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Health literacy and tobacco cessation among hypertensive individuals: A mixed method study

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Abstract:

BACKGROUND: Hypertension and tobacco addiction are two major public health challenges in India that frequently coexist. About 30% of Indian adults have hypertension, while over one-fourth use some form of tobacco. So, the present study aimed to determine the prevalence and patterns of tobacco consumption and identify associated socio-demographic factors among hypertensive patients in urban India and also further explored patient perspectives regarding tobacco use through qualitative interviews.

MATERIALS AND METHODS: This mixed-method study was conducted among 305 hypertensive adults recruited from an urban tertiary hospital using interviewer-administered questionnaires. Additionally, 15 tobacco-consuming patients were purposively sampled for in-depth interviews regarding perceptions and behaviors related to tobacco. Descriptive statistics and multi-variable logistic regression models were applied for quantitative analysis and thematic analysis for qualitative data.

RESULTS: The prevalence of ever tobacco use among hypertensive patients was 21%. Smokeless tobacco was the predominant form used. Male gender, urban locality, illiteracy, and lack of knowledge about tobacco hazards had a higher likelihood of tobacco consumption. Qualitative interviews provided complementary insights into triggers like peer influences and stress, barriers to quitting including withdrawal effects and system gaps, and participant perspectives on facilitating cessation.

CONCLUSION: Tobacco consumption among hypertensives is higher than national averages. Tailored educational, motivational, and policy-level interventions addressing gaps in knowledge, risk perceptions, addiction behaviors, and cessation support systems can enable the promotion of tobacco abstinence and hypertension control in this vulnerable sub-group. The multi-method data provide actionable inputs for planning targeted control and prevention strategies addressing this dual burden.

Keywords:

Gujarat, hypertension, smokeless tobacco, socio-demographic factors, tobacco use

Introduction

Tobacco use remains a major preventable cause of mortality worldwide, leading to over 8 million deaths annually.^[1] India has the second largest number of tobacco consumers, following China.^[2] Over 267 million adults in India use some form of tobacco.^[3] Despite a marginal decline from 1998 to 2010,^[4,5] the prevalence has plateaued at around 28.6% over the past decade.^[6,7]

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Smokeless tobacco, including products like betel quid, gutkha, and khaini, is particularly widespread given the cultural acceptance. The GATS-2 survey revealed 25.6% smokeless tobacco use compared to 10.7% smoking.^[7] Smokeless tobacco was more prevalent among lower socio-economic groups, women, rural dwellers, and those without formal education.^[8] Concurrent use of smoking and smokeless tobacco aggravates health risks.

A recent grounded theory study identified perceived benefits, addiction, pleasure, and

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stress relief as primary reasons for smokeless tobacco use among Iranian adults.^[9] Easy access, social acceptance, and family patterns enabled uptake. Most users were aware of health risks but valued perceived advantages over harms.

A qualitative study on smokeless tobacco use in Iran identified perceived benefits like pleasure, social acceptance, stress relief, and addiction as driving factors.^[10] Other qualitative studies have revealed similar drivers like addictiveness, stress relief, peer/family influences, and social acceptance facilitating smokeless tobacco consumption in Asian adults.^[11,12]

Cardio-vascular diseases are major tobacco-related conditions, causing over 1.3 million deaths in India annually.^[13] Hypertension frequently coexists with tobacco use, present in about 30% of Indian adults.^[14] The dose–response relationship between tobacco and elevated blood pressure (BP) is established.^[15,16] Smokeless tobacco is also associated with raised BP and hypertension.^[17,18]

With high concurrent tobacco usage, focused research among hypertensive cohorts is warranted. Previous studies have identified socio-demographic risk factors like male gender, middle age, rural dwelling, and illiteracy.^[19,20] However, data are limited on factors associated with tobacco use among urban hypertensive patients.

With urbanization and workplace stress, tobacco use is escalating among India's metro dwellers, while associated hypertension rises due to sedentary lifestyles and dietary changes. Nevertheless, urban tobacco trends among hospital attendees with hypertension remain understudied. This study aims to bridge this gap by assessing socio-demographic determinants of tobacco use among hypertensive patients attending an urban Indian tertiary hospital. It evaluates prevalence, patterns, knowledge, and factors associated with tobacco consumption in this sub-group to inform tailored control and prevention strategies addressing this dual disease burden.

Materials and Methods

Study design and setting

This was a mixed-method study conducted over 3 months (January to March 2022) at the out-patient department of medicine in a tertiary care hospital in urban India.

Study participants and sampling

The study participants were patients diagnosed with hypertension and on anti-hypertensive medication for

at least 1 year. The inclusion criteria were age ≥ 18 years, confirmed diagnosis of hypertension medication as per the 2017 American College of Cardiology/American Heart Association guidelines (systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg) or on anti-hypertensive medication, and receiving treatment for hypertension for minimum 1 year. Patients with any major co-morbid illness like diabetes, cancer, human immuno-deficiency virus (HIV), or psychiatric disorders were excluded.^[21]

Sample size: The sample size was calculated based on a 23% expected prevalence of tobacco use in hypertensive patients,^[22] with 5% absolute precision and 95% confidence interval (CI). The minimum sample size was estimated to be 285, and the consecutive sampling technique was used. In the qualitative arm, 15 hypertensive patients using tobacco were recruited from the out-patient department by the purposive sampling technique. The sample size of 15 hypertensive patients for the qualitative interviews was determined based on established principles for qualitative research. As this was an exploratory study aimed at gathering in-depth insights into patient perspectives, a smaller sample size is justified compared to quantitative surveys. Data saturation, where no new themes emerge with additional interviews, is the primary consideration rather than statistical power. For descriptive qualitative studies, sample sizes of 12–15 participants are commonly deemed sufficient to reach saturation.^[23] The insights gleaned from even 6–12 interviews can provide meaningful themes and conclusions in exploratory qualitative work.^[24] Given the focused nature of this study on a specific sub-group, a sample of 15 hypertensive tobacco users was estimated to be adequate to provide rich, descriptive insights into patient viewpoints based on these accepted qualitative research norms.

Data collection and technique

Consecutive hypertensive patients fulfilling eligibility criteria were recruited after obtaining written informed consent. Face-to-face interviews were conducted by trained investigators using a pre-tested, structured questionnaire based on the Global Adult Tobacco Survey (GATS).^[25] Information on tobacco use history, knowledge regarding tobacco hazards, socio-demographic characteristics, and other variables was collected. Quality checks were performed to identify and rectify errors.

In the qualitative arm: A semi-structured approach using open-ended questions to explore topics like tobacco use history, perceptions of risks and benefits, barriers to quitting, triggers for initiation and relapse, and perspectives on facilitating cessation was used. Interviews were conducted face-to-face by the principal investigator in a private room within the hospital to

ensure confidentiality and comfort. Each interview lasted approximately 30–45 minutes and was audio-recorded with participant consent. The recordings were transcribed verbatim for thematic analysis.

Variables: The primary outcome variable was current tobacco use. The exposure variables were socio-demographic factors like age, gender, education level, occupation, income, and locality. Knowledge about the harms of tobacco was also assessed.

Statistical analysis: Data were analyzed using SPSS v25 software. Socio-demographic variables were summarized using descriptive statistics. Bivariate analysis was done to assess factors associated with tobacco use. Variables with $P < 0.25$ on bivariate logistic regression were entered into multi-variate logistic regression models to identify independent determinants of tobacco consumption. Adjusted odds ratios (AORs) with 95% CI were calculated. P value < 0.05 was considered statistically significant. Transcripts were analyzed using thematic analysis principles by two independent coders. Open coding was first done to identify major categories and concepts. Codes were then organized into predominant themes and sub-themes. Representative quotes for each theme were extracted. Data are managed using qualitative analysis software (NVivo).

Ethical consideration

The study was approved by the Institutional Ethics Committee (REF No: 40/01/2023). Written informed consent was obtained from all participants. Participant anonymity was maintained using unique identifiers.

Results

Table 1 shows a total of 305 individuals participated in the study. The sample consisted of 50% males and 50% females. The most common age group was 25–35 years (33%), followed by 36–45 years (25%), 46–60 years (20%), and over 60 years (22%).

The majority of participants were Hindu (60%) compared to Muslim (40%). Two-thirds were married (67%), and one-third were unmarried (33%). Over half lived in nuclear families (58%), while 42% lived in joint families. Most participants were literate (80%) and from urban areas (60%). The sample consisted primarily of a lower socio-economic status (70%).

Table 2 shows knowledge and practices related to tobacco consumption. 245 (80%) knew the harmful effects of tobacco. 64 (21%) reported ever using tobacco products. Among tobacco users ($n = 64$), half used only smokeless tobacco (50%), 25% only smoked, and 25% used both. Less than half of tobacco users (41%) consumed these

products five or more times per day. Most tobacco users had consumed for 10 years or less (64%) and half were trying to quit (50%), though only 19% had successfully quit.

Table 3 shows the characteristics of tobacco consumption. The most common reasons for starting were peer/friend influence (34, 53%) and work pressure (12, 19%). The most common reasons for continuing were addiction (30, 47%) and pleasurable effects (28, 43%). The most common withdrawal symptoms were lack of concentration (15, 23%) and headache (13, 20%). 34 (53%) started tobacco use at age ≤ 20 years.

Table 4 shows the association between socio-demographic factors and knowledge about tobacco’s harmful effects.

Table 1: Socio-demographic profile of patients (n=305)

Variables	Category	Frequency (%)
Age	25-35	102 (33%)
	36-45	76 (25%)
	46-60	61 (20%)
	≥ 60	66 (22%)
Sex	Male	152 (50%)
	Female	153 (50%)
Religion	Hindu	183 (60%)
	Muslim	122 (40%)
Marital status	Married	203 (67%)
	Unmarried	102 (33%)
Type of family	Joint	127 (42%)
	Nuclear	178 (58%)
Literacy	Literate	245 (80%)
	Illiterate	60 (20%)
Residence	Rural	122 (40%)
	Urban	183 (60%)
Socio-economic class (according to BG Prasad classification)	Higher class (I and II)	91 (30%)
	Lower class (III, IV, and V)	214 (70%)

Table 2: Knowledge and Practice on Tobacco Consumption (n=305)

Variables	Categories	Frequency (%)
Knowledge about the harmful effects of tobacco consumption	Yes	245 (80%)
	No	60 (20%)
Tobacco consumption ever	Yes	64 (21%)
	No	241 (79%)
Type of addictions (n=64)	Only SLT	32 (50%)
	Only smoking	16 (25%)
	Dual consumption	16 (25%)
Frequency of consumption per day (n=64)	<5	38 (59%)
	≥ 5	26 (41%)
Duration of tobacco consumption (in a year) (n=64)	≤ 10	41 (64%)
	>10	23 (36%)
Trying to quit (n=64)	Yes	32 (50%)
	No	32 (50%)
Quitting tobacco	Yes	12 (19%)
	No	52 (81%)

Older age (AOR 3.3), male sex (AOR 12.4), urban locality (AOR 2.3), illiteracy (AOR 6.8), married (AOR 3.2) and employment (AOR 8.5) were significantly associated with knowledge.

Table 5 shows the association between socio-demographic factors and tobacco addiction. Male sex (AOR 33), urban locality (AOR 4.8), illiteracy (AOR 3.8), and lack of

knowledge about tobacco’s harmful effects (AOR 9.4) were significantly associated with tobacco addiction.

Table 6 summarizes the key qualitative findings from the in-depth interviews with hypertensive patients using tobacco, providing insights into their knowledge, reasons for tobacco use, barriers to quitting, and suggestions for cessation support.

The qualitative data provided complementary insights into patient viewpoints, highlighting the role of knowledge gaps in risk perceptions, stress as a trigger, cue-induced re-initiation, withdrawal difficulty as a barrier, and patient-recommended strategies for tobacco cessation among hypertensive individuals.

In summary, the study provides insights into tobacco use patterns and factors associated with knowledge and addiction in hypertensive patients. Targeted interventions should focus on high-risk sub-groups identified here.

Discussion

The present study aimed to assess the socio-demographic determinants associated with tobacco consumption

Table 3: Characteristics of Tobacco Consumption

Variables	Categories	Frequency (%)
Reason for starting tobacco (n=64)	Due to work pressure	12 (19)
	Parent/relative influence	11 (17)
	Peer/friends influence	34 (53)
	Status symbol	7 (11)
Reason for continuing tobacco (n=64)	Act as mouth cleaner	3 (5)
	Addicted	30 (47)
	Pleasurable	28 (43)
Withdrawal symptoms (multiple options) (n=64)	Relieve stress	3 (5)
	Anxiety	10 (16)
	Lack of concentration	15 (23)
	Constipation	3 (5)
	Headache	13 (20)
Age of starting (n=64)	Loss of appetite	1 (1.5)
	≤ 20	34 (53)
	>20	30 (47)

Table 4: Association of socio-demographic variables with knowledge about effects of tobacco addiction on hypertension patients

Socio-demographic factors	COR (95% CI)	AOR (95% CI)	P
Age (year)			
< 50 (ref)	2.6 (1.1-7)	3.3 (1.2-11)	0.005*
≥ 50			
Sex			
Male	4.9 (1.3-17.6)	12.4 (1.6-52)	<0.001**
Female (ref)			
Locality			
Urban	3.00 (1.08-8.3)	2.3 (1.21-10)	0.003*
Rural (ref)			
Education			
Illiterate	2.79 (1.4-7.5)	6.8 (1.41-32)	<0.001**
Literate (ref)			
Religion			
Hindu	0.47 (0.103-2.14)	-	
Others (ref)			
Marital status			
Married	2.86 (1.3-22)	3.2 (1.5-6)	0.04*
Unmarried (ref)			
Type of family			
Nuclear	0.56 (0.32-4.1)	-	
Joint (ref)			
Employment			
Employed	10.8 (2.99-39)	8.5 (1.91-38)	<0.001**
Unemployed (ref)			
Socioeconomic class			
Higher class (I and II) (ref)	0.58 (0.2-1.5)	-	
Lower class (III, IV, and V)			

P<0.05, significant*; P<0.001**, highly significant; COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval

Table 5: The association between socio-demographic factors and tobacco addiction

Socio-demographic factors	COR (95% CI)	AOR (95% CI)	P
Age (year)			
<50 (ref)	1.5 (0.8-2.7)	-	0.189
≥ 50			
Sex			
Male	23.5 (9.3-59)	33 (12-42)	<0.001**
Female (ref)			
Locality			
Urban	2.1 (1.2-4.5)	4.8 (1.36-16)	<0.001**
Rural (ref)			
Education			
Illiterate	2.5 (1.11-5.4)	3.8 (2.1-6.5)	<0.001**
Literate (ref)			
Religion			
Hindu (ref)	1.08 (0.5-2.3)	-	
Others			
Marital status			
Married	1.02 (0.4-2.5)		0.43
Unmarried (ref)			
Type of family			
Nuclear (ref)	1.7 (0.8-3.3)	-	
Joint			
Employment			
Employed	3.08 (1.6-5.87)	0.92 (0.4-2.1)	0.123
Unemployed (ref)			
Socioeconomic class			
Higher class (I and II) (ref)	0.7 (0.3-1.3)	-	
Lower class (III, IV, and V)			
Knowledge about the harmfulness of tobacco			
Yes (ref)	11.0 (3.09-39)	9.4 (4.61-55)	<0.001**
No			

$P < 0.05$, significant*; $P < 0.001$ **, highly significant

Table 6: Qualitative findings from the in-depth interviews with hypertensive patients using tobacco (n=15)

Theme	Subtheme	Patient Perspectives/Quotes
Knowledge and Risk Perception	Awareness of harm and risk perception	9 patients acknowledged the harms of tobacco and its association with cardiovascular disease. 4 patients believed their hypertension was controlled with medication, downplaying tobacco as an additional risk. Some valued stress relief over health impacts.
Reasons for Initiation	Influences on initiation	7 patients cited peer influence. 5 patients started due to stress relief. 8 patients mentioned the easy availability and affordability of tobacco products as contributing factors.
Barriers to Quitting	Challenges faced in quitting	Nicotine withdrawal symptoms were extremely challenging for most patients. Easy availability facilitated reinitiation. Lack of access to counseling and cessation aids hindered successful quitting attempts.
Suggestions to Aid Cessation	Desired support for quitting	Patients expressed a need for tobacco-free environments (workplaces and homes) to eliminate environmental cues. Free or subsidized pharmacotherapy was requested to manage withdrawal symptoms. Tailored counseling and peer support were desired for enhanced motivation and self-efficacy.

among 305 hypertensive patients attending a tertiary care hospital in India. The prevalence of ever tobacco use was 21%, comparable to the Global Adult Tobacco Survey India findings (34.6% overall and 29.6% in hypertensives).^[25] Smokeless tobacco was the most common type used. Male gender, urban locality, illiteracy, and lack of awareness about tobacco hazards were identified as independent risk factors – congruent with other studies.^[26,27] Tobacco cessation was low, despite a high proportion attempting to quit, underscoring the need for targeted cessation assistance.

The high prevalence of smokeless tobacco use in our study population is concerning, given its association with adverse cardiovascular outcomes.^[28,29] The younger age of initiation highlights the need for school-based tobacco prevention programs. Mass media campaigns to increase knowledge of tobacco hazards should especially focus on the low-literacy sub-groups. The urban predominance of tobacco consumption merits further probing as rural dwellers typically have higher tobacco use.^[30] Possibly, easier accessibility and workplace stress drive this trend in urban hypertensive patients.

The predominant reliance on smokeless forms echoes national trends of smokeless tobacco use and cultural acceptability.^[30] The reasons cited for the initiation and continuation of tobacco align with existing evidence. Stress alleviation driving tobacco addiction has been noted among Indian sub-groups before.^[31] Peer influences and social norms facilitating initiation in adolescence are also recognized determinants, often overshadowing health risk awareness.^[32]

However, certain barriers highlighted here appear specific to the hypertensive sub-group, like compromised risk appraisal due to controlled BP status. Targeted corrective strategies to motivate cessation in this group are essential given hypertension and ongoing tobacco use can exponentially elevate future cardio-vascular event risk.^[33] Overall, the multi-method data provide actionable inputs for tailored interventions among hypertensive tobacco users, addressing gaps in motivation, self-efficacy, withdrawal relief, and health policies.

Certain barriers highlighted here appear specific to the hypertensive sub-group, like compromised risk appraisal due to controlled BP status. Half the patients perceived limited vulnerability due to their controlled blood pressure with medication, downplaying the incremental risk with tobacco use – congruent with other hypertensive cohorts.^[34,35] This strand of optimistic bias requires corrective motivation enhancement strategies tailored for hypertensives.^[36] Other identified challenges like withdrawal symptoms and access barriers to cessation resources have been reported before among Indian sub-groups.^[37,38] Specific solutions suggested by patients themselves provide further leads for designing customized assistance in this sub-group, encompassing peer support groups, subsidized pharmacotherapy, workplace tobacco bans, and counseling adapted to address hypertensive-specific barriers regarding risk perceptions and self-efficacy.^[39,40] Overall, the insights gleaned underline the need for tailored interventions to promote tobacco abstinence among hypertensives.

Limitation and Recommendation

The limitations of this study include the cross-sectional design restricting causal interpretation, self-reported data potentially impacting reliability, sample size constraints limiting generalizability, and single-center scope. However, efforts were made to minimize limitations through robust methods like consecutive sampling, validated tools, quality checks, and a high response rate. While findings may not be entirely generalizable beyond the study population, the

insights on vulnerable sub-groups offer important clues for designing focused interventions. Further multi-center studies with larger sample sizes could build on these findings. The mixed-methods approach provides a breadth of data to compensate for limitations in each single method. Future longitudinal studies tracking tobacco use before and after hypertension diagnosis could provide stronger causal evidence.

Recommendations

1. Implement educational interventions for hypertensive patients to improve awareness about tobacco hazards and enhanced risk perception, especially targeting sub-groups identified as vulnerable in this study.
2. Strengthen tobacco cessation support through counseling services and increased access to pharmacotherapy to aid quit attempts among hypertensives.
3. Enforce smoke-free policies in workplaces and public areas frequented by hypertensives to remove environmental cues triggering tobacco use.
4. Conduct multi-center studies across India to gather nationally representative data, confirm study findings on high-risk groups, and inform large-scale tobacco control policies for hypertensive patients.

Conclusion

In conclusion, this hospital-based study found a high burden of smokeless tobacco use among urban hypertensive patients supplemented by qualitative insights into associated behaviors and perspectives. The sub-groups most vulnerable to tobacco addiction were identified, including males, illiterates, and those lacking awareness about tobacco hazards. Gaps highlighted by patients' experiences reinforce the need for multifaceted interventions encompassing health education, motivational enhancement, policy regulations, and improved cessation support systems to promote tobacco abstinence among hypertensives. Implementing context-specific tobacco control initiatives targeting high-risk adults with raised blood pressure can substantially reduce the dual burden on the healthcare system.

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Conflicts of interest

There are no conflicts of interest.

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