

Review Article

A comparative analysis of tobacco and alcohol consumption patterns underlying hypertension prevalence across Indian women: evidence from National Family Health Survey-5

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ABSTRACT

The rise of hypertension among women poses a significant public health challenge in India, affecting 1 in 4 individuals. Multiple factors lead to this surge, including changing eating habits, emergence of substance consumption such as tobacco, alcohol, and both reflecting the evolving lifestyles. This study utilizing the national family health survey (NFHS)-5 data from DHS website with a total of 724,115 women from both rural and urban using statistical package for the social sciences (SPSS) version 23. Binomial logistic regression, was used to examine the association between hypertension and individual, household, and behavioral factors. Overall, 4.6% of women are affected by hypertension. The study also revealed that 6.2%, 1.9%, and 7.7% of women respectively, reported using tobacco, alcohol, and both substances simultaneously. Further analysis showed that those who used tobacco (4.9%) and alcohol (6.0%) had a higher prevalence of hypertension compared to non-users (4.6%). The highest occurrence of hypertension was observed among those who used both substances (5.1%). This aligns with the results of adjusted logistic regression, which confirmed that tobacco use (OR=1.073), alcohol use (OR=1.325), and dual-use (OR=1.129) were all significantly linked to a higher likelihood of developing hypertension. This study highlights the need for appropriate health services for screening and treatment and immediate action to reduce the uptake of these substances.

Keywords: Hypertension, Tobacco consumption, Alcohol consumption, Women's health, NFHS-5, India

INTRODUCTION

Hypertension (HTN), most commonly referred to as high blood pressure, is a significant global health concern, and India is no exception to this growing issue. It is a chronic condition characterized by elevated blood pressure levels, potentially leading to severe health complications if not properly managed. HTN, often referred to as the “silent killer” because it may show no symptoms, wreaks havoc on the cardiovascular system, underscoring the urgency of understanding and addressing its underlying causes.

As per the world health organization (WHO), approximately 1.3 billion people worldwide had hypertension in 2019, suggesting a significant impact on Global

public health.¹ Factors such as age, family history, lifestyle choices, sedentary habits, an unhealthy diet, excessive alcohol consumption, and use of tobacco lead to the development of hypertension, affecting both mortality rates and healthcare costs on a global scale.

In the Indian context, the global burden of disease (GBD) study emphasized hypertension as the leading cause of disease burden in 2015, resulting in millions of disability-adjusted life years and a considerable number of deaths.²

The Indian council of medical research-India diabetes (ICMR-INDIAB) further emphasized a higher prevalence of high blood pressure among women, ranging from 23% to 36% across different regions.³

In the last 25 years, hypertension has become a health challenge for women in India during their reproductive years (15-49 years), affecting 1 in 4 individuals i.e., 25% of the population. This change in health patterns calls for a closer look at the factors responsible for the surge among young women, who were previously believed to be less susceptible to high blood pressure.⁴

Multiple factors lead to this surge, including changing eating habits and the emergence of substance consumption, reflecting evolving lifestyles. However, knowledge gaps continue to exist regarding specific risk factors and their correlations concerning hypertension diagnosis, leaving room for further understanding and research. Untreated Hypertension affects not only personal health but also has consequences on inter-generational health which may include increased risk of pre-eclampsia and low birth weight in infants.

Global usage of tobacco encompassing both smoking and smokeless forms is widespread. Approximately 29% of the Indian population partake in tobacco consumption with a higher prevalence of smokeless tobacco. India holds a preminent position in both the production and consumption of tobacco underlining the need to address the associated health risks preferably hypertension in women.⁵

Consumption of alcohol in India is a major public health concern leading to millions of fatalities every year globally. The global disease burden is significantly increased by the detrimental impact of alcohol use. With the emergence of a growing drinking culture in India, there is an escalation in alcohol consumption, reflecting the evolution of lifestyles.⁶

The purpose of this study is to give an analysis of alcohol and cigarette smoking and their link with hypertension in women in India. This study uses data from the NFHS-5 to shed light on the complex interaction of sociodemographic factors leading to the rising prevalence of hypertension among Indian women. Understanding these complexities is crucial for developing targeted interventions and public health programs in response to rising hypertension incidence.

METHODOLOGY USED

Data source

The data for this study were derived from the NFHS-5, the Indian version of the demographic and health survey (DHS) conducted in 2019-20. NFHS-5 provided information on various population parameters, health indicators and nutrition from 28 states, 8 union territories, and 707 districts. NFHS-5 is the nationwide community-based survey in India to provide estimates on selected biomarkers such as blood pressure and blood sugar level. Blood pressure (BP) was measured for eligible women aged 15-49 and (in the state module subsample of

households only), using an Omron BP monitor to determine the prevalence of hypertension. BP measurements for each respondent were taken three times with an interval of 5 minutes between two consecutive readings.⁷ This is an exploratory study that will analyse the prevalence of hypertension and its association with tobacco and alcohol consumption among women in the reproductive age group 15-49 years based on the hypothesis that there is no association between hypertension and alcohol and tobacco consumption. An alternate hypothesis will be there is an association between hypertension and alcohol and tobacco consumption.

Sampling technique and study population

The NFHS-5 sample was a stratified two-stage sample, with primary sampling units (PSUs) selected from villages in rural areas and census enumeration blocks (CEBs) in urban areas. The sample size was determined based on the need to produce indicators at the district, state/union territory, and national levels. NFHS survey employed computer-assisted personal interviewing (CAPI) to collect data.

All women between the age group 15-49 years who stayed over the night before the survey in the selected households were included for data collection. As per NFHS-5, there were 747,176 eligible women aged 15-49 were identified for individual women's interviews. Interviews were completed with 724,115 women, for a response rate of 97 percent. A total of 724,115 women were included in this study for analysis.⁷

Outcome variable

The outcome variable in this study was the presence of hypertension among women in the reproductive age group 15-49 years. An individual is classified as having hypertension if the systolic blood pressure level ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg. In NFHS-5 blood pressure (both diastolic and systolic) of respondents was measured three times following a 5-minute gap for the second and third reading and has considered the average of the last two readings as suggested in the literature which helps in avoiding upward bias due to anxiety or nervousness while taking the very first reading.⁸ In this study the variable for hypertension was generated using a question "currently have hypertension"? If the female respondent has blood pressure $\geq 140/90$, this was coded as yes, otherwise no.

Explanatory variable

The information related to socio-demographic variables including the age of the participants, education status, marital status, body mass index (BMI), working status, wealth status, religion, place of residence, and other variables like consuming tobacco, alcohol consumption, and both alcohol and tobacco consumption. Data were extracted from the DHS conducted in 2019-20.

Individual characteristics

Individual characteristics that included age were grouped into 15-24 years, 25-34 years, and 35-49 years. Educational status was categorized as not educated, primary, secondary, and higher. Marital status coded as never married, currently married and others (divorced, separated and widowed), BMI was recoded as underweight (less than 18.5), normal (18.5-24.9), overweight (25-29.9) and obese (30 and above). Working status coded as no and yes.

Household characteristics

It includes variable wealth status that recoded as poorest, poorer, middle, richer, and richest based on the wealth index. Households were assigned scores under the wealth index based on the quantity and kind of things they own, from a television to a bicycle or car, and household characteristics like flooring material, toilet facilities, and sources of drinking water. In NFHS-5, principal component analysis is used to calculate these scores. To produce the national wealth quintiles, each normal household member is given a household score. Each household member is then ranked according to their score, and the distribution is then split into five equal categories, each comprising 20% of the population.

Religion was recoded as Hindu, Muslim, Christian, Sikh and Buddhist, and Jain were categories as others. Caste was recoded as schedule caste, schedule tribe, other backward class, "don't know". The place of residence was coded as urban and rural.

Behavioral characteristics

Cigarettes, bidis, cigars, hookah, gutkha/pan masala, pan, and khaini are tobacco products commonly consumed in India. The variable 'smoke tobacco' was generated using the question "do you currently smoke or use tobacco in any other form?" All the responses were recoded as no and yes. And if the female respondents smoked any of these products, they were coded as yes and otherwise no. In this study, passive smoking, type and duration of smoking are not considered.

Women who consume alcohol were coded as no and yes. The variable 'consume alcohol' was generated using the question "do you currently drink alcohol?" the response was coded as no and yes. In this study duration and quantity of alcohol consumption are not considered.

Statistical analysis

Secondary data from the DHS were used for analysis. The data were processed through SPSS version 23. The analysis was done concerning the objective of the study. Descriptive statistical measures for different variables such as age, education, religion, residence, wealth index, and behavioral characteristics, have been computed. Cross-

tabulation was used to analyze the percentage of tobacco and alcohol consumption.⁹ The Chi-square test was used to find the significant level at 95% confidence interval, to estimate the prevalence of hypertension among women by background characteristics. Additionally, binary logistic regression was used for modeling the association between dichotomous variable hypertension and individual, household and behavioral factors using the following equation, where $P(Y)$ is the likelihood of an individual being hypertensive, β_0 is the log odds of the intercept, and $\beta_1, \dots, \beta_n$ are the coefficient for their corresponding predictor variables ($X_1, \dots, X_n$).¹⁰

$$\text{Link function: } \log \left[\frac{P(Y)}{1 - P(Y)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots \beta_n X_n$$

Odds ratio with 95% confidence interval were calculated. A p value ≤ 0.05 is considered statistically significant and will reject the Null hypothesis and lead to acceptance of the alternative hypothesis. The overall results of this study have been presented in tabular form under different headings.

OBSERVATIONS

Table 1 shows the sociodemographic characteristics of respondents. The study findings show that the largest percentage of women (36.4%) fall within the 35-49 age range. Additionally, the majority of participants (51.1%) have completed secondary education, and 70.8% are currently married. A significant portion (57.5%) also have a normal BMI. It is worth noting that only a small fraction (3.9%) of the respondents are employed, and among them, 22.1% belong to the poorer wealth status. Furthermore, a large majority (75.2%) of the participants reside in rural areas. In terms of lifestyle, a small proportion (6.2%) reported tobacco use, while 1.9% consume alcohol, and 7.7% consume both tobacco and alcohol.

Table 2 shows the prevalence of tobacco and alcohol consumption according to various socio-demographic characteristics. Notably, among women aged 25-34, the prevalence of tobacco use is higher at 12.2%, while those aged 35-49 are more likely to engage in alcohol consumption at 2.9%. Interestingly, primary education appears to be associated with a higher use of both tobacco (7.0%) and alcohol (2.1%). Furthermore, the data shows that working women have a higher likelihood of consuming both alcohol (10.0%) and tobacco (2.3%), as well as those living in rural areas, with corresponding rates of 6.4% and 2.2%. Interestingly, wealth status also plays a role, as the richest quintile displays a lower prevalence of both tobacco and alcohol use.

Finally, when examining religious affiliation, it is evident that Christians have a higher prevalence of tobacco use at 11.6% compared to Hindus with 1.6%.

Table 3 shows the prevalence of hypertension in each socio-demographic group. The prevalence of hypertension

increases with advancing age, 35-49 years (8.4%). A higher proportion of women with the richest wealth index (6.1%) were hypertensive. Also, Christian women have the highest proportion of hypertension (12.0%) among all other group. A higher proportion of working women (5.1%) and from urban residence (5.3%) were hypertension.

According to the study, consuming tobacco has a strong link to developing hypertension. Occurrence of hypertension is found to be 4.6% among non-users, while slightly higher at 4.9% among tobacco users (with a p value of 0.002). Furthermore, individuals who drink alcohol have a prevalence rate of 6.0%, whereas it is only 4.6% for non-consumers (with a p of less than 0.001). Interestingly, individuals who indulge in both tobacco and alcohol have a significantly higher prevalence of 5.1% (with a p of less than 0.001) compared to those who abstain from both substances, whose prevalence remains at 4.6%.

In individual characteristics, age shows a positive association with hypertension (OR=2.511, 95% CI: 2.471-2.552, $p=0.001$). Educational status exhibits a negative association, indicating lower odds of hypertension with higher education (OR=0.825, 95% CI: 0.816-0.833, $p<0.001$). Marital status and working status also show significant positive associations with hypertension ($p<0.001$). In household characteristics Wealth status, religion, caste, and place of residence display statistically significant associations with hypertension ($p<0.001$) (Table 4: binary logistic regression analysis).

In behavioral characteristics, tobacco consumption is positively associated with hypertension (OR=1.073, 95% CI: 1.026-1.121, $p=0.002$). Also, alcohol consumption is strongly associated with hypertension (OR=1.325, 95% CI: 1.232-1.424, $p=0.001$). Concurrent tobacco and alcohol consumption also exhibit a significant positive association with hypertension (OR=1.129, 95% CI: 1.087-1.172, $p<0.001$).

The prevalence of hypertension was found to be 4.6%, and there were significant links between hypertension and older age, higher wealth status, tobacco use, alcohol use, and the combination of both habits (Figure 1).

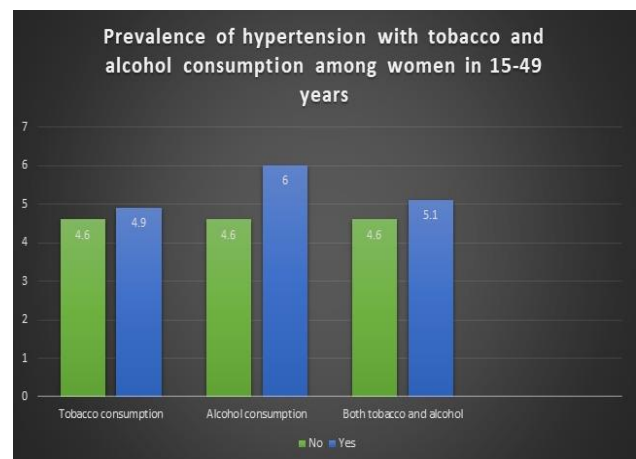


Figure 1: Prevalence of hypertension on the basis of behavioral characteristics.

Table 1: Socio-demographic profile of women aged 15-49 years in India, NFHS 5.

Background characteristics	Frequency	Percentage (%)
Individual characteristics		
Age (in years)		
15-24	241104	33.3
25-34	219443	30.3
35-49	263483	36.4
Educational status		
Not educated	167304	23.1
Primary	84983	11.7
Secondary	370012	51.1
Higher	101816	14.1
Marital status		
Never married	181285	25.0
Currently married	512408	70.8
Others	30422	4.2
BMI (kg/m²)		
Underweight	119713	16.5
Normal	416711	57.5
Overweight	115538	16.0
Obese	38178	5.3
Working status		
No	80443	11.1
Yes	28342	3.9

Continued.

Background characteristics	Frequency	Percentage (%)
Household characteristics		
Wealth status		
Poorest	149844	20.7
Poorer	160340	22.1
Middle	151505	20.9
Richer	139607	19.3
Richest	122819	17.0
Religion		
Hindu	546007	75.4
Muslim	90729	12.5
Sikh	16200	2.2
Christians	52146	7.2
Others	10389	1.4
Caste		
Scheduled caste	583167	80.5
Scheduled tribe	101914	14.1
Other backward class	34661	4.8
Don't know	4373	0.6
Place of residence		
Urban	179535	24.8
Rural	544580	75.2
Behavioral characteristics		
Consume tobacco		
No	678949	93.8
Yes	45166	6.2
Alcohol consumption		
No	710587	98.1
Yes	13528	1.9
Both alcohol and tobacco		
No (neither alcohol nor tobacco)	666882	92.1
Yes	55772	7.9

Table 2: Prevalence of tobacco and alcohol consumption in each socio-demographic group of women 15-49 years in India, NFHS 5.

Background characteristics	Tobacco, N (%)	Alcohol, N (%)	Both (tobacco and alcohol), N (%)
Individual characteristics			
Age (in years)			
15-24	5414 (2.2)	1735 (0.7)	7049 (2.9)
25-34	26878 (12.2)	4092 (1.9)	28954 (13.2)
35-49	12874 (4.9)	7700 (2.9)	19768 (7.5)
Educational status			
Not educated	11374 (6.8)	6392 (3.8)	16852 (10.1)
Primary	5938 (7.0)	1756 (2.1)	7272 (8.6)
Secondary	21657 (5.9)	4334 (1.2)	24753 (6.7)
Higher	6197 (6.1)	1046 (1.0)	6895 (6.8)
Marital status			
Never married	3986 (2.2)	3112 (1.7)	6822 (3.8)
Currently married	36971 (7.2)	9649 (1.9)	44314 (8.6)
Others	4209 (13.8)	767 (2.5)	4636 (15.2)
BMI (kg/m²)			
Underweight	7791 (6.5)	2452 (2.0)	9805 (8.2)
Normal	27840 (6.7)	7709 (1.8)	33673 (8.1)
Overweight	6536 (5.7)	2095 (1.8)	8207 (7.1)
Obese	1639 (4.3)	705 (1.8)	2244 (5.9)

Continued.

Background characteristics	Tobacco, N (%)	Alcohol, N (%)	Both (tobacco and alcohol), N (%)
Working status			
No	4374 (5.4)	1454 (1.8)	5512 (6.9)
Yes	2825 (10.0)	654 (2.3)	3297 (11.6)
Household characteristics			
Wealth status			
Poorest	11028 (7.4)	6048 (4.0)	16022 (10.7)
Poorer	10751 (6.7)	3333 (2.1)	13308 (8.3)
Middle	9378 (6.2)	2184 (1.4)	10956 (7.2)
Richer	7930 (5.7)	1202 (0.9)	8822 (6.3)
Richest	6079 (4.9)	761 (0.6)	6664 (5.4)
Religion			
Hindu	30876 (5.7)	8997 (1.6)	38352 (7.0)
Muslim	5379 (5.9)	79 (0.1)	5456 (6.0)
Sikh	801 (4.9)	2074 (4.0)	821 (5.1)
Christians	6045 (11.6)	22 (0.1)	7457 (14.3)
Others	1058 (10.2)	945 (9.1)	1695 (16.3)
Caste			
Scheduled caste	24712 (4.2)	10253 (1.8)	33559 (5.8)
Scheduled tribe	17190 (16.9)	2245 (2.2)	18101 (17.8)
Other backward class	2859 (8.2)	924 (2.7)	3617 (10.4)
Don't know	4051 (9.3)	106 (2.4)	495 (11.3)
Place of residence			
Urban	10267 (5.7)	1654 (0.9)	11499 (6.4)
Rural	34899 (6.4)	11874 (2.2)	44273 (8.1)

Table 3: Prevalence of hypertension among socio-demographic groups of women aged 15–49 years in India: insights from NFHS-5.

Background characteristics	Hypertension, N (%)	Chi-square	P value
Individual characteristics			
Age (in years)			
15-24	3261 (1.4)	14472.13	0.000
25-34	8061 (3.7)		
35-49	21817 (8.4)		
Educational status			
Not educated	9398 (5.7)	1525.309	0.000
Primary	5233 (6.2)		
Secondary	15227 (4.1)		
Higher	3290 (3.2)		
Marital status			
Never married	7950 (4.4)	34.928	0.000
Currently married	23656 (4.7)		
Others	1542 (5.1)		
BMI (kg/m²)			
Underweight	5950 (5.0)	52.968	0.000
Normal	18650 (4.5)		
Overweight	5229 (4.6)		
Obese	1765 (4.7)		
Working status			
No	3475 (4.5)	25.547	0.000
Yes	1429 (5.1)		
Household characteristics			
Wealth status			
Poorest	4771 (3.2)	1517.008	0.000
Poorer	6511 (4.1)		

Continued.

Background characteristics	Hypertension, N (%)	Chi-square	P value
Wealth status			
Middle	6993 (4.7)		
Richer	7415 (5.3)		
Richest	7458 (6.1)		
Religion			
Hindu	23752 (4.1)	2099.198	0.000
Muslim	4456 (4.9)		
Sikh	2170 (4.3)		
Christians	1928 (12.0)		
Others	496 (4.9)		
Caste			
Scheduled caste	25865 (4.5)	273.022	0.000
Scheduled tribe	5661 (5.6)		
Other backward class	1422 (4.1)		
Don't know	200 (4.6)		
Place of residence			
Urban	9463 (5.3)	254.154	0.000
Rural	23685 (4.4)		
Behavioural characteristics			
Tobacco consumption			
No	30954 (4.6)	9.570	0.002
Yes	2194 (4.9)		
Alcohol consumption			
No	32352 (4.6)	58.101	0.000
Yes	796 (6.0)		
Both tobacco and alcohol^a			
No	30243 (4.6)	40.464	0.000
Yes	2820 (5.1)		

^aEstimation low, missing value

Table 4: Binary logistic regression.

Background characteristics	OR	CI (95%)	P value
Individual characteristics			
Age (in years)	2.511	2.471-2.552	0.001
Educational status	0.825	0.816-0.833	0.000
Marital status	1.054	1.036-1.072	0.000
BMI	0.970	0.955-0.985	0.000
Working status	1.177	1.105-1.253	0.000
Household characteristics			
Wealth status	1.171	1.162-1.181	0.000
Religion	1.157	1.144-1.171	0.000
Caste	1.038	1.023-1.052	0.000
Place of residence	0.820	0.800-0.840	0.000
Behavioural characteristics			
Consume tobacco	1.073	1.026-1.121	0.002
Consume alcohol	1.325	1.232-1.424	0.001
Both tobacco and alcohol	1.129	1.087-1.172	0.000

DISCUSSION

In this study, we aimed to examine the relationship between hypertension and the use of alcohol and tobacco among women aged 15-49 in India, using data from the NFHS-5. Our key findings suggest that the consumption of

tobacco, alcohol, or both at the same time is significantly linked to a higher likelihood of hypertension among Indian women.

The findings reveal that among women, the occurrence of hypertension was 4.9% in those who use tobacco, as

opposed to 4.6% in non-users. Similarly, the prevalence of hypertension was 6.0% in those who consume alcohol, compared to 4.6% in non-drinkers. Notably, individuals who indulged in both tobacco and alcohol had a hypertension rate of 5.1%, while those who abstained from both substances reported a lower rate of 4.6%. Further analysis taking into account influencing factors revealed a significant positive correlation between tobacco use (OR=1.073), alcohol consumption (OR=1.325), and dual use (OR=1.129) with the likelihood of developing hypertension.

The negative association between education level and likelihood of hypertension (OR=0.825) may be attributed to greater awareness of healthy behaviors among more educated women. Higher education equips individuals with knowledge about preventative actions like healthy diets, exercise and avoiding tobacco and alcohol-all protective against high BP.¹¹ Additionally, education enables access to better socioeconomic status, income, jobs and healthcare facilities for early screening and control of hypertension.¹²

The heightened odds of developing hypertension with tobacco use (OR=1.073), alcohol consumption (OR=1.325) and dual use (OR=1.129) underscores the cardiovascular damage inflicted by these substances. Both tobacco smoke and alcohol mediate oxidative stress, inflammation, insulin resistance and atherogenesis-impacting blood pressure regulation.¹³ Moreover, concurrent usage has a synergistic adverse effect that compounds the hypertension risk significantly.⁶

The positive associations between hypertension and age, marital status and working status of women likely stems from hormonal changes, pregnancy complications, caregiving stress and work-life balance challenges that amplify risk as women advance in age and familial/occupational responsibilities.^{14,15}

Urban residence displayed lower likelihood of hypertension compared to rural areas, despite urban populations tending to lead more sedentary, stressful lifestyles with higher rates of obesity and substance use-known risk factors for hypertension. This disconnect is likely attributable to the substantially higher access to healthcare facilities for screening and treating high BP in cities versus rural parts with more deprived, disconnected health infrastructure.³ These results support previous research indicating the harmful impact of tobacco and alcohol on cardiovascular health. Revealing insight from a longitudinal study conducted suggests a link between alcohol consumption and the development of hypertension among middle-aged women.¹⁶ Additionally, studies have also identified tobacco use as a contributing factor for hypertension in Indian adults.^{9,10}

The alarming correlation between substance use and hypertension risk among young women in India is concerning in light of increasing rates of tobacco and

alcohol usage in this demographic. The rapidly changing lifestyles and urbanization in India have led to shifts in consumption habits. The heightened likelihood of developing hypertension as a result of tobacco and alcohol consumption emphasizes the pressing need to address this controllable health concern.¹⁷

To combat the alarming rise of hypertension among women, it is crucial to implement nationwide campaigns that educate and raise awareness about the risks associated with tobacco and alcohol use. These campaigns must reach both urban and rural areas, as both demographics are affected. To support this effort, community health workers should be empowered to actively screen and provide counsel for young women in their communities. This will not only aid in early detection and management of hypertension, but also in promoting healthier lifestyle choices. In addition to community-based initiatives, it is imperative for effective laws to be enacted and enforced to restrict the marketing and availability of tobacco and alcohol. This includes comprehensive bans on advertising, mandatory pictorial health warnings on packaging, and increased taxation. Research has shown that such population-level interventions can significantly reduce consumption rates.¹⁸

Moreover, it is essential to expand screening and affordable treatment options for hypertension under India's national programme for prevention and control of cancer, diabetes, cardiovascular disease, and stroke. Encourage the adoption of healthier eating habits and increased physical activity as key preventative measures against the growing problem of overweight/obesity and its connection to hypertension. This can be achieved through regulating the production and distribution of unhealthy food options, increasing access to nutritious foods in low socioeconomic groups, and creating safe and supportive environments for physical activity.^{15,18} In order to develop specific interventions for young Indian women, it is important to gather ongoing data on the patterns and factors contributing to substance use among this population. Additionally, monitoring the prevalence of hypertension in different geographic areas can help to guide the allocation of resources effectively in addressing this issue.

CONCLUSION

This study showed that tobacco and alcohol consumption were the major risk factors for hypertension in women. Women who consumed alcohol or tobacco had a higher likelihood of developing hypertension compared to those who did not engage in such behaviors. Research encourages to conduct of comprehensive health education campaigns targeting females to raise awareness about the risks associated with alcohol and tobacco consumption and maintaining healthy blood pressure levels. There is a need to implement and enforce strict tobacco and alcohol control policies, including restrictions on advertising, increased taxation, and banning smoking in public places. Access to healthcare services should be improved to

facilitate early detection and management of hypertension. By implementing these preventive measures, we can effectively reduce the burden of hypertension and improve the overall health and well-being of women in India.

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