Tobacco smoking habits and nicotine dependence among the college students of University of Delhi, India

Bhushan D. Kamble1, Bhabani P. Acharya2, Sumit Jethani3, Vinoth G. Chellaiyan4, Sunil K. Singh3, Satish Chaku5

1Department of Community Medicine and Family Medicine, All India Institute of Medical Sciences, Bibinagar, Hyderabad Metropolitan Region, Telangana, 2Department of Community Medicine, 166 Military Hospital, Satwari, Jammu, Jammu and Kashmir, 3Department of Community Medicine, North DMC Medical College and Hindu Rao Hospital, Delhi, 4Department of Community Medicine, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, Chennai, Tamil Nadu, 5Department of Emergency Medicine, Asian Institute of Medical Sciences, Faridabad, Haryana, India

ABSTRACT

Background: According to the report on tobacco control in India, tobacco use causes eight to nine lakh deaths annually in India. Tobacco use is on the rise among youngsters especially the college students. The Government of India has made a mandatory display of pictorial health warnings for both smoking and smokeless forms of tobacco products under the Cigarettes and Other Tobacco Product Act, 2003. The objective of the present study was to assess the prevalence of tobacco smoking and to assess nicotine dependence among the college students of the University of Delhi. Methods: A cross-sectional study was conducted among 400 college students of Delhi University from October to December 2019. A semi-structured self-administered questionnaire method was used to collect data on smoking; pictorial warnings and Fragerstrom criteria were used to assess nicotine dependence. Result: Out of the 400 study participants 92 (23%) participants were ever smokers. Among 62 current smokers, the mean age (±SD) of initiation of smoking was 17.3 years (±2.07), median (interquartile range [IQR]) number of cigarettes smoked per day was 3 (2–6), a majority (80.7%) used to smoke after 30 min of waking up in the morning, majority (59.7%) had low nicotine dependence. About half of the past smokers 47% (14 out of 30) and the current smokers 58% (36 out of 62) told that they had no effect of pictorial warning for quitting or decreasing smoking. Conclusion: The present study revealed the tobacco smoking pattern among college students of Delhi. The majority of smokers and non-smokers perceived that pictorial warning is ineffective in driving to quit smoking.

Keywords: College students, Fagerstrom score, pictorial warning, smoking

Introduction

Tobacco use is one of the main risk factors for several non-communicable diseases (NCDs). Tobacco control is important to achieve Sustainable Developmental Goal (SDG) especially SDG 3 – to “Ensure healthy lives and promote well-being for all at all ages” to reduce premature mortality from NCDs by one third by 2030 (target 3.4). Tobacco Control Legislation in India dates back to 1975, when the cigarettes act (Regulation of Production, Supply, and Distribution Act 1975) was enacted. Global Adults Tobacco Survey-2 (GATS-2) reported that 34.6% of the individuals in India use some form of tobacco.

Address for correspondence: Dr. Vinoth G. Chellaiyan, Department of Community Medicine, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, Chennai, Tamil Nadu, India. E-mail: drchellaiyan@gmail.com

Received: 02-11-2021 Revised: 04-02-2022 Accepted: 07-02-2022 Published: 30-06-2022

Access this article online

Quick Response Code: doi: 10.4103/jfmpc.jfmpc_2172_21

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_2172_21

How to cite this article: Kamble BD, Acharya BP, Jethani S, Chellaiyan VG, Singh SK, Chaku S. Tobacco smoking habits and nicotine dependence among the college students of University of Delhi, India. J Family Med Prim Care 2022;11:2965-70.
tobacco. In 2014, 60% of deaths in India were associated with tobacco use.\(^\text{[9]}\)

Pictorial warning labels (PWLS) on tobacco product packaging constitute effective tobacco prevention and control policy. PWLS are effective in communicating the health risks of tobacco use.\(^\text{[14,15]}\) To decrease the consumption of tobacco products Conference of the Parties (COP) adopted guidelines for implementation of Article 11 of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) on “Packaging and labelling of Tobacco Products” in November 2008.\(^\text{[7]}\) Making it mandatory that smokers be informed about the consequences of smoking will also act as a motivating factor to quit smoking. Between 2014 and 2016, 34 countries including India and Bangladesh, with a total of two billion people adopted large graphic PWLS on cigarette and smokeless tobacco packs.\(^\text{[8]}\) India ranks fifth along with Hong Kong, Thailand among 118 countries in terms of the largest pictorial warning on cigarette packs (85% of both sides covered) with Timor-Leste being at the top position (92.5%).\(^\text{[9]}\)

Globally, tobacco is consumed mostly in the smoking form.\(^\text{[10]}\) It has been observed that adolescence is an important stage where most smokers get into the habit of it. Stressors of the adolescent years seem to play an important role in initiating and maintaining the smoking behavior among them. College students due to peer pressure, stress, fun, and curiosity engage themselves in smoking at a young age and continue this into adulthood.\(^\text{[11,12]}\) The previous study reported that college students do not heed smoking-associated warnings and are less concerned about health outcomes associated with smoking.\(^\text{[13]}\) The study is done comprehensively to assess the burden of nicotine dependence and also measures the impact of pictorial warning on smoking cessation. Hence this study was conducted to assess the prevalence of tobacco smoking, nicotine dependence, and the influence of pictorial warnings on cigarette packages on smoking abstinence among college students of South Campus, Delhi University.

Material and Methods

Study design and setting: The present study was a cross-sectional study conducted among college students of the South Campus of Delhi University from October to December 2019. There were 21 colleges in the South Campus of Delhi University, out of which 5 colleges were randomly selected. The colleges selected were: Sri Venkateshwara College, Atma Ram Sanatan Dharam College, Ram Lal Anand College, Motilal Nehru College, and Sri Aurobindo College.

Sample size

Sample size was calculated considering the prevalence of current smoking among the college students of Delhi, as 28% of the study was done by Sharma et al.\(^\text{[9]}\) A sample size of 322.5 arrived with 28% prevalence, 95% confidence interval, and 5% absolute error. Adding it for 20% of non-response rate the sample size arrived was 387. In the present study, 400 college students were enrolled. Of these 80 study participants per college were randomly selected as per university enrolment number and were included.

Study tool

A pretested self-administered, semi-structured questionnaire printed in the English was used as the data collection instrument. The questionnaire comprised of 15 questions divided into three sections: (a) sociodemographic details, (b) smoking pattern and nicotine dependence, and (c) influence of pictorial warning on smoking abstinence. Nicotine dependence was assessed using the Fagerstrom criteria.\(^\text{[18]}\) It comprises six questions about the smoking habit and a score was given for each question and the cumulative score was categorised. A total score of 1–2 meant low dependence, 3–4 was low to moderate dependence, 5–7 was equal to moderate dependence, and more than 8 meant high dependence.

Data analysis

Data entry was done in Microsoft Excel 2019 spreadsheet. STATA vs. 16 was used for data analysis. Descriptive statistics were calculated (mean, median, proportion, and percentages) for sociodemographic and other characteristics. Categorical variables were compared using the Chi-square test and Fischer’s exact test for quantitative variables, Student’s t-test and Wilcoxon rank-sum test were used. P < 0.05 was considered statistically significant.

Ethical issues

Ethical approval was taken from the Institutional Ethics Committee of North DMC Medical College and Hindu Rao Hospital, Delhi (No. IECDR-88/2019). Permission was taken from the college principals for conducting the study within the college campus. Participation in the study was voluntary. Written informed consent was obtained from all the participants before they participated in this study. Anonymity and confidentiality of the study subjects were maintained.

Results

A total of 400 college students of the South Campus of Delhi University participated in the study. The mean age (±SD) was 19.2 years (±1.3). More than two third of the students were male (69.5% vs 30.5%). Majority of the students were Hindu (88.7%). Similarly, most of them were unmarried (98.7%) and the smoker population had a higher family income than the non-smoker population (₹25000 vs ₹23000). There were (92 out of 400) 23% (95% CI: 19%, 27%) of college students who smoked ever in their lifetime. Among the smokers, 15% (14 out of 92) were female, while 85% were male. This difference was found to be statistically significant [Table 1]. Out of the 400 college students, 62 (15.5%) students were found to be current smokers, 30 (7.5%) were found to be past smokers, and 92 (23%) were found to be ever smokers. There was no significant difference between age (P = 0.15) and sex (P = 0.78)
among current and past smokers. In the current smoker group, more than one-third of the students (38.7%) started cigarette smoking at the age of 17–18 years and the mean age (±SD) of starting smoking was 17.3 years (±2.07), median (IQR) number of cigarettes smoked per day was 3 (2–6), the majority (80.7%) used to smoke after 30 min of waking up in the morning. Nearly one third (32.3%) used to smoke more frequently in the morning and less than half (43.5%) hated to give up the morning dose of smoking. Among 62 current smokers, nearly one fourth (27.4%) tried to quit smoking 1–3 times and around (21%) tried to quit smoking more than thrice. A majority (59.7%) were low dependent on nicotine as per the Fagerstrom score and around 10% were moderately dependent on nicotine [Table 2]. Out of the 92 ever smokers, nearly half (45%) knew that smoking causes lung cancer and 6.5% knew that smoking can cause respiratory problems and death. Around 20% of ever smokers did not know the ill effect of smoking among which most of them (78.9%) were current smokers. There was no significant difference among male and female ever smokers regarding knowledge about the harmful effects of smoking (P > 0.05) [Figure 1].

### Influence of pictorial warning

Nearly half of the past smokers 47% (14 out of 30) and current smokers 58% (36 out of 62) told that they had no effect of pictorial warning for quitting or decreasing smoking and this finding was statistically significant (P < 0.001). Around one fourth (24.2%) ever smokers told that pictorial warnings motivated them to quit smoking [Figure 2]. Out of 308 non-smokers, nearly half (52.6%) were of the opinion that pictorial warning was ineffective in quitting smoking whereas only 8.4% of non-smokers perceived it to be effective for quitting. Nearly two third students 69.2% (213 out of 308) had the opinion that pictorial warning on the package was neither effective for quitting nor for decreasing frequency of smoking and the finding was statistically significant. (P value < 0.001) [Figure 3].

### Discussion

The present study was conducted among 400 college students of the University of Delhi. There were 92 (23%) ever smokers, out of which 62 (15.5%) were current smokers. The prevalence was similar to the other studies.[14,16–18] Raj Kumar et al.[18] in their study conducted among 2599 Delhi university college students, in 2010, reported that 15.8% were current smokers which were similar to our finding. Sharma V et al.[19] reported that 12.8% of college students were smokers in their study conducted in Bengaluru. Sharma R et al.[20] found the prevalence of smokers to be 16% among the students of Delhi. This difference in findings may be due to the differences in age groups of the study participants and the sample size. While GATS-2 found the prevalence of smokers in India to be 10.7% which is lower compared to our study.[20] Also, in our study the age of initiating smoking was observed to be 17–18 years for the majority of the participants. Similarly,

### Table 1: Baseline characteristics of study participants (n=400)

| Variables               | Ever Smoker (n=92) n (%) | Non-smoker (n=308) n (%) | Total (n=400) n (%) | P       |
|-------------------------|--------------------------|--------------------------|---------------------|---------|
| Mean age, in years (±SD)| 19.55 (±1.18)            | 19.07 (±1.32)            | 19.2 (±1.30)        | 0.002<sup>a</sup> |
| Sex                     |                          |                          |                     |         |
| Male                    | 78 (28.1)                | 200 (71.9)               | 278 (100)           | <0.001  |
| Female                  | 14 (11.5)                | 108 (88.5)               | 122 (100)           |         |
| Years of schooling      |                          |                          |                     |         |
| 13                      | 39 (28)                  | 100 (72)                 | 139 (100)           | 0.17    |
| 14                      | 24 (18.6)                | 105 (81.4)               | 129 (100)           |         |
| 15                      | 29 (22)                  | 103 (78)                 | 132 (100)           |         |
| Religion                |                          |                          |                     |         |
| Hindu                   | 79 (22.3)                | 276 (77.7)               | 355 (100)           | 0.11<sup>a</sup> |
| Muslim                  | 3 (17.6)                 | 14 (82.4)                | 17 (100)            |         |
| Christian               | 4 (44.4)                 | 5 (55.6)                 | 9 (100)             |         |
| Sikh                    | 2 (16.7)                 | 10 (83.3)                | 12 (100)            |         |
| Others                  | 4 (57.1)                 | 3 (42.9)                 | 7 (100)             |         |
| Monthly family income (₹) median (IQR) | 25000 (16000, 45000) | 23000 (14700, 45000) | 25000 (15000, 45000) | 0.30<sup>a</sup> |
| Marriage                |                          |                          |                     |         |
| Unmarried               | 91 (23)                  | 304 (77)                 | 395 (100)           | 0.87<sup>a</sup> |
| Married                 | 1 (20)                   | 4 (80)                   | 5 (100)             |         |

<sup>a</sup>Student’s t-test, *Wilcoxon Rank-sum test, Fischer’s exact test

### Figure 1: Awareness about harmful effects of smoking among ever smokers (n = 92)

![Figure 1: Awareness about harmful effects of smoking among ever smokers (n = 92)](image-url)
Kamble, et al.: Nicotine dependence in tobacco smokers

Table 2: Distribution of current smokers according to smoking behaviour pattern (n=62)

| Behaviour Variables | Male (n=53) | Female (n=9) | Total (n=62) | P |
|---------------------|------------|-------------|--------------|---|
| Mean age of initiation of smoking, in years (±SD) | 17.28 (±1.91) | 17.55 (±3.00) | 17.32 (±2.07) | 0.71* |
| Number of cigarettes smoked/day median (IQR) | 3 (2-4) | 5 (3-5) | 3 (2-6) | 0.62* |
| Time of first smoke after waking up | | | | |
| 0 min | 1 (100%) | 0 (0%) | 1 (100%) | 0.77* |
| 5-30 min | 10 (91%) | 1 (9%) | 11 (100%) | |
| >30 min | 42 (84%) | 8 (16%) | 50 (100%) | |
| Difficult to give up morning dose | 24 (89%) | 3 (11%) | 27 (100%) | 0.72* |
| Smoking more frequently in the morning | 16 (80%) | 4 (20%) | 20 (100%) | 0.45 |
| Cannot skip smoking even in sickness | 14 (82%) | 3 (18%) | 17 (100%) | 0.69 |
| Tried to quit | | | | |
| Never | 27 (84%) | 5 (16%) | 32 (100%) | 0.80* |
| 1-3 times | 14 (82%) | 3 (18%) | 17 (100%) | |
| >3 times | 12 (92%) | 1 (8%) | 13 (100%) | |
| Nicotine dependence (Fagerstrom score) | | | | |
| Low (1-2) | 31 (84%) | 6 (16%) | 37 (100%) | 0.17* |
| Low to moderate (3-4) | 18 (95%) | 1 (5%) | 19 (100%) | |
| Moderate (5-7) | 4 (67%) | 2 (33%) | 6 (100%) | |

*Student’s t-test, Wilcoxon rank-sum test, Fischer’s exact test

Figure 2: Effect of pictorial warning among every smoker group. (Current smoker (n = 62) and past smoker (n = 30))

Figure 3: Perception about the effectiveness of pictorial warning for quitting/decreasing frequency of smoking among non-smokers (n = 308)

to quit smoking. Our finding was supported by Pepper et al[24] in their study among adolescent Americans. A systematic review by Francis et al[25] reported that PWLs on packs were found to be effective in changing smoking behavior, but their influence on the young population is smaller than expected. Despite the pictorial warnings on cigarette packs, the young population in total were not convinced about the harmful effects of tobacco smoking. This could be due to the time taking natural history of the disease pattern, far off consequences, and these young people do not happen to see the link between tobacco smoking and chronic diseases. Another meta-analysis by Noar et al[26] reported that pictorial warning has an effect on more quitting smoking and garnered emotional and stronger cognitive reactions. Health education and motivation by primary care physicians is a key role which could complement to pictorial warning in tobacco cessation of students.

Although the present study gives important insight into tobacco use among college students of Delhi, it has certain limitations. Since data were gathered using a self-administered questionnaire and collected only at a single point of time, both overreporting and underreporting are possible. Recall bias can also be possible. The interpretations are restricted to college-going students only. Qualitative research methods like focused group discussions can
be utilized in further studies to have an in-depth knowledge of the reasons for tobacco smoking and the infectiveness of pictorial warnings among college students.

Conclusion and Recommendations

The present study revealed a higher prevalence of ever and current tobacco smokers among college students of Delhi University. The prevalence of tobacco smoking was higher among males than females. The results highlighted that among 92 ever smokers, only 16.3% of students quit smoking while nearly one third (29.3%) decreased the frequency of smoking due to pictorial warnings. Nearly half of the ever smoker and half of the non-smoker students perceived that pictorial warning was ineffective to quit smoking. Thus, there is a dire need for strategies and policies regarding awareness generation about the consequences of tobacco use specific to the adolescent and young populations. As youth and young adults represent a key population, a special package of policies and strategies could help in the change of tobacco smoking behavior among them.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. World Health Organisation. Tobacco threatens us all. Available from: http://apps.who.int/iris/bitstream/handle/10665/255561/WHO-NMH-PND-17.2-eng.pdf;jsessionid=647076DDC5DBDF8368FF8BDDE44E292?sequence=1.

2. WHO, MOHFW, TISS. Global Adult Tobacco Survey FACT SHEET INDIA 2016-17. Available from: https://mohfw.gov.in/sites/default/files/GATS-2%20FactSheet.pdf.

3. MOHFW, GOI. Economic Burden of Tobacco-Related Disease in India. Available from: https://mohfw.gov.in/sites/default/files/Report%20on%20Economic%20Burden%20of%20Tobacco%20Related%20Diseases%20in%20India.pdf.

4. Masud N, Azzahrazi ZK, Towhari JA, Alquayt MF, Kanadily FA, AlTowairiki RS, et al. Pictorial health warnings on cigarette packs and effect on smoking: Medical student’s perspective. J Pak Med Assoc 2020;70:1042-7.

5. Noar SM, Francis DB, Bridges C, Sontag JM, Brewer NT, Ribisl KM. Effects of strengthening cigarette pack warnings on attention and message processing: A systematic review. J Mass Commun Q 2016;94:416-42.

6. Noar SM, Francis DB, Bridges C, Sontag J, Ribisl K, Brewer N. The impact of strengthening cigarette pack warnings: Systematic review of longitudinal observational studies. Soc Sci Med 2016;164:118-29.

7. WHO Framework Convention of Tobacco Control. Guidelines for implementation of Article 11 Packaging and labelling of tobacco products. Available from: http://www.who.int/fctc/treaty_instruments/adopted/Guidelines_Article_11_English.pdf.

8. World Health Organization. WHO report on the global tobacco epidemic, 2017: Monitoring tobacco use and prevention policies. Geneva, Switzerland: World Health Organization; 2017. Available from: http://www.who.int/tobacco/global_report/2017/executive-summary/en/.

9. The Canadian Cancer Society International Tobacco Packaging Report [Internet]. Framework Convention Alliance. 2018. Available from: https://www.fctc.org/the-canadian-cancer-society-international-tobacco-packaging-report/. [Last accessed on 2020 May 02].

10. Gupta PC, Sinha DN. Tobacco research in India. Indian J Public Health 2004;48:103-4.

11. Arrozola RA, Ahluwalia IB, Pun E, Garcia de Quevedo I, Babb S, Armour BS. Current tobacco smoking and desire to quit smoking among students aged 13-15 years: Global youth tobacco survey, 61 countries, 2012-2015. Morb Mortal Wkly Rep 2017;66:1337-47.

12. Kumar R, Saroj SK, Kumar M, Mahakud GC. Prevalence of smoking among college students of Delhi University. Indian J Chest Dis Allied Sci 2010;61:31-7.

13. Le Grande M, Borland R, Yong HH, McNeill A, Fong G, Cummings KM. Age related interactions on key theoretical determinants of smoking cessation: Findings from the ITC Four Country Smoking and Vaping Surveys (2016-2020). Nicotine Tob Res 2021;23:1020-30. doi: 10.1093/ntr/ntrb230.

14. Sharma N, Singh MM, Ingle GK, Jiloha RC. An epidemiological study of cigarette smoking among male college students of Delhi University. Indian J Community Med 2006;31:35-8.

15. Kotz D, Batra A, Kastau S. Smoking cessation attempts and common strategies employed. Dtsch Arztebl Int 2020;117:7-13.

16. Gupta S, Mishra P, Nagarajappa S, Kumar S, Lalani A. Prevalence of tobacco and associated risk factors among university law students in Indore City. Indian J Dent Res 2019;30:10-4.

17. Aggarwal S, Sharma V, Randhawa H, Singh H. Knowledge, attitude and prevalence of use of tobacco among medical students in India: A single centre cross-sectional study. Ann Trop Med Public Health 2012;5:327-9.

18. Waters AF, Peltier MR, Roys MR, Stewart SA, Copeland AL. Smoking and suicidal ideation among college students: Smoking expectancies as potential moderators. J Am Coll Health 2021;69:951-8.

19. Sharma V, Hiremath SS, Puranik M, Somasundara S. Prevalence of tobacco use among 15-20 years old college students in Bengaluru city. J Indian Assoc Public Health Dent 2015;13:24-9.

20. Sharma R, Grover VL, Chaturvedi S. Tobacco use among adolescent students and the influence of role models. Indian J Community Med 2010;35:272-5.

21. GOI MOHFW. NFHS Fact Sheet 4 2015-16. Available from: http://rchiips.org/NFHS/pdf/NFHS4/India.pdf.

22. Rajeswary K, Madan Kumar PD, Shivakumar M, Lenin KR. Role of pictorial warning on cigarette packets in tobacco cessation: A questionnaire survey among cigarette smokers in Chennai. Indian J Pharm Biol Res 2012;3:182-6.

23. Karibasappa GN, Nagesh L, Usha GV, Prakash S. Assessment of awareness about pictorial warnings on tobacco products among 15 years and above age in Davangere City, Karnataka, India-A cross-sectional survey. Indian J Stomatol 2011;2:227-32.

24. Pepper JK, Cameron LD, Reiter PL, McRee A-L, Brewer NT. Non-smoking male adolescents’ reactions to cigarette
warnings. PLoS One 2013;8:1-7.
25. Francis DB, Mason N, Ross JC, Noar SM. Impact of
tobacco-pack pictorial warnings on youth and young adults:
A systematic review of experimental studies. Tob Induc Dis
2019;17:41.
26. Noar SM, Hall MG, Francis DB, Ribisl KM, Pepper JK,
Brewer NT. Pictorial cigarette pack warnings: A meta-analysis
of experimental studies. Tob Control 2016;25:341-54.