Original Article

Study of the prevalence of tobacco consumption among apparently healthy adult males in an urban area

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Abstract

Background: Keeping in view the role of tobacco consumption as a modifiable risk factor in various diseases and gaps in scientific knowledge among the apparently healthy adult male population in India, the researchers chose to undertake this study. **Materials and Methods:** A cross-sectional study was conducted among apparently healthy adult males employed in various government offices to determine the prevalence of tobacco consumption. The minimum sample size to estimate a 95% confidence interval for the prevalence of tobacco consumption with 5% absolute precision was calculated to be 340. However, 500 subjects were included in the study. The tool used for data collection was the "personal interview technique." Standard statistical methods were utilized for data analysis. **Results:** The overall mean age (standard deviation (SD)) of the study subjects was 30.96 yrs (4.32). Overall, the mean (SD) of number of years of tobacco use was 5.64 years (1.98). The mean (SD) of number of cigarettes smoked per day was 6.36 (3.09). The prevalence of current smokers showed a statistically significant increase from the age groups of 20–29 yrs to 50–59 yrs ($P < 0.001$). All subjects in the study were able to name at least three harmful effects of tobacco consumption. The overall mean amount spent on tobacco consumption per month was Rs 536.97 (1.44% of basic salary). Overall, the most common reason for smoking was peer pressure, where 40 (93.02%) gave this reason. Of forty-three tobacco users, 27 (62.79%) expressed a desire to quit tobacco consumption. The most common reason for expressing a desire to quit tobacco was the ill effects of tobacco consumption, where 23 (85.18%) tobacco users gave this reason. **Conclusion:** Our study on the prevalence of tobacco consumption among government employees provides an adequately clear picture of this public health epidemic in India. There is an immediate need for target group-specific policies for tobacco control, which should be integrated with the relevant national health programs at all levels.

Keywords: Consumption, males, population, quitting, tobacco

Introduction

Tobacco alone is responsible for far more deaths than all other psychoactive substances combined. It causes approximately 3 million premature deaths every year and nearly 30 percent of all cancer deaths in developed countries.[1-3]

On carrying out an extensive review of the literature, the researchers observed that adequate published literature was available regarding the prevalence of e-cigarette smoking and the prevalence of exposure to e-cigarette advertisements.[4,5] However, the published data available on the actual prevalence of tobacco consumption among apparently healthy adult males in our country were conspicuous by its paucity. The researchers observed gaps in

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scientific knowledge about tobacco consumption practices among this particular subset of the population in our country, which need to be filled. Keeping in view the role of tobacco consumption as a modifiable risk factor in various diseases, and the inadequate literature available in this field among apparently healthy adult males, the researchers chose to undertake this study.

The primary objective of our study was to estimate the prevalence of tobacco consumption among apparently healthy adult males. The secondary objectives were to estimate the number of cigarettes or beedis smoked per day and the average amount spent on purchasing tobacco products per month.

Materials and Methods

General settings and research design

A cross-sectional study was conducted among apparently healthy adult males to determine the prevalence of tobacco consumption.[6] The study population comprised government employees working in various government offices or establishments in the study area.

Place of study and study period

The study was conducted in an urban area in Western Maharashtra between July and December 2022.

Inclusion criteria

All available employees on the strength of the government office or establishment, those who were present on the day of the survey, those who were apparently healthy based on history given by themselves about any chronic illness or any symptom of any disease, and those who gave their consent were included in the study sample.

Exclusion criteria

All available employees on the strength of the government office or establishment, those who were absent on the day of the survey or were not apparently healthy based on history given by themselves about any chronic illness or any symptom of any disease, or who did not give their consent were excluded from the study sample.

Ethical approval

Ethical approval was obtained from the institutional ethical committee before the commencement of the study.

Sample size and sampling technique

The sample size was calculated to estimate a 95% confidence interval for the prevalence of tobacco consumption with 5% absolute precision. Studies conducted by previous researchers in this field indicated that the prevalence of tobacco consumption varied from 10% to 33%.[2,3,7,8]

The minimum sample size was calculated to be 340 assuming the prevalence to be 33%. However, 500 apparently healthy adult males were included in the study, thus substantially increasing the power of the study. Of these 500 study subjects, 100 were class I employees and 400 were class II employees. The study subjects were selected using stratified random sampling. Thus, there were two strata of study subjects, viz first stratum comprising class I employees and second stratum comprising class II employees. These classes, respectively, correspond to the upper (I) and upper middle (II) classes of the modified Kuppuswamy Scale 2022.[9]

Instruments and techniques

Based on advice from various experts in the field and available literature, a questionnaire tool was developed. The tool was pretested using a pilot study. Based on the findings of the pilot study, the tool was suitably modified. The researchers utilized the technique of "Personal interview" for data collection from the study subjects. Standard statistical methods, IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp., were utilized to conduct the data analysis.[10,11]

Results

The researchers included 500 apparently healthy adult males in the study. The stratum-wise age distribution of the study subjects is tabulated in Table 1. The mean age (SD) of the study subjects in the first and second strata and overall was 27.69 yrs (3.63), 32.76 yrs (4.56), and 30.96 yrs (4.32), respectively.

Of 500 study subjects, 43 (8.6%) were currently using tobacco, in any form, while the corresponding figures in the first and second strata were 8 (8%) and 35 (8.75%), respectively. Of the 43 tobacco users, 23 were smoking cigarettes of various brands. Twenty were consuming smokeless tobacco in the form of khaini, gutka, zarda, etc., Thus, the prevalence of smokeless tobacco use was 4%.

The number of years of tobacco use including smokeless tobacco use in each stratum is tabulated in Table 2. Overall, the mean (SD) of number of years of tobacco use was 5.64 years (1.98).

The number of cigarettes smoked per day in each stratum and overall is tabulated in Table 3. The mean (SD) of number of cigarettes smoked per day was 6.36 (3.09). Of twenty smokeless tobacco users, eight (40%) were using these products less than three times a day. Eleven (55%) were using these products three

Table 1: Age distribution of each stratum

Age group	First stratum numbers (%)	Second stratum numbers (%)	Total
20–29	022 (22.00)	043 (10.75)	065 (13.00)
30–39	069 (69.00)	325 (81.25)	394 (78.80)
40–49	004 (04.00)	020 (05.00)	024 (04.80)
50–59	005 (0.00)	012 (03.00)	017 (3.40)
Total	100 (100.00)	400 (100.00)	500 (100.00)

In the second and third columns, the percentages are calculated based on the total number of study participants in each stratum. In the last column, the percentages are calculated based on the total number of study participants including both strata

to five times per day, while one (5%) was using them more than five times a day. These findings are presented in Figure 1.

The age group-wise prevalence of current smokers including cigarette and smokeless tobacco users is tabulated in Table 4. The prevalence of current smokers increased from the age group of 20–39 yrs to 40–59 yrs. This increase was statistically significant ($P < 0.0001$).

All the subjects in both strata were able to name at least three harmful effects of tobacco consumption.

The most common source of information regarding the harmful effects of tobacco in the first strata was the Internet, where 96 (96%) reported the source of information as the Internet. The next most common sources of information were television or radio (88 (88%)) and family doctor or hospital (83 (83%)), followed by friend or relative (78 (78%)). In the second strata, the most common source of information as reported by the study subjects was the Internet, where 345 (86.25%) reported the source of information as Internet. This was followed by family doctor or hospital (315 (78.75%)), television or radio (306 (76.50%)), and friend or relative (267 (66.75%)). These findings pertaining to the first and second strata are presented in Figures 2 and 3, respectively.

The overall mean amount spent on tobacco consumption per month was Rs 536.97 (1.44% of the monthly basic salary). The stratum-wise mean amount spent on tobacco consumption per month and the mean percentage of monthly basic salary spent on tobacco consumption are tabulated in Table 5. Overall, the most common reasons for smoking across all strata were peer pressure, to relax and feel like the hero, where 40 (93.02%), 31 (72.09%), and 25 (58.13%) of 43 current smokers, respectively, gave this reason.

Of forty-three tobacco users, 27 (62.79%) expressed a desire to quit tobacco consumption. Of these, 20 (74.07%) expressed a desire to quit tobacco consumption within the next six months, while the remaining seven (25.93%) did not mention any time frame within which they planned to quit tobacco consumption. Of the 27 participants, who had expressed a desire to quit, only one participant (3.70%) who was smoking cigarettes had actually quit tobacco consumption for about fifteen days. Subsequently, the participant again resumed smoking due to craving, insomnia, anxiety, and irritability. The most common reason for expressing a desire to quit tobacco was ill effects of tobacco consumption, where 23 (85.18%) tobacco users gave this reason. The second most common reason for expressing a desire to quit tobacco consumption was economic reasons, which were given by nine (39.13%) tobacco users. These findings are tabulated in Tables 6 and 7.

Table 2: Number of years of tobacco use or smokeless tobacco use

Number of years of smoking	First stratum numbers (%)	Second stratum numbers (%)	Total
<1	01 (10.00)	04 (12.12)	05 (11.63)
1–2	06 (60.00)	08 (24.24)	14 (32.56)
2–3	02 (20.00)	07 (21.21)	09 (20.93)
3–4	00 (00.00)	11 (33.33	11 (25.58)
4–5	01 (10.00)	03 (09.10)	04 (09.30)
Total	10 (100.00)	33 (100.00)	43 (100.00)

In the second and third columns, the percentages are calculated based on the total number of current daily smokers or smokeless tobacco users in each stratum. In the last column, the percentages are calculated based on the total number of current daily smokers or smokeless tobacco users including both strata

Table 3: Quantum of cigarettes or bidis smoked per day

Quantum of cigarettes or bidis smoked per day	First stratum numbers (%)	Second stratum numbers (%)	Total
<5	04 (40.00)	06 (46.15)	10 (43.48)
5–10	01 (10.00)	04 (30.77)	05 (21.74)
10–20	03 (30.00)	02 (15.39)	05 (21.74)
>20	02 (20.00)	01 (07.69)	03 (13.04)
Total	10 (100.00)	13 (100.00)	23 (100.00)

In the second and third columns, the percentages are calculated based on the total number of current daily smokers in each stratum. In the last column, the percentages are calculated based on the total number of current daily smokers including both strata

Table 4: Prevalence of current smokers including cigarette and smokeless tobacco user in each age group

Age group (yrs)	Current smokers	Prevalence	Total
20–39	27	05.88	459
40–59	16	39.02	041
Total	43	08.60	500

Chi-square=52.59, P<0.001. Study participants of both strata including cigarette and smokeless tobacco users have been clubbed together for this analysis. Since the figures in some cells were less than 5, age groups of 20–29 and 30–39 have been clubbed in one group; and age groups of 40–49 and 50–59 have been clubbed in the second group

Discussion

The findings of our study are similar to those of the study conducted by Kulkarni MM *et al.* on 39282 subjects where they reported an overall prevalence of smokeless tobacco of 2%.[12]

Previous researchers have reported a prevalence of usage of smokeless tobacco ranging from 6.7% to 24.4%, respectively.[13-17]

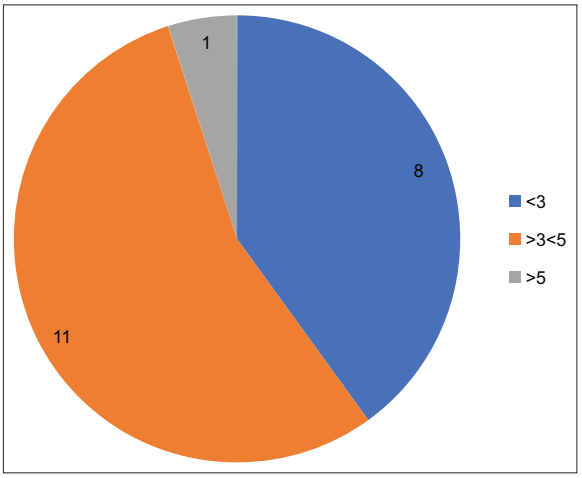

Figure 1: Frequency of use of smokeless tobacco products per day

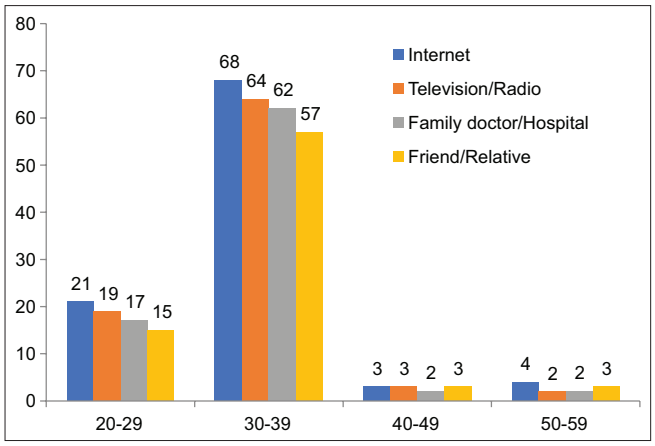

Figure 2: Age group-wise sources of information regarding the harmful effects of tobacco in the first strata

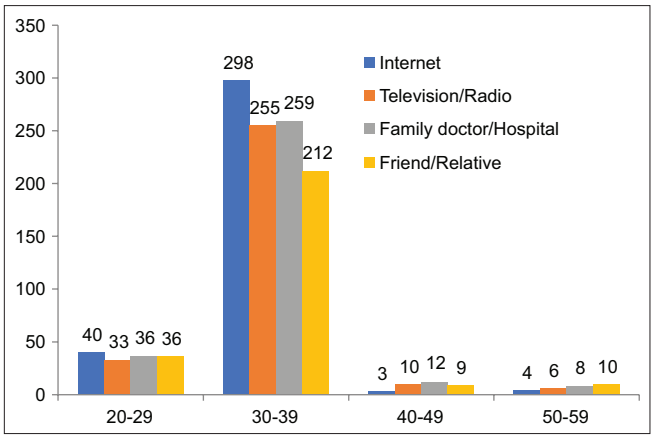

Figure 3: Age group-wise sources of information regarding the harmful effects of tobacco in the second strata

Table 5: Average amount spent on tobacco consumption per month (percentage of monthly salary spent on tobacco consumption)

First stratum	Second stratum
700 (0.96)	464 (1.89)

Study participants of both strata including cigarette and smokeless tobacco users have been clubbed together for this analysis

Table 6: Desire to quit tobacco consumption among the users of tobacco

Expressing a desire to quit tobacco consumption		Total
Yes	No	
No. (%)	No. (%)	No. (%)
27 (62.79)	16 (37.21)	43 (100)

Study participants of both strata including cigarette and smokeless tobacco users have been clubbed together for this analysis

Table 7: Reason for expressing a desire to quit tobacco consumption

Reason for expressing a desire to quit tobacco consumption	Number	Percentage
Ill effects of tobacco consumption	23	085.18
Economic reasons	09	039.13
Total	32	124.31

Study participants of both strata including cigarette and smokeless tobacco users who express a desire to quit tobacco consumption have been clubbed together for this analysis. The total of all the reasons given for expressing a desire to quit tobacco consumption is more than 27 (100%) because more than one reason was given by several study participants

Lin *et al.* reported a very high prevalence of smokeless tobacco ranging from 11.6% to 32.6% across various segments of US government employees.[18] Ma C *et al.* and Kraus L *et al.* also reported a prevalence of smokeless tobacco in any form ranging from a low of 2% to a high of 12.4% across various populations, age groups, and male and female sexes.[19,20] Rajiva *et al.* and Rajiva *et al.* in their studies on government employees reported a prevalence of smokeless tobacco of zero percent.[2,3] The findings of our study where we observed the prevalence of smokeless tobacco at four percent differ from those of all the above studies. This difference can be attributed to differences in age distribution and cultural habits of our study population with that of the previous studies.

Hermann Pythagore Pierre Donfouet *et al.* in their study of 4408 respondents reported an overall proportion of current tobacco smokers as 7.8%.[21] Rajiva *et al.* in their study on 285 subjects reported an overall prevalence of tobacco consumption of 9.82%.[3] Rai B *et al.*, reported an overall prevalence of smoking tobacco in India as 10.38%.[22] The findings of our study are similar to those of the above three studies.

Burki TK reported a high prevalence of 35% of tobacco consumption among the adult population in Bangladesh.[23] Little *et al.* reported a prevalence of tobacco use of 27.1% by US government employees.[24] Chisick *et al.* and Chu *et al.* reported a prevalence of smoking of 42.8% and 32.8%, respectively, among government personnel.[17,25] Ma C *et al.* reported a high prevalence of tobacco use of 17.9%.[19] Si Y *et al.* reported a prevalence of tobacco consumption of 29.7% among males and an overall prevalence of 16%.[26] Teixeira-da-Costa *et al.* in their study reported that 45.4% of their study subjects had ever smoked.[27]

One particular study has reported the age-standardized prevalence of smoking tobacco among individuals above 15 years of age as 32·7%.[28] Nazir MA *et al.* in their study encompassing 133 countries observed that the prevalence of tobacco use in the adolescent age group was 19.33%, ranging from 1.5% to 65.5%.[29] Globally, in 2020, 22.3% of the population used tobacco.[30]

The findings of the above studies differ from those of our study. The difference between our study and the previous studies can be attributed to different socioeconomic and cultural factors between our study population and the study population of previous studies.

The mean duration of smoking of 5.64 years observed in our study is similar to that of 5.8 years reported by Rajiva *et al.*[2] The mean duration of smoking of 5.64 years as reported in our study differs from the mean duration of smoking of 2.33 years reported by Rajiva *et al.*[3] The mean number of cigarettes smoked per day of 6.36 as observed in our study is similar to the figure of 7.52 reported by Rajiva *et al.*[3] However, it is in stark difference to the

figures of 3.69 and 14.4 reported by Rajiva *et al.* and Si Y *et al.,* respectively.[2,26] This difference could be because of different socioeconomic and cultural factors between our study population and the study population of previous studies.

Several researchers have reported a greater likelihood of tobacco consumption with increasing age and the highest proportion of current tobacco smokers among the age group of 45 to 64 years.[28,31,32] Arlene *et al.* reported a nonsignificant increase in the prevalence of smokers over the years at a Police Academy.[33] A decrease in the prevalence of smoking was observed by Chu *et al.* in young adults from 48.6% to 31% from 2006 to 2014.[25] In this regard, the findings of the above studies are similar to those of our study.

Portilla A *et al.* in their study on 560 subjects reported no association between age and tobacco consumption.[34] Si Y *et al.* reported a decrease in tobacco consumption with increasing age.[26] These findings differ from those of our study where we observed a statistically significant increase in the prevalence of tobacco consumption with increasing age.

Several studies have reported that 46% of smokeless tobacco users to more than 50% of tobacco users would be willing to give up tobacco consumption.[27,35] The findings of our study, where we have observed 62.79% of tobacco users expressing a desire to quit, are in consonance with both of the above studies. Teixeira-da-Costa *et al.* in their study reported the ill effects of tobacco consumption and economic reasons as the most common reasons for expressing a desire to quit tobacco consumption.[27] The findings of our study are consistent with those of the above study.

The lower prevalence of smoking as reported in our study could be attributed to widespread awareness about the harmful effects of tobacco by the government through various media such as cinema halls, newspapers, television, radio, and Internet. The increasing prevalence of smoking with age as observed in our study could be because of an increase in pay and allowances with each passing year of service in a government organization, coupled with work-related stress.

Limitations

Our estimation of the prevalence of tobacco consumption using a questionnaire-based survey could be an underestimate of the true prevalence of tobacco consumption, due to the socially desirable response behavior of the respondents. Besides, our sample may not be truly representative of the entire study population of government employees because due to resource constraints our study was not multicentric; the study participants were taken from one city only. However, a major strength of the present study includes a large sample size of 500, as against a minimum required sample size of 384. Our present study is one of the pioneering studies that has documented the prevalence of tobacco consumption among government employees in India.

Recommendations

The researchers recommend that ongoing awareness campaigns be strengthened to reach out to a larger target population. Sensitization campaigns can be augmented in high-risk groups. Health workers can be utilized to promote nonsmoking behavior among the target population.

Another effective instrument to reduce tobacco consumption is the taxation of tobacco products, which will also help generate substantial revenue for the government.[28,36] Behavioral changes can be brought about by strict legal implementation.

Future research needs to be conducted to study the implementation of existing tobacco control laws and the associated effects on trends in tobacco consumption in India.

Conclusion

Our study on the prevalence of tobacco consumption among government employees provides an adequately clear picture of this public health epidemic in the most populous country in the world. Our study has helped to fill in the gaps in scientific knowledge regarding tobacco consumption among apparently healthy male adults. There is an immediate need for target group-specific policies for tobacco control, which should be integrated with the relevant national health programs at all levels. Family medicine and primary care physician have a major and important role to play in implementing target group-specific policies for tobacco control. This will enable all stakeholders to synergize their efforts and obtain better efforts, which will support the ultimate goal of a tobacco-free India.

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Conflicts of interest

There are no conflicts of interest.

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