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Original Article

Tobacco use among serving army personnel: An epidemiological study

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ABSTRACT

Background: India has consequential burden of tobacco related disease and death. Though there are surveys conducted at national and regional level yet the information about tobacco consumption among army personnel is scarce. Thus an epidemiological study was conducted to estimate the prevalence and assess determinants of tobacco consumption amongst army personnel.

Methods: A community based cross sectional study was conducted using simple random sampling to enroll 380 personnel. Data was collected using a pretested and validated questionnaire with relevant domains.

Results: The age of participants was 33 + 7 years. The prevalence of ever tobacco users was 47.90% (95% CI: 42.78–53.05) and of current tobacco users was 35.00% (95% CI: 30.21–40.03). No association was found between ever users and age group, monthly income, occupation, length of service, family member usage ($p > 0.05$). Among smokeless tobacco forms, Khaini was most preferred (49.45%) followed by Gutkha. Majority of them (41.21%) were moderate tobacco chewers. Tobacco user friends (53.85%) were the main stimulants, which induced respondents to start tobacco. The important source of tobacco procurement was local vendor. 91.76% ever user were aware of the ill-effects of the tobacco use. There was statistically significant association for knowledge regarding tobacco use being harmful to family members between current users and ever users ($p = 0.036$).

Conclusion: The study highlights a high prevalence of tobacco user amongst army personnel. Reduction of easy accessibility, Behaviour Change Communication activities and stricter implementation of regulations are urgently required.

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Introduction

World Health Organization estimated that tobacco was responsible for 8.8% death worldwide in the year 2000 and by 2030, the number of premature deaths attributable to tobacco would double to 10 million deaths every year, with about 7 million deaths taking place in developing countries.¹ India's tobacco problem is more complex due to tobacco being consumed in many forms. The prevalence of tobacco use in any form among men and women has been reported to be high (15–60% from almost all parts of India^{2–6} and approximately one million deaths per year are attributed to tobacco consumption.⁷

Data on smoking habits of the army personnel in India is scarce. On literature search in Medline, Embase and manually searching for references authors could find only one study on smoking habits among army personnel published in 1986⁸ apart from a survey report on smoking habits of men in Rajasthan in which army personnel also participated.⁹ However, no exhaustive study has been carried out in respect of army personnel in India in past three decades. The army personnel constitute a closed community. They are exposed to certain stresses which are rather unique to this group and quite different from civilian population, such as regimentation and discipline of military life, lack of privacy, long periods of separation from families due to various reasons, fear of losing life or limb in times of war, counter insurgency operations, extremes of climate, etc. Although army personnel are highly disciplined and dedicated, tobacco use and related diseases can affect their medical fitness which has a direct bearing on their fighting efficiency.

Since no exhaustive study on tobacco use of army personnel is available in the current literature, this study was conducted to provide a comprehensive overview of tobacco use in army personnel, fill up gaps in knowledge and to recommend suitable preventive and control measures.

Materials and methods

A community based cross-sectional study was conducted with study population as serving male personnel of Army, presently serving in Pune and the reference population as other ranks (OR) belonging to Indian Army. Ethical approval was obtained from the institutional ethical committee (IEC).

Sample size was calculated using the Cochran formula¹⁰ and applying for finite correction, anticipated prevalence of tobacco use as 50% in army personnel and alpha of 5%. The calculated sample size was 370 however final sample of 380 was collected for this study. The sample was selected using “simple random sampling” procedure by use of Epi Info 6 for generating random numbers. The inclusion criteria were defined as persons permanently posted in Pune and not suffering from any illness as ascertained by their records. Persons on temporary duty in Pune for short duration were excluded from the study.

A questionnaire was prepared in consultation with experts in the field and pilot study was done on 30 subjects to assess its validity and reliability. Chronbach's alpha was calculated with the help of Intercooled Stata 8 software, to test the reliability of

the questionnaire which was divided into three domains for assessing Knowledge (8 variables, alpha 0.75), Attitude (39 variables, 0.78) and Practice (35 variables, 0.76). Requisite changes were made in the questionnaire following the pilot study.

The participants were explained in detail about the purpose and methodology of the study and were fully assured strict confidentiality. Informed consent was obtained on informed consent form.

The technique of personal interview with the help of the schedule was utilized for data collection. Each participant was interviewed by one investigator (AP) only. The interview was carried out either in English or Hindi and average duration of an interview was 35 min. At the end of data collection, requisite health education was imparted to all members of the study-population.

Data was entered into Microsoft excel worksheets and coded appropriately. The analysis was carried out using SPSS ver 14.0. For the purpose of analysis scale for consumption of smokeless tobacco was developed after discussion with experts in the field. Consumption of smokeless tobacco 1–2 times per day, 3–6 times per day and more than 6 times per day was defined as mild, moderate and heavy consumption respectively. Descriptive statistics were used to appropriately describe the data. Chi-square and 't' test were used for categorical and continuous data, respectively.

Results

The age of participants was 33 ± 7 years (mean $\pm$ standard deviation). Table 1 illustrates the demographic characteristics of study participants. Amongst 380 respondents, 182 (47.90%)

Table 1 – Demographic characteristics of study participants.

Characteristic	N	%
<i>Age group (years)</i>		
17–24	42	11.05
25–34	185	48.61
35–44	114	30.00
≥45	34	10.26
<i>Monthly income</i>		
≤14,999	89	23.42
15,000–19,999	208	54.73
20,000–24,999	58	15.26
≥25,000	25	6.59
<i>Education</i>		
Up to high school	192	50.53
Intermediate	139	36.58
Graduate & above	23	12.89
<i>Occupation</i>		
Unskilled & semi-skilled	162	42.63
Skilled	171	45.00
Clerks	27	7.10
Semi-professional	20	5.27
<i>Length of service (years)</i>		
1–10	122	32.10
11–20	166	43.68
≥20	92	24.22

Fig. 1 – Age of starting tobacco consumption.

had ever consumed tobacco in their life time, thus prevalence of ever tobacco user was 47.90% (95% CI: 42.78, 53.05). Out of 182 ever tobacco user, 133 (73.08%) were currently using tobacco in one or the other form thus prevalence of current tobacco user was 35.00% (95% CI: 30.21, 40.03).

The age of starting tobacco use was 24.48 ± 5.83 years (mean $\pm$ standard deviation). 87.36% started tobacco consumption at or after the age of 25 years (Fig. 1). Table 2 depicts the distribution of ever user as per age group, monthly income,

occupation and length of service. The maximum number of ever user were in age group 25–34 years. However highest percentage of smokers was in age group 17–24 years (54.76%). The Maximum number of ever user belonged to the income group of Rs. 15,000–19,999.00 per month. Maximum (97) and highest percentage (56.73%) of ever smoker were skilled. According to the length of the service the maximum (86) and highest percentage were in 11–20 years of service. However, none of the variables (age, income, occupation and length of service) showed statistically significant linear trend ($p = 0.46$, 0.79, 0.14 and 0.82, respectively).

Table 3 depicts that lesser number of ever user 101 (45.91%) were giving history of at least one family member being a tobacco user than 119 (54.09%) of never user. The association between tobacco use and history of any family member using tobacco was statistically not significant ($p = 0.364$). No statistically significant association was found between ever user and never user with regard to history of father or brother smoking habits ($p > 0.05$). Maximum number (99) and highest percentage (51.56%) of ever user were educated only till high school. However, no statistically significant linear trend was observed ($p = 0.36$).

Table 4 depicts that among smokeless tobacco forms, majority had a preference for Khaini (90, 49.45%). Among smoked forms of tobacco, either consumed with or without

Table 2 – Distribution of ever tobacco users as per age group, monthly income, occupation, length of service and education.

Parameter	N	%	p value
<i>Age group (years)</i>			
17–24	23	12.64	0.463
25–34	85	46.70	
35–44	59	32.42	
≥45	15	8.24	
<i>Monthly income</i>			
≤14,999	36	19.78	0.798
15,000–19,999	110	60.44	
20,000–24,999	29	15.93	
≥25,000	7	3.85	
<i>Occupation</i>			
Unskilled & semi-skilled	64	35.16	0.142
Skilled	97	53.30	
Clerks	12	6.59	
Semi-professional	9	4.95	
<i>Length of service (years)</i>			
1–10	56	30.77	0.823
11–20	86	47.25	
≥20	40	21.98	
<i>Education</i>			
Up to high school	99	54.40	0.272
Intermediate	60	32.97	
Graduate	23	12.63	
Stat test: Chi-square for linear trend.			

Table 3 – Distribution of ever tobacco users as per family history of tobacco consumption.

Family history of tobacco consumption (N)	Ever user (N)	
	Yes	No
Yes	101	119
No	81	79
Total (380)	182	198
Pearson Chi-square, $p = 0.364$.		

Table 4 – Forms of tobacco used.

Type of tobacco form used	Frequency ^a	(%)
Smokeless tobacco forms		
Khaini	90	49.45
Gutkha	28	15.38
Zarda	17	9.34
Paan	11	6.04
Supari	10	5.49
Surti	9	4.94
Mishri ⁱ	4	2.20
Others (Mawa, Snuff, Burnt Powder, Paste)	8	4.40
Smoked tobacco forms		
Cigarette	83	45.60
Bidi	19	10.44
Hookah	1	0.55

^a The Frequency and % are more than 182 and 100 respectively due to use of more than one tobacco forms by some individuals.

smokeless forms; majority had a preference for cigarettes (83, 45.60%).

Table 5 shows the frequency of tobacco use among ever tobacco user. Majority (71, 39.01%) smoked 1–9 cigarettes/bidis per day among those who consumed tobacco in smoked form. Among those who consume tobacco in smokeless form majority 75 (41.21%) were moderate tobacco chewers (3–6 times per day). The prevalence of strict users of smokeless form was 24.74% (95% CI: 20.48–29.39) and strict use of smoked form of tobacco was 13.95% (95% CI: 10.62–17.84). 78 (42.9%) spent less than Rs. 100 per month on different tobacco products. 152 (83.51%) ever users spent less than Rs. 400 per month and the rest of them, 30 (16.49%) spent more than Rs. 400. Out of these, 3 (1.65%) spent more than Rs. 1000 per month on tobacco.

Table 6 shows that curiosity (87, 47.80%), peer pressure/company (75, 41.21%) and excitement (48, 26.37%) were the main reasons for initiating tobacco use apart from prohibition, parental history of tobacco consumption, low self image, feel like adult and loneliness. The stimulants, which induced respondents to start tobacco use were mainly company of tobacco user friends (98, 53.85%), loneliness (39, 21.43%), urge after meals (32, 17.58%), morning natural call (30, 16.48%), to relieve anxiety and/or tension (28, 15.38%) and over work (26, 14.29%). The important sources were, local vendors (130, 70.88%) followed by vendors outside their work place (26, 14.29%), through friends (25, 13.74%). Unit lines (63.74%) and homes (25.27%) were most common places of tobacco consumption. Only 6.59% and 4.4% gave history of consumption of tobacco at public place and offices respectively.

Table 6 – Reasons for starting tobacco use (N = 182).

Reasons	N (%) ^a
Curiosity	87 (47.80)
Peer pressure/company	75 (41.21)
Excitement	48 (26.37)
Consumption by parents	16 (8.79)
Prohibited	12 (6.59)
Low self image	9 (4.94)
Feel like adult	5 (2.75)
Loneliness	5 (2.75)
Other reasons	16 (8.79)

^a The total N and % are more than 182 and 100 respectively due to multiple responses.

Almost all ever users, 167 (91.76%) were aware of ill-effects of tobacco use but there was no statistically significant difference between the awareness of ill effects between current tobacco user and not current user ($p = 0.986$). There was statistically significant association for knowledge regarding tobacco use being harmful to family members between current user and ever user ($p = 0.036$, OR 0.47, 95% CI: 0.21, 0.99). In our study we have found TV (66.48%) and warning on cigarette packets (50.55%) as two most common source of information of ill effects of tobacco use.

Discussion

The prevalence of current users in this study (35%) is much lesser than earlier studies done in armed forces personnel, with previous studies⁸ showing it as 45% and 68.6%.⁹ The decreasing trend of tobacco consumption seen in the army personnel is in consonance with worldwide decreasing trend in tobacco consumption prevalence as evidenced from studies in developed countries, e.g. in Japan, male smoking (≥ 15 years) reduced from 81% in 1960 to 54% in 2000, UK (≥ 16 years) 61% in 1960 to 28% in 1998, USA (≥ 18 years) 52% in 1965 to 26% in 1999.¹¹

A recent (2003) national household survey showed prevalence of tobacco consumption, either smoked or chewed, among 15 years and older as 30% (47% men, 14% women), which translates to almost 195 million people (154 million men, 41million women) in India. The prevalence of tobacco consumption increased up to the age of 50 years and then levelled or declined.¹² Thus, prevalence among army personnel is much lesser than the national figures. We also found a delayed initiation of tobacco consumption ($>85\%$ starting after 25 years). None of the previous studies among army soldiers

Table 5 – Frequency of daily consumption of tobacco by ever tobacco user.

Smoked forms		Smokeless forms	
Daily quantity in numbers	N (%)	No. of times per day	N (%)
1–9	71 (39.01)	1–2 (mild)	23 (12.64)
10–19	8 (4.40)	3–6 (moderate)	75 (41.21)
≥ 20	9 (4.94)	>6 (heavy)	31 (17.03)
NA	94 (51.65)	NA	53 (29.12)
Total	182 (100.0)	Total	182 (100.0)

had mentioned this variable. GYTS mentioned that large proportion of smokers start before 10 years.¹³ Over 30 percent of children smoked their first whole cigarette before age 10 in Ghana, Grenada, Guyana, India, Jamaica, Palau, Poland, N Mariana Islands and St. Lucia.¹¹ Delayed initiation among army personnel may be due to exposure after joining the service, company of tobacco consumer and peer pressure at work. This also may be the reason of not finding any statistically significant association of tobacco use with parental or household tobacco use in this study.

Previous study among army soldiers showed a decreasing trend in smoker's prevalence with length of service and education⁸ however our study showed no statistically significant difference either with length of service or education, though the maximum number of ever user were less educated (only up to high school). National household survey found tobacco consumption to be highest in the least educated, poorest, and scheduled castes and scheduled tribes.¹²

Our study and previous study on army personnel⁸ show that highest proportion of skilled worker as ever user. A study in Mumbai showed that both education and occupation had simultaneous and independent relationship with tobacco use,¹⁴ however no such statistically significant difference was found in our study, which may be due to the fact that our study population was different.

In the national sample survey amongst subjects of over 10 years of age, regular use of tobacco increased significantly with each diminishing income quintile.² Similar observations have been made in developed countries; e.g. people with low income were reported to more than twice as likely to smoke in the United States.¹⁵ However, our study shows no statistically significant association with income.

Majority (129, 70.88%) procured Tobacco from the local vendors, thus indicating stricter implementation of the existing efforts in the units. None of the previous studies among army personnel had mentioned this variable. Easy accessibility has been highlighted by various studies among school children¹⁶ and other groups and is one of the basis of recommending legislative measures for no sale near school premises.

A community based study among North Indians reported mean number of times smokeless tobacco consumed as 4.3 (95% CI: 3.2, 5.4) for Guthka and 6.5 (5.4, 7.5) for Khaini. Smokeless tobacco consumers preferred Khaini (49.45%) and Guthka (15.38%) over other forms by ever users.¹⁷ Also the study found that the mean number of cigarette consumed per day is 6 (4.8, 7.2). These findings are similar to findings in our study.

In our study, the proportion of persons consuming smokeless tobacco (97.24%) was more as compared to smoked ones (56.59%). This has implications for the National Cancer Control Programme for prevention of oral cancer.

Tobacco use as Injurious to health and long term use causes some or the other disease was perceived by 91.76% and this was similar to older study in armed forces as well as in civilian population in Kerala.^{8,18} The finding that ever users and current users differed according to the knowledge of harmful effects of tobacco on family members (passive smoking) may have implications on quit tobacco programme.

Previous study among army soldiers showed radio, doctors/ friends, warning on cigarette packets and own experience as

information sources of ill-effects of tobacco use.⁸ TV was not very commonly found in 1984 hence was not the main source of information at that time. In a KAP study of rural Kerala,¹⁸ electronic (58.7%) and print media (44.7%) were more common sources of knowledge, as compared to health education (20.6%) provided by health care workers. The tobacco packets as information source is on the expected lines as after the promulgation of "The Cigarettes and other Tobacco products Act, 2003", warning is present not only on cigarette packets but also on packets of smokeless forms of tobacco products.

Conclusion

This study highlights that prevalence of tobacco consumption amongst army personnel is much lesser than that seen in the country among similar age population and has brought out certain correlates. However, the study has certain limitations. Firstly, the study was conducted in a single centre hence the generalisation of the study to the whole Indian army may be questionable, secondly cross-sectional nature of the study did not allow us to make conclusion about the trend of tobacco use. Hence in future a large multicentre cohort study on tobacco consumption is recommended.

Nevertheless, this study has highlighted the requirement of further strengthening of the excellent preventive efforts being conducted in the Indian Army. We need to start Behaviour Change Communication (BCC), in Training Centers and later continued up to unit level. The continuation of such activities is required to prevent late starters. Increased focus is also required on prevention of smokeless tobacco products. Another important area is to expand knowledge about ill effects of tobacco consumption on the family, which may help in quitting the tobacco consumption, hence should be highlighted in every BCC. These activities coupled with stricter implementation of the legislation and curbing the easy accessibility will further reduce the prevalence of tobacco consumption among army personnel.

Conflicts of interest

The authors have none to declare.

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