

## Prevalence of hypertension and associated risk factors among Nomad Tribe groups

Screening of Hypertension, Adiposities and ABO Blood Group  
among Select Nomad Tribes of Rajasthan, India

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### Abstract

*Background: Hypertension is strongly correlated with modifiable risk factors such as adiposities, age, stress, high salt intake, Overweight and obesity is conveniently determined from BMI and visceral adiposity is determined by waist circumference. On the other hand, genetic factor has been established as an important non-modifiable predisposing factor. And ABO blood group is one such factor which needs to be investigated. Objectives: To study the prevalence rate of hypertension and various associated risk factors among few select endogamous group of Tribal Population. Methods: Cross-sectional, Tribal population-based study, consisting of a total sample of twelve hundred and eighty-six discrete subjects of age  $\geq 18$  years was chosen. BMI, waist circumference, ABO blood group, systolic and diastolic blood pressure were determined and correlated with each other. Results: The results were analyzed by applying correlation analysis and chi-square test. This study revealed that the prevalence of hypertension was high among the entire select tribe groups but seen highest in frequency in Bhopa (31%). It further showed that the subjects with blood group B had high blood pressure in the entire tribal groups except Bhopa Tribe. Conclusion: This study provides population based study on hypertensive tendency among select few endogamous tribal populations.*

**Key words:** Nomad tribes, obesity indicators, ABO blood groups, Systolic blood pressure and Diastolic blood pressure.

### Introduction

In spite of incredible world-over progress in the field of medicines, curative and preventive health measures, still there are huge population living in isolation in natural and unpolluted surroundings far away from civilization with their traditional values, customs, beliefs and myths intact. They are commonly known as “tribals” and are considered to be the autochthonous people of the land. About half of the world’s autochthonous people, comprising 635 tribal communities including 75 primitive tribal communities live in India. According to 1991 census, Rajasthan has a tribal population of 54,

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74,881, which forms 12.44 percent of the total population of the state. The population has grown at a rapid rate for the last eighty years and at an almost flooding rate during the last three decades. During 1901 the total population in the state was 103 lakhs, which rose to 564 lakhs in 2001.<sup>1</sup> Keeping in mind the rapid growth of tribal population and following the lifestyle of urbanization that leads to various lifestyles oriented diseases. Our main focus of the study is to screen out the presence of lifestyle related disease especially the hypertension and associated risk factors among few endogamous group of Tribal population

### Methods

The procedure involved in the present investigation was to fill a questionnaire by the subject stating his brief bio-data. The subjects' blood pressure was measured with digital blood pressure machine. Classification of hypertension was based on JNC guidelines <sup>2</sup> (a) Healthy blood pressure: < 120/80 (b) Pre-hypertension: between 120/80 and 140/90 (c) Hypertension: 140/90 or higher. BMI, which is the most commonly used indicator of obesity in population studies, was determined from calculated as weight in kilograms divided by height in meters squared (kg/m<sup>2</sup>) <sup>3</sup>. The cut-off value of waist circumference for female was ≥85cm and for men ≥101cm. It was measured by inch tape around the belly button or just above it. To determine the blood group, the finger was pricked with a lancet under aseptic conditions. The blood group was determined using the anti A and anti B sera. Rh typing was not done. The gene frequencies for these two systems were calculated after Mourant et al. (1976) <sup>4</sup>. The study was approved by the institutional human ethics committee at BITS, Pilani, Rajasthan, India and performed according to the Declaration of Helsinki. All study members were given detailed explanation of the study in their regional language before obtaining their written consent

### Results

From table 1 it has been found that the prevalence rate of hypertension was very high (22.8%). It ranges from 16.3 % to 30.9 % among different caste of nomad tribals. The prevalence rate of hypertension was high in Bhopa tribe as compared to other group. Chi-square test was used to analyse the association between different caste of tribes and it was found to be significant.

**Table 1: Prevalence of Hypertension among Few Endogamous Group of Tribal Population**

		Blood Pressure		Total
		Healthy N (%)	Hypertension N (%)	
Nomad Tribes	Banjara	317 (72.9%)	118 (27.1%)	435 (100%)
	Natt	350 (83.7%)	68 (16.3%)	418 (100%)
	Sapara	116 (77.3%)	34 (22.7%)	150 (100%)
	Bawaria	40 (72.7%)	15 (27.3%)	55 (100%)
	Sansui	58 (80.6%)	14 (19.4%)	72 (100%)
	Bhopa	76 (69.1%)	34 (30.9%)	110 (100%)
	Gujjar	36 (78.3%)	10 (21.7%)	46 (100%)
Total		993 (77.2%)	293 (22.8%)	1286 (100%)

*Chi-square=19.994 p=0.003*

The frequency distribution of Obesity and Overweight among different caste of Nomad Tribes were as

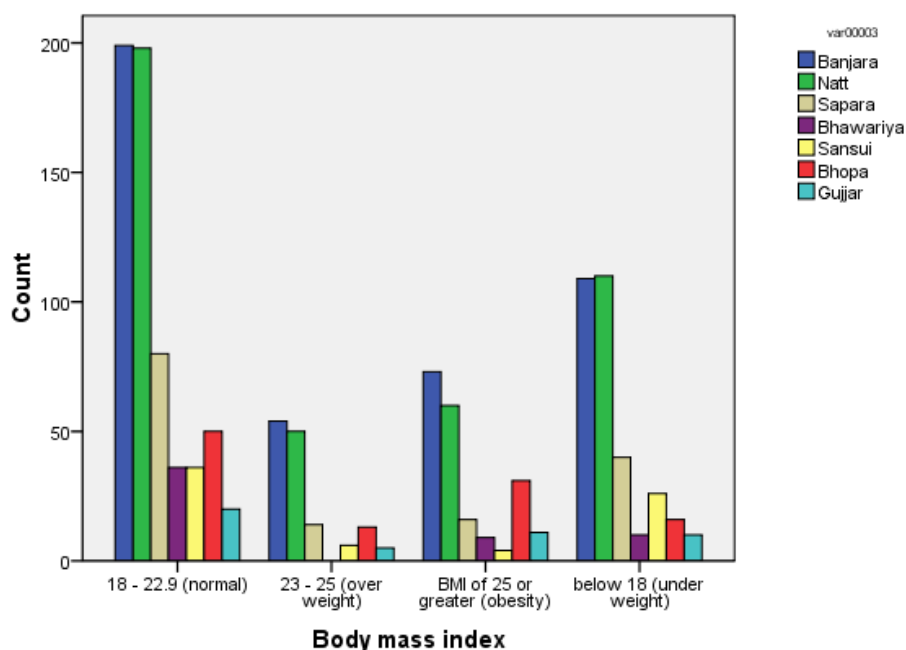
shown in table 2. Banjara and Natt tribes shown maximum percentage of obesity and overweight tendency as compared to other group .It was followed by Bhopa Tribe that had 15.2% of Obesity. Whereas Bawariya and Sansui tribes had not attained as much as tendency towards overweight and obesity .The graphical representation of distribution of tendency towards obesity and overweight among different population of Nomad Tribes were shown in Bar Chart 1.

**Table 2: Prevalence of Obesity and Overweight among Different Caste of Nomad Tribes**

Body mass index	Nomad Tribes							Total
	Banjara	Natt	Sapara	Bawaria	Sansui	Bhopa	Gujjar	
18 - 22.9 (normal)	199(32.1%)	198(32%)	80(12.9%)	36(5.8%)	36(5.8%)	50(8.1%)	20(3.2%)	619
23 - 25 (over weight)	54(38.0%)	50(35.2%)	14(9.9)	0(0%)	6(4.2%)	13(9.2%)	5(3.5%)	142
BMI of 25 or greater (obesity)	73(35.8%)	60(29.4%)	16(7.8%)	9(4.4%)	4(2.0%)	31(15.2%)	11(5.4%)	204
below 18 (under weight)	109(34.0%)	110(34.3%)	40(12.5%)	10(3.1%)	26(8.1%)	16(5.0%)	10(3.1%)	321
Total	435(33.8%)	418(32.5%)	150(11.7%)	55(4.3%)	72(5.6%)	110(8.6%)	46(3.6%)	1286

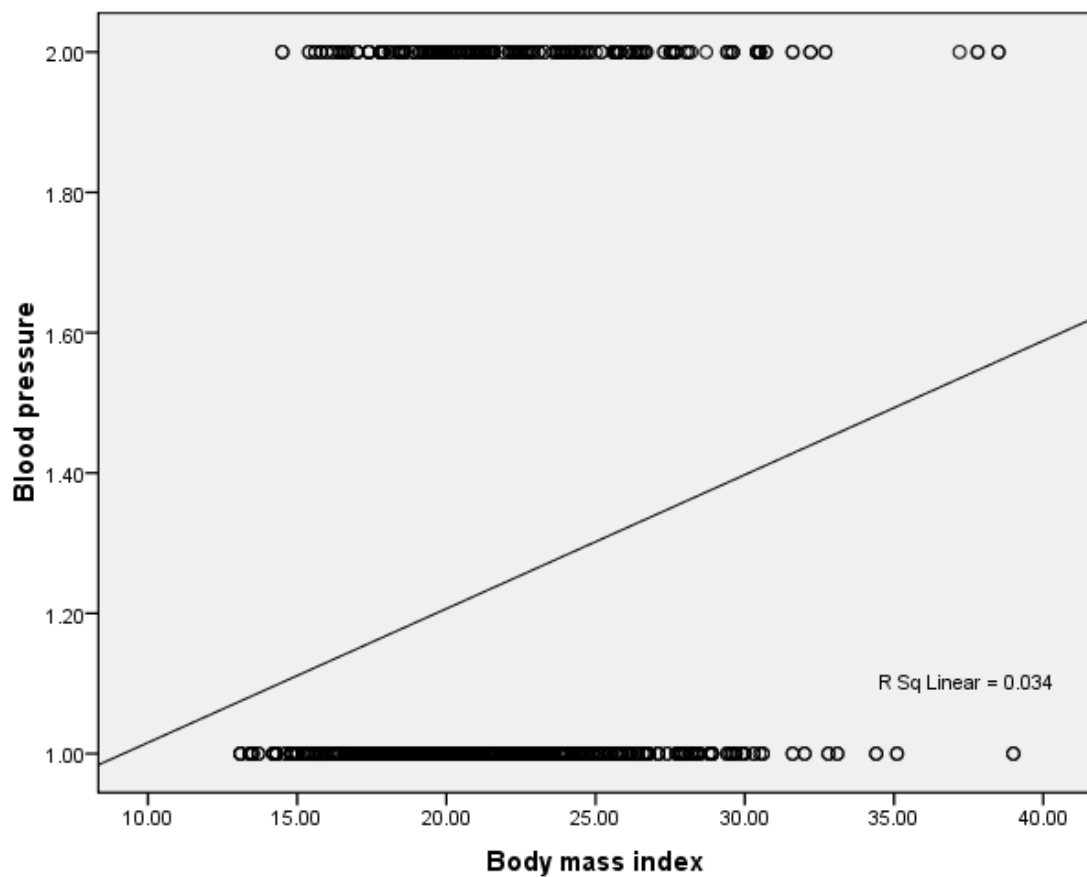
Chi-square=44.003 p=.001

**Bar Chart**



Linear regression analysis was done to find out the correlation between blood pressure and body mass index and a positive relationship ( $r=0.186$ ) was observed between blood pressure and body mass index and based on the t-value (6.771) and p-value (0.001), we can conclude that this relationship is statistically significant (Figure 1).

**Fig. 1: Correlation between body mass index of respondents and blood pressure among few endogamous groups of tribes**



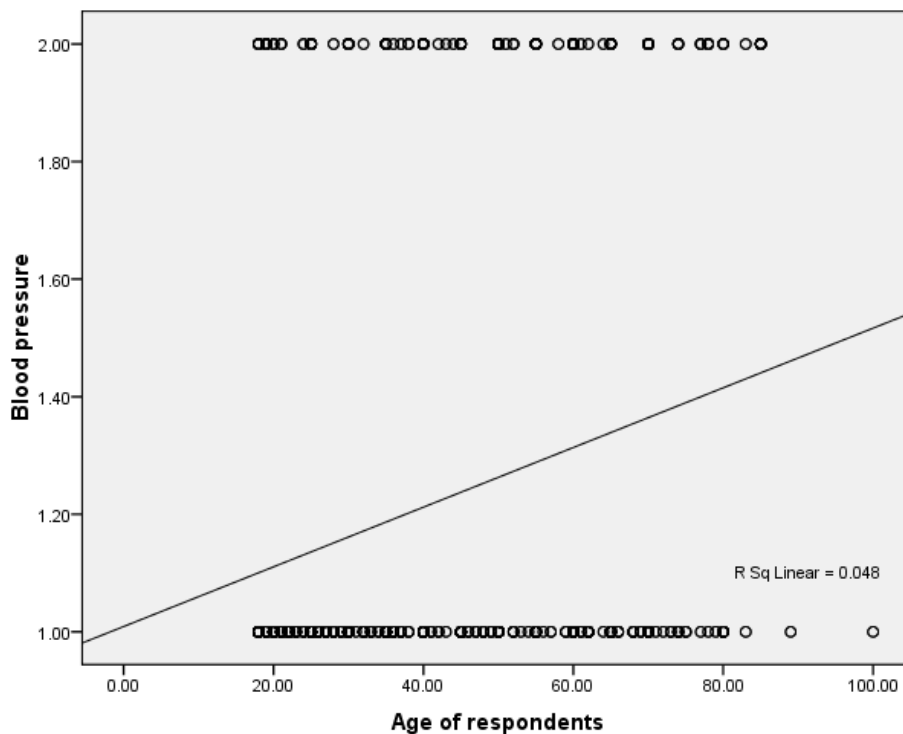
The distribution of hypertension according to the age groups were given below in table 3. It was seen that the prevalence of hypertension increases from the 12.5% to 60% as the age increases and it was maximum at the age between seventy-eights to eighty-seven years. Chi-square was done to see the association between different age groups and hypertension among few endogamous Nomad Tribal group and it was found to be significant that shows that the entire Nomad Tribal group had inclination towards hypertension and it increase with increase in age.

**Table 3. Prevalence of Hypertension among Different Age Groups among Different Nomad Population**

		Blood Pressure		Total
		Healthy N (%)	Hypertension N (%)	
Age of respondents	18-27	288 (87.5%)	41 (12.5%)	329
	28-37	228 (87.4%)	33 (12.6%)	261
	38-47	137 (74.1%)	48 (25.9%)	185
	48-57	96 (64.4%)	53 (35.6%)	149
	58-67	148 (71.2%)	60 (28.8%)	208
	68-77	73 (67.6%)	35 (32.4%)	108
	78-87	21 (40%)	25 (60%)	42
Total		993 (77.2%)	293 (22.8%)	1286

Chi-square=85.701, p=0.001

**Fig. 2: Scatter Plot Diagram between Age of Respondents and Blood Pressure among Few Endogamous Groups of Tribes**



The percentile distribution of visceral adiposity measured by waist circumferences among few endogamous Nomad Tribes .It was seen that Bhopa tribe had maximum abdominal overweight trend followed by Banjara Tribe.Bawaria, Gujjar and Sansui had least tendency as compared to other groups. The overall propensity of having abdominal overweight among all the tribes was 11.6%.Linear

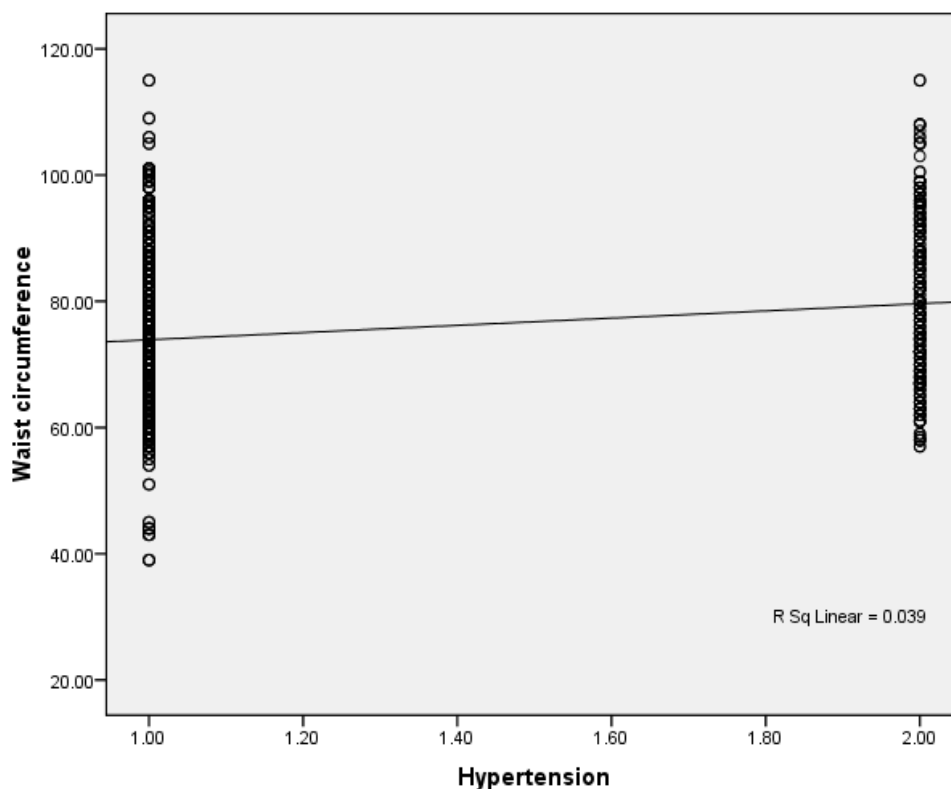
correlation analysis was calculated to find out the relationship between visceral adiposity and hypertension and it was found to be positively correlated with  $r=0.97$  based on  $t$ -value (7.190),  $p=0.001$  as shown in figure 3.

**Table 4: Percentage Frequency Distribution of Visceral Adiposity among Nomad Tribes**

		Waist Circumference		Total
		Abdominal overweight N (%)	Normal N (%)	
Tribal Population	Banjara	70 (16.1%)	365 (83.9%)	435
	Natt	40 (9.6%)	378 (90.4%)	418
	Sapara	18 (12.0%)	132 (88.0%)	150
	Bawaria	0 (0%)	55 (100%)	55
	Sansui	2 (2.8%)	70 (97.2%)	72
	Bhopa	19 (17.3%)	91 (82.7%)	110
	Gujjar	0 (0%)	46 (100%)	46
	Total	149 (11.6%)	1137 (88.4%)	1286

*Chi-square=32.467, p=0.001*

**Figure 3. Correlation ship between Increasing Waist Circumference and Hypertension**



The percentile frequencies distributions of the ABO blood groups among different caste of Nomad

tribe population having hypertension are presented in Table 2. It was observed that % distribution of blood group A 25.6 %, group B 40.6 %, group AB 6.8 % and group O 27% as given in table .It has been found that the prevalence of hypertension was high among the blood group B as shown in figure (Fig.4).

**Table 5: Phenotypic distribution of the ABO blood groups among the different caste of Nomad population of Rajasthan (N=293)**

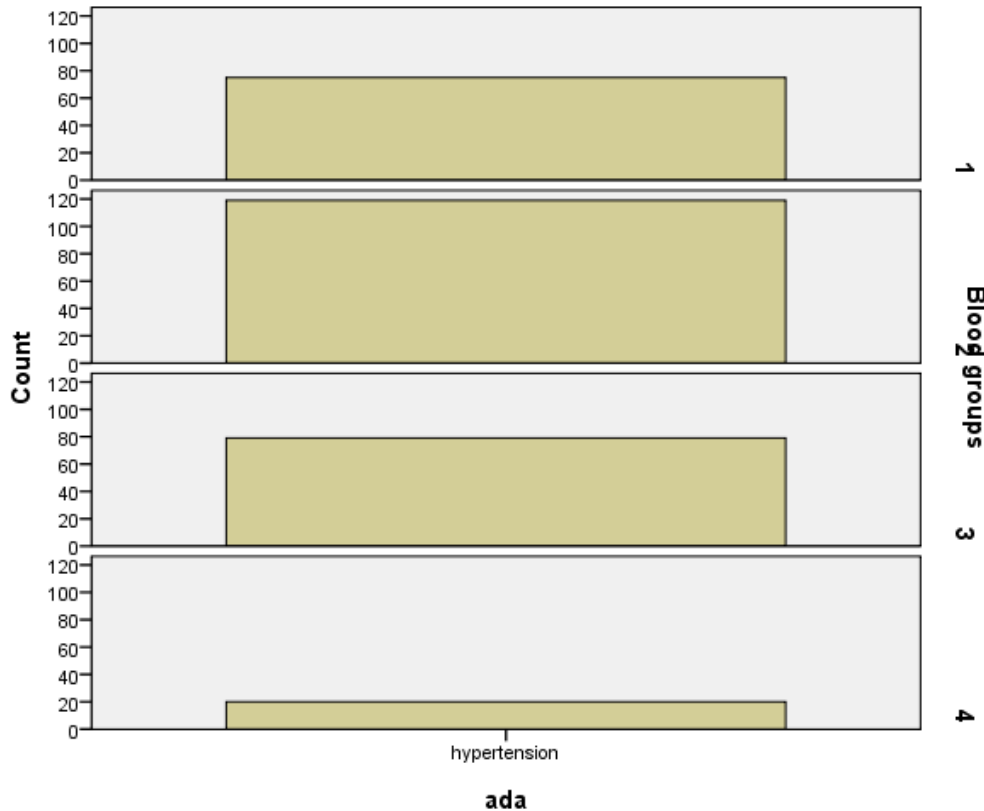
		Blood groups				Total
		A	AB	B	O	
Caste	Banjara	34 28.8%	8 6.8%	40 33.9%	36 30.5%	118 100.0%
	Natt	10 14.7%	6 8.8%	38 55.9%	14 20.6%	68 100.0%
	Sapara	12 35.3%	4 11.8%	12 35.3%	6 17.6%	34 100.0%
	Bawaria	2 13.3%	0 .0%	8 53.3%	5 33.3%	15 100.0%
	Sansui	0 .0%	0 .0%	10 71.4%	4 28.6%	14 100.0%
	Bhopa	13 38.2%	2 5.9%	5 14.7%	14 41.2%	34 100.0%
	Gujjar	4 40.0%	0 .0%	6 60.0%	0 .0%	10 100.0%
	Total	75 25.6%	20 6.8%	119 40.6%	79 27.0%	293 100.0%

## Discussion

Hypertension is a major health problem, especially because it has no clear symptoms. Many people have hypertension without knowing it. It is now well proved that modifier factors like obesity, overweight that is measured by BMI, visceral adiposity measured by waist circumference, increasing age, are associated with the high prevalence of hypertension.<sup>5-11</sup> Our study has reported that the prevalence of hypertension and associated risk factors are in the increase among the Nomad Tribes and regarding unmodified component i.e. ABO blood group, the B blood group subjects seen more in the hypertension category except the Bhopa Tribe with blood group A. In current study group the population had high prevalence rate of hypertension among the entire tribal group. Body mass index and abdominal adiposity had shown positive correlation with hypertension .Similarly increasing age had strong correlation ship with blood pressure. One of the reasons might be that now a days tribal population residing mostly in and around villages and cities and adapt the lifestyle similar to them, that is why they had almost similar risk factors associated with the prevalence of hypertension as rural and

urban population had, as shown in other studies.<sup>12,13</sup>

**Figure 4: Prevalence of Hypertension among different ABO Blood groups in hypertensive cases.**



Findings from the present study also lend support to the hypothesis that genetic factors related to the distribution of some blood groups may play a role in the development of elevated blood pressure. If we take only the hypertensive group then a positive association was found between the ABO blood group and hypertension; those carrying the B blood group were more susceptible to hypertension as compared to blood group A and O. Whereas AB blood group had less chance of getting hypertension. This could suggest that B group might genetically more prone to hypertension as compared to other groups. Although this is preliminary study, a clear trend is seen which is in agreement with some of the recent studies.<sup>14, 15, 16</sup>

### Conclusion

There is significant correlation between BMI, age and ABO blood group with the incidence of hypertension among different caste of Nomad tribal population of Rajasthan. Tendency to develop hypertension is strongly associated with increase in BMI, age, obesity and those with blood group B appeared to be more susceptible to hypertension.

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