

# A cross sectional study to assess the prevalence of smokeless tobacco usage in adolescents in an urban slum of a metropolitan city in Maharashtra

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## Abstract

**Background:** Tobacco use is one of the chief preventable causes of death all over the world. Tobacco use in India is more varied than in most countries, 40 % of the tobacco consumed in India is in the smokeless form like tobacco quid's, Gutkha, panmasala, zarda etc. Oral cancer is one of the ten most common cancers in the world. Approximately 90% of Indian oral cancers are tobacco related. Adolescents are easily attracted to these tobacco products and they land into addiction. This study aims to find out the prevalence of smokeless tobacco usage amongst adolescents in an urban slum. **Methodology:** This was a cross sectional questionnaire-based epidemiological observational study to assess the prevalence of usage of smokeless tobacco in adolescents of an urban slum in a metropolitancy of western Maharashtra. We studied 1800 adolescents in an urban slum for prevalence of smokeless tobacco use. **Results:** There were 59.4% males and 40.6% females in our study. Majority of the participants (61.9%) were Muslim by religion. Most of them were from socioeconomic class II (37.9%) and class III (37.4%). Most of the participants (75.2%) got pocket money, of them majority (88.6%) received Rs.5–Rs. 20. The prevalence of smokeless tobacco consumed in our study was found to be 13.9%. 3.6% of the subjects had other form of addictions as well, Alcohol was the most common other addiction seen in 3.4% of adolescents. **Conclusion:** We conclude that there is a 13.9% prevalence of smokeless tobacco usage amongst adolescents. This is the age when they try to take risks and go into addiction very easily due to peer pressure and due to the careless behaviour. It's a nation's responsibility to provide healthy environment for their adolescents who are the building blocks of country's future.

**Key Word:** Adolescents, Smokeless Tobacco, Prevalence, Addiction, Urban Slum.

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Received Date: 22/03/2019 Revised Date: 11/05/2019 Accepted Date: 02/07/2019

DOI: <https://doi.org/10.26611/1011113>

## Access this article online

Quick Response Code:



Website:

[www.medpulse.in](http://www.medpulse.in)

Accessed Date:  
03 July 2019

## INTRODUCTION

Tobacco use is one of the chief preventable causes of death in world. Tobacco attributed to about 100 million deaths in 20th century. At present tobacco use causes 3.5 to 4 million deaths every year which is expected to increase to 10 million by 2020's and 80% of these cases will be in developing countries. Studies in developed countries show that most people begin using tobacco before the age of 18 years, if these patterns continue, tobacco use will result in deaths of 250 million of people who are children and adolescents today many of them in

**How to cite this article:** Anand Bhide, Amrut Swami. A cross sectional study to assess the prevalence of smokeless tobacco usage in adolescents in an urban slum of a metropolitan city in Maharashtra. *MedPulse International Journal of Community Medicine*. July 2019; 11(1): 13-19. <https://www.medpulse.in/>

the developing countries<sup>1</sup>. Tobacco use in India is more varied than in most countries, 40 % of the tobacco consumed in India is in the smokeless form like tobacco quid's, Gutkha, panmasala, zarda etc. The last few decades have seen a phenomenal growth in the smokeless tobacco industry. The use of various forms of smokeless tobacco is an unfortunate pastime of millions of people across all sections of society<sup>2</sup>. In the last three decades there has been a major change in the use of smokeless tobacco in India, while there is a noted decline amongst traditional users, the older males, there's a phenomenal increase amongst adolescent and young adult males of the country.<sup>3</sup> Oral cancer is one of the ten most common cancers in the world. Approximately 90% of Indian oral

cancers are tobacco related. The possibility of developing the lesion being ten times higher if the habit is formed below age of 14 years.<sup>4</sup> The first signs are appearance of patches in mouth, difficulty in mouth opening. At this stage the signs can be reversible but if left untreated will possibly develop into a cancer.<sup>5</sup> It is typically during adolescent age that decisions are made as to whether or not to go for tobacco. Education of harmful effects of tobacco usage can therefore play an important role in reducing the incidence of tobacco consumption and harmful effects that may result from its use. A concentrated effort at targeting the adolescent population may help in preventing the problems in years to come.

**Table 1:** The various forms of smokeless tobacco are as follows:-

Sr. No.	Type of Smokeless Tobacco	Product Constituents
1	Betel quid chewing*	Betel leaf, pieces of areca nut, a few drops of lime (calcium hydroxide), several condiments, sweetening, and flavoring agents
2	Gutkha*	Betel nut, Catachu, Tobacco, Lime, Saffron, Flavoring.
3	Khaini*	Tobacco, Slaked Lime Paste, sometimes Areca nut.
4	Mawa*	Tobacco, Slaked lime, Areca nut.
5	Pan Masala with Tobacco*	Tobacco, Areca nut, Slaked lime, Betel leaf.
6	Gul (Gudakhu)*	Tobacco, Areca nut, Slaked lime, Betel leaf.
7	Zarda*	Tobacco Powder, molasses, other ingredients.
8	Mishri*	Tobacco
9	Creamy Snuff*	Tobacco, Clove Oil, Glycerin, Spearmint, Menthol, Camphor.
10	Dry Snuff (Tapkeer)*	Tobacco
11	Nass (Naswar, Niswar)*	Nass: Tobacco Ash, Cotton or Sesame Oil, water. Naswar, Niswar: Tobacco, Slaked lime, Indigo Cardamom oil, Menthol, Water.
12	Nicotine Lozenges	Tobacco, mint, eucalyptus.
13	Loose Leaf Chew	Leaf tobacco, Sweetener, and/or licorice.
14	Moist plug	Enriched tobacco leaves, fine tobacco, sweetener, and/or licorice.
15	Plug (chew)	Enriched tobacco leaves, fine tobacco, sweetener and/or licorice.
16	Twist (roll)	Tobacco, tobacco leaf extract.
17	Iqa. Mik	Tobacco, punk ash.
18	Moist Snuff	Tobacco.
19	Toombak	Tobacco, sodium bicarbonate.
20	Chima	Tobacco leaf, sodium bicarbonate, brown sugar, ashes from the (Melicocca bijuga), and vanilla and anisette flavoring.

\*Type of smokeless tobacco used in India<sup>6</sup>

Chemical analysis of various types of smokeless tobacco has revealed the presence of 'polonium 210', a radioactive alpha-emitter and known radiation carcinogen and representatives of two classes of powerful chemical carcinogens, the polycyclic aromatic hydrocarbons and the nitrosamines. Of the 19 nitrosamine identified in smokeless tobacco, the carcinogenic nitrosamines present in the highest related chemically to nicotine<sup>7</sup>. Nicotine is absorbed in substantial quantities from smokeless tobacco and could contribute to the adverse consequences of smokeless tobacco use<sup>8</sup>. Hemoglobin adducts to carcinogens present in smokeless tobacco products are measurable in the blood of smokeless tobacco users,

indicating that smokeless-tobacco-related carcinogens circulate throughout the body. This prompts a concern that smokeless tobacco may increase risks of other cancers as well.<sup>9</sup> Squamous cell carcinoma is the most common cancer, accounting for 95 to 98 percent of all oral malignancies in India. Natural History in most instances reveals that oral cancer arises from precancerous lesions or conditions. Smokeless tobacco increases the risks of cancer of the mouth and gum, pharynx, and salivary glands.<sup>10</sup> and also Cancer of the nasal cavity, cancer of pancreas and cancer of urinary tract.<sup>11</sup> Tobacco use caused over one million deaths in India in 2010, and nearly three-fifth of attributable deaths

was among women in India. This calls for targeted public health intervention focusing on SLT products especially among women.<sup>12</sup> Last decade noted approximately 1.5% of total deaths in India were tobacco-related, and the nation amassed over 1.7 million disability-adjusted life years (DALY's) due to disease and injury attributable to tobacco use. Tobacco-related cancers account for approximately half of all cancers among men and one-fourth among women and it is estimated that 8.3 million cases of coronary artery disease and chronic obstructive airway diseases are also attributable to tobacco each year. Treating these three tobacco-related diseases costs billions of rupees. Smokeless tobacco is an important etiological factor in cancers of the mouth, lip, tongue, and pharynx. It is not surprising therefore, that India has one of the highest rates of oral cancer in the world. These rates are steadily increasing and oral cancers are occurring more frequently among younger individuals. Annual oral cancer incidences in the Indian subcontinent have been estimated to be as high as 10 per 100 000 among males.<sup>13</sup> Sharma S, Singh M *et al.* in their study "Predictors of Tobacco Use among Youth in India: GATS 2009-2010 Survey." Found that - The total population interviewed in GATS India -2010 was 69,926. Of these the youth population between 15- 24. The total number of tobacco users (smokers and smokeless) was 2,969 (22%). There were 11 (3.05%) dual users. Smokeless form of tobacco (15.1%) was used more than smoked form among youth. Males and urban youth preferred smoked form of tobacco over smokeless form. Smoking among youth had an inverse relation with increasing education level. Majority of smokeless form of tobacco users and dual users belonged to poor economic classes. The study concludes stating -This productive age group is more susceptible to tobacco addiction, especially smokeless tobacco. Rural youth, students, female sex and poor socio-economic strata prefer smokeless whereas urban, male and lesser educated youth preferred smoked form of tobacco. Efforts should be directed towards discouraging tobacco use initiation among the young population in India.<sup>14</sup> B Prabhakar *et al* in their study found that total tobacco use among Indian residents is overall 34.6%, varying for males (47.9%) and females (20.7%). The rural areas of the country exhibit comparatively higher prevalence rates (38.4%) in comparison to urban areas (25.3%). Overall, Khaini, a smokeless tobacco product (12.0%), is the most popular form of tobacco use among males and females, followed by bidi smoking (9.0%).the study concludes: Results of GATS data can be used as baseline for evaluation of new tobacco control approaches in India integrating culturally acceptable and cost effective measures.<sup>15</sup> Mukherjee A, Sinha A, *et al.* in the study "Tobacco abuse

among school going adolescents in a rural area of West Bengal, India." State that-Adolescents are vulnerable targets of tobacco industry with all consequences of usage. Studies reveal that tobacco abuse is rising in this age group in India. Low prevalence of tobacco intake was obtained among the students, with 9.8% reported having ever used smokeless tobacco and 4.3% ever smoked. Tobacco intake was higher among those with a history of parental tobacco intake. Continued information education and communication (IEC) activities should be conducted by the school authorities, with involvement of nongovernment organizations (ngos) and parents for primary prevention.<sup>16</sup> This study was therefore conducted in adolescent population, whereby an attempt was made to study the prevalence of smokeless tobacco usage.

## AIM AND OBJECTIVES

1. To study the sociodemographic profile of adolescents in an urban slum.
2. To find prevalence of smokeless tobacco usage in adolescents in an urban slum.

## METHODOLOGY

**Study design:** A cross sectional questionnaire-based epidemiological observational study to assess the prevalence of usage of smokeless tobacco in adolescents of an urban slum in a metropolitancy.

**Study population:** Adolescents residing in the urban slum area under study.

**Study Site:** An Urban slum attached to the urban health centre of a tertiary level hospital and medical college in a metropolitan city of Maharashtra.

**Study period:** April 2015 to April 2016.

**Subject eligibility-**

**Inclusion criteria**

1. Adolescent male and female - age 10 to 19 completed years.
2. Permanent residents, those who are residing in the study area since past 5 years.
3. Give consent /assent to participate in the study.

**Exclusion criteria**

1. Those who refused to give the consent / assent to participate in the study
2. Those who were suffering from any major illness.

**Sample size:** As per census (2011), in India 20.9% of total population are adolescent. Considering this, the rough estimate of total adolescent in urban area under study is 17399 in a total population of 83253 in area under study. With Confidence Interval of 0.95, Desired Precision of 0.05, using proportion of Smokeless tobacco use among adolescent population of 12.25%

([www.who.int/fctc/reporting/Annexoneindia.pdf](http://www.who.int/fctc/reporting/Annexoneindia.pdf)), using below mentioned formula, the sample size calculated was 172.

$$n = (Z^2 \times P(1 - P)) / e^2$$

Where Z = value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI)

P is expected true proportion e is desired precision (half desired CI width) (+/- 0.05 (5%). However, since sample size of 172 was small, and since resources like subjects, investigative tools, time for research exist in sufficient quantity, it was planned to enrol minimum of 10% of the total adolescent population as sample size for the present study i.e. 1800. Total number of houses in area under study was 14297 houses.<sup>2</sup> Sampling interval =  $14297 \div 1800 \approx 8$  Sample size selected for study was 1800 subjects and sample interval is 8. An adolescent from every 8<sup>th</sup> house of community will be, by systematic sampling, taken as study subject with a random start. If no adolescent is found in the sample house, next house shall be considered as the sample house, but the sampling interval for further houses won't change. If the sample house has more than one adolescent residing, the adolescent with younger age was taken as subject.

**Type of epidemiological study:** Cross sectional-questionnaire based study.

**Ethics Approval:** Ethical approval was taken from the institutional ethics committee.

**Statistical Analysis:** A predesigned pretested questionnaire was used to collect the data. Data Collected was entered in Microsoft Excel. Data is represented in frequencies and percentages, charts and graphs. Mean and standard deviation of quantitative variables is shown. Appropriate statistical tests are applied using EpiInfo version 7.2 and SPSS software version 20 for analysis. Chi square test was used for association wherever applicable.

#### Definitions

1. **Adolescent**-WHO identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19 years.
2. **Per-capita income**- Actual total family income in rupees per month/total number of family member's B.G Prasad classification will be used to classify.
3. **User** - All adolescent who were consuming smokeless tobacco at the time of questionnaire
4. **Nonuser** -All the adolescents who were not consuming smokeless tobacco at the time of the questionnaire.

## RESULTS

Table 1: Socio-demographic profile of subjects

Variables	No.	Percentage (n=1800)
Age	10	24
	11	43
	12	138
	13	305
	14	277
	15	260
	16	256
	17	252
	18	211
	19	34
Sex	Male	1070
	Female	730
	Muslim	1114
Religion	Hindu	677
	Christian	9
	Laborer	78
Occupation	Vendor	43
	Student	1679
	Nuclear	1378
Type of Family	Joint	406
	Three Generation	16
	Class I	127
	Class II	683
	Class III	673
Socioeconomic class	Class IV	313
	Class V	4



In present study enrolling 1800 adolescents, aged 10 to 19 years, Majority were of age 13 years. Mean age was  $13.78 \pm 4.9$  years. 1070 (59.4%) were males and 730 (40.6%) were females. Majority of the subjects were Muslims (59.4%), followed by Hindus which were 677 (37.6%). Maximum (93.3%) of the subjects were students. It was also found that 1378 (76.6%) of the subjects belonged to nuclear families. According to modified B.G. Prasad's classification for socioeconomic status, roughly 70% of the subjects belonged to class II and III.

**Table 2:** Distribution among the cases of access to Pocket Money

Do you Get Pocket Money?	No.	Percentage
Yes	1354	75.2%
No	446	24.8%
Total	1800	100.0%

As is apparent from the above table, 1354 (75.2%) subjects got pocket money and 446 (24.8%) subjects did not get pocket money

**Table 3:** Utilization of pocket money among the enrolled subjects

Variables	No.	Percentage (n=1354)
Who Gives you the Pocket Money?	Mother	831 61.4%
	Father	523 38.6%
Do you Spend that Money on Travelling	Yes	570 42.1%
	No	784 57.9%
Do you Spend that Money on food items	Yes	68 5.0%
	No	1286 95.0%
Do you Spend that Money on Shopping Novelty Items	Yes	23 1.7%
	No	1331 98.3%
	5	356 26.3%
	8	19 1.4%
	10	513 37.9%
	15	192 14.2%
How Much Pocket Money do you Get (Rupees Per Day)?	20	119 8.8%
	30	47 3.5%
	40	6 0.4%
	50	87 6.4%
	100	15 1.1%

As per above table, 831 (61.4%) of the subjects got pocket money from their mothers. Maximum of the subjects [513 (37.9%)] got 10 rupees per day as pocket money and the amount was spent maximally on travelling. Amongst all majority (88.6%) received Rs.5 – Rs. 20 per day.

**Table 4:** Consumption of tobacco among the enrolled subjects

Variables	No.	Percentage (n=1800)
Consume smokeless Tobacco	Yes	251 13.9%
	No	1549 86.1%
Do you have any other Addictions?	Yes	65 3.6%
	No	1735 96.4%
Do you have any other Addictions?	Alcohol	61 3.4%
	Pan Masala	4 0.2%
	None	1735 96.4%

As observed from the above table, of the total 1800 subjects enrolled for the study, 251 (13.9%) subjects said they consumed smokeless tobacco products. It was also observed that 65 (3.6%) subjects had other form of addictions as well, Alcohol was the most common other addiction seen in 61 (3.4%) adolescents.

## DISCUSSION

A total of 1800 adolescents were enrolled for the study from urban slum community in a metropolitan city. Age distribution of the enrolled subject's shows that majority of them were in age group of 13, followed by 14 and 15, which follows the designated age group of the present study i.e. 10 to 19 years. Mean age of our participants

was  $13.78 \pm 4.9$  years Mohan S *et al* reported the mean age of 14.7 years, comparable to our study. As depicted in Table No. 1, male predominance was seen in the present study with 1070 (59.4%) subjects are male and rest 730 being females. This shows an unnatural proportion of male and female possibly due to custom of early marriage. The community is predominantly a Tamil

speaking, Muslim community and this was reflected in the present study as well, with 79.8% subjects being Muslims followed by Hindus (37.6%). The age group under the study was 10 to 19 years and it was expected that everyone will be in school and this was proved by the fact that 1679 (93.3%) subjects were students. However, it was heartening to find that 78 subjects were employed as unskilled labourers, working in jari industry and a few (43 subjects) were self-employed as vendors. A trend is on in the modern era to have a nuclear family and this was seen even in the present study with 1378 (76.6%) subjects belonging to nuclear family. In the community additional force migration from outside state and inside state to a metropolitan city and having a separate nuclear type of family is a trend among new generation. However, this trend is disadvantageous from part of supervision of the adolescents' access and uptake of habit of smokeless tobacco, as has been seen in further analysis. Socio-economically the community is better off as 45% of the subjects belonged to class I and II combined. And hardly 4 subjects belong to class V. Being more in nuclear type of family, then family size of  $4.48 \pm 1.29$  with 98.5% of fathers employed, it's bound to be a better community. However, this better socio-economic status can mean a bigger share of pocket money, better access to smokeless tobacco products and better sustainability of the habit. Though, it is also advantageous in terms of education and health facilities for many. As the age group range from 10 to 19 years with 13, 14, 15 year olds being the maximum number of the subjects that were enrolled in the present study, it was expected that most should be in higher secondary school (45.4%) and this was reflected in the present study. It was good to note that there was negligible number of out of the school subjects among the enrolled subjects. Table No. 2 shows that, adolescents get financial support for their daily needs in term of pocket money. This cash is not closely supervised and the adolescents are free to use it as they wish to. 1354 (75.2%) of the subjects were getting pocket money, most was given by mothers (831, 61.4%) (Table No. 3). Possibly as the mothers were around in the houses most of them were unemployed. While, 570 (42.1%) subjects were spending the money on travelling, 68 (5%) were spending it on food items, 23 (1.7%) spent it on buying novelty items. The average pocket money received by subject was 14.64 rupees per day most (79.4%) were getting up to or less than 15 rupees per day. Another study showed that 50% of children received pocket money from their parents<sup>46</sup>. The community under study has maximally nuclear type of families, wherein father is out of the house for maximum time of the day and mothers are housewives. The schools in which maximum of the adolescents study is about 2 kilometres

far from the community and requires travel by vehicle be it bus or auto rickshaw. Most of the adolescents are not used to carry tiffin boxes; they prefer eating in school canteen or from the road side vendors just outside the school premises. Here the need of pocket money arises. The amount given by parents for traveling to school and having snacks goes unsupervised and gives the subject, who is already under influence of his peers, exposed to different forms of addictions from family and friends and motivated by his favourite cinema actors who advertise these tobacco products as source of enjoyment, takes a chance to break ethical barrier and take up the habit of tobacco addiction. Arora M *et al*<sup>17</sup> reported that around 59 Indian movies had more than 400 tobacco use occurrences, that's on an average around seven to eight times in a movie they show use of one or the other form of tobacco. Adolescents are very quickly impressed by such instances which drives them towards tobacco use. This was also reflected in the study, out of 1800 subjects enrolled for the study, 251 (13.9%) had consumed smokeless tobacco product in some form, while 61 (3.4 %) had also tried alcohol. So the prevalence of smokeless tobacco consumption amongst adolescent in an urban slum in our study was 13.9%. The prevalence of other addictions was found to be 3.6% and the prevalence of alcohol was seen 3.4% amongst our study population. (Table 4) N A Rigtti *et al*<sup>18</sup> reported the use of smokeless tobacco amongst the adolescents in US was 8.7% less than our study, while use of all forms of tobacco including cigarettes and cigars was 45.7%. While Nelson DE *et al*<sup>19</sup> in their study reported the overall use of smokeless tobacco amongst US adolescents was 10.5%. Arora M *et al*<sup>17</sup> reported the prevalence of tobacco use of 5.3% in their study population which is less than our study. Mohan S *et al*<sup>20</sup> reported a prevalence of tobacco use of 11.3%, they suggested to conduct Health programs to quit tobacco in all the schools with a special emphasis on poor performer kids, those receiving pocket money and those whose parents and friends use any tobacco product.

## CONCLUSION

We conclude that there is a prevalence of 13.9% adolescents consuming the smokeless tobacco products. This is the age when they try to take risks and go into addiction very easily due to peer pressure and due to the careless behaviour. Its parent's responsibility to keep a watch on their children for these addictions. It's also the responsibility of schools to maintain regular health education sessions for school children. Tobacco products should not be sold to children less than 18 years of age and government should make strict rules about these. No tobacco products should be available near premises of

schools. Parents should keep a watch on what the pocket money given to the children is being spent on. Adolescents easily get impressed by their favourite movie actors and sports persons when they advertise for anything. Such advertisements of tobacco products which are quite usual on mass media should be restricted. The statutory warnings on tobacco products wrapping should be strictly followed. It's a nation's responsibility to provide healthy environment for their adolescents who are the building blocks of country's future. All people should work together in this regard to reduce the tobacco products and other addictions amongst adolescents so that they can lead a productive and responsible life as adults.

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Source of Support: None Declared  
Conflict of Interest: None Declared