

# Determinants of Smokeless Tobacco Consumption and its Cessation among its Current Users in India

ALMAS BINNAL<sup>1</sup>, G RAJESH<sup>2</sup>, JUNAID AHMED<sup>3</sup>, CEENA DENNY<sup>4</sup>

## ABSTRACT

**Introduction:** Global Smokeless Tobacco (SLT) consumption is on the rise and constitutes a major Public Health problem. Controlling SLT intake is central to containing the increasing tobacco menace.

**Aim:** The present study was undertaken to comprehensively explore various factors involved in SLT consumption and its cessation among current SLT users.

**Materials and Methods:** Present study was conducted among current SLT users visiting Department of Oral Medicine and Radiology, Manipal College of Dental Sciences (MCOADS), Manipal University, Mangalore, Karnataka, India. A structured, pretested and self-administered questionnaire was employed for the present study. Knowledge, attitude, behaviour, worksite practices of respondents towards SLT consumption and its cessation, barriers to SLT cessation were explored. Information about socio-demographic variables was also collected.

**Results:** Overall, 170 current SLT users participated in the present study. Results revealed that the mean knowledge, attitude, worksite related practices and barrier scores were 9.96(55.33%), 48.89(81.48%), 2.70(33.75%) and 54.25(60.27%) respectively. Correlation analysis revealed significant association of socio-demographic factors with knowledge, attitude and worksite related practices ( $p < 0.05$ ). SLT cessation related practices revealed that majority wished to quit (90%) and significant associations were noted amongst wish to quit with higher attitude scores; actual quit attempts with higher attitude, lower barrier scores and difficulty to quit with higher barrier scores ( $p < 0.05$ ).

**Conclusion:** The present study draws attention towards involvement of complex interactions of various parameters including socio-demographic factors in SLT consumption and its cessation. Hence, it is imperative to implement multifactorial SLT control approach in order to contain tobacco menace spread across the globe.

**Keywords:** Barriers, Prevention, Tobacco control, Worksite practices

## INTRODUCTION

Tobacco is the gateway to number of fatal but preventable diseases all over the world [1,2]. Despite all the efforts to control consumption of tobacco, its usage is on the rise [1]. This could be attributed to continuing marketing of tobacco products; addictive nature of tobacco; lack of stringent laws governing the sale of tobacco products [2] and population explosion in countries where tobacco consumption is higher [1].

Although smoking is the most prevalent form of tobacco abuse worldwide, there is definite increase in consumption of Smokeless Tobacco (SLT) especially in the South Asian countries [2]. This is witnessed by the increase in the global SLT sales which is only expected to increase further in the years to come [3]. More than 40 forms of SLT are consumed worldwide, in India particularly it is used in the form of chewing, snuffing, application to teeth and gums [2,4]. Major SLT forms available in India are pan, pan masala, gutka, khaini, zarda, mawa, etc., [4].

The prevalent misconception that SLT is safer compared to smoking could be the basis of initiation and persistence of its usage. In reality, more than 28 chemicals are isolated from SLT that are carcinogens [5]. Although the blood levels of nicotine among SLT users is similar to that of smokers, it stays in the blood stream for longer duration [6] and nicotine content of SLT is also higher [7]. As a result, SLT usage can cause addiction and dependence, which further prevents its users from quitting [5,8]. SLT usage is associated with several health issues [2,3,8] such as oral diseases [5,9], various cancers [2,10], cardiovascular diseases [11-13], mental illnesses [2], low birth weight [8], addiction and dependence etc., [5]. More than 300 million people use SLT worldwide and majority of them reside in South Asia [2]. SLT is associated with significant morbidity, mortality and economic burden as well [14].

Therefore, SLT is a major threat especially in countries such as India due to its high prevalence and limited resources [11].

Increased prevalence of SLT could also be due to lack of policies monitoring various aspects of SLT use such as availability, contents and practices etc., [2,3]. In addition, vigorous marketing strategies employed by tobacco companies [1,2] and tobacco usage by influential personalities further draw attention of susceptible individuals towards SLT usage, especially adolescent and young subjects. Almost all of tobacco usage starts at young age and one form of tobacco usage makes the individual susceptible for other forms of tobacco. SLT use among teenage individuals could lead to smoking habit in adulthood [15]. Hence, monitoring of tobacco use in any form is essential, especially among younger age group [2]. Furthermore, most of the tobacco users are unaware of the long term consequences of SLT usage [1,15]. All these factors lead to the interruption of reduction in SLT usage rates among young subjects after consistent decline for years [15]. Preventing SLT usage is as important as smoking prevention in order to control tobacco epidemic [2,15]. However, despite high incidence of SLT usage attention paid towards curbing this habit in terms of research or policy formulation and implementation is minimal [2,3].

Various factors are involved in the initiation, perpetuation and cessation of SLT usage. Identifying these factors independently alone is not sufficient, exploring their interactions is equally important if one has to design, implement and monitor targeted measures for effective control of tobacco menace. However, research conducted earlier explored one or few of these factors, leaving behind a lacuna [11,16-19]. Information pertaining to worksite related influences, barriers, demographic factors, etc., cannot be overlooked [20]. As a result there is definite dearth

of comprehensive researches that explored various aspects of SLT use and its cessation. Therefore, the present study was undertaken with the aim of assessing various factors involved in initiation, perpetuation and cessation of SLT usage along with their interactions.

## MATERIALS AND METHODS

The study was conducted from July to November 2015, among current SLT users visiting Department of Oral Medicine and Radiology, Manipal College of Dental Sciences (MCODS), Manipal University, Mangalore, Karnataka, India. Ethical clearance was obtained from the Institution Ethics Committee prior to commencement of the study. Patients visiting Department of Oral Medicine and Radiology who were current SLT users (since 30 days) were invited to take part in the study after explaining purpose of the research. Inclusion criteria included current SLT users and patients who were willing to participate in the study. Exclusion criteria included occasional users of SLT. A cross-sectional study design was employed in the present study. A structured, pretested, self-administered questionnaire was employed for the present study. The items for the questionnaire were selected by theory, observation, research and expert opinion [21]. A pilot study with 53 subjects was conducted prior to the start of the main study. Face validity of the questionnaire was assessed by giving it to experts. Internal consistency of the questionnaire was assessed by administering it to 53 patients. Cronbach's alpha and split half reliability of the questionnaire were employed to assess reliability of the questionnaire. The final questionnaire comprised of 78 items focusing on the knowledge (18), attitude (12), worksite practices (8), barriers (18), and, SLT usage and its cessation related practices (22) of the current SLT users. Demographic details such as age, sex, education, occupation, income, marital status and religion were also collected. Socio-economic status of the study participants was classified using Kuppaswamy scale [22,23].

A total of 18 questions were used to assess the knowledge of the study subjects with respect to safety of SLT as compared to smoking tobacco; injurious and addictive nature of SLT; conditions associated with SLT; effect of duration of SLT usage on its detrimental effects and quitting; effect of maternal tobacco usage on fetus; impact of quitting SLT usage on one's health. The possible range of score for knowledge domain was 0-18, scored as 0 or 1 depending on the appropriateness of the answer.

Attitude of the study subjects was evaluated employing 12 items focusing on selling of tobacco to children; price, health warnings, advertisement of tobacco products; banning and implementation issues; quitting SLT usage. A 5 point Likert scale with the options of 'strongly agree', 'agree', 'unsure', 'disagree' and 'strongly disagree' was used with the possible score in range of 12-60.

Worksite related practices towards SLT use and its cessation were gauged using 8 items with a possible score range of 0-8. Each item was scored as 0 or 1 depending on the accuracy of the answer. This part of the questionnaire enquired about environmental and peer influences on tobacco use and its cessation; selling of tobacco in and around workplace; health education programs conducted at workplace.

Various factors which might negatively influence tobacco cessation were focused in the barrier domain comprising of 18 items which enquired about, if subject enjoys and craves for tobacco; if tobacco acts as a stress buster and relieves boredom; weight gain, fear of losing friends; not succeeding in quitting and withdrawal issues associated with tobacco cessation; peer and social pressure and lack of awareness about ill effects of tobacco. Five point Likert scale was used with options of 'strongly agree', 'agree', 'unsure', 'disagree' and 'strongly disagree', with scores being in the range of 18-90.

SLT usage and its cessation related practices were enquired using 22 items aiming at the age of subjects when first tried tobacco; frequency, duration, form, type of SLT usage; reasons to start, desire to quit and inability to quit tobacco; if they wish to and find it difficult to quit tobacco; have they ever stopped tobacco for at least a week; ever seek help of doctor or were counselled to quit tobacco.

Prior to the start of the main study, a pilot study was conducted among 53 patients. Results of the pilot study were used to calculate the sample size. The level of significance was fixed at 5% and the power of the study was fixed at 80%. The final sample size was estimated to be 158 for the present study.

## STATISTICAL ANALYSIS

The data was entered into the computer (MS Excel, MS Word) and Statistical Package for Social Sciences (SPSS), version 16.0 (SPSS Inc, Chicago IL) was employed for data analysis. Cronbach's alpha and split half reliability tests were employed to assess the internal consistency of the knowledge, attitude and barrier domains. The differences among domains based on demographics as well as comparison of domain scores with regard to SLT cessation practices were evaluated using student's t-test. Pearson's correlation and chi-square test were used to assess correlations between various variables.

## RESULTS

Reliability analysis of the pilot study revealed Cronbach's alpha and split half reliability values of 0.83 and 0.70; 0.78 and 0.69; and, 0.87 and 0.78 for knowledge, attitude and barrier domains respectively. A total of 170 current SLT users (n) participated in the present study and were in the age range of 18 to 65 years with the mean age being 33.4 years. Majority of the study subjects were non-graduate (n=135, 79.41%), married (n=92, 54.12%), males (n=165, 97.06%), belonging to Hindu religion (n=138, 81.2%), having income of ≤Rs.10,000 (n=112, 65.88%) and were involved in occupations other than professional and semi-professionals (n=159, 93.53%) [Table/Fig-1].

Mean knowledge, attitude, worksite related practices and barrier scores were 9.96±3.86 (55.33%), 48.89±6.62 (81.48%), 2.70±1.85(33.75%) and 54.25±11.7(60.27%) respectively. Mean knowledge scores of subjects who were graduates and above (p<0.01), involved in semiprofessional or professional occupations (p<0.05) and with income ≥Rs.10,001 were significantly higher than their counterparts. Mean attitude scores were significantly higher among graduates and above and with income ≥Rs.10,001 (p<0.01). Mean worksite related practice scores were significantly better among respondents aged ≤30 years (p<0.05) [Table/Fig-1].

Correlation analysis of various domains with respect to demographics revealed significant association of knowledge with education (r=0.213, p=0.005), occupation (r=0.152, p=0.048) and income (r=0.168, p=0.029); attitude with education (r=0.211, p=0.006) and income (r=0.209, p=0.006); whereas, worksite related practices negatively correlated with age of the study subjects (r=-0.153, p=0.047) [Table/Fig-2]. Results also revealed that the knowledge was significantly associated with attitude (r=0.45, p=0.000) and worksite related practices (r=0.216, p=0.005); while the barriers in quitting smokeless tobacco negatively correlated with worksite related practices of the study subjects (r= -0.188, p=0.014) [Table/Fig-3].

SLT related practices revealed that the average age of the respondents when they first tried and regularly started using tobacco was 23.74±7.94 years and 25.18±8.39 years respectively. Majority of the study subjects chewed gutka (47.1%); daily chewed (95.3%); 1 to 5 times per day (62.4%); placed it in a particular site (57.6%); for an average of 13.30 (range: 1-60 minutes) minutes per use; spat out after chewing (94.1%); chewed at worksite (70%)

Demographic variables		Study subjects		Knowledge		Attitude		Work-site practices		Barriers	
		Number	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	≤30 yrs	83	48.82	9.93	3.88	48.92	5.93	2.99*	1.92	52.60	11.63
	≥31 yrs	87	51.18	10.00	3.86	48.86	7.26	2.43*	1.74	55.83	11.60
Sex	Male	165	97.06	9.96	3.77	48.93	6.69	2.68	1.81	54.16	11.84
	Female	5	2.94	10.20	6.83	47.40	4.28	3.40	3.05	57.40	3.91
Education	<Graduation	135	79.41	9.55**	3.77	48.18**	6.63	2.57	1.83	54.27	11.32
	≥Graduation	35	20.59	11.57**	3.81	51.63**	5.92	3.20	1.84	54.17	13.24
Occupation	≥Semi profession	11	6.47	12.18*	3.74	49.64	5.61	3.36	1.43	54.45	14.77
	Others	159	93.53	9.81*	3.83	48.84	6.70	2.65	1.87	54.24	11.51
Income	≤Rs.10,000	112	65.88	9.50*	3.80	47.89**	6.67	2.71	1.79	54.54	11.55
	≥Rs.10,001	58	34.12	10.86*	3.83	50.81**	6.15	2.69	1.96	53.69	12.05
Marital status	Single	78	45.88	9.86	3.72	48.92	5.81	2.94	1.89	54.06	11.88
	Married	92	54.12	10.05	3.99	48.86	7.27	2.50	1.79	54.41	11.6
Religion	Hindu	138	81.2	9.89	3.93	48.88	6.73	2.70	1.84	53.86	11.57
	Others	32	18.8	10.28	3.56	48.91	6.25	2.72	1.91	55.97	12.26
Total		170	100	9.96	3.86	48.89	6.62	2.70	1.85	54.25	11.70
%				55.33		81.48		33.75		60.27	

[Table/Fig-1]: Intragroup comparison of various parameters among study subjects.

\*-Significant at 5% level of significance; \*\*-Significant at 1% level of significance

Demographic variables	Knowledge		Attitude		Work-site practices		Barriers	
	r value	p-value	r value	p-value	r value	p-value	r value	p-value
Age	0.009	0.903	-0.004	0.958	-0.153	0.047*	0.138	0.072
Sex	0.011	0.890	-0.039	0.612	0.066	0.391	0.047	0.543
Education	0.213	0.005**	0.211	0.006**	0.138	0.072	-0.004	0.963
Occupation	0.152	0.048*	0.030	0.700	-0.095	0.219	-0.005	0.953
Income	0.168	0.029*	0.209	0.006**	-0.004	0.958	-0.035	0.653
Marital status	0.025	0.743	-0.005	0.950	-0.118	0.125	0.015	0.847
Religion	0.040	0.608	0.001	0.986	0.005	0.949	0.071	0.359

[Table/Fig-2]: Correlation analysis of various parameters with respect to demographics.

\*-Significant at 5% level of significance; \*\*-Significant at 1% level of significance

	Knowledge		Attitude		Work-site practices		Barriers	
	r value	p-value	r value	p-value	r value	p-value	r value	p-value
Knowledge	-	-						
Attitude	0.450**	0.000**	-	-				
Work-site practices	0.216**	0.005**	0.077	0.321	-	-		
Barriers	0.015	0.848	-0.041	0.595	-0.188	0.014*	-	-

[Table/Fig-3]: Correlation analysis of various parameters among study subjects.

\*-Significant at 5% level of significance; \*\*-Significant at 1% level of significance

and spent an average of Rs. 476.2(range: 10-3000) per month on SLT. Average time of first use of SLT for the day after waking up was 3 hour 54 minutes with 52.4% of subjects using SLT within the first hour of waking up. Peer and social pressure (24.7%), pleasure (20%) and stress (19.4%) were the major reasons for starting SLT among study subjects.

SLT cessation related practices showed that the majority of participants (n=153, 90%) wished to quit the habit, with the main reasons for the same being worry of tobacco related diseases (n=65, 38.2%) and fear of developing cancer (n=32, 18.8%). Most of them did not find it difficult to quit (n=97, 57.1%) and had stopped tobacco usage for at least a week (n=97, 57.1%). Majority of study subjects had not tried any form of medications or remedies to quit the habit (n=138, 81.2%); had not approached doctor seeking help to quit (n=152, 89.4%); and, were never counselled by doctor to quit (n=131, 77.1%). Most of the respondents reported that the major reasons for not able to quit was that they did not know how to quit (n=67, 39.4%) and their decision of not wanting to quit immediately (n=56, 32.9%). A total of 72.4% (n=123) were ready

to quit immediately and 62.9% (n=107) did not feel the need of assistance in quitting tobacco.

[Table/Fig-4] shows correlation analysis of SLT cessation related practices with respect to demographics, revealing significant association of desire to quit with age ( $\chi^2 = 4.837$ ,  $p=0.039$ ) and occupation ( $\chi^2 = 9.083$ ,  $p=0.015$ ). Quit attempt of at least a week was significantly correlated with occupation of the respondents ( $\chi^2 = 4.259$ ,  $p=0.05$ ). Further notable was the significant association of religion with difficulty to quit ( $\chi^2 = 4.345$ ,  $p=0.047$ ), quit attempts ( $\chi^2 = 5.179$ ,  $p=0.029$ ) and attempts to seek help of doctor ( $\chi^2 = 4.668$ ,  $p=0.026$ ).

As shown in [Table/Fig-5], correlation analysis of SLT cessation related practices with respect to study domains revealed significant association of desire to quit with attitude of the study subjects ( $r = -0.167$ ,  $p=0.030$ ); difficulty to quit with barriers in tobacco cessation ( $r = -0.298$ ,  $p=0.000$ ); quit attempts with attitude ( $r = -0.162$ ,  $p=0.035$ ) and barriers ( $r = 0.182$ ,  $p=0.018$ ); whereas, work site practices were associated with seeking help of doctor ( $r = -0.150$ ,  $p=0.05$ ) and counselling to quit tobacco ( $r = -0.211$ ,  $p=0.006$ ).

Demographic variables		Wish to quit tobacco		Find it difficult to quit tobacco		Ever stopped tobacco for at least 1 week		Ever sought help of doctor		Ever counselled to quit tobacco	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Age	≤30 yrs	79*	4	34	49	50	33	10	73	17	66
	≥31 yrs	74*	13	39	48	47	40	8	79	22	65
Sex	Male	149	16	71	94	94	71	18	147	39	126
	Female	4	1	2	3	3	2	0	5	0	5
Education	<Graduation	122	13	57	78	79	56	14	121	30	105
	≥Graduation	31	4	16	19	18	17	4	31	9	26
Occupation	≥Semi profession	7*	4	6	5	3*	8	3	8	3	8
	Others	146*	13	67	92	94*	65	15	144	36	123
Income	≤Rs.10,000	103	9	45	67	62	50	11	101	23	89
	≥Rs.10,001	50	8	28	30	35	23	7	51	16	42
Marital status	Single	72	6	33	45	45	33	10	68	14	64
	Married	81	11	40	52	52	40	8	84	25	67
Religion	Hindu	124	14	54*	84	73*	65	18*	120	33	105
	Others	29	3	19*	13	24*	8	0*	32	6	26
Total		153	17	73	97	97	73	18	152	39	131

[Table/Fig-4]: Intragroup Comparison of SLT cessation related practices with respect to demographics.

\*-Significant at 5% level of significance

Demographic variables		Knowledge		Attitude		Work-site practices		Barriers	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Wish to quit tobacco	Yes (153)	9.98	3.853	49.25*	6.270	2.73	1.846	53.85	11.679
	No (17)	9.82	4.004	45.59*	8.783	2.41	1.873	57.88	11.548
Find it difficult to quit tobacco	Yes (73)	10.08	4.225	48.75	6.916	2.62	1.777	58.26**	11.751
	No (97)	9.88	3.574	48.99	6.430	2.76	1.903	51.24**	10.762
Ever stopped tobacco for at least 1 week	Yes (97)	10.35	3.530	49.81*	5.803	2.87	1.924	52.41*	10.658
	No (73)	9.45	4.223	47.66*	7.443	2.48	1.725	56.70*	12.608
Ever sought help of doctor	Yes (18)	11.06	3.992	49.17	6.456	3.50*	1.618	56.83	14.492
	No (152)	9.84	3.833	48.86	6.664	2.61*	1.853	53.95	11.338
Ever counselled to quit tobacco	Yes (39)	10.46	4.006	48.74	7.301	3.41**	1.888	53.95	13.700
	No (131)	9.82	3.815	48.93	6.438	2.49**	1.786	54.34	11.087

[Table/Fig-5]: SLT cessation practices with respect to various domains.

\*-Significant at 5% level of significance; \*\*-Significant at 1% level of significance

Barriers	1-5 yrs			6-10 yrs			11-15 yrs			16-20 yrs			21-25 yrs			≥26 yrs		
	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No
I enjoy tobacco	19.51	13.41	67.07	17.39	10.87	71.74	9.09	9.09	81.82	17.65	11.76	70.59	28.57	0.00	71.43	0.00	0.00	100.00
I am not interested to quit tobacco usage	74.39	17.07	8.54	63.04	15.22	21.74	72.73	0.00	27.27	64.71	0.00	35.29	57.14	14.29	28.57	42.86	14.29	42.86
Tobacco relieves my boredom	20.73	19.51	59.76	13.04	17.39	69.57	18.18	18.18	63.64	17.65	11.76	70.59	14.29	0.00	85.71	14.29	14.29	71.43
It is cool to use tobacco	32.93	21.95	45.12	30.43	21.74	47.83	9.09	18.18	72.73	41.18	17.65	41.18	28.57	0.00	71.43	14.29	42.86	42.86
Tobacco usage is a big stress buster for me	19.51	12.20	68.29	19.57	15.22	65.22	27.27	9.09	63.64	29.41	0.00	70.59	14.29	14.29	71.43	14.29	0.00	85.71
I get craving for tobacco	26.83	17.07	56.10	21.74	19.57	58.70	36.36	18.18	45.45	17.65	5.88	76.47	14.29	14.29	71.43	14.29	28.57	57.14
When I stop tobacco use, I tend to gain weight	37.80	41.46	20.73	41.30	39.13	19.57	45.45	18.18	36.36	47.06	41.18	11.76	42.86	42.86	14.29	57.14	42.86	0.00
I get withdrawal symptoms when I quit tobacco	40.24	26.83	32.93	34.78	34.78	30.43	27.27	45.45	27.27	52.94	35.29	11.76	57.14	14.29	28.57	57.14	0.00	42.86
I fear of losing friends if I quit tobacco	58.54	26.83	14.63	60.87	23.91	15.22	54.55	9.09	36.36	52.94	23.53	23.53	42.86	14.29	42.86	85.71	14.29	0.00
I can't quit tobacco because of social pressure	58.54	25.61	15.85	58.70	23.91	17.39	54.55	18.18	27.27	58.82	17.65	23.53	42.86	0.00	57.14	71.43	14.29	14.29
I fear I won't succeed in quitting tobacco	53.66	26.83	19.51	39.13	30.43	30.43	54.55	27.27	18.18	52.94	23.53	23.53	42.86	14.29	42.86	71.43	14.29	14.29
I get discouraged when I try to quit tobacco	57.32	21.95	20.73	50.00	28.26	21.74	54.55	27.27	18.18	52.94	5.88	41.18	14.29	14.29	71.43	71.43	0.00	28.57
I am not aware of ill effects of tobacco	70.73	13.41	15.85	65.22	13.04	21.74	54.55	9.09	36.36	88.24	11.76	0.00	28.57	28.57	42.86	71.43	14.29	14.29
I don't have time for treatment	54.88	26.83	18.29	41.30	21.74	36.96	27.27	36.36	36.36	41.18	11.76	47.06	28.57	0.00	71.43	14.29	42.86	42.86
I can't come often for treatment	51.22	24.39	24.39	34.78	30.43	34.78	9.09	27.27	63.64	29.41	5.88	64.71	28.57	0.00	71.43	0.00	57.14	42.86
I don't have money for medicines while quitting tobacco	51.22	19.51	29.27	41.30	23.91	34.78	27.27	27.27	45.45	35.29	11.76	52.94	28.57	0.00	71.43	14.29	57.14	28.57
I don't know where to go for assistance in quitting tobacco	24.39	28.05	47.56	23.91	36.96	39.13	36.36	18.18	45.45	35.29	11.76	52.94	14.29	0.00	85.71	14.29	42.86	42.86
My friends offer me tobacco	39.02	10.98	50.00	39.13	13.04	47.83	36.36	27.27	36.36	29.41	5.88	64.71	14.29	0.00	85.71	28.57	14.29	57.14

[Table/Fig-6]: Percentage of study subjects reporting various barriers to quit SLT use (in relation to the duration of habit).

[Table/Fig-6] shows percentage of study subjects reporting various barriers to quit SLT use with respect to duration of SLT usage. It can be observed that the barriers to quit SLT use among those who have been using tobacco from the past 1-5 years and 6-10 years were "I am not interested to quit tobacco usage" and "I am not aware of ill effects of tobacco". For study subjects who have been using SLT from the past 11-15 years, the barriers reported were "I am not interested to quit tobacco usage", "I am not aware of ill effects of tobacco", "I fear losing friends if I quit tobacco", "I can't quit tobacco because of social pressure", "I fear I won't succeed in quitting tobacco", "I get discouraged when I try to quit tobacco". Similarly the barriers, differed depending upon the duration of habit.

## DISCUSSION

In order to restrain SLT usage, it is crucial to establish baseline data pertaining to the factors involved in SLT use and its cessation along with their varied interactions. Earlier work explored one or fewer aspects of SLT usage and its cessation [Table/Fig-7] [24-29]. The present work was one of the first attempt aimed at comprehensive exploration of various factors associated with SLT use and its cessation.

It is well appreciated that lack of knowledge and awareness are important factors that lead to initiation and persistence of SLT usage [1,15]. Although previous studies enquired one or fewer knowledge based questions [16,24,30], there is definite paucity of literature pertaining to exhaustive evaluation of knowledge related to SLT and its cessation. The present study aimed at addressing this void and the mean knowledge score was found to be 55.3%. The mean knowledge score was low despite the various measures exercised by the policy makers such as bold graphic embodiment of danger on SLT packets, audio-visual multimedia messages, ban

on selling tobacco products, etc. This questions the implementation of such policies and directs attention towards the urgent need to further reinforce the existing policies and bring in newer measures aimed at prevention of SLT usage and promotion of its cessation. Subjects who were graduates and above, involved in semi-professional or professional occupations and with income  $\geq$ Rs.10,001 had significantly better knowledge scores than their counterparts in the present study, which could be attributed to their higher level of education. Majmudar et al., found association of better knowledge with higher level of education but not with income of their study participants [16]. Tiwari et al., also reported higher level of education with better knowledge [31]. Khawaja et al., found association of knowledge with age of their study subjects [32], contrasting the results of present study and Majmudar et al., [16].

Attitude of SLT users is a determining factor in the development, implementation and realization of measures targeted towards the prevention of SLT use and promotion of its cessation. Attitude of the present study participants was favourable (81.48%). Study participants who were graduates and above and those with income  $\geq$ Rs.10001 had better attitude scores, which could be attributed to their higher level of education. Despite having favourable attitude towards tobacco cessation, study participants were continuing SLT usage, pointing the inability of favourable attitude alone in controlling SLT use. This focuses attention towards importance of other variables like socio-demographic factors, worksite practices, barriers etc., which might play role in SLT usage and its cessation.

Individuals might get influenced by the practices of others at worksite due to sharing of time and same environment [33,34]. Engaging in certain occupations might even promote usage of

Article	Population	Main parameters	Main findings	Comparison
Raute et al., (2011) [24]	Smokeless tobacco users in India	Knowledge of health effects and intentions to quit	<ul style="list-style-type: none"> <li>38% intended to quit, and 11% intended to quit within the next 6 months</li> <li>Respondents with higher knowledge were more likely to have intentions to quit</li> </ul>	<ul style="list-style-type: none"> <li>153 (90%) of respondents wished to quit tobacco</li> <li>Attitude was significantly correlated with wish to quit</li> </ul>
Surani et al., (2012) [25]	764 adult respondents from urban and rural areas of Maharashtra and Bihar	Intention to quit among Indian tobacco users	<ul style="list-style-type: none"> <li>32.5% intended to quit</li> <li>Literate participants had greater intention to quit</li> <li>Respondents who felt tobacco had damaged their health intended to quit</li> </ul>	<ul style="list-style-type: none"> <li>153 (90%) of respondents wished to quit tobacco</li> <li>Occupation was significantly correlated with wish to quit tobacco</li> <li>Attitude was significantly correlated with wish to quit</li> </ul>
Sarkar et al., (2013) [26]	Smokers and smokeless tobacco users in the states of Gujarat and Andhra Pradesh, India	Tobacco cessation behaviour	<ul style="list-style-type: none"> <li>18.3% attempted to quit in past year</li> </ul>	<ul style="list-style-type: none"> <li>57.1% had stopped tobacco usage for at least a week (n=97)</li> </ul>
Corsi et al., (2014) [27]	Tobacco users in Andhra Pradesh, India	Tobacco use, smoking quit rates, and socioeconomic patterning	<ul style="list-style-type: none"> <li>45.5% of women and 18.8% of men attempted to quit</li> </ul>	<ul style="list-style-type: none"> <li>57.1% had stopped tobacco usage for at least a week (n=97)</li> </ul>
Dhumal et al., (2014) [28]	tobacco users in India	Quit history, intentions to quit, and reasons for considering quitting	<ul style="list-style-type: none"> <li>72% of participants had intention to quit</li> <li>Intention to quit was significantly associated education status and workplace exposure to anti-tobacco messages</li> </ul>	<ul style="list-style-type: none"> <li>153 (90%) of respondents wished to quit tobacco</li> <li>Occupation was significantly correlated with wish to quit tobacco</li> <li>Workplace related practices was significantly correlated with ever sought help of doctor and ever counselled to quit tobacco</li> </ul>
Thakur et al., (2015) [29]	Respondents across States and Union Territories of India	Prevalence of both forms of tobacco use and its association with socio-economic determinants was assessed across States and Union Territories of India	<ul style="list-style-type: none"> <li>Odds of tobacco consumption reduced with higher wealth</li> </ul>	<ul style="list-style-type: none"> <li>Education, occupation and income were significantly correlated with knowledge</li> <li>Education and income were significantly correlated with attitude</li> <li>Occupation was significantly correlated with wish to quit tobacco and ever stopped tobacco for at least 1 week</li> </ul>

[Table/Fig-7]: Comparison of previous literature with present study findings [24-29].

SLT among the workers due to various reasons such as extended working hours, late night shifts, social acceptance, peer pressure etc. Similarly, implementation of targeted measures such as banning SLT use in and around work premises, conducting health talks, setting up of tobacco cessation clinics etc., might be more fruitful at worksite [33]. Binnal et al., noted that work site practices played significant role in smoking and its cessation [35]. Hence, monitoring worksite related practices might be important to control SLT usage. Worksite related practices among the present study participants were poor (33.75%), confirming the reports of Binnal et al., [35]. It was also noted that younger aged respondents had significantly better worksite practice scores than their counterparts. This could be attributed to the recent increase in the awareness programs conducted by the policy makers and to the fact that longer the duration of SLT use higher is its addiction, which could be true among older individuals.

Murthy and Saddichha proposed that lack of knowledge about ill effects of tobacco, cultural influences, lack of promotion of tobacco cessation and own use of tobacco by health professionals might act as barriers in tobacco cessation [36]. Hence, there is need to identify and eliminate the factors which impede tobacco cessation. Higher the barrier scores greater is the difficulty in SLT cessation. The present study barrier scores were 60.27% and were not influenced by any of the demographic factors under study. There is need to implement measures in order to overcome these barriers such as SLT related awareness programs, cessation clinics, ban its usage in and around schools, colleges and public places, etc. Studies pertaining to barriers associated with SLT cessation are scarce, future studies are required to elucidate further on these findings.

Significant association of knowledge with attitude and worksite related behaviour in the present study strengthens the importance of measures designed to improve knowledge towards harmful effects of SLT and benefits of its cessation. Barriers in SLT cessation were inversely correlated with worksite practices among present study participants, indicating better worksite practices if the existing barriers would be eliminated. These findings confirm results of Binnal et al., who reported similar findings among current smokers [35].

Confirming the previous reports [18,37], majority of the present study members chewed SLT daily, 1 to 5 times per day, at worksite, placed tobacco in a particular site, for an average of 13.3 minutes per use, spat out after chewing. Mean age of the respondents when they first tried and regularly initiated tobacco usage in the present study was 23.8 years and 25.9 years respectively, which is consistent with the results of Joshi et al., Mishra et al., and Kumar et al., [18,30,37]. In contrast, Majmudar et al. and Global Adult Tobacco Survey (GATS) India reported 15 and 17.9 years respectively as age at daily initiation [16,17]. Majority of study participants used SLT within an hour of waking up, which is consistent with the previous findings [16,17]. This indicates degree of dependence of the study subjects on SLT and hence might complicate tobacco cessation. The main reasons for using SLT among present study participants were peer and social pressure followed by pleasure and stress, which confirm the earlier findings [30,33,37]. SLT usage expenses among the participants of the present study was Rs. 476.2 (range: 10-3000), while Mishra et al., reported an average expenditure of Rs. 66.7 [30]. Study participants of Mishra et al., were industrial workers, while the present study included participants from diverse socio-economic backgrounds [30]. Although majority of our study participants had income  $\leq$ Rs.10,000, their SLT related expenses were considerably high. The results of the present study indicate that SLT related expenses might constitute a significant economic burden on their family.

The present study aimed at identifying factors that played role in SLT cessation. Majority (90%) of our study subjects wished to quit SLT usage which is consistent with the reports of Majmudar et al., and Agaku et al., [16,38], however conflict the observations of GATS India, Raute et al., Panda et al., [17,24,39]. Most of them had stopped SLT usage for atleast a week and claimed that they did not find it difficult to quit, confirming the reports of Majmudar et al., and conflicting that of Stoebner-Delbarre and Aghi [16,40]. Identifying the reasons behind intention to quit and inability to quit might be important to formulate strategies that facilitate SLT cessation. The main reason for intention to quit SLT usage among present study participants was fear of developing cancer, confirming the reports of Joshi et al., [18]. Majority of the present study respondents claimed that they were not able to quit and the reasons were that they did not know how to quit, their desire not to quit immediately and withdrawal effects. These findings point towards need to increase awareness that SLT is addictive hence might be difficult to quit, and, about whom to approach if they wish to quit.

Influence of the socio-demographic factors on SLT cessation related practices were also assessed in the present study. Significant association of age with desire to quit; occupation with desire to quit and quit attempts; religion with difficulty to quit, quit attempts and attempts to seek help of doctor. Panda et al., reported significant association of intention to quit with age, employment and previous quit attempts [39]. Early interventions to help quitting SLT usage especially among high risk occupational groups might be significant in promoting tobacco cessation practices.

Further notable findings were, better attitude scores among subjects who desired to quit and had tried quitting SLT; better worksite practice scores among those who seek help of doctor and who were counselled to quit tobacco; and, higher barrier scores among subjects who found it difficult to quit and those without any quit attempts. These observations need to be considered by the policy makers while evolving and executing SLT cessation methods. Newer policies exercising multiple approach strategy are required for effective SLT cessation. As this is first attempt at exploring various aspects of SLT cessation comprehensively, further studies are required to elucidate more on these issues.

## LIMITATION

The results of the present study must be interpreted in view of its limitations. Participants of the present study were SLT users visiting a dental institution. Hence, the results of the study cannot be extrapolated to the general population. As the present study is a questionnaire based research, it is susceptible to acquiescence (yea-saying), deviation (faking bad) and social desirability (faking good) biases. Further studies with larger sample size are required to confirm the results.

## CONCLUSION

The present study draws attention towards involvement of multiple factors along with their complex interactions in SLT usage and its cessation. Socio-demographics play a significant role in initiation, perpetuation and cessation of SLT. In a country like India with growing population and limited resources, it is essential to consider these multitude of factors and adopt a multifactorial SLT control approach. Implementation of various measures such as SLT-free laws against SLT usage in public places; ban on advertisement, promotion and sale of SLT products especially around schools, workplaces; forbid sponsorships by tobacco industry, etc are required. Policy makers should also consider promotion and description of types of danger associated with SLT on SLT products; promoting SLT cessation activities such as setting up of SLT cessation clinics, promotion of various benefits

of SLT cessation, anti-SLT campaigns, whom to approach if one wants to quit SLT usage, monetary benefits upon quitting, etc., in order to combat SLT hazard.

## REFERENCES

- [1] World Health Organization. Economics of tobacco toolkit: assessment of the economic costs of smoking. Geneva: WHO, 2011.
- [2] Eriksen M, Mackay J, Schluger N, Islami F, Drope J. The Tobacco Atlas. 5<sup>th</sup> Ed. GA: American Cancer Society, and, New York, NY: World Lung Foundation, 2015.
- [3] Eriksen M, Mackay J, Ross H. The Tobacco Atlas. 4<sup>th</sup> Ed. Atlanta, GA: American Cancer Society, and, New York, NY: World Lung Foundation, 2012.
- [4] Gupta PC, Ray CS. Smokeless tobacco and health in India and South Asia. *Respirology*. 2003;8(4):419-31.
- [5] International Agency for Research on Cancer. Smokeless Tobacco and Some Tobacco-Specific N-Nitrosamines. Lyon, France: World Health Organization International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, 2007;89.
- [6] National Cancer Institute. Smokeless Tobacco or Health: An International Perspective. Bethesda, MD: National Cancer Institute: Smoking and Tobacco Control Monograph 2, 1992.
- [7] Djordjevic MV, Doran KA. Nicotine content and delivery across tobacco products. *Handb Exp Pharmacol*. 2009;192:61-82.
- [8] World Health Organization Report on the global tobacco epidemic, 2008: the MPOWER package. Geneva: World Health Organization, 2008.
- [9] Walsh PM, Epstein JB. The oral effects of smokeless tobacco. *J Can Dent Assoc*. 2000;66(1): 22-25.
- [10] Boffetta P, Hecht S, Gray N, Gupta P, Straif K. Smokeless tobacco and cancer. *Lancet Oncol*. 2008;9(7):667-75.
- [11] Gupta R, Gupta N, Khedara RS. Smokeless tobacco and cardiovascular disease in low and middle income countries. *Indian Heart J*. 2013;65(4):369-77.
- [12] Hergens MP, Alfredsson L, Bolinder G, Lambe M, Pershagen G, Ye W. Long-term use of Swedish moist snuff and the risk of myocardial infarction amongst men. *J Intern Med*. 2007;262(3):351-59.
- [13] Piano MR, Benowitz NL, Fitzgerald GA, Corbridge S, Heath J, Hahn E, et al. Impact of smokeless tobacco products on cardiovascular disease: implications for policy, prevention, and treatment: a policy statement from the American Heart Association. *Circulation*. 2010;122(15):1520-44.
- [14] John RM, Sung HY, Max W. Economic cost of tobacco use in India, 2004. *Tob Control* 2009;18(2): 138-43.
- [15] US Department of Health and Human Services. Preventing tobacco use among youth and young adults: A report of the surgeon general. Atlanta, GA: U.S. Department of Health and Human Services, Centers for disease control and prevention, National center for chronic disease prevention and health promotion, Office on smoking and health, 2012.
- [16] Majumdar VP, Mishra AG, Kulkarni VS, Dusane RR, Shastri SS. Tobacco-related knowledge, attitudes, and practices among urban low socioeconomic women in Mumbai, India. *Indian J Med Paediatr Oncol*. 2015;36(1):32-37.
- [17] Tobacco use. Global Adult Tobacco Survey: India Report 2009-2010. Ministry of Health and Family Welfare, Government of India, 2010.
- [18] Joshi U, Modi B, Yadav S. A study on prevalence of chewing form of tobacco and existing quitting patterns in urban population of Jamnagar, Gujarat. *Indian J Community Med*. 2010;35(1):105-08.
- [19] Palipudi KM, Sinha DN, Choudhury S, Zaman MM, Asma S, Andes L, et al. Predictors of tobacco smoking and smokeless tobacco use among adults in Bangladesh. *Indian J Cancer*. 2012;49:387-92.
- [20] Gupta PC, Ray CS. Tobacco, education and health. *Indian J Med Res*. 2007;126: 289-99.
- [21] Streiner DL, Norman GR, Cairney J. Health measurement scales: a practical guide to their development and use. Oxford University Press, USA; 2014.
- [22] Kuppaswamy B. Manual of socioeconomic status scale (urban). Delhi: Manasayan, 1981.
- [23] Vijaya K, Ravikiran E. Kuppaswamy's Socio-economic Status Scale-Updating Income Ranges for the Year 2013. *National Journal of Research in Community Medicine*. 2013;2(2):79-82.
- [24] Raute LJ, Sansone G, Pednekar MS, Fong GT, Gupta PC, Quah AC, et al. Knowledge of Health Effects and Intentions to Quit among Smokeless Tobacco Users in India: Findings from the International Tobacco Control Policy Evaluation (ITC) India Pilot Survey. *Asian Pacific J Cancer Prev*. 2011;12:1233-38.
- [25] Surani NS, Gupta PC, Fong TG, Pednekar MS, Quah AC, Bansal-Travers M. Intention to quit among Indian tobacco users: findings from International Tobacco Control Policy evaluation India pilot survey. *Indian J Cancer*. 2012;49(4):431-37.
- [26] Sarkar BK, Arora M, Gupta VK, Reddy KS. Determinants of tobacco cessation behaviour among smokers and smokeless tobacco users in the states of Gujarat and Andhra Pradesh, India. *Asian Pac J Cancer Prev*. 2013;14(3):1931-35.
- [27] Corsi DJ, Subramanian SV, Lear SA, Chow CK. Tobacco use, smoking quit rates, and socioeconomic patterning among men and women: a cross-sectional survey in rural Andhra Pradesh, India. *Eur J Prev Cardiol*. 2014;21(10):1308-18.
- [28] Dhimal GG, Pednekar MS, Gupta PC, Sansone GC, Quah AC, Bansal-Travers M, et al. Quit history, intentions to quit, and reasons for considering quitting among tobacco users in India: Findings from the Wave 1 TCP India Survey. *Indian J Cancer*. 2014;51(1):S39-45.
- [29] Thakur JS, Prinja S, Bhatnagar N, Rana SK, Sinha DN, Singh PK. Widespread inequalities in smoking & smokeless tobacco consumption across wealth quintiles in States of India: Need for targeted interventions. *Indian J Med Res*. 2015;141(6):789-98.
- [30] Mishra GA, Shastri SS, Uplap PA, Majumdar PV, Rane PS, Gupta SD. Establishing a model workplace tobacco cessation program in India. *Indian J Occup Environ Med*. 2009;13(2):97-103.
- [31] Tiwari R, Deb P, Debbarma A, Chaudhuri R, Chakraborty A, Lepcha M, et al. Tobacco use and cardiovascular disease: A knowledge, attitude and practice study in rural Kerala. *Indian J Med Sci*. 2006;60:271-76.
- [32] Khawaja MR, Mazahir S, Majeed A, Malik F, Merchant KA, Maqsood M, et al. Chewing of betel, areca and tobacco: Perceptions and knowledge regarding their role in head and neck cancers in an urban squatter settlement in Pakistan. *Asian Pac J Cancer Prev*. 2006;7:95-100.
- [33] Pimple S, Pednekar M, Mazumdar P, Goswami S, Shastri S. Predictors of quitting tobacco-results of a worksite tobacco cessation service program among factory workers in Mumbai, India. *Asian Pacific J Cancer Prev*. 2012;13:533-38.
- [34] Prabhakar B, Narake SS, Pednekar MS. Social disparities in tobacco use in India: the roles of occupation, education and gender. *Indian J Cancer*. 2012;49:401-09.
- [35] Binnal A, Rajesh G, Ahmed J, Denny C, Nayak SU. Insights into smoking and its cessation among current smokers in India. *Asian Pac J Cancer Prev*. 2013;14(5):2811-18.
- [36] Murthy P, Saddichha S. Tobacco cessation services in India: Recent developments and the need for expansion. *Indian J Cancer* 2010;47(Suppl S1):69-74.
- [37] Kumar S, Dwivedi V, Pandey U, Bala N, Vasandani S, Singh K, et al. Tobacco use in Northern India-Part 1: The detailed habit. *J Oral Biol Craniofac Res*. 2011;1(1):24-30.
- [38] Agaku I, Akinyele AO, Omaduie UT. Evaluation of factors influencing intention to quit smokeless and cigarette tobacco use among Nigerian adolescents. *Niger Med J*. 2012;53(1):31-36.
- [39] Panda R, Venkatesan S, Persai D, Trivedi M, Mathur MR. Factors determining intention to quit tobacco: exploring patient responses visiting public health facilities in India. *Tob Induc Dis*. 2014;12(1):1.
- [40] Stoebner-Delbarre A, Aghi MB. A comparative study of perceptions on tobacco in vulnerable populations between India and France. *Glob Health Promot*. 2013;20:82.

### PARTICULARS OF CONTRIBUTORS:

1. Reader, Department of Oral Medicine and Radiology, Manipal College of Dental Sciences, Manipal University, Mangalore, Karnataka, India.
2. Professor and Head, Department of Public Health Dentistry, Manipal College of Dental Sciences, Manipal University, Mangalore, Karnataka, India.
3. Professor and Head, Department of Oral Medicine and Radiology, Manipal College of Dental Sciences, Manipal University, Mangalore, Karnataka, India.
4. Associate Professor, Department of Oral Medicine and Radiology, Manipal College of Dental Sciences, Manipal University, Mangalore, Karnataka, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. G Rajesh,  
Professor and Head, Department of Public Health Dentistry, Manipal College of Dental Sciences,  
Manipal University, Mangalore - 575001, Karnataka, India.  
E-mail: drrajeshgrao@gmail.com

Date of Submission: Jul 12, 2016

Date of Peer Review: Aug 01, 2016

Date of Acceptance: Aug 31, 2016

Date of Publishing: Oct 01, 2016

FINANCIAL OR OTHER COMPETING INTERESTS: None.