technology, non-communicable diseases silently and rapidly increasing all over the world and posing a substantial threat to mankind. Hypertension being one of them is an important risk factor for cardiovascular diseases. Prevalence of hypertension is relentlessly on the rise not only across the globe butin India too. Hypertension is a controllable disease and it has been reported that targeted reductions in people with hypertension are expected to produce large reductions in the burden of cardiovascular disease.[1]The increasing prevalence of hypertension is attributable to rapid transition of life style practices in developing countries including India, as well as increased elderly population due to an increase in life expectancy.[2]Globally, the overall prevalence of hypertension or raised blood pressure in adults aged 25 and above was around 40% in 2008.[3]As per World Health Statistics 2012, prevalence of raised blood pressure among adults aged 25 years and more in India is 23.1% and 22.6% for males and females respectively.[4] A recent meta-analysis has shown prevalence of hypertension as 40.8% and 17.9% in urban and rural population of India.[5]

Over the years, risk factors has been established for hypertension; both modifiable and non-modifiable. Obesity, high salt consumption, alcohol intake, high body mass index, physical activity, stress are some important modifiable risk factors.[6] Use of tobacco and its relation with hypertension is not very consistent. Nicotine and carbon monoxide, two products of tobacco combustion, are both potent vasoconstrictors and a risk factor for stroke and heart disease.[7] Overwhelming evidence supports the conclusion that cigarette smoking causes various adverse cardiovascular events and acts synergistically with hypertension and dyslipidemia to increase the risk of coronary heart disease.[8-10] Smokeless tobacco use should be considered a potential cause of sodium retention and poor blood pressure control because of its nicotine, sodium, and licorice content.[11]Alcohol intake is an important risk factor for hypertension. Alcohol usage is a more frequent contributor to hypertension than is generally appreciated. It appears to be transitory in most patients, but is not benign. Because of its transitory nature, alcohol associated hypertension may go unrecognised, or may be dismissed as inconsequential and hence a potential cause of cardiovascular morbidity may go untreated.[12] Stress is among the psychological variables that have long been listed among the potential and important risk factors of hypertension and coronary heart disease.[13,14]Acute stressful events have no consistent association with hypertension. Chronic stress on the other hand, particularly the non-adaptive response to stress, have been reported as more likely the cause of sustained elevation of blood pressure.[15]Detailed information about association between sleep and hypertension is not available. However, some data shows possible association and further evaluation on this aspect required.[16]

Present study was done to determine the prevalence of hypertension and its association with sociodemographic and behavioural correlates in a rural area of Jharkhand. Some part of this research work has been published earlier.[17,18]

II. Materials and methods:

A community based cross sectional study was conducted in the rural health training centre area of Rajendra Institute of Medical Sciences (RIMS), Ranchi from January 2013 to September 2014. Sample size was calculated by n-Master software 2.0 developed at CMC, Vellore, India. Cluster sampling was done in the present study. Based on literature search; assuming expected prevalence of hypertension as 20%, absolute precision of 5%, design effect 2 and 95% confidence interval, a sample size of 492 was calculated. Methods of subject selection and eligibility criteria has been discussed in detail in previous articles. [17,18]

A pre-tested, semi-structured questionnaire was used for data collection. Data were collected about tobacco use, alcohol use, stress and physical activity from each subject.A person was considered hypertensive if he/she has a systolic BP of ≥140 mm Hg and/or a diastolic BP of ≥90 mm Hg measured on two separate occasions with a minimum interval of at least 5 minutes between the two measurements OR a self reported history of taking anti-hypertensive medications.[19]Blood pressure was measured in sitting position by mercury sphygmomanometer. Average of two measurements was taken for study. Questions for tobacco use, alcohol use and physical activity were based on WHO STEPS questionnaire. Questions for assessment of stress were based on questionnaire of INTERHEART study.Study was approved by Institutional ethical committee of RIMS, Ranchi.Statistical analysis: Data entry was done in MS excel spreadsheet. Data analysis was done using SPSS software and MS excel. Chi square test was applied to see the association between categorical variables.

III. Results:

There were 263 (52.6%) male and 237 (47.4%) female subjects in the study. Minimum age of subjects was 20 years where as maximum age was 90 years. Maximum numbers of subjects were in age group 40-49 years (125; 25.0%). Mean age of study subjects was 44.12 years (SD-13.64 years). Among 500 subjects, 221 (44.2%) were illiterate. 90.0% of the study subjects were from class IV and class V.(Table - 1)

Table 1: Selected socio-demographic profile of study subjects (n=500).

Variables		Frequency	Percentage
Gender	Male	263	52.6
	Female	237	47.4
Age (in years)	20-29	90	18.0
	30-39	109	21.8
	40-49	125	25.0
	50-59	92	18.4
	60 and above	84	16.8
Education	Illiterate	221	44.2
	Less than 10th std	170	34.0
	10th std or above	109	21.8
Socio-economic status*	Class I	2	0.4
	Class II	17	3.4
	Class III	31	6.2
	Class IV	206	41.2
	Class V	244	48.8

*As per modified Prasad's classification for May 2014[20]

Out of 500 subjects, 263 (52.6%) had normal blood pressure reading. 138 (27.6%) subjects were pre-hypertensive. There were 83 (16.6%) subjects in stage I and 16 (3.2%) in stage II hypertension. Hence, total 99 (19.8%) subjects were hypertensive. (Table - 2)

Table 2: Status of blood pressure of subjects under study (n = 500)

Blood pressure status		Number	Percentage
Normal		263	52.6
Pre Hypertension		138	27.6
Hypertension	Stage I	83	16.6
	Stage II	16	3.2
Total		500	100.0

Mean SBP- 122.83, SD – 15.83, Mean DBP – 79.24, SD - 8.73

Present study revealed that 45.0% subjects were using tobacco in one or other form. Mean systolic as well as diastolic blood pressure was significantly higher among tobacco users. Prevalence of hypertension was significantly higher (p-value = 0.018) among tobacco users than to non users. Higher prevalence of hypertension was noted among alcoholic subjects (22.7%) than non-alcoholic subjects (18.2%). However, this difference was statistically not significant (p-value = 0.228). Less than 10% (37) subjects had stress in their life. Out of 37 subjects with stress, 11 (29.7%) had hypertension whereas only 88 (19.0%) of remaining 463 subjects had hypertension. This difference was also statistically not significant (0.115). Duration of sleep was significantly associated with hypertension (p-value < 0.001). Higher prevalence of hypertension was found among subjects

who had sleep duration less than six hours (39.6%) than to subjects who had sleep duration 6 – 8 hours (15.1%). Prevalence of hypertension was lower among subjects engaged in vigorous physical activity (12.0%) than those who were engaged in moderate (16.7%) or mild (23.5%) physical activity.However, this difference was also statistically not significant (p-value = 0.147). (Table - 3)

Table 3: Association between selected behavioural risk factors and hypertension (n = 500)

Variables		Blood pressure status		Chi square test results
		No hypertension	Hypertension	
Tobacco use by subjects	Tobacco use present (225)	170 (75.6%)	55 (24.4%)	χ^2 = 5.557, df = 1, p-value = 0.018
	Never used (275)	231 (84.0%)	44 (16.0%)	
Alcohol intake	Present (181)	140 (77.3%)	41 (22.7%)	χ^2 = 1.453, df = 1, p-value = 0.228
	Absent (319)	261 (81.8%)	58 (18.2%)	
Stress	Stress present (37)	26 (70.3%)	11 (29.7%)	χ^2 = 2.481, df = 1, p-value = 0.115
	No stress (463)	375 (81.0%)	88 (19.0%)	
Sleep duration	Less than 6 hours (96)	58 (60.4%)	38 (39.6%)	χ^2 = 29.283, df = 1, p-value < 0.001
	6–8 hours (404)	343 (84.9%)	61 (15.1%)	
Physical activity	Mild (247)	189 (76.5%)	58 (23.5%)	χ^2 = 4.476, df = 2, p-value = 0.107
	Moderate (228)	190 (87.3%)	38 (16.7%)	
	Vigorous (25)	22 (88.0%)	3 (12.0%)	
Duration of physical activity*	< 30 minutes (27)	20 (74.1%)	7 (25.9%)	χ^2 = 2.103, df = 1, p-value = 0.147
	≥ 30 minutes (473)	192 (85.0%)	34 (15.0%)	

*Moderate to vigorous activity

IV. Discussion:

Tobacco use in one or more forms is common in India especially in rural areas. In the present study, significantly higher prevalence of hypertension was observed among tobacco users than to non users. Significant association between tobacco use and hypertension was also found in study done by Kannan L and Sathyamoorthy TS[21], Sagare SM et al[22]and Gupta R et al[23]. Association of smokeless tobacco use with increased prevalence of hypertension has been also described in many studies done in Indian[24-26] and western population[27,28]. However, the Haryana (Chandigarh) Rural study[29]and a study done by Bansal SK et al[30] in a north Indian population did not found significant association between smoking and hypertension.

Present study revealed higher prevalence of hypertension among alcohol users than non users. Findings of present study also show higher prevalence of hypertension among more frequent drinkers and heavy drinkers. However, these findings were not statistically significant. This finding was similar to a study done by Shantirani CS et al[31] in a south Indian population where no significant association between alcohol intake and hypertension was found. Another study done by Kokiwar PR et al[32]in a rural area of central India shown no significant association between alcohol and hypertension.

Overall stress among study subjects was measured on basis of stress at home condition and at work place. Study results shows around 7% study subjects had stress. Present study has shown higher prevalence of hypertension among subjects suffering from stress. However, this association was not found to be statistically significant. Study done by Bansal SK et al[30] had shown significant association between stress and hypertension among male. Kannan L and Sathyamoorthy TS[21]had also reported environmental stress as a significant risk factor for hypertension. Not many literatures from Indian population are available in this context. Sleep duration for each subject was also assessed in the present study. It was found that prevalence of hypertension was significantly higher among subjects whose sleep duration was less than 6 hours than those who sleeps for 6 – 8 hours daily. There is dearth of information available on the duration of sleep and its relationship to hypertension in India. Vozoris NT[33] in his study in United States have observed possible relationship between sleep apnea coupled with short time sleep and hypertension. Satho H et al[34]demonstrated that both long and short habitual sleep duration were significantly associated with high blood pressure values and hypertension occurrence in Japanese male subjects. Zuo D et al[35] concluded that short sleep and presence of sleep apnea appear to independently link to hypertension.

Physical activity is one of the important determinants of hypertension. Observational and experimental studies have revealed the role of physical activity and its association with high blood pressure.[36] Present study has found the higher prevalence among subjects doing mild physical activity than those with moderate to vigorous physical activity. Difference in mean systolic blood pressure among subjects based on their physical

activity was found to be statistically significant in the present study. Higher prevalence of hypertension was also observed among subjects with lesser duration of physical activity (< 30 minute daily) although not significant. Increased risk of hypertension among subjects with mild physical activity was found in a study by Yadav S et al[37] in 2008. However, their study also did not found it as a risk factor for hypertension on multivariate analysis. Similar results have been shown in different ethnic and Indian population.[38-41] On the other hand, significant association between physical activity and hypertension has been demonstrated in many other Indian studies.[42-44]

V. Conclusion:

Nearly one-fifth of the subjects were found to be hypertensive in the present study. Tobacco use and sleep duration were found to be significantly associated with hypertension in the present study. Higher prevalence of hypertension was noted among subjects who were taking alcohol, had stress and sedentary lifestyle but, these associations were not significant.

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