

## A Study on Hypertension and Tobacco Consumption in the Rural Adult Population of Bikaner, Rajasthan

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### ABSTRACT

**Background:** Tobacco consumption is a major source of mortality and morbidity in India . 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 Prevalence of smokeless tobacco (ST) consumption in India is around 20%. The prevalence of tobacco consumption in rural areas of Rajasthan according to NFHS 4 among men and women 64% and 20.3%. The present study is conducted to assess the tobacco consumption association with hypertension among the rural adult population of Bikaner, Rajasthan. Objectives: 1) To assess the prevalence of hypertension among the rural adult population of Bikaner district, Rajasthan. 2) To assess the association of tobacco consumption with hypertension. Methodology: A community based cross sectional study was conducted in the rural area of Bikaner district, Rajasthan for a Period of one year (August 2015- July 2016). Adults aged 30 years and above is included in the study after taking informed consent, who have no acute illness and who were not pregnant. Subjects were interviewed using pre designed pre tested proforma. A total of 1000 respondents were interviewed from 12 randomly selected villages. Ethical clearance obtained from Institutional Ethics Committee. Data presented in the form of table, bar diagram & pie diagram. Data analysis done by using INSTANT GRAPH PAD, and a p value of < 0.05 is taken as significant. Results: The study shows, majority, 252 (28.96%) respondents were normotensive, followed by 240 (27.58%) were pre hypertensives, and least number of respondents i.e 180 (20.68%) were hypertensive with stage 2. In the present study , 45.63% as tobacco non users and 60% as tobacco users. Among tobacco users, 22.1% were smokeless tobacco consumer, 16.9% were current smokers, 11% were ex- smokers and 10% were using mixed variety. Prevalence of hypertension was highest 53.25% among the smokers, followed by 47.22% among the mixed variety users. The prevalence of hypertension was least, 39.29% , among tobacco non users. The association of tobacco consumption and hypertension is statistically significant. Keywords: Tobacco, Hypertension, Coronary heart disease, Bikaner, Rajasthan.

**Keywords:** Hypertension, tobacco, prevalence.

### INTRODUCTION

Tobacco consumption is a major source of mortality and morbidity in India. According to estimates there are approximately 5 million deaths due to tobacco consumption annually which is expected to reach 10 million by 2025. Currently over 20% of worldwide tobacco related mortality

occurs in India [1,2]. In developing countries like India, tobacco consumption is mainly done in two forms: smoked tobacco products and smokeless tobacco. Most commonly used smokeless tobacco products include - tobacco pan masala, tobacco with lime, tobacco with pan and betel quid [3]. Prevalence of smokeless tobacco consumption in

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India is 20%. It is significantly higher in males than in females (28% in males and 12% in females) and in rural population as compared to urban population [4]. Easy affordability, lesser cost and misconceptions regarding its useful health effects are important contributory factors for increased smokeless tobacco consumption. Even if assessing systolic BP immediately after environmental smoking exposure may be difficult unless in experimental findings, one cannot deny its increase and, consequently, its interpretation as a marker of smoking exposure [5]. The acute effects of smokeless tobacco have been documented by increases of up to 21 mm Hg in systolic blood pressure and 14 mm Hg in diastolic blood pressure and by an average increase of 19 beats per minute in heart rate [6]. Cigarette smoking has been associated with acute insulin resistance. Although the mechanism is not entirely clear, it may be related to increased levels of nor epinephrine or other counter regulatory hormones, such as growth hormone or Cortisol. Eliasson et al [7] demonstrated that smokeless tobacco users had higher insulin levels than nonusers, suggesting a similar link between smokeless tobacco and insulin resistance. 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. (Kannel, 1977) [8] Paradoxically, Berglund et. al (1975) [9] concluded from their study that, BP levels among cigarette smokers were the same as or lower than those of nonsmokers. Cryer et. al (1976) [9] conclude from their study that, nicotine acts as an adrenergic agonist, mediating local and systemic catecholamine release and possibly the release of vasopressin. Tuomilehto et. al (1982) [10] concluded from their study that, smoking causes an acute increase in blood pressure (BP) and heart rate and has been found to be associated with malignant hypertension. Siegel et. al (1992) [11] reported from their study, the long-term effects of smokeless tobacco use on blood pressure levels differ depending on the user's age and level of physical activity and on the amount of smokeless tobacco used. In young, physically active baseball players, no increase in systolic blood pressure or heart rate was found. West man (1995) [12] reported from his study, the acute effects of smokeless tobacco have been documented by increases of up to 21 mm Hg in

systolic blood pressure and 14 mm Hg in diastolic blood pressure and by an average increase of 19 beats per minute in heart rate. These effects are likely related to activation of the sympathetic nervous system. Hazarika et.al. (2002) [13] reported from their study, smokeless tobacco consumption in the form of khaini was found to be associated with hypertension in women. Similar finding was reported from the study by Gupta et. al (2007) [14] as well as from a study among western population by Hergens et.al. (2008) [15]

The prevalence of tobacco consumption in rural areas of Rajasthan according to NFHS 4 among men and women 64% and 20.3%. The present study is conducted to assess the tobacco consumption association with hypertension among the rural adult population of Bikaner, Rajasthan. The present study is conducted to assess the tobacco consumption association with hypertension among the rural adult population of Bikaner, Rajasthan. The present study was conducted with the following objectives:

- 1) To assess the prevalence of hypertension and tobacco consumption among the rural adult population of Bikaner district, Rajasthan.
- 2) To assess tobacco consumption as a risk factor for hypertension.

## **MATERIALS AND METHODS**

The present study is conducted as a community based cross sectional study, in the rural areas of Bikaner district, Rajasthan for a period of one year (August 2015- July 2016). The study was conducted among adults aged 30 years and above. Sample size was calculated using the formula  $n = 4pq/L$ , where  $p=31.7\%$  (prevalence of HTN in eastern rural India, taken from the study done by Raghupathy et.al, Systematic review & meta-analysis, published in the Journal of Hypertension, June 2014),  $q= 100-p$ ,  $L=10\%$  of  $p$ . The sample size is calculated to be 866, which is rounded up to 1000. Bikaner (Rural) district has a total of 13 PHCs, of which taking 50%, 6 PHCs are randomly selected. 2 sub centers from each of 6 PHCs are selected randomly. This gives us a total of 12 sub centers, included in the study. From each sub center, 1 villages are randomly selected. To get a sample size of 1000, 73 respondents are randomly selected

Table1: Distribution of respondents according to tobacco

| Tobacco use | Frequency | Percentage |
|-------------|-----------|------------|
| Non users   | 400       | 40         |
| Users       | 600       | 60         |
| Total       | 1000      | 100        |

Table 2: Distribution of respondents according to various forms of tobacco consumption.

| Tobacco use              | No. of respondents | Percentage (%) |
|--------------------------|--------------------|----------------|
| 1. Non users             | 400                | 40             |
| 2.Smokeless tobacco uses | 221                | 22.1           |
| 3. Smokers               |                    |                |
| Current smokers          | 169                | 16.9           |
| Ex- smokers              | 110                | 11             |
| 4. Mixed variety users   | 100                | 10             |
| Total                    | 1000               | 100            |

Table 3: Distribution of respondents according to socio demographic variables.

| Socio- Demographic variables | No. of respondents, n=1000 | Percentage (%) |
|------------------------------|----------------------------|----------------|
| Age: 30-39 yrs               | 294                        | 33.79          |
| 40-49 yrs                    | 264                        | 30.34          |
| 50-50 yrs                    | 258                        | 29.65          |
| >= 60 yrs                    | 54                         | 6.20           |
| Gender: Male                 | 317                        | 31.7           |
| Female                       | 683                        | 68.3           |
| Religion: Hindu              | 764                        | 76.4           |
| Islam                        | 146                        | 14.6           |
| Christiantiy                 | 90                         | 9              |
| Type of family: Nuclear      | 641                        | 64.1           |
| Joint                        | 359                        | 35.9           |
| Education: Illiterate        | 325                        | 32.5           |
| Primary school               | 274                        | 27.4           |
| High school                  | 166                        | 16.6           |
| HSLC                         | 98                         | 9.8            |
| HS                           | 86                         | 8.6            |
| passed                       | 51                         | 5.1            |
| Graduate and above           |                            |                |

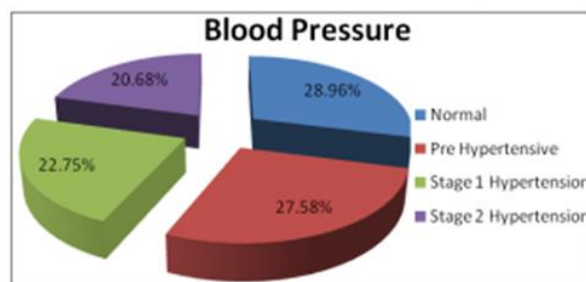


Fig 1: Distribution of respondents according to the blood Pressure status.

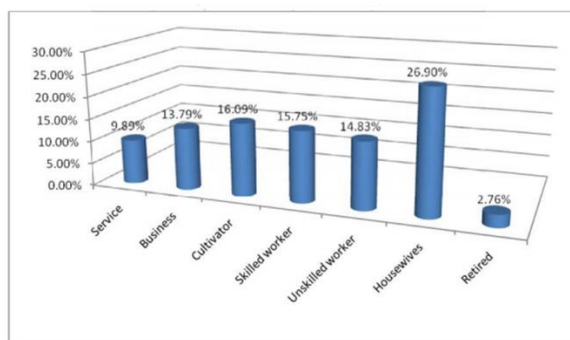


Fig 2: Distribution of respondents according to occupation.

from each village. Data collected by using pre-designed, pre-tested interview schedule followed by physical examination (using sphygmomanometer, stethoscope). Interviews were conducted by house to house visit. Pregnant women, acutely ill patients & those who did not give consent for the study was excluded. Obtained from the Institutional Ethics Committee. BP was measured using mercury column sphygmomanometer using standard technique in the sitting posture, with the back supported, leg uncrossed and after the subject had rested for at least 5 minutes. The BP is recorded in the right arm using cuff of standard size with instrument at the level of individual's heart. The cuff pressure was inflated 30 mm Hg above the level at which radial pulse disappeared and deflated slowly at the rate of 2mm Hg per second and the reading recorded to the nearest 2 mm. The first and fifth korotkoff sound were taken indicative of SBP and DBP respectively. Two readings were taken at 5 minutes interval and average of the two reading is taken as individual BP. If the difference between the two measurement is more than 5mm Hg, additional reading is taken and the average of 3 reading is considered as individuals BP. Participants who had taken food, tea, coffee, alcohol or who had smoked

or done any strenuous physical activity were made to rest for 30 minutes before recording the BP. According to JNC VIII th recommendation, systolic BP  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mm Hg is taken as hypertensives. In the present study hypertensives are defined as those person who fulfills the criteria of JNC VIII and those on hypertensive medication. Data analysis done by using INSTAT GRAPH PAD, and a p value of  $< 0.05$  is taken as significant.

### Operational Definition for Tobacco Use

**Current smoker:** A person who has smoked at least 100 cigarettes in his lifetime and has continued to smoke every day or some days in the last 30 days **Ex-smoker or former smoker:** Defined as a person who has smoked more than a 100 cigarettes in his lifetime and who has not smoked for the last 12 months. **Tobacco chewing:** Defined as a person who has consumed smokeless tobacco once a day or nearly every day in any form for the last 12 months

### RESULTS

The community based cross sectional study was conducted among rural adult population of Bikaner district, Rajasthan. A total of 1000 respondents were interviewed . Out of the total respondents, 31.72% were male and 68.28% were female. Majority of the respondents i.e 33.79% were in the age group 30- 39 years and least  $\geq 60$  years i.e 6.20%. Among the total respondents 45.63% were non users of tobacco and 60% were tobacco users. Of the total respondents , 32.3% were smokers, 22.1% were smokeless tobacco users and 10% were mixed variety users.

Table 1- showing distribution of respondents according to tobacco use, Table 2- showing distribution of respondents according to various forms of tobacco use. Table 3- showing distribution of respondents according to socio – demographic status. Among the total respondents of tobacco users ( n= 600), 46.09% were male and 53.91% were female and the difference is found to be statistically significant . ( $p < 0.0001$ ). Among the total respondents using tobacco , highest percentage of users were among the age group 30-39 yrs i.e 43.55%, 40- 49 yrs = 40.59%, 50-59 yrs= 10.99%,

$\geq 60$  yrs= 4.86%. Age and tobacco use is found to be significantly associated statistically ( $p < 0.0001$ ).

Table 4 - is showing the distribution of respondents according to hypertension and tobacco use. The prevalence of hypertension is highest among the smokers i.e 53.25%. Tobacco consumption is found to be statistically associated with hypertension.

### DISCUSSION

The present study concludes that, out of the total respondents , 45.63% were tobacco non users and 60% as tobacco users. Among tobacco users, 22.1% were smokeless tobacco consumer, 16.9% were current smokers, 11% were ex- smokers and 10% were using mixed variety. Prevalence of hypertension was highest 53.25% among the smokers, followed by 47.22% among the mixed variety users. The prevalence of hypertension was least, 39.29% , among tobacco non users. The association of tobacco consumption and hypertension is statistically significant. This findings correlates with the study by Hazarika N C et. al (2004)[16] which reported prevalence of hypertension as 34.84% among smokers and 29.26% among chewers among the respondents of 30 years and above. Another study by Ambarish Pandey et. al (2009) [17] reported, prevalence of exclusive ST users as 21% while 19.4% consumed both forms and 26.6% did not take any form of tobacco. The prevalence of diastolic hypertension was significantly higher in exclusive ST users as compared to non users (40.9%, 22.9%;  $p$  value = 0.01). Prevalence of systolic hypertension was higher in exclusive ST users too though this was not statistically significant (43%, 100.4%;  $p$  value = 0.39.). Another study by Mandal P K et. al (2010)[18] reported prevalence of hypertension as 56.8% among tobacco users compared to 10.5% among non users. The difference was found to be statistically significant. It was a well established fact that tobacco consumption in any of the manner increases systolic and diastolic blood pressures, leading to circulatory defects. It is usually presumed that cigarette smokers are more affected than smokeless tobacco users. But studies have clearly said that tobacco in form has equal harmful effects [19, 20]. Several possible mechanisms have been proposed such as an imbalance of the central nervous system, impairment of the baroreceptors,

enhanced sympathetic activity, stimulation of the renin-angiotensin-aldosterone system, increased Cortisol levels, increased vascular reactivity due to increase in intracellular calcium levels, stimulation of the endothelium to release vasoconstrictors and loss of relaxation due to inflammation and oxidative injury of the endothelium leading to inhibition of endothelium-dependent nitric oxide production. Loss of relaxation due to inflammation and oxidative injury of the endothelium by Angiotensin II leading to inhibition of endothelium-dependent nitric oxide production is the major contributors of the alcohol-induced hypertension [21]

## CONCLUSION

The present study clearly depicts the health status of the rural adult population, in terms of non communicable disease. Hypertension being one of the common non communicable diseases is not only afflicting the urban population but also the rural population. Tobacco consumption is an established risk factor for hypertension. Tobacco consumption is in increasing trend in rural areas especially in the productive age group. The present study highlights the increasing trend of tobacco use in the rural areas. The prevalence of hypertension is significantly higher among those with tobacco consumption. Even though government is laying many regulations like label ling tobacco products as harmful and increasing the tax on them, complete ban on tobacco products are required to save the rural population who are the backbone of Indian agricultural Industry. Increased level of awareness generation is necessary to develop among the rural population to adopt healthy life style and to go for regular health check up.

## LIMITATION

The present study was a community based cross sectional study , but appropriate design for this study should have been cross sectional design. Due to feasibility constraints cross sectional design is selected for the study. Due to time constraints various other factors cannot measured.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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