

## Tobacco use Behaviour in the Urban Population: A Hospital-based Study from Eastern India

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### Abstract

**Background:** Tobacco use is a major public health menace in India. As a signatory to the WHO framework convention, the Government of India is trying to battle this problem earnestly. However, tobacco use is still high in India and the consumption pattern is heterogeneous. For proper public health interventions, region-specific data on tobacco use behaviour is thus needed. The present study is a pilot project to generate data from a sample urban population.

**Material and methods:** Had two sections: one for the tobacco use behaviour and one for nicotine dependence. Subjects greater than 12 years were included in the survey. Anyone with history of tobacco use in the last one month was designated as "user".

**Results:** There were 299 subjects in the study. Around 47% were below 40 years of age. 51.5% (95% CI: 45.7 - 57.3%) were tobacco users. Biri was the commonest form of tobacco used (51%). 11.7% of the users used more than one form of tobacco simultaneously. The prevalence of use in males was much more than females ( $P < 0.001$ ) and males were also more likely to be smokers. There was an increasing trend of tobacco use with age. The type of tobacco product used also varied with educational level with cigarette being more common (75%) among those with college education. As a vocation, labourers were the ones with highest rate of tobacco use (81.5%). 35% of the users had started tobacco use before 16 years of age. For male users, peer pressure was the main factor (94%) in initiation of tobacco use while for females, family influence was the main determinant (55%). More males had higher tobacco dependence scores compared to females.

**Conclusion:** Proper public health measures are needed to address adolescent tobacco use and also tobacco addiction among vulnerable groups like labourers.

**Keywords:** Tobacco; urban; biri; labourers; adolescent.

### Introduction

Tobacco is responsible for many of the public health problems in the world. According to the World health organisation (WHO), tobacco products are responsible for at least six million deaths per year and many of these are premature<sup>1</sup>. A further six hundred thousand are estimated to die annually as a result of second-hand smoke. To curb this menace, in 2003, the World Health assembly adopted the FCTC (Framework Convention on Tobacco Control) which was signed by most countries including India<sup>1</sup>. The government of India has taken many steps for tobacco control, including the banning of advertisements. However, tobacco use is still very high in the Indian population with a sizeable portion starting tobacco use in their teens, and there is considerable scope of stepping up the public health measures to curb this menace.

According to the global adult tobacco survey, 2016 - 17, 28.6% of adult Indians are current tobacco users<sup>2</sup>. There is a marked gender difference, with the use in males three times that of females<sup>2</sup>. However, there is considerable

regional difference in the pattern of tobacco use with the prevalence in Tripura being 7 times that of Goa. Thus, one public health programme will not be useful across the country and there is need of regional tobacco prevention programmes, based on local patterns of tobacco use.

Studies have shown that there is wide variation in tobacco use in India, based on habitat (rural vs urban), gender, religion, level of education and other cultural variables<sup>3</sup>. For example, while smoking is still considered as a taboo in many Indian families especially in front of elderly members, chewing forms of tobacco like betel quid enjoy a certain level of acceptance, especially among the females<sup>3</sup>. On the contrary, in most sections of the Indian society, smoking is considered indecent for females, although people tend to tolerate smoking in males. Also, there are certain myths about smokeless tobacco (SLT) like their benefit for dental pain and their role in weight reduction. These are incorrect assumptions but these myths lead to a culture of chewing tobacco for the perceived health benefits<sup>3</sup>.

In a recent study from North-east India, Sarkar *et al* found

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that 74% of urban slum dwellers were current tobacco users<sup>4</sup>. SLT was more commonly used compared to smoking, especially in the higher age groups<sup>4</sup>. But in another study from Indore among law students, it was seen that cigarette and hookah were the commonest forms of tobacco used while SLT was very rarely used<sup>5</sup>. In other studies from India, smoking has been found to be the predominant form of tobacco use among college students<sup>5</sup>. Thus, different socio-economic groups in India would require different tobacco control measures.

Tobacco is responsible for a lot of human diseases like coronary artery disease, hypertension, gastric ulcer, and various types of malignancy. Thus, control of tobacco use is an essential preventive programme. But for this to be successful there is need of regional data on tobacco use behaviour from different parts of India. While there is some data from north and south India, there is a dearth of good quality data from Eastern India. The present pilot study is aimed at generating this data from a sample urban population of West Bengal.

## Aims

To study the tobacco use behaviour in a sample urban population (including teenagers) with special reference to smokeless tobacco.

To study the level of nicotine dependence in the tobacco users.

## Material and methods

This was a hospital-based cross-sectional survey conducted in a tertiary care medical college of West Bengal. The questionnaire for the survey was adopted from the sample questionnaire provided in the document: "Tobacco questions for surveys" by CDC, Atlanta<sup>6</sup>. Since this was a pilot study, all sections of the survey questions were not included and only those which were relevant for generating initial pilot data were chosen.

In addition to this, to measure the level of nicotine dependence, the revised version of the Fagerstrom Test for Nicotine Dependence (FTND) was also used in the study subjects<sup>7</sup>. Thus, there were two sections: one for the tobacco use behaviour and one for the FTND. The whole questionnaire was made in the local language, Bengali, and checked by an expert in clinical research. Then, the questionnaire was tested in 30 subjects as a pilot project. After validation, the final questionnaire was used for the survey.

For FTND, the total score was analysed as follows<sup>8</sup>:-

Table showing interpretation of FTND scoring system

FND score	Interpretation
1 - 2	Low dependence
3 - 4	Low-moderate dependence
5 - 7	Moderate dependence
8 +	High dependence

Adult (> 12 years) patients and the family members coming to the medicine OPD of the concerned medical college were screened for inclusion in the survey. The legal and medical definition of adulthood varies. In some definitions, adulthood is defined as  $\geq 18$  years of age. *But in this study, the cut-off limit of 12 years was used as one of the aims of the survey was to find the prevalence of teenage tobacco use.* The prospective participants were explained about the study in their own language. In cases where communication due to language barrier was a problem, help of an interpreter was sought. The exclusion criteria included anyone involved with the tobacco industry, anyone with dementia, and anyone enrolled in smoking cessation programmes. Informed consent was obtained from each study participant.

The study was approved by the institutional ethics committee. All interviews were conducted by the same person (SG). The study was conducted for four months, between May - August, 2019. The participants were taken to a separate place, away from their family members or friends, and then interviewed. The survey questionnaire was read out to the participants and their responses were marked. Then at the end, the responses were verified again. Incomplete responses were rejected. Tobacco use was defined as use of any tobacco product currently or within the last one month.

## Sample size

For calculating the sample size, the authors used a well-designed 2013 study from South India<sup>9</sup>. In this study, comparing tobacco use among rural, semi-urban and urban areas, the prevalence of tobacco use in urban areas was found to be 19.4%<sup>9</sup>. Taking this as reference, for 95% confidence interval and an acceptable difference of 5%, the sample size, as calculated by the WINPEPI software, was 241. A 10% margin of error was also considered. Thus, the target sample size was 265.

The data from the survey was first entered in case record forms. Then, this was transferred to Microsoft Excel worksheet. Data entry was cross-checked by another researcher. The data was first checked for normalcy and then analysed using online statistical software like Graphpad.  $P < 0.05$  was considered significant.

Full confidentiality was maintained and the data from this survey was not released to any other entity, including the subject's family.

## Results

There were a total of 299 subjects in this survey with male: female ratio of 197: 102. Average age was  $42.2 \pm 16.2$  years with a range of 12 - 88 years. Among the subjects, 92 (30.8%) were labourers and 56 (18.7%) were businesspersons. The rest were of diverse occupations. According to educational qualification, 36.8% were educated up to primary level while 28.8% had studied up to the secondary level. Table I shows the demographic characteristics of the subjects.

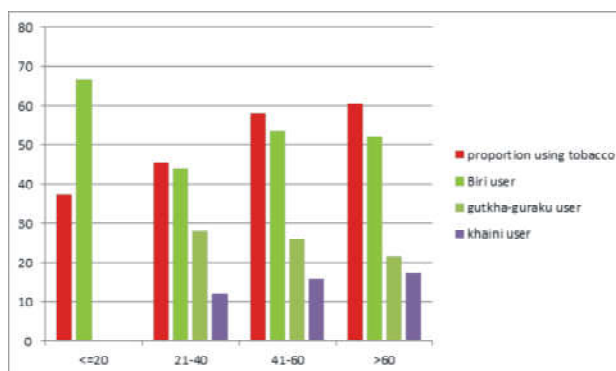
**Table I: Showing the demographic characteristics of the study subjects.**

Parameter	Percentage	
Gender	Male	65.9
	Female	34.1
Age (in years)	≤20	10.7
	21 – 40	36.8
	41 – 60	39.8
	> 60	12.7
Educational qualification	Illiterate	14.4
	Primary	36.8
	Secondary	28.8
	Higher Secondary + College educated	20
Occupation	Home-maker	19.4
	Labourer	30.8
	Business person	18.7
	Farmer	8.7
	Student	10
	Miscl.	12.4

Among the study subjects, 154 (51.5%; 95% CI: 45.7 - 57.3%) used one or more tobacco products (henceforth called "users"). 136 subjects used one tobacco product, 17 used two products and only one used three tobacco products. Among the tobacco users (n = 154), biri was the most popular (n = 79; 51.3%; 95% CI: 43.1 - 59.4%), followed by guraku (16.2%) and Khaini (13.6%). Snuff and Dokta (2 each) were the least used tobacco products. Among the subjects who used two tobacco products (n = 17), the combination of biri and khaini was the most popular (17.6%).

There was considerable gender difference in tobacco use behaviour. Among males, 63.5% were users, while for females, this figure was only 28.4% ( $p < 0.0001$  by two-tailed chi square test). In males (n = 197), biri was the most popular (37.6%) followed by Khaini and Cigarette (10% each). In females (n = 102), Guraku was the most popular (18.6%). Males were also more likely to use two tobacco products simultaneously. Among the persons who used two or more tobacco products, 77.8% were male. Also the smoking form of tobacco (biri or cigarette) was used much more by male users (75.2%) compared to females (20.7%) ( $p < 0.0001$  by Chi square test).

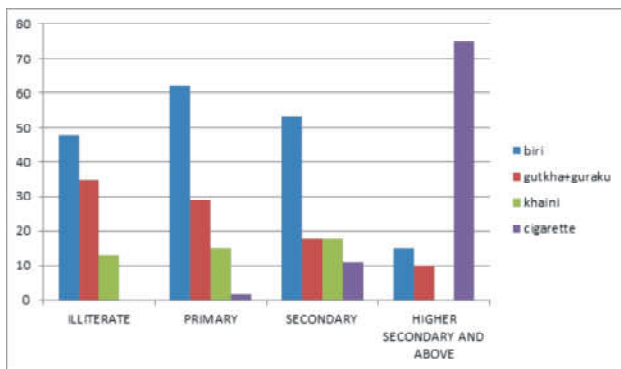
Fig. 1 shows the tobacco use behaviour according to the age groups. It is seen that there is an increasing trend of tobacco use in higher age groups with more than 60% of those above 60 being tobacco users ( $p = 0.01$ , Chi square for trend). Thus, the younger people were less likely to be tobacco users. Gutkha-Guraku use was the highest in 21 - 40 year age group while khaini use was the highest in the over-60 age group.



**Fig. 1: Histogram showing trends of tobacco use in different age groups.**

Among the illiterate subjects, 53.5% were tobacco users, among those educated up to primary level, 60% were users and in the secondary-educated group, 52.3% were users. Biri was the commonest form of tobacco used in all these educational groups. However, gutkha and guraku were more commonly used by illiterate or primary educated subjects (34.8% and 28.8% respectively) compared to secondary level educated subjects (17.8%). Among those with higher secondary or college level education (n = 60), 33% were users. Gutkha-guraku was used by only 10%, biri was used by 15% and cigarette was used by 75% of the users. This difference in the type of tobacco product used in different educational groups is shown in Fig. 2. There is a trend of decreasing gutkha-guraku use ( $p = 0.01$ , Chi square test for trend) and increasing cigarette use ( $p < 0.01$ , Chi square test for trend) with higher educational qualification.

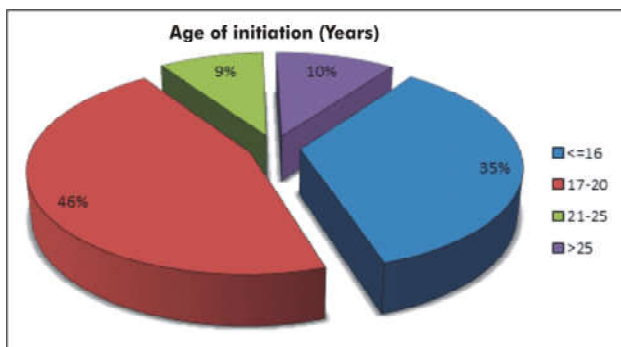
Among the female subset (n = 102) as a whole, 28.4%



**Fig. 2:** Histogram showing the proportion of different tobacco products used by tobacco consumers in different groups according to the educational qualification.

were users. But among females who were labourers, 50% were users. Similarly among males, tobacco use was seen in 63.5%. But among the male labourers, (n = 70), tobacco use was reported in 91.4%. Thus, labourers, as an occupation, had higher risk of tobacco use (81.5% in labourers compared to 38.2% in non-labourers;  $p < 0.001$  by Chi square test, Two-tailed).

The average age of initiation of tobacco product was 19.7 years with the lowest recorded age being 12 years. Also, among the users, 35.1% reported initiation of tobacco at or before 16 years of age. Fig. 3 shows the age of initiation of tobacco use. Average daily frequency of tobacco product use was 8.4 with 32 of the 154 users (20.8%) reporting a daily frequency equal to or greater than 20. Of these 20, 90% were male. The average daily frequency of tobacco use in males (12.9) was much higher compared to females (6.8) ( $p = 0.001$ ).



**Fig. 3:** Pie diagram showing the age of initiation of tobacco use in the subjects.

Among the users, 83.1% (95% CI: 76.2 - 88.7%) reported peer group influence as the factor leading to initiation of tobacco use. But there was significant gender difference. In male users (n = 125), peer influence was instrumental in 94.4%, while in female users (n = 29), peer influence was present in 34.5% ( $p < 0.0001$ , Fisher's Exact test, two-tailed).

For female users, family was the more important influence (55.2%).

Table II shows the distribution of tobacco dependence score (TDS) in the users. It is seen that among the female users (n = 29), 69% had low TDS ( $\leq 4$ ). Among male users, only 38.4% had TDS  $\leq 4$ . Thus, males had higher TDS compared to females ( $p = 0.0036$ , two-tailed Fisher's Exact test). Altogether, 14% of the users had very high TDS ( $\geq 8$ ) (all male). There was not much difference in average TDS across age groups with the below-20 group having average TDS of 3.6 and above-60 group having average TDS of 3.9.

Among the study subjects, 99% were aware of the harms of tobacco.

**Table II: Showing the tobacco dependence scores (TDS) in the tobacco users (n = 154).**

TDS	Male	Female	Total (n; %)
1 - 2	13	10	23; 14.9
3 - 4	35	10	45; 29.2
5 - 7	55	9	64; 41.6
$\geq 8$	22	0	22; 14.3

## Discussion

In this hospital-based survey, it was seen that more than 50% of the participants were tobacco users with biri being the commonest form of tobacco used. Men were more likely to use tobacco compared to females and men also used the smoking form of tobacco much more than women. Trend of tobacco use increased with age. Subjects with higher educational qualification were more likely to use cigarette and less likely to use gutkha or guraku. As a vocation, labourers were the ones most likely to be tobacco users. 1 in 3 users had started tobacco use before the age of 16. 1 in 5 tobacco users reported a daily frequency of use in excess of 20 and the daily frequency of use in males was almost double that of females.

In the 2013 study from Chennai, the prevalence of tobacco use in urban wards was 19.4%<sup>9</sup>. But this was a community-based survey while our study is a hospital-based survey. Tobacco use prevalence may be higher in hospital-based surveys as tobacco makes people sick and those people are more likely to turn up in a hospital. Thus, in our study, the prevalence of tobacco use was 51%. But similar to our study, the Chennai study also recorded an increasing prevalence of tobacco use with age, more tobacco use in males and more smoking in males. In this study, 60% had started using tobacco between 15 to 24 years<sup>9</sup>. But in our study, more than 80% had started using tobacco before 20 years of age (Fig. 3). Thus, in our population, initiation of

tobacco use was probably earlier. In the south Indian study, chewing raw tobacco leaves was the most common form of SLT while in our study, guraku and khaini were the most common forms.

In our study, biri was the commonest smoking form of tobacco, except in the college educated group where cigarette was preferred. National surveys from various countries have revealed that cigarette is the commonest form of smoking everywhere in the world except in India and Bangladesh where biri is preferred<sup>10</sup>. This preference for biri in these countries may be due to very low cost (average price of one biri in India is 20 - 30% that of the cheapest cigarette<sup>11</sup>), easy availability, and less regulations on its sale. However, biri is no less harmful than cigarette or other forms of smoking and a recent study from the Indian subcontinent have shown that biri smokers have high-risk of airway obstruction or cardiovascular events<sup>12</sup>. However, still, biri is not given as much importance as cigarette in tobacco prevention programmes in India.

In our present study, it was seen that labourers, as an occupational group, had very high prevalence of tobacco use (81%). In a study among construction site labourers in New Delhi, the prevalence of tobacco use was found to be 91%<sup>13</sup>. Most of them (97%) used tobacco at the workplace with their peers<sup>13</sup>. More than 50% had started smoking before 20 years of age. Tobacco led to considerable expenses for these poor workers<sup>13</sup>. Thus, workplace tobacco prevention programs are needed for such labourers in unorganised sectors. There is a clear relation between presence of workplace smoking rules and the prevalence of smoking in workers<sup>14</sup>. However, in the unorganised sectors of India like construction or goods carriage, such workplace rules are a distant dream. Since peer pressure is a strong influence on tobacco use, the use of peer educators can be an option for tobacco prevention in such vocations.

In another cross-sectional study in urban slums of North-East India, tobacco use prevalence was found to be 74%<sup>4</sup>. However, the type of tobacco product was different from our study with cigarette, Khaini and Betel Quid being the most popular ones. In this study also, an increasing trend of tobacco use with age was observed up to 54 years, after which the tobacco use decreased by 8 percentage points. Labourer and drivers were the two occupations associated with high tobacco use<sup>4</sup>. A study similar to the Chennai project was conducted in Haryana, North India<sup>15</sup>. In this, it was found that the prevalence of tobacco use among urban males was 35% and that among females was 3.5%<sup>15</sup>. The corresponding figures in our study were considerably higher. There was considerable difference in the daily frequency of tobacco use, depending on the actual product, in the

study from Haryana. Thus, for biri, daily frequency was 13, while for gutkha, it was 4.3. In our study also, high daily frequency of tobacco use was found in a section of the male subjects.

## Limitations

The present study is limited by the small number of subjects. Also, it is a hospital-based survey and thus, the results may not always be extrapolated to the community. Also, some demographic variables like monthly income have not been included in this survey.

However, despite the shortcomings, this pilot survey generates a lot of data which may be used for tobacco prevention programmes in target groups.

## Conclusion and recommendation

Tobacco use is very high among the attendees of hospitals in urban areas in Eastern India. Thus, these hospitals can be the sites of tobacco prevention programs. This can be in the form of anti-tobacco billboards and banning of tobacco sale for a specific radius around the hospital. Specific groups like labourers, who are likely to have high-risk of tobacco addiction, should be targeted for the interventions. For this, places frequented by the people of that vocation like railway stations, long distance bus stations or street-side eateries may be used.

Since a large part of the users start tobacco use before the age of 20, the adolescent age group should be a target of tobacco control programmes in urban areas. This can be in high schools and colleges. Physicians should be aware of the population groups with high chance of tobacco addiction and routine medical history must document the tobacco use behaviour in these groups.

**Role of authors:** SG was involved in data collection; RP was involved in statistical calculation; RP, SG and IT were involved in writing and revision.

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## References

1. WHO global report on trends in prevalence of tobacco smoking 2015. World Health Organisation. Geneva 2015.
2. Global Adult Tobacco Survey GATS 2: India 2016-17. Tata Institute of Social Sciences (TISS), Mumbai and Ministry of Health and Family Welfare, Government of India. New Delhi 2018.
3. Shah S, Dave B, Shah R *et al*. Socio-economic and cultural impact of tobacco in India. *J Family Med Prim Care* 2018; 7: 1173-6.
4. Sarkar A, Roy D, Nongpiur A. A population-based study on tobacco

- consumption in urban slums: Its prevalence, pattern, and determinants. *J Family Med Prim Care* 2019; 8: 892-8.
5. Gupta S, Mishra P, Nagarajappa S *et al.* Prevalence of Tobacco and associated risk factors among university law students in Indore City. *Indian J Dent Res* 2019; 30: 10-4.
  6. Global adult tobacco survey collaborative group. Tobacco questions for surveys: a subset of key questions from the Global Adult Tobacco Survey (GATS). 2nd Edition. Atlanta, GA: Centres for disease control and prevention, 2011.
  7. Heatherton TF, Kozlowski LT, Frecker RC *et al.* The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict* 1991; 86: 1119-27.
  8. Fagerstrom Test for Nicotine Dependence. [Cited 2020 Jan 5]. Available online from [http://ndri.curtin.edu.au/btftp/documents/Fagerstrom\\_test.pdf](http://ndri.curtin.edu.au/btftp/documents/Fagerstrom_test.pdf).
  9. Chockalingam K, Vedhachalam C, Rangasamy S *et al.* Prevalence of Tobacco Use in Urban, Semi Urban and Rural Areas in and around Chennai City, India. *PLoS One* 2013; 8: e76005.
  10. Giovino GA, Mirza SA, Samet JM *et al.* Tobacco use in 3 billion individuals from 16 countries: an analysis of nationally representative cross-sectional household surveys. *Lancet* 2012; 380: 668-79.
  11. Tobacco Pack Surveillance System (TPackSS). Bidi prices in India: Findings from a cross-country survey of 3,240 tobacco packs (Policy brief). Baltimore, MD: Johns Hopkins Bloomberg School of Public Health. (Cited 2020 Jan 4). Available online from [http://globaltobaccocontrol.org/tpackss/sites/default/files/IGTC\\_bidi\\_policy\\_final\\_6\\_2\\_2017.pdf](http://globaltobaccocontrol.org/tpackss/sites/default/files/IGTC_bidi_policy_final_6_2_2017.pdf).
  12. Duong M, Rangarajan S, Zhang X *et al.* Effects of bidi smoking on all-cause mortality and cardiorespiratory outcomes in men from south Asia: an observational community-based substudy of the Prospective Urban Rural Epidemiology Study (PURE). *Lancet Glob Health* 2017; 5: e168-76.
  13. Parashar M, Dwivedi S, Singh M *et al.* Tobacco use behaviour among construction site workers of Delhi, India. *Int J Health Allied Sci* 2017; 6: 210-4.
  14. CalHam D, Przybeck T, Strickland JR *et al.* Occupation and Workplace Policies Predict Smoking Behaviors: Analysis of National Data from the Current Population Survey. *J Occup Environ Med* 2011; 53: 1337-45.
  15. Gupta V, Yadav K, Anand K. Patterns of tobacco use across rural, urban, and urban-slum populations in a North Indian community. *Indian J Community Med* 2010; 35: 245-51.

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