Prevalence of Usage of Tobacco: A Cross-Sectional Study in a Rural Area of Dehgam Taluka, Gujarat, India

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INTRODUCTION

Each year, over 8 million people die prematurely due to tobacco use, with half of these deaths directly caused by smoking, and approximately 1.2 million nonsmokers are exposed to second-hand smoke. India faces a tobacco problem as it holds the title for the largest smoking population in the world with approximately 120 million adult smokers. By 2030 this number is projected to rise significantly to over 9 million annually. This worrisome trend is particularly prevalent in countries. To prevent illnesses and fatalities associated with smoking it is crucial that we work towards reducing the prevalence of this habit.[1,2] The medical community has classified "tobacco dependence" as an illness according to the International Classification of Diseases (ICD 10).[3] Various severe health conditions caused by smoking affect every organ in our bodies including cancers, coronary heart disease, cerebrovascular disease and lung diseases.[4,5] Extensive research has provided evidence that exposure to smoke leads to similar health issues as direct tobacco use. These include heart disease, lung cancer, bronchitis as asthma attacks.[6–9]

Tobacco usage presents a public health concern globally. It is alarming that six out of the eight causes of death are linked to tobacco usage. In India specifically tobacco smoking among men remains widespread across all regions, with rates often surpassing 50%.[10]

According to the National Family Health study (NFHS) 5 study in India, which was carried out in 2019– 21, men (38.0%) and women (8.9%) in rural areas, illiterates, and a weak and vulnerable segment of society all smoke cigarettes more frequently than other groups of people.[11] According to estimates from the Global Adult Tobacco Survey (GATS)-2, which was performed in 2016–17 among people aged 15 and older, 28.6% of adults (42.4% men and 14.2% women) now use cigarettes. Adults smoke 10.7% of the time (19.0% of men and 2.0% of women), and smokeless tobacco is used by 21.4% of adults (29.6% of men and12.8% of women).[12]

According to the GATS estimates for Gujarat for the years 2016–17, among those aged 15 and over, 25% of adults (38.7% of men and 10.4% of women) now use tobacco. 7.7% of adults smoke (14.2% of males, 0.7% of women), and 19.2% (27.6% of men, 10.0% of women) use smokeless tobacco.[13]

There are many different places and socioeconomic strata where people use tobacco, including chewing and smoking. Gujarat is the second-highest producing state for tobacco, and it has been shown that rural men and women use smokeless tobacco more frequently across all age groups. As a result, oral and oropharyngeal cancers are the most prevalent malignant diseases in Gujrat state's rural districts.[1] Unfortunately, there is little information available about the prevalence of tobacco use among Gandhinagar's rural residents, particularly in the Dehgam taluka, even though chewing tobacco is quite common in Gujarat and emerging nations like India. For that the study aimed to find out the prevalence and socio-demographic characteristics of tobacco uses for enabling targeted public health measures to combatrelated healthrisks.

MATERIALS AND METHODS

An observational Cross-sectional study was conducted in Dehgam taluka, Gujarat, from March 2021 to November 2022, focusing on tobacco use. This study included individuals aged 15 and above from a population of 225,930, as per the 2011 census. Those who didn't give consent or couldn't be reached were excluded.

The study included 1,200 participants, as determined by a formula. Cluster sampling was employed,

selecting 30 villages out of 92. Each cluster was divided into Sheri/mohalla, and the 40 samples were distributed proportionally among them. Within each Sheri/mohalla, household samples were selected using systematic random sampling.

Current tobacco users are defined as individuals who have used tobacco at least once in the 30 days

preceding the survey. Past smokers (former/ex-smokers) are defined as individuals who have not smoked in the last month. The study involved face-to-face interviews via Google Forms, following ethical approval. A structured questionnaire covering demographics, tobacco use, nicotine dependence, cessation,media influence, and tobacco advertising was used.

Data analysis was conducted using Excel and chi-square tests to examine relationships between variables. Ethical approval was obtained from the Institutional Ethics Committee, and verbal informed consent was collected as per ICMR Ethics guidelines (2017), with strict adherence to ethical principles throughout the study.

RESULTS

In this study, out of 1200 participants, the majority (24.3%) were between the age group 25-34 years, 20.5% were between 45-54 years, 11.3% were above 65 years and 2.5% were between 15-17 years (Fig 1). The mean and median age for the study population was 43.2±16.5 and 42 years respectively. (range=15-88) [Table 1]

Table 1: Age and Sex Distribution of Participants (N=1200)

Variable	No. (%)
Age (In Years)	
15-17	30 (2.5)
18-24	122 (10.2)
25-34	291 (24.3)
35-44	198 (16.5)
45-54	247 (20.5)
55-64	177 (14.8)
≥ 65	135 (11.2)
Sex	
Male	649 (54.1)
Female	551 (45.9)

Most of the participants were educated up to higher secondary education (26.9%) followed by graduates (26.0%) and those with secondary education (23.0%). The most significant segment, comprising 31.3%, is comprised of individuals engaged in homemaking, while the second-largest group consists of those employed in agriculture, making up 13.5%. The third-largest category includes individuals with private sector occupations, accounting for 12.6%. In contrast, the least represented groups are retirees at 1.5%, college students at 5.7%, and school attendees at 4.5%.

Table 2: Prevalence of tobacco use in the study population. (N=1200)

Prevalence	No. (%)
Current tobacco smokers (occasional + daily)	147 (12.3)
Current smokeless tobacco users	353 (29.4)
Use of both forms of tobacco	74 (6.2)
Never Tobacco users	743 (61.9)
Former tobacco users	31 (2.6)

It was also observed that the prevalence of smoking tobacco increases with age. The majority (27.9%) of the current tobacco smokers belonged to the age group 55-64 years while among the current smokeless tobacco user's majority (26.6%) belonged to 45-54 years. In the age group 15-17,

the study found all the participants were non-tobacco users, which might be due to the prohibition of selling tobacco under the ageof 18.

Among males, 22.7% currently smoke tobacco (either occasionally or daily), 44.4% currently use smokeless tobacco, 11.4% use both forms of tobacco, and 44.4% have never used tobacco. Among females,none of them currently smoke tobacco, but 11.8% were current smokeless tobacco users.

Table 3: Tobacco uses according to Education

Education	Current tobacco smokers (occasional + daily) N=147 No. (%)	Current smokeless tobacco users N=353 No. (%)	Use of both forms of tobaccoN=74 No. (%)	Never + Former Tobacco users N=774 No. (%)	Total No.
Illiterate	3 (2.0)	23 (6.5)	0 (0)	37 (4.8)	63
Primary	9 (6.2)	64 (18.2)	3 (4.1)	131 (16.9)	201
Secondary	46 (31.3)	75 (21.2)	24 (32.4)	179 (23.1)	276
Higher Secondary	53 (36.0)	97 (27.5)	30 (40.5)	203 (26.2)	323
Graduate	30 (20.4)	84 (23.8)	11 (14.9)	209 (27.0)	312
Postgraduate	6 (4.1)	10 (2.8)	6 (8.1)	15 (1.9)	25

This table shows the relationship between education level and the proportion of tobacco use. The proportion of current tobacco smokers was highest among individuals with a higher secondary education (36.0%), and it decreased as the education level increased to graduate (20.4%), and postgraduate (4.1%). The same pattern was observed for smokeless tobacco users. [Table 3]

The proportion of tobacco use varied significantly among different occupations. The highest proportion of current tobacco smokers was among people with agricultural occupations (42.2%), followed by laborers (12.2%), and the lowest percentage was among retired individuals (2.0%). For smokeless tobacco users the highest proportion was among Laborers (24.1%) followed by Agricultural workers (21.2%).

Table 4: Summary of tobacco consumption Prevalence among the study population. (N=1200)

Tobacco consumption	No.	Percentage (%)
Smoking		
Current	147/1200	12.3%
Daily	101/147	68.7%
Occasionally	46/147	31.3%
Total	147	
Smokeless tobacco		
Current	353/1200	29.4%
Daily	329/353	93.2%
Occasionally	24/353	6.8%
Total	353	

Above table shows that among the current smoking tobacco users (12.3%), more than two-third (68.7%) smoke daily whereas among current smokeless tobacco users (29.4%), 93.2% were smoking daily. [Table 4]
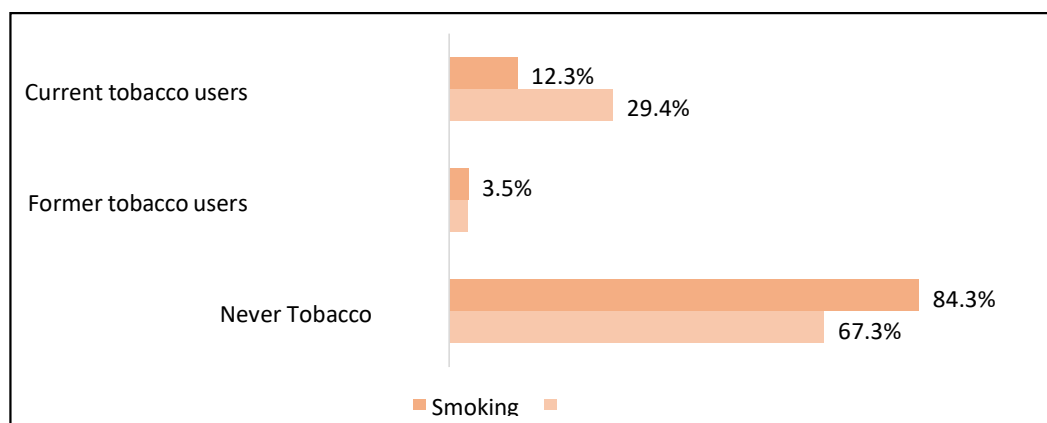
Figure 1: Prevalence for smoking and smokeless tobacco. (n=1200)

The figure presents the prevalence of smoking and smokeless tobacco use among study population. The data showed that the percentage of current tobacco smokers (12.3%) was lower than the percentage of current smokeless tobacco users (29.4%). Similarly, the percentage of former tobacco smokers (3.5%) was lower than the percentage of former smokeless tobacco users (3.3%). Furthermore, the percentage of non- smokers (84.3%) was higher than the percentage of non-smokeless tobacco users (67.3%).

Table 5: Association between Socio-demographic characteristics and type of tobacco consumption.

Basic Characteristics	Type of Tobacco consumption		Test value(df)	P value
	Smokers (n=147) n (%)	Smokeless tobacco (n=353) n (%)		
Age group				
15-34	22 (15.0%)	94 (26.6%)	χ^2-12.67 (df=2)	0.002*
35-54	64 (43.5%)	162 (45.9%)		
55 & above	61 (41.5%)	97 (27.5%)		
Education				
Illiterate	03 (2.0%)	23 (6.5%)	χ^2-22.15 (df=5)	<0.001**
Primary	09 (6.1%)	64 (18.1%)		
Secondary	46 (31.3%)	75 (21.2%)		
Higher Secondary	53 (36.1%)	97 (27.5%)		
Graduate	30 (20.4%)	84 (23.8%)		
Postgraduate	06 (4.1%)	10 (2.8%)		
Socio-economic status				
Upper class	40 (27.2%)	61 (17.3%)	χ^2-19.53 (df=4)	<0.001**
Upper middle class	50 (34.0%)	102 (28.9%)		
Middle class	42 (28.6%)	91 (25.8%)		
Lower middle class	14 (9.5%)	84 (23.8%)		
Lower class	02 (1.4%)	15 (4.2%)		

**Very highly significant, *Highly significant

Majority (43.5% of smokers and 45.9% of smokeless tobacco) of users were from age group 35–54-year age. Among those with higher secondary education, 36.1% were smokers and 27.5% were smokeless tobacco users. 34.0% of smokers and 28.9% of smokeless tobacco users belonged to the upper middle class. There was a significant difference between the different types of tobacco consumption in terms of socio- demographic characteristics like age group, education, and socio-economic status. (p=<0.05)

DISCUSSION

Of the 1200 participants in the study, 24.3% were between the age group 25-34 years, and 16.5% were between 35-44 years, hence around 41% participants of the study were between the age group 25–44 years. Among this age group smoking and smokeless prevalence were 4.2% and 12% respectively and this result was below the GATS-2 report[13] which was 5.9% and 23.2% for smoking and smokeless users respectively. Further, in this study the prevalence of smoking tobacco increased with age which is similar to the findings of the GATS-2 report[13], the study done by Rani M et al[14], and Giovino GA et al[15]. The lower tobacco uses rates among those aged 25-44 in this study, compared to GATS-2, which might be due to shifts in societal attitudes, anti-smoking initiatives, and improved access to quit-smoking programs. As for the rising smoking rates with age, it could be because people tend to accumulate exposure and develop addiction to smoking over time, which aligns with what previous research has found.

Regarding gender distribution, this study found that individuals currently engaged in tobacco smoking were exclusively males, constituting 22.7% of the study population which aligns closely with the research conducted by Chockalingam K et al[16]. However, there was a notable disparity in smoking prevalence among females, differing from the patterns observed in the study. Male smoking is a social norm in India as everywhere else. While in current tobacco smokeless users' prevalence was higher among males (44.4%) as compared to females (11.8%) which was similar to the study conducted by Rani M et al[14], Subramanian SV et al[17] and Viradiya RB et al[1]. The variation in tobacco use between genders in this study can be explained by cultural and social norms in India. Smoking among males is more socially accepted and common, whereas female smoking is less prevalent due to these established norms and expectations.

This study's results suggest a wide prevalence of tobacco chewing in the study population. Almost one- third of the study population was found to be exposed to the habit of smokeless tobacco. In this study prevalence of current smokeless tobacco users was 29.4%, which was more than GATS-2 report (19.2%) and similar to the study done by Viradiya RB et al[1] who found the prevalence of current smokeless tobacco users was 26.2%. Around one third (33%) of the total study population was found to be exposed to tobacco chewing either in past or present which was similar to the study conducted by Joshi U et al[18] and Sinha DN et al[19] where the prevalence of smokeless tobacco was 37.2%. and 32.7% respectively. Additionally, the tobacco industry is more inclined to market smokeless tobacco and introduce it as a speedy substitute for combustible tobacco as a result of growing campaigns and government efforts to air anti-tobacco television advertisements.[20] The higher prevalence of smokeless tobacco uses in this study, compared to GATS-2 and similar studies, could be due to regional and cultural factors, as well as differences in data collection methods. Additionally, the tobacco industry's marketing of smokeless tobacco as a safer alternative might have influenced its increased use.

In this study prevalence of smoking tobacco was 12.3%, this finding was more than the GATS-2 report which was 7.7%, and below the study done by Agrawal M et al[21] who found the prevalence of smoking tobacco was 25.7% but similar to study done by Viradiya RB et al[1] which was 11.5% in Gandhinagar district. Over the years, smoking has been replaced by smokeless tobacco use.

This study found that there was an increase in the prevalence of smoking and smokeless tobacco users up to 54 years which was similar to a study conducted by Agrawal M et al[21] who found that an increase in both the smoking and chewing form of tobacco is seen with age for the habitues up to the age of 59, after which a significant decline is observed in the prevalence of tobacco use. There was significant difference seen between the different types of tobacco consumption in terms of socio-demographic characteristics like age group, education, and socio-economic status which was the same as in a study by Chockalingam K et al[16]. A study by Sinha DN et al[19] also found that socio-economic status has a strong impact on tobacco use. Research of Agrawal M et al[21] also found that

the number of years of education seemed to have a detrimental effect on tobacco use among the population.

Limitations of the cross-sectional study comprise its failure to track temporal changes, possible sampling bias, validity issues due to self-reported data, and constrained generalizability to populations beyond Dehgam taluka's rural areas.

CONCLUSION

This descriptive cross-sectional study, conducted in the villages of Dehgam taluka in Gujarat, India from March 2021 to November 2022, included all individuals aged 15 years or above. The Study provides an overview of the prevalence of tobacco consumption among study population of 1200 participants. It highlights key findings such as the higher prevalence of smokeless tobacco use compared to smoking, the relationship between increasing education levels and reduced risk of tobacco use, the significant difference in tobacco consumption among different occupations, and the correlation between socio-demographic characteristics such as age group, education, socio-economic status, and tobacco consumption. While 12.3% of participants identified as current smokers and 29.4% as current smokeless tobacco users, a significant majority, over two third, opted neither for smoking nor smokeless tobacco use. Moreover, the prevalence of smoking tobacco increases with age and many of the current smokers belong to the 55-64 age group and most of the current smokeless tobacco users belong to the 45-54 age group. It highlights the need for interventions to reduce tobacco use, promote education and awareness of the dangers of tobacco and efforts to reduce its prevalence in all demographic groups. The findings of this study showed that tobacco use is more prevalent among men than women, especially among educated and agricultural workers. Among women, Smokeless tobacco is mostly used. Using snuff has historically been regarded as a risk-free method of tobacco addiction that is also socially and culturally acceptable. As a result, it has primarily been practised by old-age women in rural areas.

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