Prevalence of Tobacco Use and Alcohol Consumption in India and its Contextual Determinants: Findings from WHO-SAGE Wave 2

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Abstract

The study aims to assess the prevalence of tobacco use and alcohol consumption among older adults (aged 50+) in India using the second wave of the longitudinal cohort study from the Study on Global Ageing and Adult Health (SAGE, Wave 2), India (2015). An analytical sample of 7103 individuals aged 50 and above was used for the study. Descriptive statistics, bivariate, and logistic regression analyses have been performed to examine the prevalence of tobacco use and alcohol consumption and to assess its contextual determinants among older adults in India. The study results show that around one-third of respondents were tobacco users; one-tenth consumed alcohol. Results from logistic regression analysis showed a pattern of association between tobacco use and alcohol consumption by socio-demographic characteristics. As the respondent's educational level increases, their consumption of tobacco and alcohol decreases. Similarly, the respondents from the highest wealth quintile were 0.57 times less likely to use tobacco compared to the poorest wealth quintile. However, the BMI was inversely related to tobacco use, with those in the underweight category being more likely to use tobacco. Respondents who reside in rural were less likely to consume alcohol compared to urban dwellers. Finally, tobacco use was highest in West Bengal, Uttar Pradesh, and Rajasthan, while alcohol consumption was significantly higher in Assam. The study concludes that Finally, the information obtained from this study can be used as a baseline for the prevention of modifiable risk factors in India. Future research should further explore to understand the relationship between various risk factors and mental health, cultural practices, and substance use to design more effective preventive strategies.

Keywords: Risk Factors, Tobacco Use, Alcohol Consumption, Older Population, India

1. Introduction

Tobacco use and alcohol consumption are significant risk factors for illness and premature deaths from major Non-Communicable Diseases (NCDs) such as cancer, cardiovascular disease (CVD), liver diseases, and respiratory diseases. Nearly 8 million people die each year due to tobacco use and among those, about 7 million deaths are direct users of tobacco, while more than 1 million are the result of second-hand smoke (World Health Organization [WHO] 2021). In 2016, about 3 million deaths were caused by the harmful use of alcohol and it is responsible for 5.3% of the global burden of disease (WHO, 2018a & 2018b). Both these lifestyle risk factors are also major public health concerns in low and middle-income countries

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like India. Especially, these substance use disorders contribute significantly to the burden of non-communicable diseases and have far-reaching consequences on the individual, family, and community (Chavan et al., 2019; Kumari & Salve, 2020) India, with its large population, faces a significant challenge in addressing these issues.

The prevalence of tobacco use in India is alarmingly high, with nearly 30% of the population aged 15 years and above using tobacco in various forms (Sucharitha et al., 2021), including both smoking and smokeless tobacco products. Exposure to second-hand smoke (SHS) is also a major concern, with over 30% of adults being exposed to SHS in various settings, including homes, workplaces, and public places. (Sharma & Goel, 2022). Alcohol consumption, though less prevalent than tobacco use, is still a significant issue in India, with around 4.5% of the population reported to be regular users (Sumbria et al., 2020). However, the actual prevalence may be higher, as the consumption of locally brewed and unrecorded alcoholic beverages is not well-captured in national surveys.

2. Review of Literature

According to the existing literature, the prevalence of tobacco use in India remains high with a wide variety of consumption patterns, including smoking, chewing, and using smokeless tobacco. The Global Adult Tobacco Survey (GATS) 2016-17 reported that nearly 28% of Indian adults use tobacco in some form, with smokeless tobacco (Government of India, 2018). Particularly, smokeless tobacco products, such as gutkha and paan, are more frequently used in rural areas (Jha et al., 2015; Mishra et al., 2022), where it is deeply ingrained in social and cultural practices. Furthermore, there is a growing trend of tobacco consumption among women, especially smokeless forms, which has been linked to both accessibility and cultural normalization (Goyal et al., 2020). The socio-economic gradient also plays a significant role, with tobacco use being higher among individuals with lower education and income levels (Patel et al., 2021).

Alcohol consumption in India shows marked gender and regional disparities. According to the National Family Health Survey, 2019-2021 (NFHS-5), approximately 19% of men and about 1% of women report alcohol consumption in the past month, with regional variations being significant (International Institute for Population Sciences [IIPS], 2021). The North-eastern states, particularly Assam, Nagaland, and Mizoram, report significantly higher alcohol consumption compared to the rest of the states in India, where alcohol use is generally lower

and more socially stigmatized for women (Simha et al., 2022). Alcohol consumption in India is predominantly a male behaviour, with women facing greater social pressures and stigma (Verma et al., 2010).

Moreover, the socio-economic factors, such as education and wealth quintile are strongly associated with higher rates of tobacco use and alcohol consumption. Lower socio-economic status is linked to a higher prevalence of tobacco and alcohol consumption (Patel et al., 2021). Additionally, the availability and accessibility of tobacco and alcohol products, contribute to their widespread consumption, especially in rural areas (Simha et al., 2022).

Despite various public health efforts, tobacco and alcohol consumption remain highly prevalent, contributing to a rising incidence of NCDs. With India's diverse population, addressing the contextual factors influencing tobacco use and alcohol consumption significantly enhances public health policies, and improves overall health outcomes. Although some studies have well established the association between SES and lifestyle risk factors in developed countries, but is not clear how these risk factors are distributed within developing countries like India (Allen et al., 2017). Therefore, in this study, an attempt has been made to assess the prevalence of two significant behavioural risk factors (tobacco use and alcohol consumption) of NCDs and their associated determinants among people aged 50 years or more. Also, this study provides insight into comprehensive research gaps and policy implications for the older population in India.

3. Objectives

1) To examine the prevalence of tobacco use and alcohol consumption among the older population in India and States/UTs.

2) To assess the contextual determinants associated with tobacco use and alcohol consumption among the older population in India and States/UTs.

4. Methods and Materials

4.1 Data Source

This study uses secondary data from the Study on Global Ageing and Adult Health (WHO-SAGE) Wave 2, India which was conducted during 2014-2015. The survey adopted a multistage cluster sampling design of 375 primary sample units (285 from villages and 90 from CEBs) from six selected states such as Assam, Karnataka, Maharashtra, Rajasthan, Uttar

Pradesh and West Bengal. The SAGE Wave-2 India was a follow-up survey of SAGE Wave-1 (2007-10) and data was collected from the same PSUs and sample households. Overall, the survey conducted two types of populations (N=9116), a nationally representative sample of older people aged 50 years or over, and a smaller comparative sample of adults aged 18–49 years. The survey covered crucial information like demographic and socio-economic characteristics, work history and benefits, social networks, health state descriptions, chronic health conditions, health care utilization, risk factors of NCDs and their preventive health behaviours and quality of life etc. However, the present study restricts to use of only aged 50+ years sample (N=7103).

4.2 Study Variables

The study uses two dependent variables: tobacco use and alcohol consumption to assess the contextual determinants among the older population in India. Concerning tobacco use, participants were asked, "Have you ever smoked tobacco or used smokeless tobacco?" Those who answered 'yes' were coded as '1', otherwise '0'. For alcohol consumption, the question asked to the respondent was, "Have you ever consumed a drink that contains alcohol (such as beer, wine, spirits)?" Those who responded 'yes' were coded as '1', otherwise '0'.

Covariates included in this study are: sex (male and female), age group (50–59, 60–69, 70–79 and 80+ years), educational level (no education, primary, middle, secondary, and higher and above), marital status (never married, currently married, widowed/separated/others), social group (Scheduled Castes [SCs], Scheduled Tribes [STs], Other Backward Classes [OBC], and other social groups) religion (Hindus, Muslims, and other religious), wealth quintile (lowest, second, middle, fourth, and highest), place of residence (rural and urban), states/region (Assam, Karnataka, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal), and body mass index (BMI) category (underweight, normal, overweight, obesity, and not reported/missing). The BMI cut-offs are classified as underweight is <18.5 kg/m^2, normal weight is 18.5–24.9 kg/ m^2, overweight is 25.0–29.99 kg/ m^2, and obese is >30 kg/ m^2.

4.3 Statistical Analysis

Data analysis for this study was performed using STATA Version 18.0 and individual probability sampling weights were applied in all the estimates. Descriptive statistics and bivariate analysis were used to examine the prevalence of tobacco use and alcohol consumption and logistic regression analysis has been used to assess significant determinants associated with

tobacco use and alcohol consumption among aged 50+ years in India. Adjusted Odds Ratio (aOR) with 95% confidence intervals are presented to assess the odds of having both lifestyle risk factors in the selected socio-economic groups.

5. Results

5.1 Description of the study population

The study population was composed of 7118 respondents aged 50 years and above, with 47.6% of males and 52.4% of females. Approximately 41% of the study population was from the 50–59 age group and 36% of them were from the 60-69 age group. In terms of education, nearly half (48.3%) of individuals have no formal education, while only 15.3% have completed higher & above levels of education. About three-fourths of participants were currently married (74.9%), while about a quarter (24%) were widowed or separated. Half of the study population belongs to Other Backward Classes (49.6%) and about one-fifth of the participants were from the Schedule Castes and Scheduled Tribes. A significant portion of the study respondents were Hindus (85%), followed by Muslims around 12%, and other religions accounting for only 3%.

Table 1. Profile of the study population (aged 50+ years)

Covariate	%	N
Sex		
Male	47.6	3337
Female	52.4	3781
Age group		
50–59 years	40.9	2904
60–69 years	36.0	2585
70–79 years	18.0	1285
80 years & above	5.1	344
Educational level		
No education	48.3	3574
Primary	13.2	942
Middle	13.5	980
Secondary	9.7	675
Higher and above	15.3	947
Marital Status		
Never married	1.1	76
Currently married	74.9	5305
Widowed/Separated	24.0	1737
Social Group		
Schedule Castes	6.3	522
Schedule Tribes	14.7	1168
Other Backward Classes	49.6	3313
None of the above	29.4	2115
Religion		

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Hindu	85.0	5966
Muslim	11.9	869
Others	3.1	283
Place of Residence		
Urban	28.5	1512
Rural	71.5	5606
Wealth Quintile		
Lowest	20.1	1371
Second	18.0	1304
Middle	18.1	1318
Fourth	20.9	1468
Highest	22.9	1657
States (Region)		
Assam	5.1	723
Karnataka	11.2	872
Maharashtra	21.1	1176
Rajasthan	12.2	1456
Uttar Pradesh	32.3	1534
West Bengal	18.1	1357
BMI category		
Underweight	24.8	1718
Normal	48.6	3563
Overweight	14.0	966
Obesity	3.3	247
Missing/Not reported	9.4	624
Total	100.0	**7118**

Note: % is weighted and N is unweighted.

A substantial majority of participants reside in rural areas (71.5%), while 28.5% live in urban settings. Wealth distribution was fairly balanced in the study population, with 22.9% of individuals in the highest wealth quintile and 20.1% in the lowest wealth quintile. Geographically, Uttar Pradesh has the largest representation sample (32.3%), followed by Maharashtra (21.1%) and Assam has the smallest representation (5.1%), followed by Karnataka (11.2%).

5.2 Sex-differentials in Tobacco use and Alcohol consumption

Figure 1 shows the sex differences in the prevalence of tobacco use and alcohol consumption among older adults (aged 50+ years) in India. For instance, more than one-third of the respondents (34%) were used tobacco and one-tenth of the respondents (10%) were consumed alcohol. Further, there were significant sex differences in terms of tobacco use and alcohol consumption among older adults. Thus, the prevalence of tobacco use (51%) and alcohol consumption (20%) were highest among males compared to their female counterparts (18% and 2% respectively).

Figure 1. Sex-wise prevalence of Tobacco use and Alcohol consumption among aged 50+ years in India
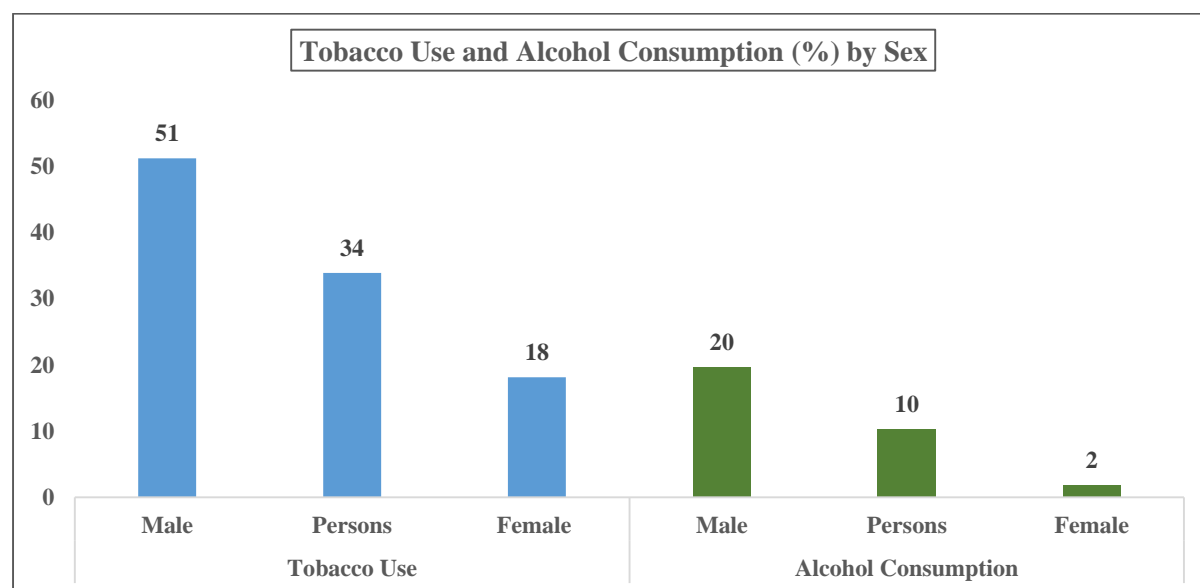
5.3 Prevalence of Tobacco use and Alcohol consumption by demographic and socio-economic characteristics

The prevalence of tobacco use and alcohol consumption among respondents aged 50+ years by socio-economic and demographic characteristics is depicted in Table 2. The prevalence of tobacco use was higher among respondents aged 60 years and above, while alcohol consumption did not vary much by age, except for 80 years & above age group. Surprisingly, the percentage of respondents who were not educated using tobacco and consuming alcohol less compared to their educated counterparts.

Moreover, the prevalence of tobacco use and alcohol consumption were lowest among those widowed, separated or others and this prevalence was highest among respondents from SCs and STs and respondents from lowest wealth quintiles compared to their respective counterparts. Tobacco use was higher among rural residents (36.4%) than those who resided in urban areas (27.7%). As far as BMI is concerned, about 43.6% of the underweight respondents used tobacco, followed by respondents who had normal BMI (33.6%), and overweight (23%). Surprisingly, the respondents who are obese consume alcohol compared to other BMI category respondents.
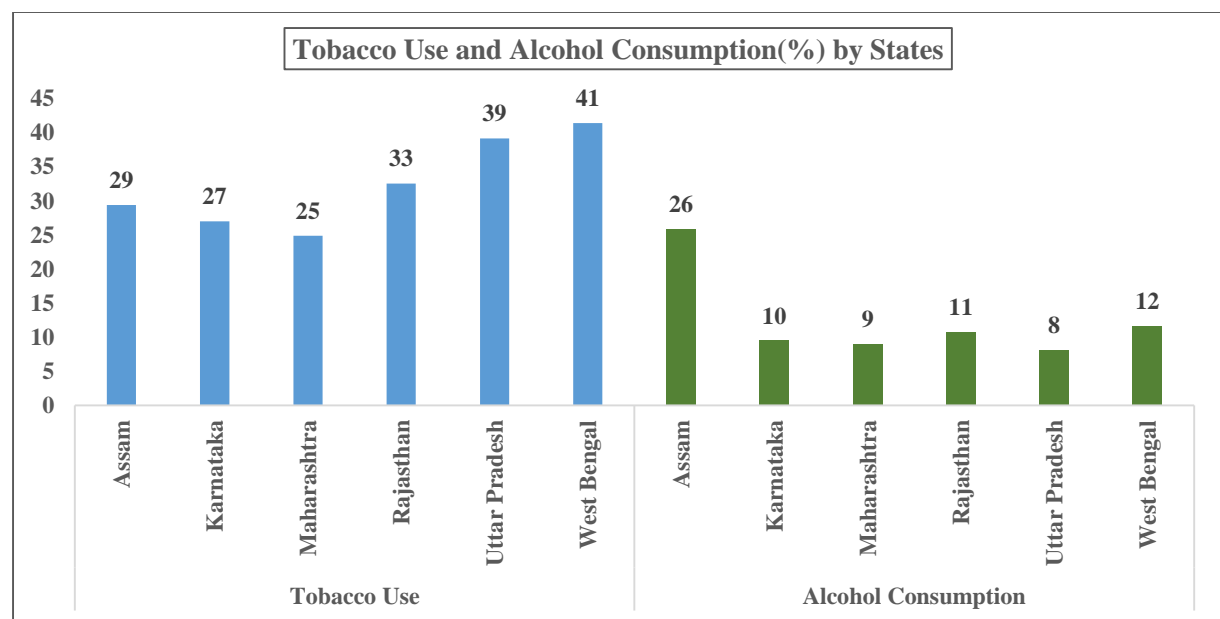
Table 2. Prevalence of Tobacco use and Alcohol consumption by demographic and socio-economic characteristics among aged 50+ years in India

Covariate	Tobacco Use (%)	Alcohol Consumption (%)	N
Sex			
Male	51.2	19.7	3,331
Female	18.2	1.9	3,772
Age group			
50–59 years	30.3	10.4	2,902
60–69 years	36.3	10.4	2,580
70–79 years	36.6	10.7	1,279
80 years & above	36.6	8.0	342
Educational level			
No education	30.9	7.5	3,564
Primary	36.1	12.5	940
Middle	37.5	12.7	980
Secondary	37.8	13.3	675
Higher and above	36.0	13.7	944
Marital Status			
Never married	45.3	11.6	76
Currently married	35.1	11.7	5,295
Widowed/Separated	29.7	6.0	1,732
Social Group			
Schedule Castes	36.2	22.4	521
Schedule Tribes	41.6	15.4	1,165
Other Backward Classes	31.3	8.3	3,308
None of the above	33.9	8.7	2,109
Religion			
Hindu	33.5	11.3	5,957
Muslim	36.8	2.0	866
Others	32.8	17.3	280
Wealth Quintile			
Lowest	43.2	11.5	1,370
Second	35.0	10.5	1,301
Middle	37.9	10.9	1,315
Fourth	28.9	8.4	1,465
Highest	26.3	10.6	1,652
Place of Residence			
Urban	27.7	10.4	1,509
Rural	36.4	10.3	5,594
BMI category			
Underweight	43.6	11.1	1,718
Normal	33.6	10.6	3,563
Overweight	23.0	8.3	966
Obesity	14.9	4.6	247
Missing/Not reported	32.7	12.2	609
Total	**33.9**	**10.4**	**7103**

5.4 State-wise variations in the prevalence of Tobacco use and Alcohol consumption

Figure 2 presents the state-wise variations in the prevalence of tobacco use and alcohol consumption among aged 50+ respondents in India. A majority of the respondents from West Bengal (41%) and Uttar Pradesh (39%) reported the highest prevalence of tobacco use and Maharashtra (25% and Karnataka (27%) reported the lowest use of tobacco. Similarly, Assam was reported the highest consumption of alcohol (26%) and Uttar Pradesh (8%) and Maharashtra (9%) reported the lowest consumption of alcohol.

Figure 2. State-wise prevalence of Tobacco use and Alcohol consumption among older people (aged 50+ years) in India

5.5 Socio-economic determinants of Tobacco use and Alcohol consumption

Table 3 shows the results from the logistic regression analysis after adjusting the variables indicating the socio-economic characteristics of the respondents. The regression results revealed that older females were significantly less likely than older males to be tobacco users and alcohol consumers (aOR=0.15, [CI: 0.13-0.18] and aOR=0.05, [CI: 0.04-0.07] at p<0.001) respectively. Aged 80 years and above individuals were 0.55 times less likely to be alcohol consumers than those in the age group 50-59 years. Respondents education level higher and above were less likely to be tobacco users (aOR=0.64) and alcohol consumers (aOR=0.65) compared to those who did not receive any formal education. Furthermore, as the respondent's educational level increases, their consumption of tobacco and alcohol decreases.

Table 3. Adjusted logistic regression results: A significant factors associated with Tobacco use and Alcohol consumption among aged 50+ years in India

Covariate	Tobacco Use	Alcohol Consumption
	aOR [95% CI]	aOR [95% CI]
Sex		
Male	1.00	1.00
Female	0.15*** [0.13,0.18]	0.05*** [0.04,0.07]
Age group		
50–59 years	1.00	1.00
60–69 years	1.04 [0.88,1.22]	0.80* [0.62,1.03]
70–79 years	0.92 [0.74,1.15]	0.76 [0.52,1.12]
80 years & above	0.85 [0.61,1.18]	0.45*** [0.27,0.74]
Educational level		
No education	1.00	1.00
Primary	0.82* [0.66,1.01]	0.88 [0.64,1.20]
Middle	0.85 [0.69,1.05]	0.76 [0.54,1.07]
Secondary	0.75** [0.57,0.99]	0.72 [0.47,1.10]
Higher and above	0.64*** [0.50,0.83]	0.65** [0.46,0.92]
Marital Status		
Never married	1.00	1.00
Currently married	1.14 [0.59,2.21]	1.77 [0.69,4.52]
Widowed/Separated	1.57 [0.79,3.11]	2.01 [0.76,5.35]
Social Group		
Scheduled Castes	1.00	1.00
Scheduled Tribes	1.17 [0.89,1.55]	0.60*** [0.43,0.84]
Other Backward Classes	0.90 [0.69,1.18]	0.38*** [0.27,0.52]
Other social groups	1.11 [0.84,1.46]	0.38*** [0.26,0.54]
Religion		
Hindu	1.00	1.00
Muslim	0.98 [0.78,1.22]	0.13*** [0.07,0.22]
Others	1.08 [0.73,1.60]	1.23 [0.83,1.83]
Wealth Quintile		
Lowest	1.00	1.00
Second	0.73*** [0.58,0.91]	0.76 [0.54,1.08]
Middle	0.87 [0.68,1.10]	0.77 [0.55,1.07]
Fourth	0.63*** [0.50,0.79]	0.73 [0.50,1.07]
Highest	0.57*** [0.44,0.73]	0.96 [0.65,1.41]
Place of Residence		
Urban	1.00	1.00
Rural	1.09 [0.88,1.37]	0.74* [0.52,1.04]
States (Region)		
Assam	1.00	1.00
Karnataka	1.25 [0.93,1.68]	0.25*** [0.17,0.37]
Maharashtra	0.99 [0.74,1.33]	0.19*** [0.12,0.28]
Rajasthan	1.45*** [1.14,1.85]	0.24*** [0.18,0.34]
Uttar Pradesh	1.79*** [1.40,2.28]	0.19*** [0.14,0.26]
West Bengal	2.26*** [1.77,2.88]	0.31*** [0.22,0.43]
BMI category		
Underweight	1.00	1.00
Normal	0.73*** [0.62,0.86]	0.84 [0.66,1.07]
Overweight	0.56*** [0.42,0.75]	0.89 [0.56,1.41]
Obesity	0.40*** [0.25,0.63]	0.65 [0.33,1.28]
Missing/Not reported	0.69*** [0.53,0.92]	1.12 [0.74,1.70]
Constant	1.28 [0.60,2.73]	3.53** [1.17,10.61]
N	**7103**	**7102**

Note: aOR=adjusted odds ratio; CI=Confidence Interval; Significance levels: ***p<0.001, **p<0.01, *p<0.05

With respect to social groups, SC respondents were more likely to consume alcohol as compared to STs, OBCs and other social groups and the results are statistically highly significant. Muslims were significantly 0.13 times less likely to consume alcohol compared to the reference category (Hindus). With the increase in wealth quintile, respondents were significantly less likely to use tobacco. For instance, the respondents from the highest and higher wealth quintiles were 0.57 times and 0.63 times less likely to use tobacco respectively compared to the poorest wealth quintile.

Moreover, older people residing in rural areas (aOR=0.26) were less likely to consume alcohol compared to their urban counterparts (aOR=1.00). The likelihood of tobacco use is significantly higher in West Bengal, Uttar Pradesh, and Rajasthan, compared to Assam, with individuals in these states having 2.26, 1.79, and 1.45 times higher odds of tobacco use, respectively and these results are statistically significant. Similarly, older respondents in Karnataka, Maharashtra, Rajasthan, Uttar Pradesh, and West Bengal have significantly lower odds of consuming alcohol compared to those in Assam, with odds ratios ranging from 0.19 to 0.31. Therefore, alcohol consumption is much more common in Assam compared to other states, and the differences are statistically significant. Concerning the BMI category, 0.40 times obesity, 0.56 times overweight, and 0.73 times normal weight older respondents were less likely to be tobacco users compared to underweight respondents.

6. Discussion

The study demonstrated that India has a higher prevalence of behavioural risk factors, such as tobacco use and alcohol consumption. Overall, older females were found to be significantly less likely to use tobacco and alcohol compared to older males. Older individuals, particularly those aged 80 and above, were less likely to consume alcohol than those in the 50-59 age group. Higher educational levels were strongly associated with lower tobacco and alcohol consumption, while those with no formal education were more likely to engage in both behaviours. Social group affiliations also played a role, with SC individuals more likely to consume alcohol, while Muslims were less likely to do so compared to Hindus.

Individuals belonging to the highest wealth quintile were significantly less likely to use tobacco, with those in the highest wealth quintile showing the greatest reduction in use. Additionally, rural residents were less likely to consume alcohol compared to urban dwellers.

Regionally, tobacco use was highest in West Bengal, Uttar Pradesh, and Rajasthan, while alcohol consumption was significantly higher in Assam. Finally, BMI was inversely related to tobacco use, with those in the underweight category being more likely to use tobacco.

A comparison of our results shows that the prevalence of tobacco use and alcohol consumption was in the same order of magnitude as reported in other studies: it ranged from (17%-37%) for tobacco consumption in various parts of India (Gupta et al., 2010; Bhagyalaxmi et al., 2013; Wu et al., 2015). The prevalence of tobacco use was found to be 34% which has declined from 47% based on a study based on the first wave of WHO-SAGE (Wu et al., 2015). In line with the previous findings, the study found that household wealth was strongly related to tobacco consumption (Laaksonen et al., 2003; Wu et al., 2015). The findings of the study also showed a strong association between alcohol consumption and increasing age, females, rural residence and lower education level, which are similar to the findings of other studies (Maimela et al., 2016). Varying levels of prevalence of alcohol consumption have been reported in studies conducted in South Africa (Maimela et al., 2016), and India (Thakur et al., 2016; Sivanantham et al., 2021). Studies have reported a higher prevalence of tobacco and alcohol consumption among men than women which was in line with our findings (Maimela et al., 2016; Thakur et al., 2016; Pham et al., 2009). One of the possible reasons behind this could be the social unacceptability of women consuming tobacco and alcohol in Indian society. Studies have reported 2.5 times higher odds of having NCDs among substance users than substance non-users (Gopal et al., 2018; Doddamani et al., 2021).

The study has the following limitations while interpreting the results. Since the data on lifestyle risk factors are self-reported, this can lead to recall bias. However, the self-reported method has been widely used given the reliability and validity of self-reported data on information on tobacco use and alcohol consumption (Bowlin et al., 2021). Moreover, in self-reporting surveys, participants tend to over-report in socially desirable ways (Prinja et al., 1996). Moreover, the dataset utilized in this study is limited to only 6 states representing the entire 36 states/UTs of India which may not adequately represent the overall scenario.

7. Conclusion

The study concludes that the prevalence of tobacco use and alcohol consumption in India is influenced by a combination of socio-economic and regional factors. Overall, the study found a higher prevalence of tobacco use and alcohol consumption among older males, illiterates,

lowest wealth quintile, and respondents who were underweight. Therefore, public health interventions must address these contextual determinants to effectively reduce the prevalence of tobacco and alcohol-related harm in India. The information obtained from this study can be used as a baseline for the prevention of modifiable risk factors in the country. Monitoring the progress of NCDs and their risk factors trends is important for guiding the comprehensive policies and programmes (WHO, 2021b). Finally, future research should further explore to understand the relationship between various risk factors and NCDs and also explore the intersection of mental health, cultural practices, and substance use to design more effective preventive strategies.

Patient and Public Involvement

The study design for SAGE 2 was a follow-up of individuals from SAGE 1. Standardized SAGE survey instruments based on the World Health Survey programme were used for collecting data. Respondents were asked to sign a consent form before the administration of the individual and household questionnaire.

Data Sharing Statement

This study uses secondary data which was available on request through https://www.iipsindia.ac.in/content/SAGE-data

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