Section: Community Medicine

Original Research Article

SOCIO DEMOGRAPHIC CORRELATES OF TOBACCO CHEWING HABITS AND THEIR IMPACT ON ORAL HEALTH IN RURAL BAREILLY, UTTAR PRADESH: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Smokeless tobacco (SLT) is widely used in rural India and predisposes to oral precancerous lesions. Socio-demographic factors strongly influence its consumption. The objective is to determine the socio-demographic correlates of tobacco-chewing habits and their association with oral precancerous lesions among adults in rural Bareilly, Uttar Pradesh.

Materials and Methods: A community-based cross-sectional study was conducted from May to August 2025 among 435 adults (≥18 years) selected by simple random sampling from the field-practice area of Rajshree Medical Research Institute, Bareilly. A pre-tested semi-structured questionnaire captured socio-demographic details and tobacco habits. Oral examination followed WHO (2013) guidelines. Data were analysed in Jamovi using descriptive statistics, Chi-square tests and logistic regression; $p < 0.05$ was significant.

Results: Prevalence of current tobacco chewing was 28.5 %. Gutkha (36.3 %) and khaini (29.0 %) were most common. Oral precancerous lesions were detected in 10.3 %, mainly leukoplakia (5.1 %) and oral submucous fibrosis (3.7 %). Lesions were more frequent among participants ≥ 45 years ($p < 0.001$). In multivariate analysis, age ≥ 45 years (AOR 2.31; 95 % CI 1.24–4.32; p=0.008) and illiteracy (AOR 1.78; 95 % CI 1.02–3.11; p=0.042) were independent predictors.

Conclusion: One-third of rural adults chew tobacco; one in ten already have oral precancerous lesions. Older age and low literacy markedly increase risk. Strengthened oral-screening and health-education programmes are required.

Keywords: Smokeless tobacco; Gutkha; Khaini; Oral precancerous lesions; Rural health; Socio-demographic factors.

INTRODUCTION

Tobacco consumption remains one of the world's leading preventable causes of death, killing more than eight million people annually.[1] In India, about 29 % of adults use tobacco, predominantly in smokeless form.[2] Common varieties gutkha, khaini, betel quid with tobacco, and zarda are cheap, socially accepted, and heavily marketed.[3] Prolonged SLT exposure leads to leukoplakia, erythroplakia, oral submucous fibrosis (OSMF) and oral cancer,[4,5] oral cancer accounts for one-third of all cancers in India, mostly due to SLT use.[6]

Socio-demographic variables age, gender, education, and socio-economic status (SES) influence both the initiation and continuation of tobacco habits.[7,8] Understanding these correlates is crucial for targeted rural interventions. The present study assesses the socio-demographic determinants of tobacco chewing and their impact on oral precancerous lesions in rural Bareilly.

MATERIALS AND METHODS

Study design and setting: A community-based cross-sectional study was conducted between May to August 2025 in villages under the field-practice area of Rajshree Medical Research Institute (RMRI), Bareilly, Uttar Pradesh.

Study population: All adults (≥ 18 years) residing in the area were eligible.

Inclusion and exclusion criteria

Included were adults (≥ 18 years) who gave written informed consent. Excluded were individuals with known oral cancer or systemic mucosal disease and those unable to undergo oral examination.

Sample size: The sample size was calculated using the formula n=(Z^2 pq)/d^2 where p (anticipated prevalence of tobacco chewing) was taken as 30% from GATS-2[2], q = 1−p, Z = 1.96 for a 95% confidence level, and d = 0.05. The calculated sample size was 323, which was increased by 35% to account for non-response, resulting in a final sample size set of 435.

Sampling technique: Simple random sampling was used. The RMRI field area household registry served as sampling frame. A computer-generated random number table identified households; one eligible adult per household was selected by lottery.

Data collection: A pre-tested semi-structured questionnaire recorded socio-demographic variables (age, gender, education, occupation, SES per Modified BG Prasad 2025), tobacco use pattern (type, frequency, duration), and oral complaints. Trained investigators conducted face-to-face interviews.

Oral examination: Oral screening followed WHO Oral Health Survey Methods (2013) [9]. Examinations were done under daylight with sterile mirrors and spatulas. Lesions were classified as leukoplakia, OSMF, erythroplakia or mixed.

Statistical analysis: Data were analysed using Jamovi. Descriptive statistics summarised data. Associations were tested by Chi-square; variables with $p < 0.10$ entered logistic regression to obtain AOR (95 % CI). $p < 0.05$ was significant.

RESULTS

Socio-demographic profile: Among 435 participants, 257 (59.1 %) were males and 178 (40.9 %) females; mean age was 41.7 ± 13.2 years. Most (71.0 %) belonged to lower/lower-middle SES, and 34.9 % had no formal education.

Table 1: Distribution of tobacco-chewing habits (n = 435)

Form of tobacco (among users n = 124)	n	% (among users)	Mean duration (years ± SD)
Gutkha	45	36.3	8.2 ± 3.1
Khaini	36	29.0	9.5 ± 4.2
Betel quid with tobacco	27	21.8	7.8 ± 3.6
Zarda / Mishri / Others	16	12.9	10.4 ± 4.9
Total users	124	100.0	—
Prevalence in whole sample	124/435	28.5 %	—

In the present study, 28.5 % of the participants (124 out of 435) were current smokeless-tobacco users. Among them, gutkha was the most common form (36.3 %), followed by khaini (29.0 %), betel quid with tobacco (21.8 %) and zarda or mishri (12.9 %). The mean duration of use ranged from 7.8 to 10.4 years, indicating long-term and habitual exposure to tobacco in this rural population.

Gutkha and khaini together accounted for nearly two-thirds of smokeless tobacco use (36.3% and 29.0%, respectively), followed by betel quid with tobacco (21.8%) and other forms such as zarda or mishri (12.9%). This pattern reflects the widespread accessibility and preference for packaged products in rural areas.

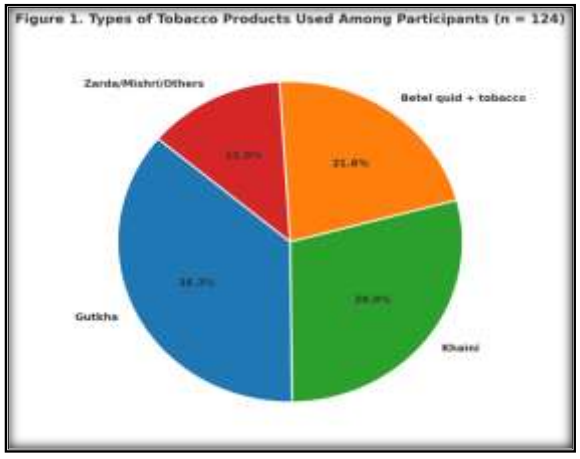

Table 2: Oral precancerous lesions detected (n = 435)

Lesion type	n	% (of total sample)
Leukoplakia	22	5.1
Oral submucous fibrosis (OSMF)	16	3.7
Erythroplakia	4	0.9
Mixed lesions	3	0.6
Any lesion present	45	10.3

[Table 2] represents the oral precancerous lesions were found in 45 individuals, giving an overall prevalence of 10.3 %. Leukoplakia was the most common lesion (5.1 %), followed by oral submucous fibrosis (3.7 %), erythroplakia (0.9 %), and mixed lesions (0.6 %). These findings indicate that nearly

one in ten adults had detectable precancerous changes, with leukoplakia and OSMF being the predominant patterns observed in the community.

Lesion prevalence increased progressively with age from 3% among participants under 25 years to 17% among those aged 45 years or older indicating the cumulative impact of long-term smokeless-tobacco exposure. Percentages represent age-specific lesion prevalence within each age group. Combined, these account for the overall lesion prevalence of 10.3% in the total sample.

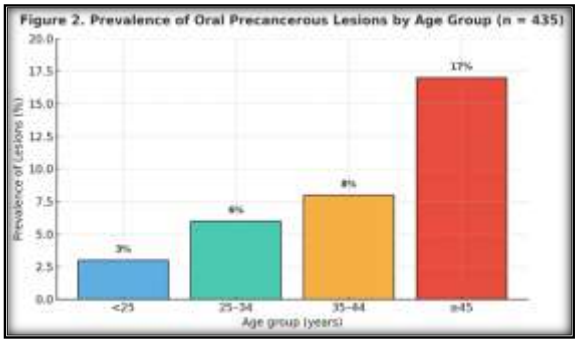

Table 3: Association and predictors of oral precancerous lesions (n = 435)

Variable	Lesion present n (%)	Bivariate p-value	AOR (95% CI)	Multivariate p-value
Age < 45 years (Ref)	14 (5.7)	—	1.00	—
Age ≥ 45 years	31 (17.6)	<0.001	2.31 (1.24–4.32)	0.008
Literate (Ref)	23 (7.8)	—	1.00	—
Illiterate	22 (14.5)	0.026	1.78 (1.02–3.11)	0.042
Female (Ref)	19 (10.7)	—	1.00	—
Male	26 (10.1)	0.118	1.12 (0.74–1.71)	0.271
Upper / Upper-middle SES (Ref)	15 (8.0)	—	1.00	—
Lower / Lower-middle SES	30 (11.7)	0.078	1.24 (0.81–1.89)	0.318

{(Ref) = Reference category; AOR = Adjusted Odds Ratio; CI = Confidence Interval; SES = Socioeconomic Status.}

[Table 3] presents the association between selected socio-demographic variables and the presence of oral precancerous lesions. The prevalence of lesions was considerably higher among participants aged 45 years and above (17.6%) compared with those below 45 years (5.7%), and this association remained statistically significant after adjustment, with an adjusted odds ratio (AOR) of 2.31 (95% CI: 1.24–4.32; p = 0.008). Illiterate individuals also showed a significantly higher prevalence of lesions (14.5%) than literate ones (7.8%), indicating 1.78 times greater odds (95% CI: 1.02–3.11; p = 0.042). Although the prevalence of lesions was slightly higher among males (10.1%) and those belonging to lower socioeconomic status (11.7%), these associations were not statistically significant after controlling for confounders. Overall, age and educational status emerged as independent predictors of oral precancerous lesions in the study population.

DISCUSSION

The present study found that 28.5 % of rural adults chewed tobacco, consistent with national GATS-2 data.[2] Gutkha and khaini predominated, similar to patterns reported in Maharashtra,[10] and Bihar.[11] The 10.3 % prevalence of oral precancerous lesions aligns with studies from Tamil Nadu,[12] and Gujarat.[13] Older age and illiteracy were independent predictors, echoing findings by Gupta and Ray,[14] and Mehrotra et al.[8] Age reflects cumulative exposure, while low literacy limits awareness of health risks.

Gender and SES did not show significance after adjustment, a trend also noted in recent national studies.[15,16] Rising SLT use among rural women may explain the narrowing gender gap.[16] Comprehensive strategies community education, school programs, and enforcement of gutkha bans are essential.[17-20]

CONCLUSION

In rural Bareilly, 28.5 % of adults chewed tobacco and 10.3 % had oral precancerous lesions. Older age and illiteracy were significant determinants. Integrating oral-screening and tobacco-cessation services into primary care can help prevent progression to oral cancer.

Recommendations: Regular oral health screening should be incorporated into primary health-care services to ensure early detection of precancerous lesions. Health education programs must focus on increasing awareness of the harmful effects of smokeless tobacco, particularly among older and illiterate adults. Strengthening tobacco-cessation counseling at community and primary-care levels, along with strict enforcement of anti-tobacco laws, is essential. Community participation and continuous surveillance of oral lesions should also be promoted to sustain preventive efforts.

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