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Original Research Article

Tobacco use among adults in India, healthcare provider advice and quit attempts: analysis of NFHS-5

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ABSTRACT

Background: Tobacco use is a leading preventable cause of morbidity and mortality in India and contributes substantially to cancers and other non-communicable diseases. Both smoked and smokeless tobacco products are widely used. Advice from healthcare providers is a proven, cost-effective intervention to promote tobacco cessation, yet its coverage and impact at the population level remain suboptimal. This study assessed patterns of tobacco use, receipt of healthcare provider advice to quit, and quit attempts among adults in India.

Methods: This was a cross-sectional secondary data analysis using the National Family Health Survey-5 (NFHS-5), conducted during 2019-21. The analysis included men and women aged 15 years and above. Current tobacco use (smoked and/or smokeless), receipt of advice to quit tobacco from a healthcare provider in the past 12 months, and self-reported quit attempts were examined. Descriptive statistics were used to estimate prevalence, and associations with socio-demographic characteristics were assessed.

Results: A considerable proportion of adults reported current tobacco use, with smokeless tobacco use being more prevalent than smoked forms. Among current tobacco users, only a small proportion reported receiving advice to quit from a healthcare provider. Quit attempts were more frequent among individuals who had received professional advice compared to those who had not. Significant variations were observed in tobacco use, receipt of advice, and quit attempts across age groups, sex, education levels, place of residence, and wealth quintiles.

Conclusions: Tobacco use remains highly prevalent in India, while the delivery of healthcare provider-initiated cessation advice is inadequate. Expanding routine tobacco cessation counselling within healthcare settings, particularly at the primary care level, could enhance quit attempts and reduce the long-term burden of tobacco-related diseases.

Keywords: Healthcare provider counselling, India, National Family Health Survey, Quit attempts, Smoking cessation; Smoking, Tobacco, Tobacco control

INTRODUCTION

Tobacco use is a major preventable risk factor for cancer and remains a significant public health concern in India. The use of both smoked and smokeless tobacco products contributes substantially to cancers of the oral cavity, pharynx, esophagus, lung, and other sites, accounting for a considerable proportion of the national cancer burden.[1] Smoking tobacco exposes users to a complex mixture of more than 7,000 chemicals, of which at least 250 are known to be toxic and at least 69 have been identified as carcinogenic.[2-4] This toxic exposure harms nearly every organ system and significantly increases the risk of cardiovascular, respiratory, and oncological diseases. Tobacco smoke exacerbates conditions such as asthma, chronic obstructive pulmonary disease (COPD), and heart disease, and is a major risk factor for numerous cancers. Exposure to second-hand smoke also carries serious

health risks, contributing to sudden infant death syndrome (SIDS), middle ear infections, chronic respiratory illnesses, low birth weight, and cancers including lung and oropharyngeal carcinoma.

Globally, tobacco use- including exposure to second-hand smoke, is responsible for over 7 million deaths each year, including an estimated 1.6 million deaths among non-smokers exposed to second-hand smoke.[5,6] Tobacco is a leading preventable cause of non-communicable diseases, which account for nearly 63% of global deaths, and remains one of the most significant risk factors for premature death worldwide. More than $27 billion economic burden is attributable to tobacco use in India.[7] Despite the implementation of tobacco control policies and population-level interventions, tobacco consumption continues to be widespread across socio-demographic groups in India.[8]

Healthcare providers play a critical role in tobacco control through early identification of users and delivery of cessation advice during routine clinical encounters. Brief advice from physicians has been shown to increase motivation to quit and the likelihood of cessation attempts in diverse settings. In the Indian context, prior studies have reported that receipt of professional advice is associated with higher odds of quit attempts, particularly among younger populations.[4] However, evidence examining this relationship among adults using nationally representative data remains limited.

Understanding the influence of physician advice on tobacco cessation attempts is essential for strengthening cancer prevention strategies in India. This study examined this association at the population level, capturing both tobacco use behavior and effect of physician advice on attempts to quit tobacco use among Indian adults, using NFHS-5 data, with the aim of informing policies that promote integration of tobacco cessation counseling into routine clinical practice for cancer prevention.

METHODS

Data source and study design

This study used data from the National Family Health Survey-5 (NFHS-5), a nationally representative, cross-sectional survey conducted in India during 2019-2021. NFHS-5 was implemented by the International Institute for Population Sciences (IIPS), Mumbai, under the supervision of the Ministry of Health and Family Welfare, Government of India. The survey employed a stratified multistage cluster sampling design to obtain representative estimates at national, state, and district levels. Villages in rural areas and census enumeration blocks in urban areas served as primary sampling units. Data were collected using standardized questionnaires administered through computer-assisted personal interviewing.

Study population

The analysis was restricted to current tobacco using men and women aged 15-54 years, identified from the men's and women's individual datasets. Participants with missing information on smoking behavior, quit attempts, or healthcare advice were excluded from the final analysis. Pregnant individuals and those with cancer were also excluded.

Outcome variable

The dependent variable is- attempt to quit smoking or tobacco in the past 12 months, derived from respondents' self-reported answers. The variable was coded dichotomously as yes (made at least one quit attempt) or no (did not attempt to quit).

Main independent variable

The primary independent variable was advice to quit smoking from a healthcare professional in the past 12 months. This variable was based on respondents' reports of whether a doctor or other healthcare provider had advised them to stop smoking during a healthcare visit and was coded as a binary variable (yes/no).

Covariates

Sociodemographic and health-related covariates included age, sex, place of residence (urban/rural), educational attainment, wealth index, alcohol consumption, and polytobacco use. These variables were selected based on prior literature examining smoking cessation behavior.

Statistical analysis

All analyses were performed using STATA 14MP (Stata Corp) and accounted for the complex survey design, including sampling weights, clustering, and stratification. Descriptive statistics were used to summarize participant characteristics. Associations between healthcare professional advice and smoking quit attempts were examined using survey-adjusted logistic regression models, and results were presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs). Statistical analyses were conducted using appropriate survey procedures to ensure nationally representative estimates.

RESULTS

Table 1 presents the demographic characteristics of the survey population from NFHS-5 based on their gender. The age distribution was relatively even across adult age groups between men and women, with the largest proportion in the 20-29 years category (30.51%), followed by 30-39 years (26.55%) and 40-49 years (23.50%). Adolescents aged 15-19 years constituted 16.53% of the sample. Participants aged 50-54 years represented a small proportion overall (2.9%), with representation primarily among males.

Table 1: Demographic characteristics of the survey population NFHS-5.

Characteristics	Male (%)	Female (%)	Total (%)
Age (years)			
15-19	16.09	16.92	16.53
20-29	28.06	32.67	30.51
30-39	25.67	27.33	26.55
40-49	23.99	23.07	23.50
50-54	6.18	0	2.90
Education			
No education	11.82	22.43	17.45
Primary	12.02	11.73	11.87
Secondary	56.88	50.18	53.33
Higher	19.28	15.65	17.35
Wealth quantile			
Poorest	16.69	18.5	17.65
Poor	19.69	20	19.85
Middle	21.3	20.52	20.89
Rich	22.29	20.81	21.5
Richest	20.04	20.17	20.11
Place of residence			
Urban	35.19	32.49	33.76
Rural	64.81	67.51	66.24

Table 2: Descriptive characteristics based on the type of tobacco use.

Tobacco use	Non-tobacco user (%)	Smokable (bidi, Cigs, Pipe, etc) (%)	Smokeless tobacco (khaini, paan, chewable) (%)	Both smokeable and smokeless tobacco use (%)
Gender				
Men	59.53	13.51	20.15	6.8
Women	95.84	0.19	3.78	0.17
Residence				
Urban	82.49	6.53	8.35	2.62
Rural	76.91	6.4	13.06	3.63
Age (years)				
15-19	92.93	2.32	3.65	1.09
20-29	83.07	4.8	9.02	3.1
30-39	75.74	6.78	13.71	3.75
40-49	70.8	9.07	16.04	4.08
50-54 (men only)	46.04	22.8	24.08	7
Education				
No education	73.71	7.18	14.8	4.31
Primary education	66.39	9.65	18.12	5.83
Secondary education	79.96	6.0	11.09	2.95
Higher education	88.81	4.88	4.74	1.56
Region of India				
Northern	85.55	4.74	7.01	2.68
Northeast	59.69	10.17	21.35	8.79
Eastern	70.55	9.13	14.68	5.62
Central	81.1	3.14	12.68	3.08
West	74.94	3.79	18.99	2.27
South	86.80	7.69	4.27	1.23

Table-3: Unadjusted and adjusted odds ratio of quit attempt of tobacco use in the past 12 months and healthcare provider advice.

Odds ratio of quitting smoking or tobacco use	Unadjusted odds	Adjusted odds
Doctor/Healthcare provider Advised to quit smoking in past 12 months		
No	1.00(ref)	1.00(ref)
Yes	5.62 (4.6-6.8)*	5.67 (4.6-6.8)*
Gender		
Male	1.00(ref)	1.00(ref)
Female	1.08 (1.02-1.16)*	1.25 (1.04-1.4)*
Education		
No education	1.00(ref)	1.00(ref)
Primary	1.12 (1.01-1.24)*	1.14 (0.8-1.4)
Secondary	1.30 (1.19-1.42)*	1.16 (0.9-1.4)
Higher education	1.33 (1.14-1.54)*	1.34 (0.8-2.04)
Urban/rural		
Urban	1.00 (ref)	1.00(ref)
Rural	1.09(0.9-1.2)	1.43 (1.07-1.9)*
Polytobacco use		
No	1.00(ref)	1.00(ref)
Yes	1.15 (1.04-1.28)	1.22 (0.9-1.6)
Alcohol use		
No	1.00(ref)	1.00(ref)
Yes	0.97(0.89-1.05)	0.84 (0.6-1.01)
Socioeconomic status		
Poorest	1.00(ref)	1.00(ref)
Poorer	1.11(1.02-1.22)*	1.27 (0.9-1.6)
Middle	1.28(1.16-1.42)*	1.43 (1.08-1.9)*
Richer	1.27 (1.12-1.44)*	1.41 (1.01- 1.9)*
Richest	1.26 (1.08-1.47)*	1.75 (1.1-2.7) *

Regarding educational attainment, more than half of the respondents had completed secondary education (53.33%), while 17.35% had higher education. No formal education was reported by 17.45% of participants, with a higher proportion among females compared to males. Wealth distribution was relatively uniform across quintiles, with each category contributing approximately one-fifth of the study population. A majority of respondents resided in rural areas (66.24%), while 33.76% lived in urban settings.

Table 2 describes tobacco use patterns stratified by gender, place of residence, age, education, and region. Overall, tobacco use was markedly higher among men than women. Among men, 40.47% reported some form of tobacco use, including smokable tobacco (13.51%), smokeless tobacco (20.15%), or both forms (6.8%). In contrast, tobacco use among women was substantially lower, with 4.14% reporting any form of use.

Rural residents exhibited a higher prevalence of smokeless and dual tobacco use compared to urban residents. Smokeless tobacco use was reported by 13.06% of rural participants versus 8.35% of urban participants. The prevalence of tobacco use increased with age, with the highest levels observed in the 50-55-year age group, where more than half reported tobacco use in some form.

An inverse relationship was observed between educational attainment and tobacco use. Individuals with no formal education or only primary education had higher prevalence of smokeless and dual tobacco use, whereas participants with higher education showed the lowest prevalence across all tobacco use categories.

Regional variation was notable. The northeast region demonstrated the highest prevalence of smokeless (21.35%) and dual tobacco use (8.79%), while the Southern region had the lowest prevalence of smokeless (4.27%) and dual use (1.23%).

Table 3 presents unadjusted and adjusted odds ratios for quit attempts in the past 12 months. Participants who reported receiving advice to quit tobacco use from a doctor or healthcare provider had significantly higher odds of making a quit attempt compared to those who did not receive advice (adjusted OR: 5.67; 95% CI: 4.6-6.8).

Female participants had higher odds of quit attempts compared to males after adjustment (adjusted OR: 1.24; 95% CI: 1.04-1.40). Rural residence was also

independently associated with higher odds of quit attempts (adjusted OR: 1.43; 95% CI: 1.07-1.9).

Socioeconomic status demonstrated a positive gradient, with participants from middle, richer, and richest wealth quintiles showing significantly higher adjusted odds of attempting to quit compared to the poorest group. Education level, polytobacco use, and alcohol use were not significantly associated with quit attempts after adjustment.

DISCUSSION

The present study, based on nationally representative NFHS-5 data, demonstrates a strong association between healthcare provider advice and tobacco quit attempts among adults in India. Individuals who reported receiving advice from a doctor or healthcare provider to quit tobacco use had nearly five times higher odds of attempting to quit in the past 12 months compared to those who did not receive such advice. This finding underscores the substantial influence of brief clinical interventions on cessation behavior in low- and middle-income country settings.

Our findings are consistent with earlier national evidence from India. An analysis of Global Adult Tobacco Survey (GATS-2, 2016-17) data reported that tobacco users who received advice from a healthcare provider had approximately twofold higher odds of making a quit attempt compared to those who did not receive advice, among both smoked and smokeless tobacco users.[10] The higher magnitude of association observed in the present NFHS-5 analysis may reflect increased health system engagement, improved awareness of tobacco harms, or temporal changes in provider-patient interactions.

International evidence similarly supports the role of healthcare provider advice in promoting quit attempts. In the United States, Agaku et al reported that adult smokers who received advice from a healthcare professional had significantly higher odds of attempting to quit tobacco use compared to those who did not receive advice.[11,12] The magnitude of association in these studies were lower than the nearly fivefold odds observed in the present NFHS-5 adult population, possibly reflecting differences in healthcare delivery systems, cultural factors, survey methodology, or tobacco product types.

Among adult populations in high income countries, research also supports the role of healthcare provider advice in promoting cessation related behaviors, though study outcomes vary by measure. For example, Kruger et al found that current cigarette smokers in the U.S. who received the full 5 A's brief intervention from a health professional had substantially higher odds of using evidence-based cessation treatments (counseling, medication, or both) compared to those who received one or none of the components.[13] Evidence from Europe further corroborates these findings. A multi-country analysis using Global Adult Tobacco Survey data from European nations reported that smokers who received physician advice were significantly more likely to attempt quitting, although the strength of association varied across countries.[14]

Systematic reviews and meta-analyses also demonstrate that brief advice from healthcare professionals increases cessation-related behaviors. A Cochrane review reported that even minimal advice from physicians increases the likelihood of quitting compared to no advice, with pooled estimates showing a statistically significant effect.[15] Although effect sizes reported in randomized trials are typically smaller than those observed in population-based surveys, the consistency in direction supports the effectiveness of provider advice across diverse settings.

Gender differences in quit attempts were observed in the present study, with females demonstrating higher adjusted odds of attempting to quit compared to males (1.0 versus 1.24 odds). The literature on gender difference and tobacco cessation results across India is scant and mixed. Almost all the studies have pointed to the lower tobacco use rates among women compared to men, and consumption of more smokeless tobacco compared to smokeable forms.[9,16,17] Other studies found the gender difference and quit attempts to be insignificant.[17,18]

Rural residence was independently associated with higher odds of quit attempts in this study. This finding aligns with research suggesting increased outreach through primary healthcare systems and community health workers in rural areas, although tobacco use prevalence remains higher in these populations.[19]

Socioeconomic gradients in quit attempts were also evident, with individuals from middle and higher wealth quintiles more likely to attempt quitting. Similar socioeconomic differentials have been documented in multiple countries, reflecting disparities in access to healthcare services, cessation support, and health information.[16,17,20]

This study has several strengths, including the use of a large, nationally representative dataset and inclusion of both smoked and smokeless tobacco forms. Limitations include the cross-sectional design, reliance on self-reported measures, and the inability to assess sustained abstinence or the intensity and quality of healthcare provider advice. Further longitudinal studies on national level or multi-district level are needed to assess the healthcare providers effectiveness on tobacco cessation.

CONCLUSION

In conclusion, the present findings add to robust national and global evidence demonstrating that healthcare provider advice is strongly associated with tobacco quit attempts. The magnitude of association observed in this study suggests that systematic integration of brief

cessation advice into routine healthcare encounters could substantially enhance tobacco control and cancer prevention efforts in India and the Asia-Pacific region.

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