

Tobacco Use and Its Correlates among 13-15-Year-Old School Children in Barpeta District, Assam

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Abstract:

Background: Tobacco use during adolescence is a major public health concern. Early initiation increases the risk of long-term dependence and disease. Smokeless tobacco use is deeply embedded in the sociocultural practices particularly in Northeast India. However, data on adolescent tobacco use in Assam remain limited. This study assessed tobacco use and its correlates among 13-15-year-old school children in Barpeta District, Lower Assam, using a Global Youth Tobacco Survey (GYTS)-based questionnaire.

Material and Methods: A descriptive cross-sectional study was conducted among 269 school-going adolescents aged 13–15 years in a single school in Barpeta District over one month (November–December 2025). Data on sociodemographic profile, parental tobacco exposure, tobacco use behaviour, dependence indicators, and secondhand-smoke exposure were collected using a structured, self-administered questionnaire. Chi-square/Fisher's exact tests and binary logistic regression were used for analysis, with crude and adjusted odds ratios (COR, AOR) reported at 95% confidence intervals.

Results: The overall prevalence of tobacco use was 25.65%, with smokeless tobacco predominant (67.21%) and betel nut alone the most commonly used product (60.65%). Parental tobacco use was the strongest independent predictor of adolescent use (AOR 8.09, 95% CI 4.08–16.02, $p < 0.001$); paternal high-school education was also significantly associated (AOR 4.21, $p = 0.027$). Only 43.5% of participants were aware that passive smoking is harmful, and 78.26% accessed tobacco through friends or family.

Conclusion: Tobacco use among adolescents in Barpeta District is substantially high and closely linked to parental tobacco use and low secondhand-smoke awareness, highlighting the need for family-oriented, culturally tailored school-based interventions.

Keywords: Adolescent tobacco use; Smokeless tobacco; Parental influence; Global Youth Tobacco Survey; Assam

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I. Introduction

Tobacco use among adolescents remains a major global public health concern.¹ Early initiation is particularly harmful, as it increases the likelihood of long-term nicotine dependence, chronic disease, and premature death.² The World Health Organization (WHO) estimates that tobacco kills more than eight million people every year, and the majority of adult tobacco users report initiating the habit before the age of eighteen.¹

Adolescence is a period which is driven by curiosity, peer influence and the desire for social acceptance. Children can be exposed to tobacco within the home environment and consider such behaviour as acceptable when it is practised by parents or other close family members. This normalisation is reinforced in settings where tobacco use, particularly of smokeless forms, is culturally accepted and embedded in everyday social practice.³ Consequently, patterns of tobacco use established during these formative years tend to persist into adulthood, and it makes adolescence a critical and modifiable window period for intervention rather than merely a period of passing experimentation. Moreover, easy access to tobacco products, peer influence, and low awareness of associated harms have all been shown to contribute among school-going children.⁴

The Global Youth Tobacco Survey (GYTS) is a standardized, school-based survey developed jointly by the World Health Organization and the United States Centre for Disease Control and Prevention to systematically monitor tobacco use and its determinants among adolescents across countries. It uses a core questionnaire covering prevalence, type of tobacco used, age at initiation, dependence, cessation behaviour, exposure to second-hand smoke, access to tobacco products, and exposure to tobacco advertising, allowing comparable estimates to be generated across diverse settings.⁵

In India, the fourth round of the Global Youth Tobacco Survey in 2019 (GYTS-2019) reported that 8.5% of students aged 13-15 years were current users of any tobacco product nationally, with a higher prevalence among boys (9.6%) than girls (7.4%).¹ However, Considerable regional variation exists within this national figure. A previous study done in the northeastern states of India, including Assam, has reported tobacco use prevalence among school children well above the national average, reflecting the deep cultural embeddedness of smokeless tobacco products such as khaini, gutka, zarda, and betel quid with tobacco in this region.²

Despite the well-documented cultural acceptance and high prevalence of smokeless tobacco use in the northeastern states of India, including Assam, the available literature examining these patterns among school-going adolescents in this region remains limited. Therefore, the present study was designed as an exploratory investigation to assess the prevalence of tobacco use and its associated factors among children in a school in Barpeta District, Lower Assam which is essential to guide targeted interventions and strengthen tobacco control policies using GYTS-based evidence.

II. Materials and Methods

This descriptive cross-sectional study was conducted among school-going adolescents aged 13-15 years in a single school in Barpeta District, Lower Assam, over a period of one month. All students aged 13-15 years enrolled in classes 8th-10th in the selected school were enrolled for the study. Medically compromised children, children with special needs, and those unwilling to participate were excluded.

Study Design: Descriptive cross-sectional study.

Study Location: The study was carried out in a single school located in Barpeta District, Lower Assam.

Study Duration: November 2025 to December 2025.

Sample size: 269 participants

Sample size calculation: The minimum sample size was calculated using the formula $n = Z^2pq/d^2$, where $Z = 1.96$ (95% confidence level), $p = 8.5\%$, the prevalence of current tobacco use among school-going adolescents aged 13-15 years reported by the Global Youth Tobacco Survey-4, India (2019)¹, $q = 100 - p = 91.5\%$, and $d = 4\%$ (absolute precision), yielding a minimum sample size of 187; after adjusting for an anticipated non-response rate of 10%, the minimum required sample size was determined to be 210. A total of 269 students were finally enrolled in the study, exceeding this minimum requirement.

Subjects & selection method: A convenience sampling technique was adopted, and all children present on the days of data collection who fulfilled the inclusion and exclusion criteria were recruited into the study.

Inclusion criteria:

1. All students aged 13-15 years enrolled in classes 8th-10th in the selected

Exclusion criteria:

1. Medically compromised children.
2. Children with special needs.
3. Those unwilling to participate.

Procedure methodology

Data was collected using a structured questionnaire, which was adapted from the original Global Youth Tobacco Study (GYTS) questionnaire. The questionnaire was administered through Google Form. Each student completed the form individually to ensure privacy and minimize peer influence.

The questionnaire includes details on:

- Sociodemographic information
- Parental tobacco exposure
- Tobacco use behaviour among children
- Tobacco dependence indicators among children
- Exposure to secondhand smoking.

Statistical analysis

Data was analyzed using SPSS software (Version 22.0). Descriptive statistics were expressed as frequencies and percentages for categorical variables and as mean $\pm$ standard deviation for continuous variables

(age). The Chi-square test and Fisher's exact test (where cell frequencies were less than 5) were used to assess associations between categorical variables. Binary logistic regression was performed to assess factors associated with tobacco use, with crude odds ratios (COR) obtained from univariate analysis and adjusted odds ratios (AOR) from multivariable analysis, both reported with 95% confidence intervals. A p-value <0.05 was considered statistically significant.

III. Result

Sociodemographic profile of the study population is presented in Table 1. The majority of participants belonged to the 14–15 year age group (54.3%), and 63.2% (n=170) were male. The mean age of the study population was 14 ± 1.3 years. It was observed that, 39.4% of fathers and 37.2% of mothers were high school graduates, while 28.3% of fathers and 34.6% of mothers had not completed high school.

Table 1: Socio-demographic profile of the study population (N = 269)

Variable	Category	Frequency (n)	Percentage (%)
Age group	13–14 years	123	45.7
	14–15 years	146	54.3
Gender	Male	170	63.2
	Female	99	36.8
Parental education			
Father's education	College graduate	87	32.3
	High school graduate	106	39.4
	Did not graduate high school	76	28.3
Mother's education	College graduate	75	27.9
	High school graduate	100	37.2
	Did not graduate high school	93	34.6

It was observed that the overall prevalence of tobacco use among the study participants was 25.65% (Table 2). Among tobacco users, smokeless tobacco was the most commonly used form (67.21%), followed by smoking (26.23%) and dual use of both smoking and smokeless tobacco (6.56%). Betel nut used alone was the most frequently reported product (60.65%), followed by cigarettes alone and gutka alone (11.47% each), with the remaining participants reporting various product combinations (Figure 1).

Among tobacco users, 24.78% initiated use before 9 years of age while 62.17% initiated after 9 years of age; 71.01% were occasional users (<9 days/month) and 28.98% were frequent users (≥ 9 days/month) in the preceding 30 days. Tobacco products were most commonly obtained through social sources such as friends or family (78.26%), while a smaller proportion (8.69%) self-purchased their products.

Among the study participants, 24.90% of participants reported tobacco use by both parents, 11.15% by the father only, and 2.23% by the mother only, while 61.71% reported that neither parent used tobacco. Awareness that passive smoking is harmful was present in only 43.5% (n=117) of participants, while the remaining 56.5% were unaware of its harmful effects.

Table 2: Tobacco use characteristics, parental tobacco use pattern, and awareness of passive smoking among study participants

Variable	Category	Frequency (n)	Percentage (%)
Type of tobacco use (n = 69)	Smokeless	46	67.21
	Smoking	18	26.23
	Mixed (smoking + smokeless)	5	6.56
Age at initiation (n = 60)	Early (<9 years)	17	24.78
	Late (≥ 9 years)	43	62.17
Frequency of use, past 30 days (n = 69)	Occasional (<9 days/month)	49	71.01
	Frequent (≥ 9 days/month)	20	28.98
Source of access (n = 69)	Social access (friends/family)	54	78.26
	Self-purchased	6	8.69
Parental tobacco use pattern (N = 269)	Both parents	67	24.90
	Father only	30	11.15
	Mother only	6	2.23
	Neither parent	166	61.71
Awareness that passive smoking is harmful (N = 269)	Yes	117	43.5
	No	152	56.5

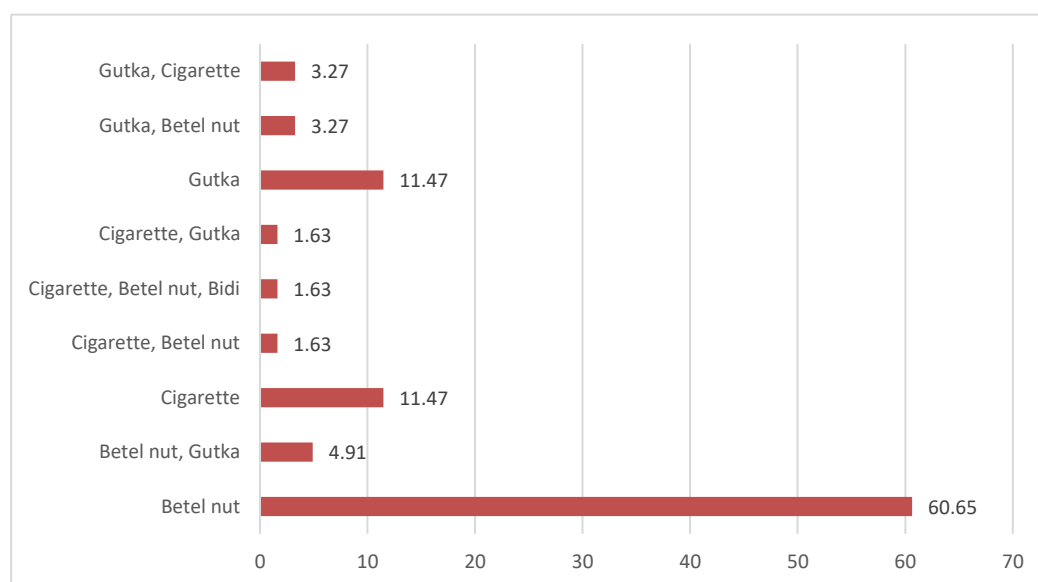
Figure 1: Types of tobacco used among the participants (%)


Table 3 presents the results of the univariate and multivariable logistic regression analysis of factors associated with tobacco use. In the univariate analysis, male students had significantly higher odds of tobacco use than female students (COR 2.13, 95% CI 1.15–3.94, $p=0.016$), but this association was no longer significant after adjustment for other variables (AOR 1.94, 95% CI 0.96–3.90, $p=0.064$). Compared with participants whose fathers were college graduates, those whose fathers were high school graduates had significantly higher odds of tobacco use after adjustment (AOR 4.21, 95% CI 1.18–15.05, $p=0.027$), whereas the association for fathers who did not graduate high school did not reach significance (AOR 4.17, 95% CI 0.95–18.28, $p=0.058$). Lower maternal education was significantly associated with tobacco use on univariate analysis but did not remain significant after adjustment. Participants with parental tobacco use had significantly higher odds of tobacco use than those without (AOR 8.09, 95% CI 4.08–16.02, $p<0.001$), making parental tobacco use the strongest independent predictor identified in this study.

Table 3: Univariate and multivariable logistic regression analysis of factors associated with tobacco use

Variable	Category	COR (95% CI)	p-value	AOR (95% CI)	p-value
Gender	Female	2.13 (1.15–3.94)	0.016*	1.94 (0.96–3.90)	0.065
	Male				
Father's educational status	College graduate	1	–	1	–
	Did not graduate high school	1.90 (0.87–4.16)	0.108	4.17 (0.95–18.28)	0.058
	High school graduate	3.05 (1.50–6.22)	0.002*	4.21 (1.18–15.05)	0.027*
Mother's educational status	College graduate	1	–	1	–
	Did not graduate high school	2.29 (1.11–4.70)	0.025*	1.04 (0.26–4.19)	0.952
	High school graduate	1.30 (0.62–2.74)	0.482	0.61 (0.17–2.15)	0.436
Parental tobacco use	No	1	–	1	–
	Yes	7.30 (3.95–13.49)	<0.001*	8.09 (4.08–16.02)	<0.001*

* $p<0.05$. COR, Crude odds ratio; AOR, Adjusted odds ratio; CI, confidence interval.

IV. Discussion

The present cross-sectional study was conducted among 269 school-going adolescents aged 13–15 years in a single school of Barpeta District, Lower Assam. The overall prevalence of tobacco use was found to be 25.65%. This is considerably higher than the current tobacco use prevalence of 8.5% reported in the fourth round of the Global Youth Tobacco Survey (GYTS-4), India, conducted in 2019¹. However, the present study can be

compared to other studies from the northeastern region. State-level GYTS-4 data ranked Mizoram and Arunachal Pradesh among the highest-prevalence states in the country, with Mizoram alone reporting 44% current smoked-tobacco use and 33% current smokeless-tobacco use among students of this age group². Similarly, a previous study done by Shewta et al. in Western Maharashtra among 13-19-year-olds reported a tobacco prevalence of 30.32%⁵. A cohort study examining adolescents in urban India similarly emphasized that community-level compliance with tobacco control policies, including enforcement of retail sale restrictions and advertising bans plays a critical role in shaping adolescent tobacco use trajectories over time. It emphasized that individual and family-level interventions alone may be insufficient without parallel strengthening of policy enforcement at the community level.⁹

In the present study, smokeless tobacco was predominant (67.21%), followed by smoking (26.23%) and dual use (6.56%), with betel nut used alone accounting for 60.65% of all tobacco use, which can be compared to other studies done in Assam and the rest of the northeastern region. A previous school-based study done by Beauty M et al. among adolescents in an industrial town of Assam similarly reported a high prevalence of betel nut chewing, 72.1% without added tobacco and 10.9% with tobacco added.⁶ These findings reveal areca nut use as a deeply embedded, almost normalized, chewing habit in Assam, distinct from conventional smokeless tobacco products such as gutka or khaini. This pattern calls for implementation of local and culturally accepted intervention strategies within these areas.

It was found that, male students had significantly higher odds of tobacco use than female students which can be compared to National GYTS-4 data recorded current tobacco use of 9.6% among boys compared with 7.4% among girls.¹ These suggest that male predominance in tobacco use remains consistent both in national and regional perspectives.

A significant association was observed between parental and adolescent tobacco use patterns, which can be compared to previous literature. A case-control study by Janakiram et al. in Kerala found that adolescents with tobacco-using parents had nearly four times higher odds of starting tobacco use.¹⁰ These findings reflect a combined effect of direct behavioral modelling and easy in-home social access to tobacco products. This highlights the need for family-oriented counselling as a component of any school-based tobacco control intervention.

Among tobacco users in the present study, 24.78% reported initiating use before the age of 9 years, while the majority (62.17%) began after this age, which is consistent with GYTS-4 national data, which reported a median age of initiation for smokeless tobacco of 9.9 years¹. However, a previous study done by Beauty et al. in Assam reported that some children started chewing betel nut as early as 3 years of age.⁶ This suggests that areca nut use in this region often begins in early childhood as a culturally accepted practice influenced by family members, rather than as a typical adolescent risk behavior.

It was found that, among tobacco users most of the tobacco products were accessed through social sources friends or family members (78.26%), while a smaller proportion (8.69%) purchased tobacco themselves. However, a previous study done by Kumar et al. in a Delhi-based study revealed that three-fourths of tobacco users purchased products directly from shops and only a small minority obtained them from others.¹² This pattern of social access to tobacco in this region again reflects the predominance of smokeless tobacco and betel nut; products are frequently shared within family and peer settings rather than purchased individually by minors. Nonetheless, the presence of any self-purchasing behaviour highlights persistent gaps in the enforcement of the Cigarettes and Other Tobacco Products Act (COTPA), 2003, which prohibits the sale of tobacco products to minors.¹³ It was observed that only 43.5% of participants in the present study believed passive smoking to be harmful, considerably lower than the 71% reported nationally in GYTS-4 India and the 88.1% reported among school students in a more recent Mumbai-based survey^{1,14}. This highlights the need for targeted health education and awareness programmes to improve knowledge regarding the risks associated with second-hand smoke exposure.

The findings of this study underscore that adolescent tobacco use cannot be addressed through generic, awareness-based interventions alone. It is deeply embedded in family and community life rather than driven primarily by individual risk factors. This is consistent with another study that revealed that tobacco and areca nut use across India is shaped by regionally distinct sociocultural norms that a one-size-fits-all national strategy may fail to capture.¹⁵ Effective control will require a combination of stricter COTPA enforcement around underage sale, school-based education addressing both tobacco and areca nut specifically, and family-level engagement that acknowledges tobacco use as a normalized household behaviour rather than an isolated adolescent habit.

The present study adds locally relevant, school-level data on adolescent tobacco use from a district of Lower Assam and reflects a range of behavioural, familial, and knowledge-related correlates using a GYTS-adapted questionnaire. However, several limitations should be considered while interpreting these findings. The study was conducted in a single school using a convenience sampling technique, which limits the generalizability of the findings to the wider adolescent population of Barpeta District or Assam as a whole. The self-administered questionnaire may have introduced social desirability bias, potentially leading to under-reporting of tobacco use.

The relatively small number of tobacco users identified ($n = 69$) limited the precision of some subgroup and multivariable estimates, as reflected in the wide confidence intervals for several associations

V. Conclusion

The present study demonstrates a substantially high burden of tobacco use among 13-15-year-old school-going adolescents in Barpeta District, Lower Assam, driven predominantly by smokeless tobacco and betel nut use, and closely tied to parental tobacco use, paternal educational status, and male gender. These findings are consistent with existing evidence that adolescent tobacco use in India's northeastern states substantially exceeds the national average and is shaped by distinct cultural patterns of areca nut and smokeless tobacco consumption not fully captured by national-level GYTS data. The comparatively low awareness of secondhand-smoke harm and the presence of self-purchasing behaviour among minors further point to specific, actionable targets for school- and family-based tobacco control interventions in this setting. Strengthening enforcement of COTPA provisions around underage sale, integrating culturally tailored anti-areca-nut and anti-smokeless-tobacco health education into the school curriculum, and engaging parents as part of any prevention strategy may together help address the locally elevated burden identified in this study.

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