



Prevalence of tobacco use and Impact of Psychosocial and Environmental factors on tobacco initiation among adolescents in Mumbai Metropolitan Region, India: An analytical study

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ABSTRACT

Background: Increasing prevalence of tobacco use can be correlated to certain factors; this perceived risk of tobacco usage is essential in determining susceptibility of adolescents in initiating tobacco use.

Objective: To estimate the tobacco usage among adolescents and determine the psychosocial and environmental factors associated with the initiation of tobacco habit in Mumbai Metropolitan region, Maharashtra.

Method: A cross sectional study using self-administered questionnaire conducted by selecting 1110 sample using two-stage random sampling method which included adolescent school going children (13-19 years) who study in Mumbai metropolitan region.

Results: The earliest age at which school going children tried tobacco product was at the age of 7 years (16.14%). Parental influence, influence of role models, tobacco use by best friend, refusal to sell tobacco, alcohol use plays a major role in initiation of tobacco use. Multiple regression analysis showed statistical significance influence of parental use of tobacco, alcohol use, and influence of friends, anti-smoking message and refusal to sell tobacco to minors on tobacco habit independently. There was strong correlation found with high adjusted odds ratio with refusal to sell tobacco (OR 6.11, CI 1.74-21.49, p-0.001), use of tobacco if best friend offers it (OR 3.51, CI 1.71-7.23, p-0.001). Also, alcohol use was strongly associated with tobacco habit. (OR 4.167, CI 1.61-10.73, p-0.003)

Conclusion: We identified and determined the factors which lead to the initiation of tobacco habit among adolescents. It shows a strong influence of multiple psychosocial and an environment factor that affects the tobacco related behavior. Hence preventive programs should focus on these multiple aspects. Schools should follow strict "no tobacco" policy and offenders should be punished/fined. Teachers should set a good example and motivate children to steer clear of tobacco.

Keywords: Tobacco use; Parental influence; Susceptibility to smoking; Adolescents education; smoking

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INTRODUCTION

The epidemic of tobacco use is one of the greatest threats to global health today. It is one of the preventable causes of disease and disability around the world. It is the most important identified cause of cancer and is responsible for about 50% of cancers in men and about 20% of cancers in women. At present, about 4 million people die of tobacco-related diseases every year.¹

World Health Organization predicts that unless there is a dramatic change in the present trends of tobacco use, it will be killing 8.4 million people a year by late 2020 and hence will become the single largest health problem in the world.²

India is one of the biggest tobacco markets in the world, ranking third in total tobacco consumption behind only the markets of China and the United States. However, the per capita consumption in the country is 0.9 kg compared to the world average of 1.8 kg.³

The tobacco use situation in India is complex owing to the availability of various forms of tobacco. According to the National survey on drug use and health, nearly all tobacco use begins in childhood and adolescence (11-19 years). In India, as per the Global Adult Tobacco Survey-2, there are 266.8 million tobacco users aged 15 or above. Among current users, 202.0 million are men and 64.8 million are women. About 12.2% started using tobacco daily before turning 15 years, 23.6% started when they were between 15 and 17 years, and 19.4% started tobacco use at 18–19 years.⁴

It is further projected that current trends of tobacco use would result in the deaths of 250 million children and young people over time, most of them in developing countries.⁵ Globally, 1 in every 10 girls and 1 in every 5 boys, aged 13 to 15 years, use tobacco.⁶

As per Global Youth Tobacco Survey (GYTS) results, supported by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), conducted during the years 2000-2004 in India, current prevalence of tobacco use, in any form, among school going youth (age 13-15 years) in India is 17.5% (range: 2.7% -63%).

India passed the Tobacco Products Bill 2001, which prohibits advertisement of all tobacco products, smoking at public places and selling tobacco to persons under 18 years of age. It also directs the manufacturers of tobacco products to indicate the nicotine and tar contents and warnings of adverse health effects of tobacco products on packages in both English and regional languages.⁷

Latest statistics presented by Tata Memorial Hospital say that of the 20.5 million-strong population of Mumbai and its neighboring areas (including Thane and Navi Mumbai), an estimated six million people use tobacco—in form of cigarettes or gutka.⁸ A need was felt to estimate the prevalence of tobacco use among school going youth in Mumbai who are most likely vulnerable of inculcating tobacco habits.

Several factors can be attributed for tobacco use in adolescents, and these include peer pressure, tobacco advertisements, promotion, easy access to tobacco products, and low prices. The early initiation of smoking habits and constant exposure to tobacco products increase the relative risk factor in the occurrence of serious acute or chronic health disorder.

The present study was undertaken to determine the prevalence of tobacco products in adolescents and factor which influence its initiation among them in Mumbai metropolitan region.

MATERIALS AND METHODS

A cross-sectional questionnaire study was conducted to assess the Factors Related to tobacco Initiation and its use among adolescents in Mumbai metropolitan region, Maharashtra. Before conducting the study, ethical clearance was obtained from the ethical committee of the institution. The study was conducted for the duration of 3 months from July to September 2019. The target population consisted of school going children of 11-18 years age that generally covered students studying in 6th to 12th grades. The necessary permission to carry out the study was obtained from the respective school authorities. Informed consent was obtained from parents of all the students.

PILOT STUDY

Prior to the commencement of the main study, a pilot study was conducted among 100 students to assess the psychometric properties, validity and reliability of the questionnaire. Based on the results of the pilot study, some minor modifications were made in the proforma. Sample size was calculated based on results obtained in pilot study by using formula- Z^2pq/e^2

$$Z=1.96$$

p= prevalence (pilot study we found that 12% students have tried tobacco products)

$$q= 1-p (88\%)$$

e= error (error was fixed at 2%)

$$\text{Sample size} = (1.96)^2(0.12)(0.88)/(0.02)^2$$

Moreover, a further 10% was added to compensate possibility of incomplete records. So total sample of 1110 was included.

STUDY DESIGN AND SAMPLING

The study involved a two-stage random sampling to select a representative sample of students in classes 6th to 12th in government, private aided and private unaided schools. The sampling required complete enrolment lists of all the government, private aided and private unaided schools in Greater Mumbai municipal corporation region. This information was collected from the Municipal Corporation of Greater Mumbai (MCGM) portal.⁹

Proportional stratified random sampling was used for selecting schools. In the present study number of students selected from each school was 30. This was according to the guidelines of WHO oral health surveys basic methods.¹⁰ To reach sample size, 37 schools were selected randomly from the list of schools. In a first stage of sampling, schools were selected based on proportional random sampling taking considerations of number of schools in each category. In the second stage of sampling, school children were recruited by using random sampling method (lottery method). All the students who gave consent to participate were eligible for the study. The survey procedure was designed to ensure confidentiality and voluntary participation. The answer sheet did not contain any information on the identity of the student or of the school. Details of sampling are given in figure 1.

QUESTIONNAIRE AND DATA COLLECTION

A standardized structured proforma was developed to collect the data, which consisted of two parts. The first part consisted of general information like the age, sex and education, parent's occupation and type of family. The second part is the questionnaire, which consisted of 30 questions related to tobacco habits and factors related tobacco initiation. Information was sought about parental tobacco use, use of both smoking and nonsmoking forms of tobacco, attitude to tobacco use, media advertising and other variables. Each item was a multiple-choice question with a single answer. There was no skip or branching pattern of any question. It was a self-administered questionnaire and all questions were required to be answered. Questionnaire was designed in English, Hindi and Marathi depending on the language of instructions used in a particular school.

VALIDITY AND RELIABILITY OF QUESTIONNAIRE:

Questionnaire was checked for its face and content validity. For Face validity it was observed that 86% of the participants found the questionnaire to be easy. Content validity was assessed based on expert opinions. Mean Content Validity Ratio (CVR) was calculated as 0.87 based on the opinions expressed by a panel of six subject experts. The same questionnaire was administered to the same group of students after one week for reliability testing. The test

retest correlation coefficients for individual questions ranged from 0.80-1.0. These correlation coefficients were evidence of the high reliability of the questionnaire.

Students were explained the purpose of the study and instructions to respond to the questionnaire. Students were interviewed by the investigator using the proforma. The questionnaire was constructed with reference to relevant literature and validated. The questionnaire forms were distributed to the students at the end of scheduled class sessions. The questionnaire generally took an average of fifteen minutes to complete and forms were retrieved immediately after the survey.

ANALYSIS OF DATA

The data was analyzed using Statistical Package for Social Science (SPSS) version 17.0. The p-value was taken as significant when less than 0.05 (with confidence interval of 95%). Frequency and percentage were computed. Chi-Square Test was used to find an association between tobacco habit and different independent variables. Odds ratio with 95% confidence interval was computed using logistic regression analysis to assess the presence and degree of association between tobacco habit and independent variables. For those variables that had a $P < 0.05$, binary multiple logistic regression analysis was computed.

RESULTS

A total of 1110 students filled the questionnaire. A pre-designed, pre-tested, semi structured, self-reporting questionnaire with a set of 30 questions was prepared. Government school comprises 35% (n=382) of total students whereas private aided and unaided comprises 18% (n=196) and 47% (n=503) of total students respectively.

Table 1 shows association between tobacco use and different independent variables studies. There was a statistical significance found between smoking among adolescence and peer pressure, parental use, influence of role models. Of the total count of participants 161 participants have tried tobacco. Our present study shows that among the “ever tried tobacco” 74.5% (n=120) of the participants are males and 25.5% (n=41) of females have tried smoking. Overall, tobacco use was 1.78(OR) times greater in males compared to females and this was statistically significant ($p=0.001$) (fig 2).

Our study shows that maximum number of smokers were studying in 12th std (n= 32) and a shocking number of (n=31) students who claims to be smoking were in 9th std. (fig 3)

It is observed that, alarmingly 16.14% of total participants have tried tobacco before or at the age of 7 years ($p=0.00$); also, the highest prevalence (25.46%) was seen at an age ranging between 12- 13 years whereas 21.11% of students started using tobacco between the age of 8-9 years (fig 4).

Through this study, it was noted that 15.52% of smokers claimed to have smoked more than 20 cigarettes per day in the past 30 days, whereas maximum number of smokers i.e., 21.73% have smoked 2-5 cigarettes per day (fig 5)

Of the total students with tobacco habit, 55.9% reported that their parents were also tobacco users. There was 3-fold increase (2.8OR) ($p=0.00$) of tobacco use seen in adolescent whose parents also smoked. It is of significance that 78.3% (n=744) of non-smokers said their parents didn't indulge in tobacco. This shows a strong correlation between parents habit and child's behavior, also that parents habitual of tobacco consumption would most certainly lead to development of the initiation of tobacco in their children. It should be noted that 93.8% of habitué (n=151) reported that they didn't face any refusal from shopkeeper for buying tobacco cigarettes whereas only 6.2% of the total smoker said that they were denied purchase of tobacco. Hence, there is 1.28 times increased risk of finding tobacco habit in those who were not denied cigarettes by the shopkeeper. ($p=0.00$)

Among the participants who have tried smoking, 53.4% said their best friends also smoked and it should be noted that 97.4% (n=925) of nonsmokers and 86.3% of smokers(n=139) admitted that they will indulge in cigarettes if their best friend offered them. There was greater likelihood i.e., 0.38(OR) times increased consumption of tobacco seen in those adolescents whose best friend smokes, hence peer association should be considered as an important factor for initiation of tobacco habit.

Further it should be noted that, 59.6% (n=96) habitué students reported that they never had their guardian/ teacher talk about the harmful effects of smoking. It was observed that there was 1.65 OR (p=0.003) times higher likelihood of trying tobacco among students who never got any instructions from their guardian or school teachers.

The present study also paves to show that 79.5% (n=128) of the total smokers and 94.2%(n=895) of nonsmokers were aware about the ill-effects of smoking whereas 33% of smokers weren't cognizant of the harmful effect of tobacco with a odds ratio of 4.12 (p=0.00). It was determined through this study that of majority of participants thought passive smoking was harmful (p=0.00).

Also, there was greater odds 0.144(OR) of finding habit of alcohol consumption among the adolescents who has a smoking habit (p=0.00) in the present study.

The analysis shows that 75.2% (n=121) of tobacco users admits they haven't seen any anti-smoking messages in the past 30 days where as only 24.8% (n=24.8%) claims of seeing such messages. There was 1.972(OR) times increased risk of developing a habit, with 77.8% (n=739) of nonsmokers saying they have seen advertisements of cigarettes on billboards and magazines, and amongst smokers 36% (n=58) agreed that they have seen ads promoting cigarettes whereas 64% (n=103) denied seeing such ads.

We also observed that there was 2.855(p=0.001) times more chances of using tobacco among those who said that they saw actors smoking on TV, movies or videos as compared to those who denied it.

In our study 91.5% of non-smokers (n=869) and 79.5% of smokers (n=128) agreed to have purchases such items with logos of brands promoting cigarette sales. (p=0.00)

Through the study, it was seen that the most common ways through which students got their cigarette were either by borrowing it from someone (25.46%), asking someone else to buy for them (21.11%) or buying directly from the shop (14.28%) (fig 6).

Our results also show, maximum of the students (32.91%) got a monthly pocket money of more than Rs.150, 23.6% having an allowance of Rs100, whereas 43.4% have an allowance below 100. This result can be correlated with the amount of money the students spend on cigarettes with 27.95% claims to spend Rs 20-40 on cigarettes monthly whereas 15.52% spends less than Rs.10, which gives us the idea as to how with a bare minimum spending from their pocket money, students can indulge in smoking (fig 8).

Table 2 is the result of multiple logistic regression analysis. This model shows effect of different factors independently on tobacco habit initiation. This model only contains variables found to be statistically significantly associated with tobacco habit. This confirms the statistical significance influence of parental use of tobacco, alcohol use, and influence of friends, anti-smoking message and refusal to sell tobacco to minors on tobacco habit independently. There was strong correlation found with high adjusted odds ratio with refusal to sell tobacco (OR 6.11, CI 1.74-21.49, p=0.001), use of tobacco if best friend offers it (OR 3.51, CI 1.71-7.23, p=0.001). Also, alcohol use was strongly associated with tobacco habit. (OR 4.167, CI 1.61-10.73, p=0.003)

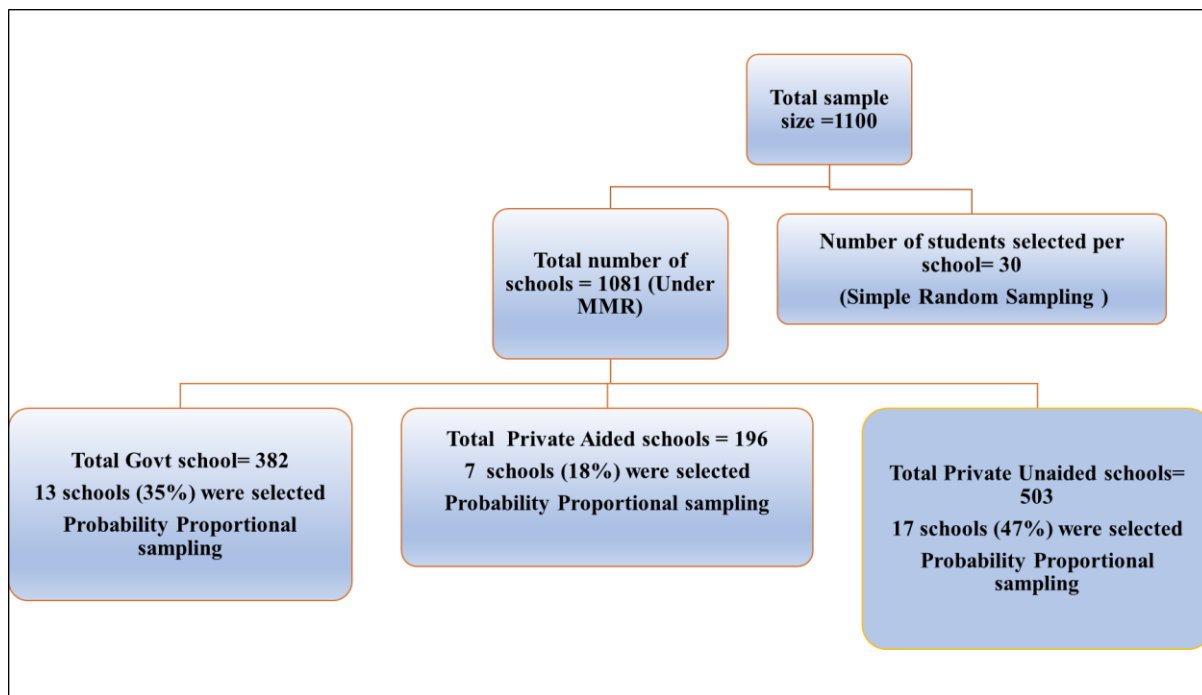


Figure 1: Selection of schools and sampling details

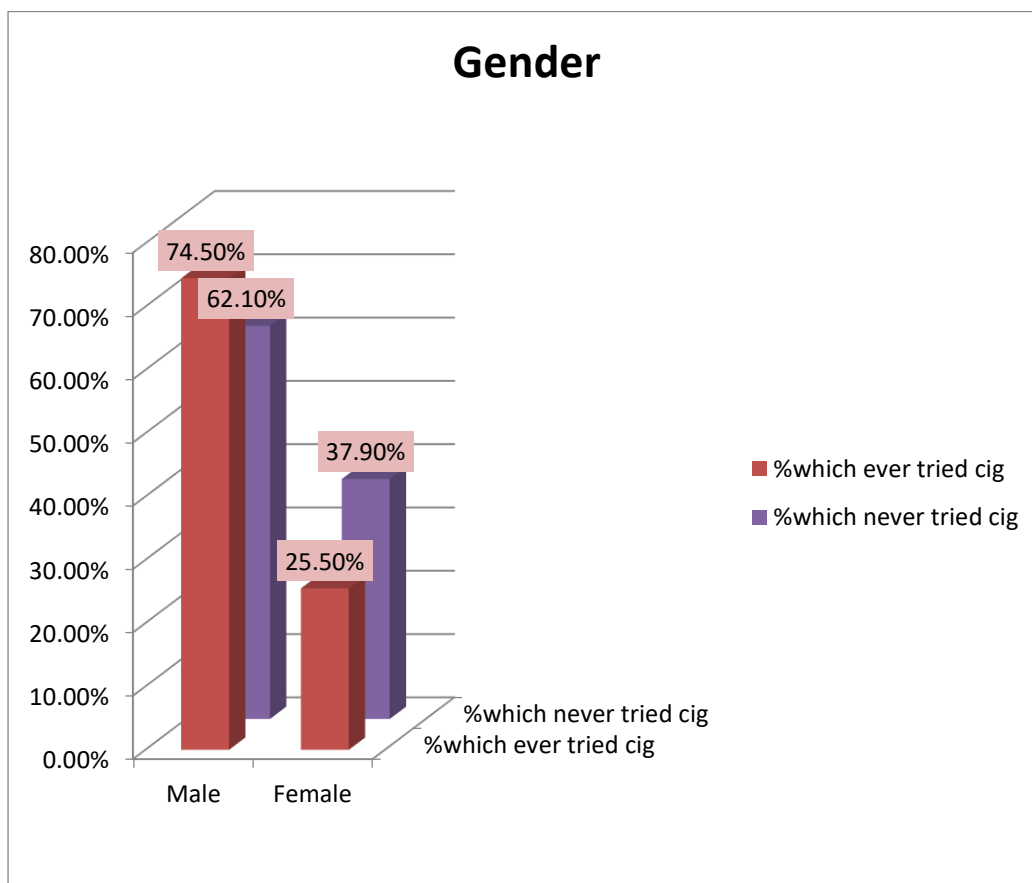


Figure 2 Prevalence of tobacco, stratified by Gender

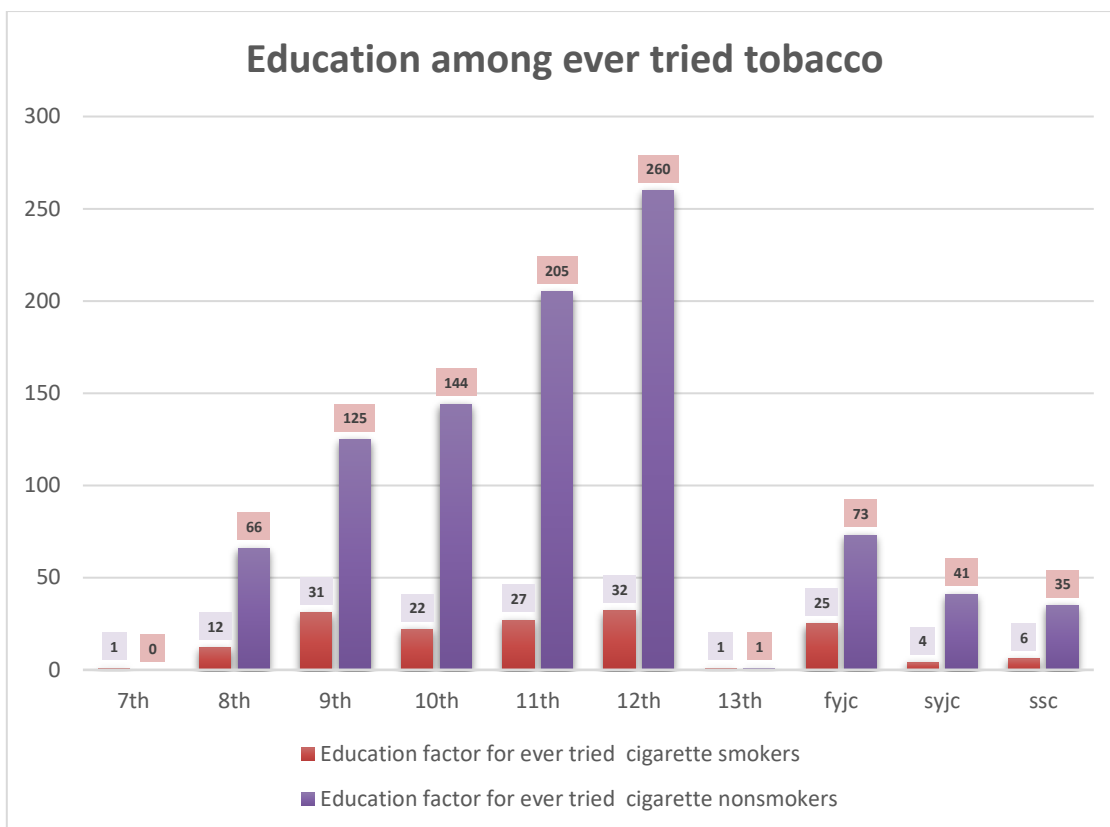


Figure 3 Prevalence of tobacco use among the adolescents by education.

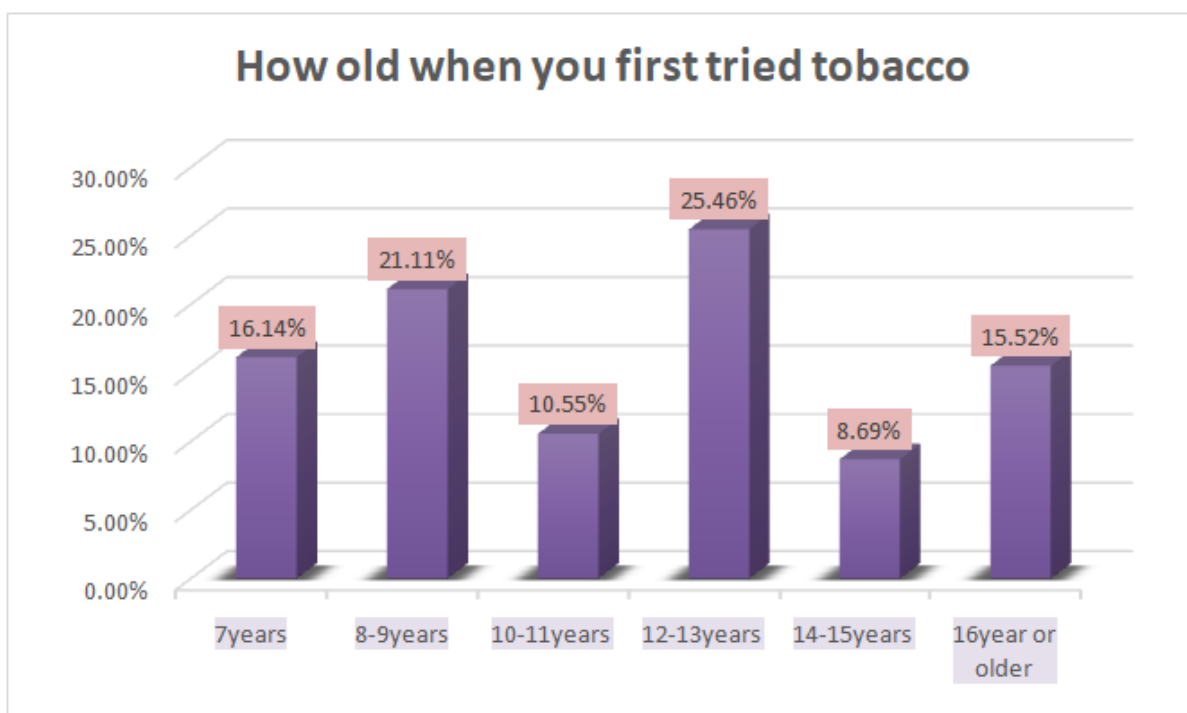


Figure 4 Prevalence of tobacco among adolescents stratified by age



Figure 5 Prevalence of smoking among adolescents by number of cigarettes in past 30 days

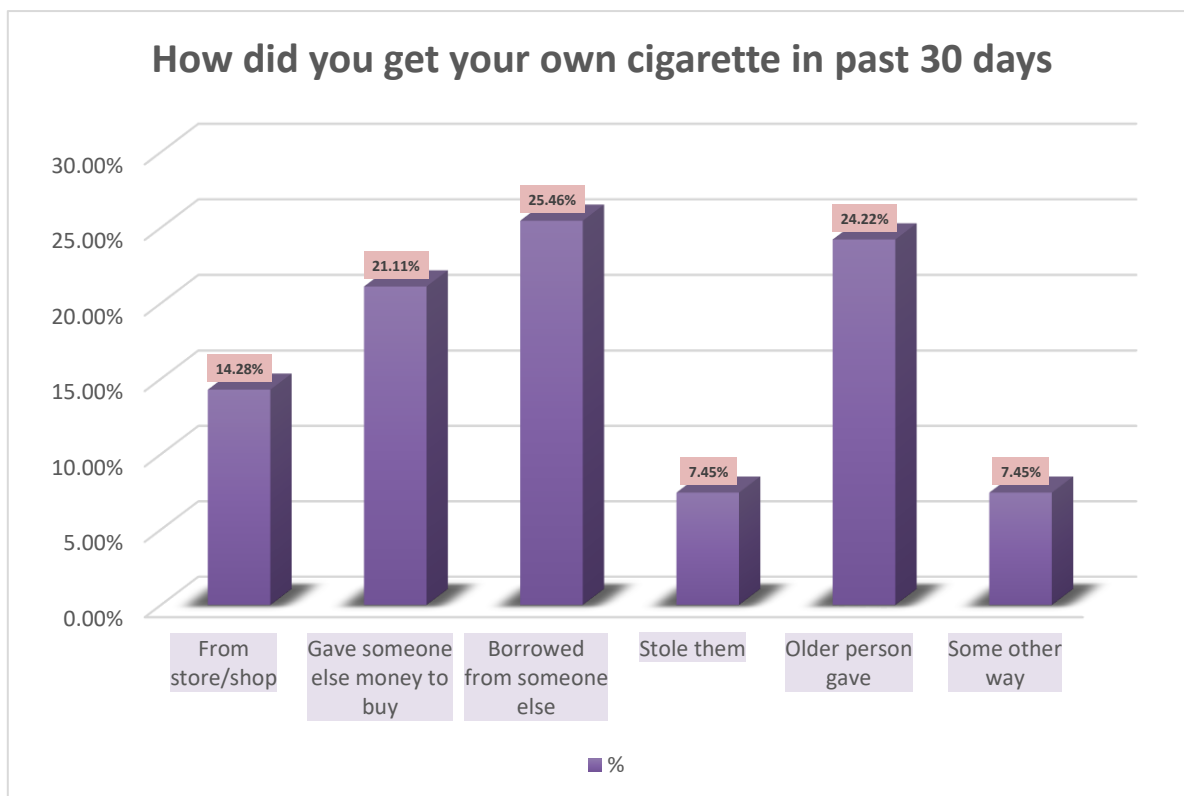


Figure 6 Prevalence of smoking among adolescents by mode of purchase of cigarette

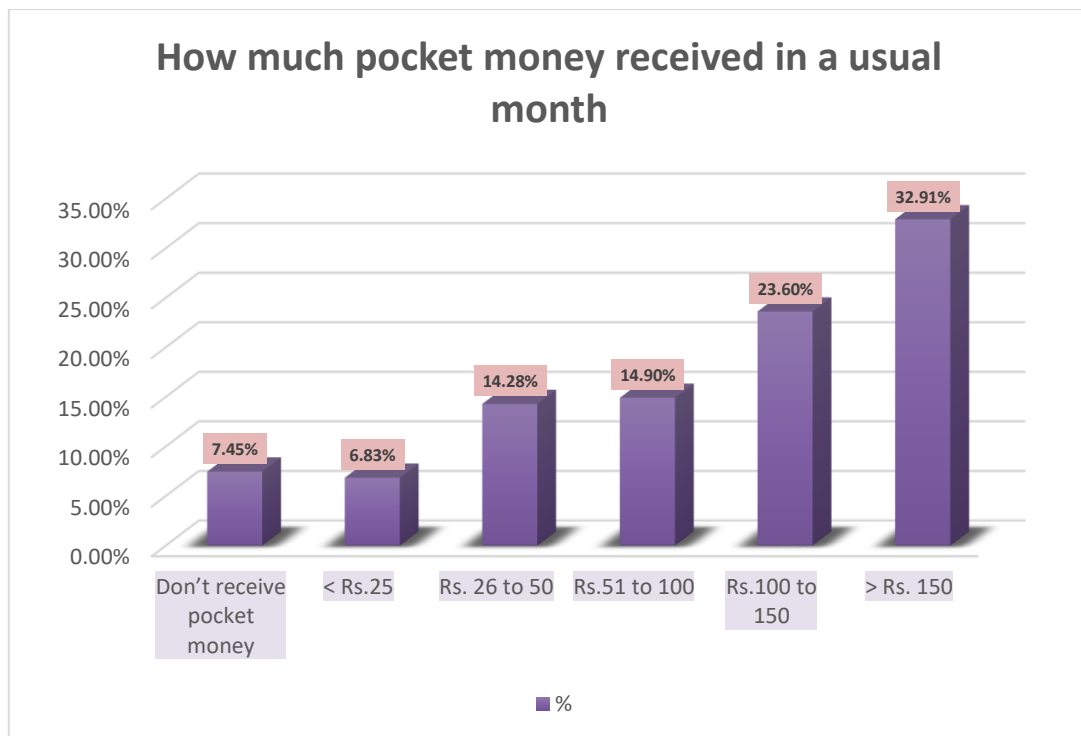


Figure 7 Prevalence of smoking among adolescents by the monthly allowance of children

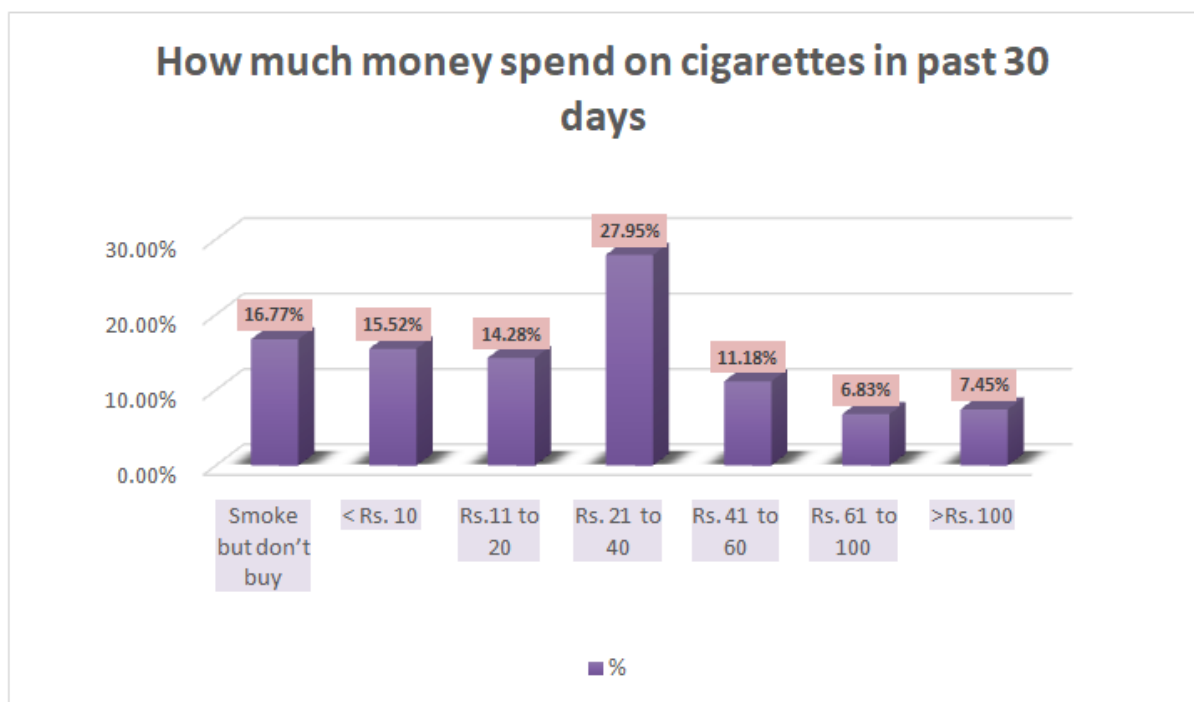


Figure 8 Prevalence of smoking among adolescents by money spend on cigarettes in past 30 days

Table 1: Association between tobacco use and different independent variables studies

Variable		Smoking n (%)	Non smokers	P value	ODDS ratio
Gender	Males	120(74.5)	590(62.1)	0.001	1.786
	Females	41(25.5)	360 (37.9)		

Parental tobacco use	Yes	90(55.9)	206(21.7)	0.000	2.846
	No	71(44.1)	744(78.3)		
Refusal to sell tobacco by shopkeeper	Yes	10(6.2)	5(0.5)	0.000	1.280
	No	151(93.8)	945(99.5)		
If your best friend offer cigarette, would you smoke?	Yes	139(86.3)	925(97.4)	0.000	0.171
	No	22(13.7)	25(2.6)		
Smoking is harmful	Yes	128(79.5)	895(94.2)	0.000	4.123
	No	33(20.5)	55(5.8)		
Your best friend smoke?	Yes	86(53.4)	293(69.2)	0.000	0.389
	No	75(46.6)	657(30.8)		
When you see a man smoking what do you think of him	He lacks confidence, stupid, a loser	142(88.2)	907(95.5)	0.001	0.354
	He is successful, intelligent, real man	19(11.8)	43(4.5)		
Passive smoking is harmful	Yes	130(80.7)	896(94.3)	0.000	3.953
	No	31(19.3)	54(5.7)		
During past 30 days how many anti smoking media messages have you seen	yes	40(24.8)	819(86.2)	0.000	2.067
	No	121(75.2)	131(13.8)		
How often do you see actor smoking in tv, movies or video?	yes	146(90.7)	917(96.5)	0.002	2.855
	No	15(9.3)	33(3.5)		
Do you have something with cigarette brand logo on it?(pen, pencil, backpack etc)	Yes	128(79.5)	869(91.5)	0.000	0.362
	No	33(20.5)	81(8.5)		
During past 30 days have you seen advertisements for cigarette on newspaper/ billboards/magazines?	Yes	58(36)	739(77.8)	0.000	1.972
	No	103(64)	211(22.2)		
Has teacher or any other person ever talked about harmful effects of smoking in class?	Yes	65(40.4)	277(29.2)	0.003	1.645
	No	96(59.6)	673(70.8)		
Alcohol intake	Never	20(12.4)	931(98)	0.000	0.144
	Yes	141(87.6)	19(2)		

p<0.05, statistically significant, chi-square test, CI-Confidence interval, SD- standard deviation, a Chi-square test

Table 2: Multiple logistic regression analysis with stepwise backward elimination to show effect of different factors independently on tobacco habit initiation and use among study participants

Variables		Adjusted Odds Ratio	95% Confidence Interval	P value
Parental tobacco use	No	0.425	0.288-0.627	0.00
	Yes	1		
Refusal to sell tobacco by shopkeeper	No	6.119	1.74-21.49	0.005
	Yes	1		
If friends offered cigarette Will you smoke	Yes	3.519	1.71-7.23	0.001
	No	1		
Smoking harmful to health	Yes	0.531	0.278-1.013	0.055
	No	1		
If your best friend smoke would you smoke	Yes	1.567	1.042-2.358	0.031
	No	1		
Passive smoking is harmful	No	0.372	0.196-0.708	0.003
	Yes	1		
Antismoking messages seen on billboards/media etc	Yes	0.558	0.338-0.922	0.023
	No	1		

P<0.05, CI Confidence interval, SD- standard deviation, Multiple logistic regression analysis

DISCUSSION

The WHO estimates that tobacco product has caused around 3 million deaths in a year in the early 1990s. The death toll is steadily increasing and unless the present trend of tobacco use isn't reversed, the figure is believed to surge to 10 million deaths per year by 2020s or early 2030s, with developing countries being affected the most.¹¹ In India's case, the population is expected to grow by about 300 million between 2000 and 2020.¹²

Tobacco usage among adolescents is a "need of the hour" which needs to be addressed. The study which we conducted reveals several findings regarding susceptibility, perceived risks, and harmful effects of smoking. We measured perceived risks of tobacco use among adolescents and the factors which influence them.

In our study, it was seen that the prevalence of tobacco initiation among boys was 74.5% and that of girls is (25.5%), showing a male dominant pattern of habit. The prevalence of smoking among women is low in most areas due to social unacceptability. Though the prevalence of smoking among Indian women is low at this point of time, it needs to be tracked carefully due to the increased marketing efforts and impact of globalization. There is already an indication that beedi and cigarette smoking is high (at least 30%) among women in Bihar and the northeastern states.¹³

Our study shows that the highest prevalence of tobacco use was seen in early age and adolescents with maximum of habitué following below the age of 15 years.(fig 3) A similar study done in Bengaluru city shows the same result that the age range of initiation spans from as low as 10 years to as high as 18 with maximum under the age of 15 years of age.¹⁴ However, a study in Alaska 2004 reported that cigarette smoking seems to peak at the ages from 18 to 24 years.¹⁵ This can be correlated to the ease of access to cigarettes, which calls for vigilant implementation of the laws.

Easier access to tobacco also paves the way for its much higher use, it was noted from our study that no counter questions were asked when an underage teen demanded for a cigarette. The most common ways teens get their hands on tobacco is either directly via shopkeeper, borrowing from someone or getting it from someone older than them or asking them to buy instead.

These calls for a shift of focus towards educating the minors, training the retailers as well as conducting regular checks via “dummy customer” who are minor and violators shall be fined. Additionally, prominent display of point-of-sale boards of “no sales to minors” which is required by law should be enforced and monitored by health, excise and other municipal officials who visit retail shops regularly.¹⁶

It is not surprising but of concern to find from the present study that higher percentage of tobacco users (79.5%) knew about the harmful effects of smoking i.e., respiratory illness, physical fatigue, serious oral health diseases etc yet continue with its consumption. Greater odds of finding alcohol consumption in those who were already a habitué (87.6%) was observed from the present study, which calls for an analysis that lack of knowledge is not the prime factor for indulging in tobacco. At times individuals with depression/anxiety also tend to start smoking at an earlier age, smoke more heavily, and are more addicted to cigarettes than the general population.¹⁷ This calls for further studies to be conducted in this field to associate and confirm the correlation between mental illness and smoking.

The study also reveals that 80.7% of smokers and 94.3% of non-smoker were aware about the ill effects of passive smoking. The public needs to be informed about the dangers of second-hand smoke as well as the existing law-The Cigarettes and Other Tobacco Products Act, 2003(section 4) No. 34 of 2003 needs to be implemented vehemently.

Teens are influenced by media, magazines and actors which may at times have an adverse effect on their cognitive behavior. Our study shows there is almost 2 times more risk of developing a smoking habit in those who saw cigarette ads on billboards and magazines or logo of cigarette brands on their belongings. Personalities in the public domain should realize that their resorting to the use of these substances in the public eye can seem like a virtual endorsement of these risk behaviors for their adolescent fans.¹⁸

Peer pressures, curiosity as well as a sense of feeling accepted by their friends were common reasons for higher likelihood of starting smoking in adolescents. The present study shows higher risk (53.4%) of smoking in those whose best friends smoke, and 86.3% of smokers revealed that they will indulge in smoking if their best friends offered them a cigarette. In developing countries, documented factors implicated in the initiation of tobacco use among youth include experimentation, peer pressure and sense of feeling more matured.¹⁹

Teens should be educated about the harmful effects, hard hitting media campaign should be conducted on all platforms to which teens are exposed. Social media should surge to influence the teens in the right way, frequent tobacco control messages should be displayed which should reverberate through the teens.

The type of family is also an important factor when you analyze influence on tobacco initiation. Our study shows a positive correlation between parental use and adolescent indulging in smoking, almost half the population of smokers who were part of the study shows either their dad or mom have a tobacco smoking habit. This can be a result of bad parenting, or at times parents sending their kids to buy a pack of cigarettes from the nearby vendor, exposes them to the environment, which can increase the likelihood of tobacco smoking in adolescents.

Our study shows almost 59.6% of the total smokers confirmed that they were educated about the ill effects of tobacco smoking by teachers. The recent Global Youth Tobacco Survey 2019 shows that 82.1% of schools in India follow tobacco-free school guidelines and 38.2%

schools were authorized by the state govt. to collect fine for violation under section 6 of COPTA act, 2003.²⁰

Through the present study it was noted that majority (27.9%) of children spent somewhere between Rs.20-40 on cigarettes in a month, which can be correlated to another observation from the study which shows that maximum children who indulged in smoking had a pocket money of more than Rs.150, this gives a clear indication as to how monetary support can be misused if not advised on properly, we can conclude by saying parents should be heedful to the money given as monthly allowances to their children and keep a watch on how their kids spend their money.

The present study concurs some limitations. There is lack of response on the type of smoking and smokeless forms they are indulging in. Furthermore, this study was limited to school going adolescents; further studies need to cover students who are out of school or from low social strata who are not enrolled in schools. Since it's a self-assessment questionnaire, there are chances of recall biases as few questions involves recall period up to 30 days. Furthermore, studies analyzing correlation between depression/anxiety and initiation of smoking needs to be conducted. Finally, the response of students willing to quit was not recorded.

CONCLUSION

The findings from this study suggest tobacco usage still being a risk factor among adolescents. It shows a strong influence of multiple psychosocial and environment factors that affect the tobacco related behavior. Hence preventive programs should focus on these multiple aspects.

Ease of availability, peer pressure and alcohol consumption are few of the factor which are in correlation with tobacco usage among adolescents. The school should follow strict "no tobacco" policy and offenders should be punished/fined. Teachers should set a good example and motivate children to steer clear of tobacco. The government and law enforcements need to be very vigilant while handling sale of tobacco to minors, COPTA act needs be set into action more vigorously. This study was restricted to Mumbai Metropolitan region. Further studies are recommended with more detailed analysis of various factors which affect the tobacco behavior among adolescents in wider geographical area. This will help in targeted intervention for tobacco control.

SOURCES OF FUNDING

Nil.

CONFLICT OF INTEREST

None declared

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