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Research Article

Status of Oral Health in Smokeless Tobacco Users in Chargawan Block of District Gorakhpur: A Cross-sectional Study

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A B S T R A C T

Introduction: Smokeless Tobacco (SLT) is widely consumed by people in various forms without combustion, particularly in South-East Asia, notably Bangladesh and India. India has a high prevalence of tobacco consumption, with 10.38% of people consuming tobacco and 21.38% consuming smokeless tobacco. SLT use can lead to various oral health issues, including cancer, tooth decay, gum disease, and tooth loss. Tobacco-related diseases contribute to a significant number of deaths in India, with millions of cancer cases diagnosed annually.

Methods: This cross-sectional study aimed to assess the status of oral health among smokeless tobacco users in the Chargawan block of Gorakhpur District, India. The study was conducted from August 2021 to July 2022 and included residents aged 15-60 years who were regular users of SLT. A sample size of 365 was randomly selected using multistage random sampling.

Results: The study found that altered taste sensation was prevalent among 314 participants (89.7%), followed by staining/ tooth decay (84.3%), oral pigmentation (75.7%), stomatitis/ gingivitis (66.3%), oral submucous fibrosis (OSMF) (54.3%), and coated tongue (53.7%). Associations between oral findings and demographic factors were analysed. The age group, education level, and socioeconomic status showed varying degrees of association with certain oral health conditions.

Conclusion: The findings of this study suggest a high prevalence of oral health problems among SLT users in the Chargawan block. Altered taste sensations, staining/ tooth decay, and oral pigmentation were common issues. The associations of education level and socioeconomic status with the oral findings indicate that these factors may play a role in determining the SLT user's oral health status.

Keywords: Oral Health, Smokeless Tobacco, Oral Submucous Fibrosis

Introduction

"Smokeless tobacco" (SLT) refers to a wide range of commercially or illicitly accessible goods or mixes, with tobacco as its main ingredient. It is administered orally or nasally without combustion.[1] Tobacco can be consumed orally in a variety of ways, including chewing, sucking, applying to the teeth or gums (for example, with topical toothpaste or powder), dissolving in the mouth, gargling, or inserting it in betel quid. The majority of SLT users (89%) are located in the South-East Asia region. In several nations, most notably Bangladesh and India, SLT consumption is much more common than that of tobacco.[2] India is now the world's second-largest tobacco consumer. All segments of the Indian population smoke, albeit the frequency of the habit and the varieties most frequently consumed, vary by region.[3] According to a survey (GATS) done in 2016–17, India's total prevalence of tobacco use is 10.38%, while SLT use is 21.38%. There are 28.6% of adults who smoke or use SLT products, including 42.4% of males and 14.2% of females.[4] As per the GATS-2 study conducted in 2016–17 in Uttar Pradesh, 29.4% of all adults only use SLT, compared to 35.5% of all adults who either smoke or use it. Between GATS-1 and GATS-2, the incidence of tobacco usage rose to 35.5%.

SLT can result in cancer by causing white or grey spots inside the mouth (leukoplakia), tooth decay, gum disease, and tooth loss. Many types of SLT, such as tobacco-specific nitrosamine, which develop during the growing, curing, fermenting, and ageing of tobacco, include compounds that might cause cancer. Adult mortality is increased by tobacco use, particularly in low- and middle-income nations where the burden of tobacco-related disease and death is the greatest.[5] Tobacco is responsible for 9.5% of all deaths in India, with more than 1 million people dying each year due to its consumption.[6] In India, there are 2 to 2.5 million cancer patients at any particular time, with 0.7 million cases diagnosed every year.

Objectives

- To study the status of oral health in smokeless tobacco users
- To determine the sociodemographic factors associated with oral health in smokeless tobacco users

Materials and Methods

This cross-sectional study was conducted in the rural area of Chargawan block, located in Gorakhpur District, India, spanning from 1st August 2021 to 31st July 2022. The primary objective of the study was to predict the prevalence of SLT use among individuals aged 15-60 years who resided in the study area. Exclusion criteria encompassed individuals who declined participation, experienced difficulties in opening their mouths, or had significant underlying health conditions. To determine the required sample size, the formula $N = 4pq/L^2$ was utilised, considering the prevalence of SLT users in India (29.4%) and accounting for a 10% non-response rate. The selection of participants involved multistage random sampling techniques.

Gorakhpur district comprises 7 tehsils, 1294 gram panchayats, 3448 villages, and 20 Primary Health Centres (PHCs). The first stage of random sampling involved the selection of Chargawan Block PHC and APHC Maniram from the available PHCs. Subsequently, one sub-centre each from Chargawan Block PHC and APHC Maniram was randomly chosen, resulting in the selection of two sub-centres, namely Manvela and Maheshara. In the third stage, two villages were randomly selected from each sub-centre, leading to a total of four villages. A comprehensive list of individuals aged 15-60 years residing in these four selected villages was compiled through diligent house-to-house visits. The list included personal details such as name, father's name, and address. From this compiled list, 365 participants were randomly selected to form the study sample. The aid of local health workers (ASHA) and community members was sought to facilitate the identification and location of the selected participants. Prior to data collection, written consent was obtained from each study subject in the local language (Hindi) after providing a clear explanation of the study's purpose and procedures. Stringent measures were implemented to ensure the confidentiality and anonymity of the respondents. Approval was taken prior to the start of the study from the Institutional Ethics Committee. Face-to-face interviews and oral examinations were conducted with all participants, utilising a meticulously designed and pre-tested questionnaire. Of the 365 selected participants, 15 individuals did not respond and thus the final sample size came to be 350.

Data were gathered using a semi-structured, pre-tested questionnaire encompassing various sections, including socio-demographic information, details pertaining to smoking and tobacco chewing habits, as well as comprehensive oral health examinations performed by expert professionals. The collected data were subsequently entered into IBM SPSS VF25 trial version (Statistical Package for Social Sciences) for analysis, employing suitable statistical tests to derive meaningful insights.

Results

In this study, the majority (50.9%) of the study participants belonged to the age group of 31-45 years followed by 94 (26.9%) and 78 (22.3%) participants belonging to the age groups of 15-30 years and 46-60 years, respectively. Regarding the distribution of gender of participants, males were found to be high in number (97.7%). Most of the study participants (90.9%) were Hindu followed by Muslims (9.1%). It was also observed that most of the study participants

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belonged to the general category (37.4%) followed by SC/ ST (35.1%) and OBC (27.4%). Regarding the education of study participants, it was observed that most (36.0%) of them were illiterate, followed by 107 (30.6%) participants who were educated till primary school. Among the rest of the study subjects, 44 (12.6%) and 45 (12.9%) were educated till intermediate and graduation or higher level, respectively. 145 (41.4%) respondents were unemployed, 72 (20.6%) were unskilled, 65 (18.6%) were skilled, and 58 (16.6%) were semi-skilled. Regarding the socioeconomic status of the participants, 168 (48.0%) subjects were from the middle class followed by 157 (44.9%) from the lower class. It was also observed that 261 (74.6%) participants were married. Only 249 (71.1%) respondents were from nuclear families followed by 92 (26.3%) participants who were from joint families (Table 1).

Table 1.Distribution of Study Participants according to Their Sociodemographic Profile (N = 350)

Sociodemographic Particulars		n	%
Age (years)	15-30	94	26.9
	31-45	178	50.9
	46-60	78	22.3
Gender	Male	342	97.7
	Female	8	2.3
Religion	Hindu	318	90.9
	Muslim	32	9.1
Caste (category)	General	131	37.4
	OBC	96	27.4
	SC/ ST	123	35.1
Education	Illiterate	126	36.0
	Primary school	107	30.6
	High school	28	8.0
	Intermediate	44	12.6
	Graduate & above	45	12.9
Occupation	Skilled worker	65	18.6
	Semi-skilled worker	58	16.6
	Unskilled worker	72	20.6
	Self-employed	10	2.9
	Unemployed	145	41.4
Socioeconomic status	Upper class	0	0.0
	Upper-middle	0	0.0
	Middle class	168	48.0
	Lower-middle class	25	7.1
	Lower class	157	44.9
Marital status	Married	261	74.6
	Unmarried	89	25.4
Type of family	Nuclear	249	71.1
	Joint	92	26.3
	3rd generation	9	2.6

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312 (89.1%) study participants chewed SLT products every 1-10 mins followed by 24 (6.9%) participants who chewed them every 20-30 mins. Regarding the consumption of SLT products, only 323 (92.3%) participants consumed less than 10 packets. The majority (58.6%) of the study participants reported their families as the source of their tobacco addiction. Most (69.1%) of the study participants preferred consuming SLT products during their working hours (Table 2).

Most (64%) of the study subjects consumed gutkha, followed by khaini (50.6%), paan (11.1%) and nuts, lime, and tobacco (20%) (Figure 1).

The association between the age group of study participants and their oral finding in which 314 respondents had altered taste sensation was found to be statistically insignificant (p = 0.569). 295 out of 350 study subjects had staining/ tooth decay. This association was also found to be statistically insignificant (p = 0.510). 266 study subjects were found to have oral pigmentation and the association was found to be statistically insignificant (p = 0.248). A total of 232 study subjects were suffering from stomatitis/ gingivitis in oral mucosa. This association was also found to be statistically insignificant (p = 0.757). A total of 190 subjects had oral submucous fibrosis (OSMF) and the association was found to be statistically insignificant (p = 0.323) (Table 3).

The association of educational level with pigmentation in oral mucosa, stomatitis/ gingivitis in oral mucosa, OSMF, and coated tongue was found to be statistically significant (with p values being less than 0.001, less than 0.001, 0.017, and 0.018, respectively). On the contrary, its association with altered taste and staining/ tooth decay was found to be statistically insignificant (p values being 0.346 and 0.348, respectively) (Table 3).

Table 2.Pattern of SLT Usage among Study Participants (N = 350)

Particulars		n	%
Duration of per packet chewing (SLT products) (minutes)	1-10	312	89.1
	10-20	14	4.0
	20-30	24	6.9
Per day usage (packets)	< 10	323	92.3
	10-20	21	6.0
	> 20	6	1.7
Source of tobacco addiction	Family members	205	58.6
	Friends	95	27.1
	Society & school	50	14.3
Condition favouring SLT usage	Working hours	242	69.1
	Stress	35	10.0
	Friends	43	12.2
	Post meals	30	8.6

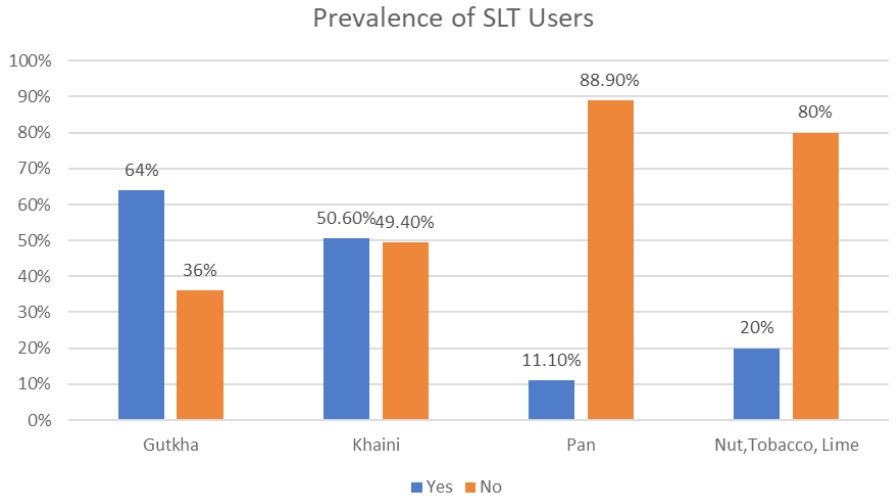

Figure 1.SLT Products Consumed by the Study Participants

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Table 3.Association of Personal Characteristics of Study Subjects with Their Oral Findings Table

Variables/ Factors		Altered Taste N = 314 n (%)	Staining / Tooth Decay* N = 295 n (%)	Pigmen-tation N = 266 n (%)	Stomatitis/ Gingivitis* N = 232 n (%)	OSMF N = 190 n (%)	Coated Tongue N = 188 n (%)
Age (years)	15-30	87 (27.7)	82 (27.8)	66 (24.8)	60 (25.9)	57 (30.0)	47 (25.5)
	31-45	158 (50.3)	150 (50.8)	137 (51.5)	118 (50.9)	94 (49.5)	99 (25.7)
	46-60	69 (22.0)	63 (21.4)	63 (23.7)	54 (23.3)	39 (20.5)	42 (22.3)
p value		0.569	0.510	0.248	0.757	0.323	0.677
Education	Illiterate	109 (34.7)	103 (34.9)	106 (39.8)	100 (43.1)	79 (41.6)	73 (38.8)
	Primary school	101 (32.2)	96 (32.5)	69 (25.9)	56 (24.1)	62 (32.6)	59 (31.4)
	High school	25 (8.0)	22 (7.5)	23 (8.6)	15 (6.5)	10 (5.3)	11 (5.9)
	Intermediate	40 (12.7)	38 (12.9)	27 (10.2)	16 (6.9)	20 (10.5)	29 (15.4)
	Graduate & above	39 (12.4)	36 (12.2)	41 (15.4)	45 (19.4)	19 (10.0)	16 (8.5)
p value		0.346	0.348	**< 0.001**	**< 0.001**	**0.017**	**0.018**
Socio-economic status	Middle class	157 (50.0)	136 (46.1)	127 (47.7)	105 (45.3)	73 (38.4)	91(48.4)
	Lower-middle class	24 (7.6)	23 (7.8)	24 (9.0)	20 (8.6)	17 (8.9)	13 (6.9)
	Lower class	133 (42.4)	136 (46.1)	115 (43.2)	107 (46.1)	100 (52.6)	84 (44.7)
p value		**0.020**	0.204	**0.046**	0.180	**< 0.001**	0.977
No. of packets/ slots	< 10	289 (92.0)	272 (92.2)	247 (92.9)	212 (91.4)	180 (94.7)	168 (89.4)
	10-20	19 (6.1)	18 (6.1)	19 (7.1)	14 (6.0)	4 (2.1)	14 (7.4)
	> 20	6 (1.9)	5 (1.7)	0 (0.0)	6 (2.6)	6 (3.2)	6 (3.2)
p value		0.697	0.981	**0.001**	0.211	**0.001**	**0.031**

*Either or both the findings were included

Test of significance - Chi-square test

p value < 0.05 - significant

p value < 0.001 - highly significant

Similarly, the association of socio-economic status (SES) was found to be statistically significant with altered taste, pigmentation, and OSMF (p values being 0.020, 0.046, and less than 0.001, respectively), and it was found to be statistically insignificant with staining/ tooth decay, and stomatitis/ gingivitis (p values being 0.204 and 0.180, respectively) (Table 3).

Discussion

In the current study, the majority of participants (50.9%) were between the ages of 31 and 45 years. This aligns with a previous study by Singh et al.[8], which found that the highest consumption of smokeless tobacco (SLT) occurred among individuals aged 21-40 years. Another study by Agrawal et al.[9] found that tobacco chewing was the most prevalent among individuals aged 25-39 years. Mishra et al.[10] conducted a similar study and concluded that SLT and tobacco dual use were highest among individuals aged 25-44 years.

In our study, the vast majority of SLT users (97.7%) were male, which is consistent with the findings reported by Gupta,[7] who noted that the lowest age group (15-34 years) had the highest incidence of habit acquisition, although some females in the middle age group (35-54 years) also

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acquired the habit. Singh et al.[8] reported that males using SLT were 5.8 times more likely to have this habit compared to females (14.7%). This gender disparity in SLT use was also observed in a study by Prabhakar et al.,[11] who found that the consumption of paan masala by males was four times higher than by females.

The participants of our study reported various oral findings, including altered taste (89.7%), staining (84.3%), pigmentation (76%), stomatitis (66.3%), oral submucous fibrosis (OSMF) (54.3%), and coated tongue (53.7%). Gutkha consumption was associated with the highest incidence of these oral findings. Similarly, Singh et al.[8] found that 84.3% of participants showed dental staining due to SLT use, and oral lesions were observed in 60.9% of cases. Khaini (51.0%) and gutkha (35.4%) were the most commonly used SLT products associated with these oral findings. Muthukrishnan and Warnakulasuriya[12] conducted a study that revealed significant staining of teeth among SLT users, while Vikneshan et al.[13] reported tooth abrasion and severe teeth staining in association with SLT use. In our study, 54.3% of participants were diagnosed with OSMF due to SLT use. This aligns with the findings of Muthukrishnan and Warnakulasuriya[12], who identified increased gutkha use as the most common cause of OSMF in India. Singhavi et al.[14] also found that gutka was the most commonly consumed SLT product leading to OSMF in India. Another study by Vellappally et al.[15] demonstrated that the most prevalent form of SLT consumed was a black powder known as "misri," obtained by roasting and powdering tobacco, and was applied by rubbing it on the gums.

Conclusion

The study revealed that SLT consumption was higher among illiterate individuals, with gutkha and khaini being the most prevalent types. Oral health issues, such as altered taste, staining/ tooth decay, and pigmentation, were commonly observed among SLT users.

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