Prevalence of Hypertension & Associated Risk Factors among Tribal Population in a Rural Community of Katihar

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ABSTRACT

BACKGROUND
Hypertension has become a major public health threat especially for developing countries with more people living in rural setting. As it is largely asymptomatic, majority of people are totally unaware about their blood pressure status. This unawareness is more dangerous for people living in difficult areas or hard to reach areas as they are deprived of adequate health care, resulting in missing timely screening of hypertension. Even if they are diagnosed, they do not adhere to the lifestyle changes and regular follow up visit to health centers. We wanted to determine the prevalence of hypertension among tribes.

METHODS
A cross-sectional study among tribal population in a rural area of Katihar district in Bihar state was carried out including all persons with age of 18 years and above. Altogether 820 subjects were surveyed in the tribal villages of Katihar district. Information regarding age, sex, education, occupation, socio-economic status, religion, additional salt intake, physical activity, body weight, height, body mass index (BMI) and blood pressure was collected by house visit and recorded in the pre-designed and pretested schedule. Statistical analysis was done using SPSS v 20.

RESULTS
The prevalence of hypertension among 820 subjects in this study was found to be 15.7 percent (n=129). The prevalence of hypertension increased with age, BMI, additional salt intake, smoking and drinking alcohol and was found to be statistically significant. In comparison to females (12.1%), males (18.6 %) have high prevalence of hypertension. A binary logistic regression analysis also revealed that hypertension odds increased significantly with increasing age (1.83 times), additional salt intake (2.31 times), smoking (10.9 times), drinking alcohol (4.09 times) and in males (1.97 times). The likelihood of hypertension with increasing BMI was found to be less but it was not statistically significant (p= 0.548).

CONCLUSIONS
The prevalence of hypertension among tribal population in a rural area was found to be high. They appear equally affected by the changing lifestyle due to migration, acculturation and urbanization overshadowing their heavy working attitude.

KEY WORDS
Hypertension, Tribal, Prevalence, Risk Factors

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BACKGROUND

Non-Communicable Diseases (NCDs) have emerged as a major cause of morbidity and mortality due to increase in aging population and environmentally driven changes in behaviour. It becomes a major public health problem even for developing countries along with developed countries due to its wide range of heterogeneous conditions affecting different organs and systems of different age and socioeconomic groups.

India is also alarmingly advancing towards the high burden of NCDs causing significant increase in morbidity and mortality, both in urban and rural population along with considerable loss in potentially productive years (age 35-64 years) of life. Bihar with an epidemiological transition ratio of 0.74 possesses more threat due to dual burden of disease. [1]

The WHO Global status report on non-communicable diseases showed that NCDs are the biggest cause of death worldwide (71% of the 57 million deaths) during 2016. [2] Among all NCDs related deaths, 17.9 million (44% death) people died from by cardiovascular disease. [2] Among different cardiovascular diseases, Hypertension is a complex health problem and a matter of great concern as it is itself the leading risk factor responsible for 13% of deaths globally. [3] Considerable epidemiological, clinical and experimental data show high blood pressure or hypertension to be a major risk factor for cardiovascular disease.[4,5]

Globally, the prevalence of hypertension in adults is around 30-40 percent and it is not affected much by income status of population. The National Family Health Survey – 4 of 2015-16 provides the current scenario of hypertension in India. It reported that prevalence of hypertension in females and males is 11 percent and 15 percent respectively. The prevalence of hypertension among females at 15-49 years ranges from 8 percent in Bihar to 18 percent in Sikkim and Assam which are also mostly populated by the tribes. For males, the prevalence ranges from 6 percent in Delhi to 31 percent in Sikkim.[6]

With modern medical care, increase in life expectancy, change in lifestyle and behavioural pattern, the prevalence of hypertension will continue to increase. The high blood pressure has always been considered as 'Silent Killer'. On most occasion people are unaware about the disease and it may have no warning sign and symptoms. Therefore, early detection is very important to reduce morbidity and mortality of the disease. One can easily be detected as hypertensive by their blood pressure measurement, which is very easy, painless and least expensive. Detection, treatment and control of hypertension are an important health priority worldwide.

It is usually presumed that tribal population are least exposed to risk factors like decreased physical activity and obesity by virtue of their occupation, but the other side of the coin suggests that the risk factors like smoking and alcohol consumption is increasing among these lower socioeconomic strata. Data from NSSO, 52nd round showed that tobacco intake (smoking and non-smoking) and alcohol usage are higher in the poorest 20% percent of income quintile. The unawareness regarding the different risk factors is quite common among rural population resulting in delayed or no screening for high blood pressure.

We wanted to determine the prevalence of hypertension among tribes.

METHODS

A cross-sectional study among tribal population in a rural area of Katihar district in Bihar state was carried out in 2013 including all persons with age of 18 years and above. The study was approved by the Institutional ethical committee and the written consents were obtained from the participating people. The study population resides in Manshahi block of Katihar district. There are 26 villages in Manshahi block and only few of the villages comprise of the tribes. All tribes with age of 18 years and above were included in the study irrespective of their hypertensive status. The study subjects were interviewed at their house and all information recorded in the pre-designed and pretested schedule. A second home visit was given to collect data when people who were not able to be contacted on first occasion. People who were unavailable at the second home visit have been excluded from the study. Altogether 820 subjects consented for the study. Age, sex, education, occupation, socio-economic status, religion, additional salt intake, physical activity, body weight, height, body mass index (BMI) and blood pressure were taken as different variable for this study.

Two measurement of blood pressure were taken on each study participant with a mercury column sphygmo-manometer. Both blood pressure measurements were obtained after subject had rested for at least 5 minutes in a seated position. A WHO study group recommended the sitting position than the supine position for recording blood pressure.[7] The first blood pressure measurement was recorded after obtaining the socio-demographic information from the study subject, while the second was recorded after a brief clinical examination. All blood pressure measurements were on the left arm of each study subject, using cuff of appropriate size at the level of the heart. The cuff pressure was inflated 30 mm Hg above the level at which the radial pressure disappears, and then deflated slowly at the rate of about 2 mm per second and the readings recorded to the nearest 2 mmHg. The first (appearance) and the fifth (disappearance) Korotkoff sounds were recorded as indicative of systolic and diastolic blood pressure (SBP and DBP) respectively. The average of the two recordings of SBP and DBP were used to describe the blood pressure of the participants. In case where the two readings differed by over 10 mmHg then a third reading was taken and average of three measurements was taken as blood pressure of the subject. Those people who are on medication for the hypertension were also considered as hypertensives. According to The seventh report of Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure, the participants were grouped as hypertensives.[8] Body weight was measured (to the nearest 0.5 Kg) with the subject standing motionless on the weighing scale, about 15 cm apart, and weight equally distributed on each leg without foot wear and minimum clothes. Height was measured (to be nearest 0.5 cm) with the subject in an erect position against vertical surface and with the head positioned so that the top of the external auditory meatus will be level with inferior

margin of bony orbit. People taking additional salt separately while taking food or taking salty preparations like prickles, preserved sauces and other food stuffs had been grouped as additional salt takers.

Statistical analysis of the data collected was carried out using SPSS 20.0. Beside descriptive statistics, Chi- Square test done to find significance of risk factors in association with development of hypertension. A Binomial logistic regression was performed to explain the impact of predictor variables in terms of odds ratios. The Omnibus Tests of Model Coefficients test was done to judge the fit of the model to data and pseudo R square value (Cox & Snell R Square & Nagelkerke R square value) was calculated to know the variation in the outcome.

RESULTS

Variables	N=820	Percentage
Age Groups (in Years)		
18-29	152	18.5%
30-39	129	15.7%
40-49	189	23.0%
50-59	183	22.3%
>=60	167	20.4%
Gender		
Male	456	55.6%
Female	364	44.4%
Education		
Illiterate	136	16.6%
Just literate	219	26.7%
Primary school	200	24.4%
Middle school	114	13.9%
High school	119	13.3%
Above high school	42	5.1%
Occupation		
Agriculture	369	45.0%
Unskilled labour	252	30.7%
Skilled labour	106	12.9%
Student	59	7.2%
Unemployed/ housewife	34	4.1%
Socioeconomic Class (Pareek's Method)		
Middle	53	6.5%
Lower Middle	105	12.8%
Lower Class	662	80.7%

Table 1. Demographic Profile of the Subjects

		Total Subjects (Out of N=820)	Hyper-tensives	%	Chi Square (df)	p Value
Prevalence		**820**	**129**	**15.7%**		
Age Groups (years)	<49	470	57	12.1 %	10.79 (1)	.001
	>49	350	72	20.6 %		
Gender	Male	456	85	18.6 %	6.55 (1)	.012
	Female	364	44	12.1 %		
BMI	<25	743	101	13.6 %	27.28 (1)	<.0001
	>25	77	28	36.4 %		
Additional salt intake	Yes	76	23	30.3 %	13.34 (1)	.001
	No	744	106	14.2 %		
Smoking	Yes	138	69	43.5 %	146.97 (1)	<.001
	No	682	60	8.8 %		
Drinking Alcohol	Yes	474	105	22.2 %	34.92 (1)	<.001
	No	346	24	6.9 %		

Table 2. Hypertension and Risk Factors

Variables in the Equation Table							
		B	SE	Wald	df	Sig.	Exp(B)
Step 0	Constant	1.678	.096	306.201	1	.000	5.357
Step 1	Age	.605	.227	7.073	1	.008	1.830
	Gender	.681	.273	6.213	1	.013	1.975
	additional salt intake	.838	.341	6.034	1	.014	2.312
	Smoking	2.389	.253	88.878	1	.000	10.904
	Alcohol intake	1.410	.294	23.060	1	.000	4.096
	Body mass index	-.203	.338	.360	1	.548	0.816
	constant	-1.770	.436	16.506	1	.000	0.170
Nagelkerke R square value =.301							

Table 3. Results of Binary Logistic Regression Analysis

The basic demographic details of the participants are tabulated in Table 1. The subjects are less educated as only 5.1% have high school education, and most of them (n=369, 45%) are involved in agriculture. There are no any upper and upper middle-class people in study population and 80.7 percent participants belong to Lower class according to Pareek's method of socioeconomic classification. Out of the 820 participants, 129 (15.7 %) subjects were having hypertension (Table 2). Subjects with age above 49 years were having high proportion (20.6 %) of hypertension in comparison to age less than 49 years. In comparison to females (12.1%), males were having higher proportion (18.6%) of hypertension. It appeared from the Table 2 that out of 129 hypertensives, 30.3 percent participants were taking additional salt, 22.2 percent were involved in drinking alcohol and 43.5 percent were smokers. The hypertension proportion was highest in participants with body mass index >25 (36.4%) among all variables. The role of Risk factors like age, gender, BMI, extra salt intake, and alcohol drinking in development of hypertension among study population was found be statistically significant ($p<0.01$).

A binary logistic regression was performed to ascertain the effects of age, BMI, Sex, additional salt intake, smoking, drinking alcohol on the likelihood that the subjects have hypertension (Table 3). The Omnibus Tests of Model Coefficients indicates that the fit of the model to data has significantly improved by including different risk factors as an explanatory variable (χ^2 =157.94, df=6, p<.001). The Classification Table including the explanatory variables shows that 85.4% are correctly classified. The Model Summary reflects (Pseudo R Square) that 17.5 % to 30.1% of variation in the outcome can be explained by this model and it is significantly better fit model than null model.

The Table 3 provides the regression coefficient (B), Wald statistics (to test significance) and Exp (B) (odds ratio) for each variable. The B coefficient is positive and significant for each variable except BMI. It means that hypertension odds will increase as the explanatory variables increases. But for BMI regression coefficient is negative and this is not significant (B=-.203, Wald=.360, p=.548). The table shows that odds of having hypertension are 10.9 times greater in smokers, 4.09 times greater in alcohol drinkers and 2.3 times greater in subjects with additional salt intake. Males are more likely to develop hypertension than females (Exp B =1.97). Increasing age was also associated with an increase likelihood of hypertension.

DISCUSSION

The prevalence in this study (15.7%) is close to the study of tribal labour population of Gujrat with prevalence of hypertension was found to be 16.9 percent. [9] In contrast to our study, among aboriginal Nicobarese tribes living in Car Nicobar Island, India has documented high prevalence of hypertension (50.5%). [10] The non-modifiable risk factors of hypertension such as age and gender have always been held responsible for hypertension. The present study results also matched to the results of previous other studies for non-modifiable risk factors. Among primitive tribes of Orissa, the study reported prevalence of hypertension among males and

females as 31.8 percent and 42.2 percent respectively while in our study it was found to be 18.6 percent and 12.1 percent respectively. [11] The high prevalence of hypertension in persons aged 49 years and above (20.6%) is consistent with the study of Mungreiphy N. K et al that blood pressures increased with age steadily from the youngest to the oldest age group among Tangkhul Naga tribal males of north east India. [12] Even WHO has reported that virtually all surveys have shown a rise in blood pressure with increasing age in both sexes. This could be attributed to the decreased compliance of arterial wall and left ventricular diastolic dysfunction changes. However, Khadilkar AH et al did not find any statistical difference in the prevalence of hypertension between males and females. [13]

The Modifiable risk factors has played most important role in increasing the burden of disease and also, they may result in reducing it if they are identified early and people are aware about it. Most of the studies in India and abroad have tried to find the relationship between obesity and hypertension. Our study comprises of only 77 subjects (9.4%) with high BMI (>25). The lower percentage of high BMI in the study population may be due to their occupation as agriculture. But the association of BMI and hypertension has been found to be statistically significant (χ^2 =27.28, df=1, p<.0001). Similar findings have been quoted by Mungreiphy N. K et al[12] and Dash S. C et al.[14] Evidences suggesting extra salt intake (in form of sodium) as a cause of hypertension is increasing day by day. Potassium supplements have been found to lower blood pressure. [15] The same stands true in this study with odds of hypertension increases 2.3 times with additional salt intake. However, Todkar et al. reported that persons consuming extra salt have 6.75 times higher risk of developing hypertension. [16]

Demographic findings revealed that the habits of smoking and alcohol intake are quite common in these tribes. This may be due to the adoption of modern lifestyle and behaviour change. Higher prevalence of hypertension was reported in smokers when compared to non-smokers by Malhotra P et al.[17] and Gupta R et al.[18] In our study also, smoking has emerged as most important risk factor in tribes with odds of developing hypertension being as high as 10.1 for smokers (table 3). Joshi R et al found the prevalence of 46.3% among smokers which is similar to our study (43.5%).[19] Gupta A.K et al found that prevalence of hypertension is more among alcoholic (22.8%) in comparison to non- drinkers (7.76%).[20] In this tribal population prevalence of hypertension among alcoholic was 22.2% and the results were statistically significant (χ^2 =34.92, df=1, p<.001)

CONCLUSIONS

A prevalence of 15.7 % indicates that rural areas of our country are also undergoing rapid transition in lifestyle diseases. Although traditional populations around the world were often believed to have low blood pressure, gradually, with changing socioeconomic environment, marked increase in blood pressure has been noted. Tribal populations are more vulnerable as they still live in remote areas with lack of proper health care facility and poor health seeking behaviour. The present trend in increasing prevalence of hypertension strongly suggests the need for launching of consistent strategies for Hypertension Control in India. Screening for hypertension (either opportunistic or targeted approach) in all adults is required at every point of contact with health professionals or allied health staff. Community based high-risk screening to detect hypertension in adults is the need of the hour.

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