

Counselling as a Tool for Tobacco Cessation in a Dental Institution: Insights from India

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Abstract

Background: Tobacco related mortality and morbidity is a growing public health problem world over. Counselling has emerged as an important arsenal in the battle against tobacco. Involving experts other than traditional medical health workers may be critical. Aim of the present study was to explore various aspects related to Tobacco cessation counselling among Indian dental students. Methods: Overall, 241 undergraduate students from Manipal College of Dental Sciences, Mangalore participated in the present investigation. A structured, pretested, self-administered questionnaire was used to ascertain knowledge, attitude, behavior, perceived effectiveness and barriers and socio-demographic details. Willingness to counsel patients and undergo further training counselling was also assessed. **Results:** Mean knowledge, attitude, behavior, perceived effectiveness and barrier scores were 2.94 (± 2.08), 51.84 (± 5.63), 19.25 (± 8.79), 16.17 (± 1.96) and 42.39 (± 5.65) respectively. Age was significantly correlated with knowledge; while year of study revealed significant correlations with knowledge and behavior ($p < 0.05$). Lack of motivation, poor attitude of patients; lack of knowledge and skills emerged as barriers. Multiple logistic regression analysis indicated that year of study, attitude, behavior and barrier scores were significant predictors for respondents ever counselled their patients ($p < 0.05$). **Conclusions:** Knowledge and behavior scores of the respondents towards Tobacco cessation counselling were low, but a majority of the subjects were willing to counsel and undergo training. Year of study, attitude, behavior and barrier scores emerged as significant predictors of counselling for Tobacco use. The present study has important policy implications and highlights curriculum changes in making Tobacco cessation counselling more relevant and effective among Indian dental students.

Keywords: Tobacco cessation- counselling practices- barriers- dental students

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Introduction

Tobacco is the root cause to a number of diseases afflicting millions of individuals all over the world. Although various efforts have been instituted to curb the consumption of tobacco, its usage is still on the rise (World Health Organization, 2017). Aggressive marketing of Tobacco products, paucity of stringent laws related to the sale of Tobacco products, addictive nature of Tobacco may have contributed to higher consumption of Tobacco (Drope et al., 2018).

Substance abuse disorders, especially Tobacco use can lead to cancers of lung, oral cavity, esophagus, pharynx and larynx; pancreatic cancer, chronic obstructive pulmonary disease, stroke, ischemic heart disease, etc (Doll and Hill, 1976; Doll and Peto, 1980; Doll, 2004; James et al., 2018). It can lead to delayed oral wound healing, increased root caries, oral pain; dental plaque, calculus and stained teeth;

oral malodour, soft tissue changes such as stomatitis nicotina, oral leukoplakia, acute necrotizing ulcerative gingivitis (ANUG), and adult periodontitis. Tobacco use is a significant predictor of failure of periodontal and implant therapies. These diseases not only lead to ailments affecting disability adjusted life years (DALYs), but also lead to a significant economic burden on societies (Walsh and Ellison, 2005; Scarborough et al., 2011; Forouzanfar et al., 2016; GBD, 2016).

Tobacco related diseases are widely prevalent among individuals in developing and underdeveloped nations. These nations have definite paucity of resources, especially for provision of health care. One of the leading nations with largest number of Tobacco related diseases in the world is India. Overall, a total of 41% of adults aged 15 years or more report consuming one form or the other of Tobacco on a day-to-day basis (Asma et al., 2015). Results of Global Adult Tobacco Survey (GATS

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2) indicate that the overall prevalence of use of any form of Tobacco has declined in India from 34.6% in 2009-10 to 28.6% in 2016-17 (Tata Institute of Social Sciences and Ministry of Health and Family Welfare Government of India, 2017). However, one can observe that number of individuals using Tobacco in India still remains very high. Trends of Tobacco related diseases in India indicate that they afflict the underprivileged the most. Thus, one of the biggest public health issues that India is currently facing is Tobacco related diseases (Mishra et al., 2012).

Tobacco cessation activities will have to be initiated and implemented by all stakeholders of the health care delivery systems. Traditionally, provision of various health care services, including Tobacco cessation services, mainly involved medical personnel. These services can be augmented by involving others involved in the provision of health care. Various other health care professionals such as dentists and their team members too can make substantial contributions towards curbing the use of Tobacco among the populace (Walsh and Ellison, 2005; Anders et al., 2014; (Block et al., 1999; Jannat-Khah et al., 2014).

One of the effective techniques in helping individuals deal with Tobacco use is counseling. Counseling is a process of communication between the health care provider and client who is dealing with an issue. It has been defined as “the process by which the structure of the self is relaxed to the satisfaction of the client’s relationship with therapist and where previously denied experiences are perceived and thus integrated into an altered self.” It entails helping the patient arrive at solutions for problems that he/she is currently facing. Various investigators have reported that individual counselling can help smokers quit the habit (Warnakulasuriya, 2002; Omaña-Cepeda et al., 2016; Lancaster and Stead, 2017).

Studies have shown that oral health professionals perceive Tobacco cessation as a part of their services to their clients (Monaghan, 2002; Walsh and Ellison, 2005; Amit et al., 2011). In their Consensus Report of the 2nd European Workshop on Tobacco Use Prevention and Cessation for Oral Health Professionals, Ramseier et al., (2010) have outlined provision of basic, intermediate and advanced care for helping patients quitting Tobacco use that are specific for dental team members. In a systematic review of interventions for Tobacco cessation by dentists, Carr and Ebbert (2012) have reported that abstinence rates may increase among Tobacco users as a result of behavioral interventions with an oral examination component provided by dentists and their auxiliaries in clinics or community settings.

Previous studies mainly focused on one or a few aspects related to counselling for Tobacco cessation among dental students (Rajasundaram et al., 2011; Halawany et al., 2013; Murugaboopathy et al., 2013). Identifying various factors involved in counselling for Tobacco cessation independently alone may not be sufficient. Exploring various interactions of these factors is equally essential if one has to design and implement targeted measures to control the Tobacco menace. The present study highlights administrative, curriculum and policy changes essential to systematically introduce counselling

in a dental institution. There are no studies which provide comprehensive insights into counseling as a means of Tobacco cessation among Indian dental students. As a result, there is a definite need of comprehensive approach to exploring various factors involved in counselling for Tobacco cessation.

Materials and Methods

The present investigation was aimed at evaluating several aspects pertaining to Tobacco cessation counselling amongst undergraduate students in a dental school in Mangalore. A cross-sectional design was employed and III and IV BDS students and interns (house-surgeons) in Manipal College of Dental Sciences (MCOADS), Mangalore, Manipal Academy of Higher Education, Manipal, Karnataka, INDIA were invited to participate in the present study. Approval to undertake this investigation was taken from Dean, MCOADS, Mangalore. Ethical approval was obtained from Institutional Ethics Committee of Manipal College of Dental Sciences, Mangalore [Protocol Ref. No. 15108]. The list of all the students studying in III and IV BDS and internship was obtained from the office of MCOADS, Mangalore and all the individuals were included in the present study.

The questionnaire for the present study was developed by theory, research, observation, and expert opinion (Streiner et al., 2015). Various parameters explored in the present study included: knowledge, attitudes, behaviors, perceived barriers and effectiveness towards Tobacco cessation counselling. Willingness to counsel patients for Tobacco cessation and willingness to undergo training for the same was also explored in the present study. A total of 16 items explored various aspects of knowledge of participants and included processes involved in 5As and 5Rs of counselling, skills involved in counselling process, etc. Attitude was assessed by 13 items, which included whether providing Tobacco cessation counselling was a part of dental student and professionals’ job, keeping oneself updated with recent advances in counselling. Behavior of respondents was measured by 10 items, which explored if they conduct Tobacco cessation counselling, provide patients with self-help materials, suggest nicotine replacement therapy (NRT) for patients who wish to quit tobacco.

Perceived effectiveness of respondents was assessed by 5 items which assessed if the respondents can identify and counsel patients for Tobacco cessation effectively, convince individuals who are not ready to quit Tobacco use to undergo counselling, perceived barriers was assessed by 11 items and included lack of knowledge, skills, time and resources; patient factors such as lack of interest from patients. Attitude, behavior, perceived effectiveness and perceived barriers were assessed by employing a 5-point Likert scale. Previous instances of providing Tobacco cessation counselling, willingness to provide counselling and undergo training for the same and familiarity with guidelines for counselling were assessed by single items.

Based on the correctness of the respondent’s answers to the items on knowledge, questions were marked as 0 or 1. A 5 point Likert scale for attitude, behavior, perceived

effectiveness and perceived barriers domain was used. Hence, the possible range of scores for various domains were: knowledge, 0-16; attitude, 1-65; behaviour, 1-50; perceived effectiveness, 1-20; and, perceived barrier, 1-55. Information regarding age, gender, and residential place of participants was also collected. Prior to the investigation, informed consent was taken from the participants. Confidentiality of information obtained during the course of the study was maintained at every stage of the investigation.

A pilot study was undertaken before the main study, in which the reliability of the questionnaire was ascertained. A total of 35 students were invited to participate in this pilot study, who were excluded from the main study. Reliability of the questionnaire was assessed by Cronbach's alpha and split-half reliability.

Statistical Package for Social Sciences (SPSS), version 16.0 (SPSS Inc, Chicago IL) was employed for statistical analysis. Student's t-test was employed for intergroup analysis. Correlation between knowledge, attitude, behavior, perceived effectiveness and barriers with demographic variables was ascertained by employing Pearson's correlation co-efficient. Multiple logistic regression analysis was employed with previous counselling as dependent variable. The level of significance was fixed at 5%.

Results

A total of 241 undergraduate students from Manipal College of Dental Sciences, Mangalore were included in the present study. Various aspects related to Tobacco cessation counselling such as knowledge, attitude, behavior, perceived effectiveness and barriers, willingness to counsel and undergo training were explored. Information related to demographic details was also collected from the study subjects. Reliability statistics for various domains,

as assessed by Cronbach's alpha and split-half reliability values were 0.69 and 0.71 for knowledge domain; 0.75 and 0.80 for attitude; 0.79 and 0.81 for behaviour; 0.80 and 0.79 perceived effectiveness; and for domain were 0.77 and 0.72 for perceived barriers respectively.

A majority of the study subjects were aged ≤ 22 years, were females and were not residing in hostels. The mean knowledge, attitude, behavior, perceived effectiveness and barrier scores were: 2.94 (± 2.08), 51.84 (± 5.63), 19.25 (± 8.79), 16.17 (± 1.96) and 42.39 (± 5.65) respectively. Results of student's t-test indicate that students aged ≥ 23 years had higher knowledge ($p < 0.05$) and behavior scores ($p < 0.001$) compared to participants aged < 23 years. Students in their internship had greater knowledge ($p < 0.01$) and behavior scores ($p < 0.001$) than those in their 3rd and 4th year of training. It can also be observed that students living in hostels had greater attitude scores compared to participants not living in hostels ($p < 0.01$) (Table 1).

It can also be observed from the results that a majority of 78.8% had not counselled their patients about Tobacco cessation. A majority of 90.9 and 84.2% of the respondents were willing to counsel patients about Tobacco cessation and were willing to undergo training for the same respectively. A majority of 94.2% of the study subjects had not undergone any previous training on Tobacco cessation counselling, while a majority of 85.5% were not familiar with recent guidelines for Tobacco cessation counselling (Table 2).

Correlation analysis indicated that knowledge, attitude, behavior, perceived effectiveness and barrier scores were all correlated among each other (Table 3). Age was significantly correlated with knowledge scores ($r = 0.171$, $p = 0.008$), while year of study was significantly correlated with knowledge ($r = 0.224$, $p < 0.001$) and behavior scores ($r = 0.260$, $p < 0.001$) of study subjects. It can also be observed that place of residence showed significant

Table 1. Demographic Variables and Knowledge, Attitude, Behavior, Perceived Effectiveness and Barriers about Tobacco Cessation Counselling among Study Subjects

Demographic variables			Knowledge		Attitude		Behavior		Perceived effectiveness		Barriers	
	n	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (yrs)												
≤ 22	157	65.15	2.74*	1.94	52.05	5.24	17.94***	8.14	16.04	1.91	42.36	5.39
≥ 23	84	34.85	3.32*	2.28	51.44	6.3	21.70***	9.45	16.42	2.06	42.45	6.14
Gender												
Male	60	24.9	2.8	2.36	51.33	6.62	19.95	9.08	16.48	1.76	42.28	5.96
Female	181	75.1	2.99	1.98	52.01	5.27	19.02	8.7	16.07	2.02	42.43	5.56
Year of study												
3rd & 4th yr	162	67.22	2.66**	1.87	51.69	5.712	17.86***	7.89	16.17	2.05	42.16	5.32
Interns	79	32.78	3.52**	2.36	52.14	5.46	22.10***	9.83	16.18	1.78	42.86	6.29
Residence												
Hostel	102	42.32	3.24	2.12	53.14**	5.29	19.91	8.79	16.25	1.9	42.17	6.33
Non-hostel	139	57.68	2.73	2.03	50.88**	5.7	18.76	8.78	16.12	2.02	42.55	5.11
Total			2.94	2.08	51.84	5.63	19.25	8.79	16.17	1.96	42.39	5.65
Percent			18.39		79.75		38.5		80.85		77.07	

*, significant at 5% level of significance; **, significant at 1% level of significance; ***, significant at 0.1% level of significance

Table 2. Distribution of Study Subjects Regarding Conduction of Counselling, Willingness to Participate and Undergo Training, Previous Training and Familiarity with Recent Guidelines Regarding Tobacco Cessation Counselling

Question	Yes		No	
	n	%	n	%
Ever conducted tobacco cessation counselling	51	21.2	190	78.8
Willingness to conduct tobacco cessation counselling	219	90.9	22	9.1
Willingness to undergo training in tobacco cessation counselling	203	84.2	38	15.8
Previous training in tobacco cessation counselling	14	5.8	227	94.2
Familiarity with guidelines for tobacco cessation counselling	35	14.5	206	85.5

Table 3. Correlation Analysis of Knowledge, Attitude, Behavior, Perceived Effectiveness and Barriers among Study Subjects by Using Pearson Correlation

	Knowledge		Attitude		Behavior		Perceived effectiveness		Barriers	
	r-value	p-value	r-value	p-value	r-value	p-value	r-value	p-value	r-value	p-value
Knowledge	-	-								
Attitude	0.155*	0.016*	-	-						
Behavior	0.315***	<0.001***	0.134*	0.038*	-	-				
Perceived effectiveness	0.239***	<0.001***	0.287***	<0.001***	0.344***	<0.001***	-	-		
Barriers	0.186**	0.004**	0.186**	0.004**	0.301***	<0.001***	0.137*	0.034*	-	-

*, significant at 5% level of significance; **, significant at 1% level of significance; ***, significant at 0.1% level of significance

correlations with attitude scores ($r=-0.198$, $p=0.002$) of respondents related to Tobacco cessation counselling (Table 4). Year of study showed significant correlations with respondents having ever counselled their patients about Tobacco use ($p<0.001$) (Table 5).

Respondents having ever counselled their patients about Tobacco use showed significant correlations with knowledge ($p<0.05$), attitude ($p<0.05$) and behavior scores ($p<0.001$). Willingness to counsel showed significant correlations with respondent's knowledge ($p<0.05$) and attitude scores ($p<0.01$); while attitude scores showed significant correlations with respondent's willingness to undergo training for counselling ($p<0.05$). Previous training was also significantly correlated with behavior ($p<0.01$), perceived effectiveness ($p<0.05$) and barrier scores ($p<0.001$) of the study subjects. Familiarity with guidelines showed significant correlations with behavior ($p<0.001$), perceived effectiveness ($p<0.001$) and barrier scores ($p<0.05$) of the respondents (Table 6).

Analysis of various barriers for Tobacco cessation counselling indicated that lack of motivation among patients, poor attitude of the patients and lack of knowledge and skills emerged as barriers. The other barriers identified

by the respondents included lack of time, interest and resources for Tobacco cessation counselling; patients might feel alienated; and patients were not aware that dentists can conduct Tobacco cessation counselling (Table 7). Multiple logistic regression analysis indicated that respondents ever counselled their patients for Tobacco cessation was predicted by year of study ($OR=5.873$, $p=0.013$, $CI=1.462-23.586$), attitude ($OR=1.081$, $p=0.039$, $CI=1.004-1.163$), behavior ($OR=1.093$, $p<0.001$, $CI=1.045-1.143$) and barrier scores ($OR=0.914$, $p=0.007$, $CI=0.856-0.976$) (Table 8).

Discussion

The present investigation was undertaken to comprehensively assess various aspects of counselling for Tobacco cessation among Indian dental students in Mangalore. Respondents' knowledge, attitude, behavior, perceived effectiveness and barriers were explored in this study. The present study is the first study to evaluate simultaneously various parameters relevant to Tobacco cessation counselling in the Indian context.

Results gleaned from this investigation might pave

Table 4. Correlation Analysis of Demographic Variables with Knowledge, Attitude, Behavior, Perceived Effectiveness and Barriers about Tobacco Cessation Counselling among Study Subjects

Demographic variables	Knowledge		Attitude		Behavior		Perceived effectiveness		Barriers	
	r-value	p-value	r-value	p-value	r-value	p-value	r-value	p-value	r-value	p-value
Age	0.171	0.008**	0.036	0.579	0.109	0.09	0.004	0.95	0.039	0.55
Gender	0.039	0.543	0.052	0.424	-0.046	0.477	-0.092	0.155	0.011	0.866
Year of study	0.224	<0.001***	0.119	0.066	0.26	<0.001***	-0.009	0.892	0.099	0.125
Residence	-0.121	0.06	-0.198	0.002**	-0.065	0.317	-0.033	0.613	0.034	0.6

*, significant at 5% level of significance; **, significant at 1% level of significance

Table 5. Correlation Analysis of Demographic Variables with Various Aspects of Tobacco Cessation Counselling Among Study Subjects

Demographic variables	Ever counselled		Willingness to counsel		Willingness to undergo training		Previous training		Familiarity with guidelines	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Age										
≤ 22	29	128	144	13	132	25	11	146	21	136
≥23	22	62	75	9	71	13	3	81	14	70
Gender										
Male	11	49	55	5	52	8	2	58	9	51
Female	40	141	164	17	151	30	12	169	26	155
Year of study										
3rd and 4th yr	20***	142***	145	17	136	26	7	155	23	139
Interns	31***	48***	74	5	67	12	7	72	12	67
Residence										
Hostel	22	80	95	7	84	18	4	98	17	85
Non-hostel	29	110	124	15	119	20	10	129	18	121

***, significant at 0.1% level of significance

the way for effective planning of education and services related to Tobacco use cessation in general and Tobacco cessation counselling in particular (Uti and Sofola, 2011). One has to view these activities as opportunities for dental educators which can help them to bring about a significant and a positive change in public health (Weaver et al., 2002). The present study might pave the way for identification of factors which facilitate or impede the participation of dental students in Tobacco cessation counseling.

Tobacco usage is on the rise the world over despite all measures to control it. In order to restrain Tobacco usage, it is essential to prevent its initiation as well as promote its cessation. Training dental students in various aspects of Tobacco cessation, including counselling is fundamental

to fight the Tobacco menace. It is crucial to establish baseline data pertaining to the factors involved in Tobacco cessation counselling. This might help in developing and implementing targeted measures to control Tobacco use as well as help in monitoring their effectiveness after the implementation.

Counseling has been proven to be a scientifically sound, effective and feasible method to combat Tobacco use. Various health care professionals other than conventional medical personnel need to implement Tobacco cessation practices to effectively counter the ill effects of Tobacco use. Dental health care professionals and its allied personnel form an important aspect of health care delivery system who can effectively fight Tobacco menace.

Table 6. Correlation Analysis of Various Aspects of Tobacco Cessation Counselling with Knowledge, Attitude, Behavior, Perceived Effectiveness and Barriers among Study Subjects

Demographic variables	Knowledge		Attitude		Behavior		Perceived effectiveness		Barriers	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Ever counselled										
Yes (51)	3.59*	2.183	53.57*	5.9	24.84***	9.586	16.59	2.002	42.22	6.224
No (190)	2.77*	2.021	51.37*	5.476	17.75***	7.937	16.06	1.944	42.44	5.503
Willingness to counsel										
Yes (219)	3.04*	2.096	52.38**	5.13	19.42	8.715	16.22	1.913	42.37	5.743
No (22)	2.00*	1.662	46.41**	7.404	17.5	9.496	15.64	2.401	42.64	4.726
Willingness to undergo training										
Yes (203)	2.99	2.103	52.45**	5.284	19.06	8.598	16.21	1.967	42.18	5.625
No (38)	2.71	1.958	48.58**	6.332	20.24	9.794	15.97	1.966	43.53	5.722
Previous training										
Yes (14)	3.71	1.858	55.14*	5.682	30.86***	9.029	17.36*	2.307	47.14***	7.263
No (227)	2.89	2.086	51.63*	5.574	18.53***	8.272	16.10*	1.923	42.10***	5.42
Familiarity with guidelines										
Yes (35)	3.34	1.893	53.00	5.636	25.31***	8.536	17.00***	1.97	44.14*	5.991
No (206)	2.87	2.105	51.64	5.617	18.22***	8.422	16.03***	1.933	42.09*	5.55

*, significant at 5% level of significance; **, significant at 1% level of significance; ***, significant at 0.1% level of significance

Table 7. Barrier Scores among the Respondents Towards Counselling for Tobacco Cessation

Barriers	Definitely Yes		Yes		Neutral		No		Definitely No	
	n	%	n	%	n	%	n	%	n	%
	Lack of knowledge and skills	54	22.4	151	62.7	21	8.7	15	6.2	0
Lack of interest	59	24.5	133	55.2	32	13.3	14	5.8	3	1.2
Lack of time	38	15.8	118	49	59	24.5	26	10.8	0	0
Lack of resources (printed materials, pamphlets, brochures, etc)	45	18.7	115	47.7	51	21.2	25	10.4	5	2.1
Low success rates of tobacco cessation counselling	38	15.8	107	44.4	61	25.3	34	14.1	1	0.4
Fear that patients may not come back to them/it might alienate them	32	13.3	110	45.6	57	23.7	40	16.6	2	0.8
Lack of interest or poor attitude among patients	66	27.4	138	57.3	31	12.9	4	1.7	2	0.8
Lack of motivation in majority of patients	67	27.8	144	59.8	26	10.8	3	1.2	1	0.4
Patients are not aware that dentists can conduct tobacco cessation counselling	57	23.7	125	51.9	40	16.6	19	7.9	0	0
Patients do not expect dental students to provide tobacco cessation counselling	51	21.2	116	48.1	53	22	20	8.3	1	0.4
Patients do not listen to dental students providing tobacco cessation counselling	68	28.2	103	42.7	55	22.8	13	5.4	2	0.8

Inclusion of dental health professionals confers many advantages in the battle against Tobacco use. Dentists can address various issues related to Tobacco use with minimal additional training. Initial signs and symptoms of various diseases related to Tobacco use is reflected in the oral cavity. Individuals are more open to the idea of getting their mouth checked, as the oral cavity is one of the most accessible and socially acceptable regions of the body that lends itself to examination. With greater emphasis on the importance of oral hygiene and appearance of the face in general and tooth in particular, a lot of young adults are more likely to visit a dentist. They are also at the greater risk for Tobacco use as peer pressure and related forces are acting on these individuals. In certain communities, dentists may be more accessible to common people than other health care professionals. Dentist also record various aspects related to Tobacco use in a detailed manner for

almost all of their patients (Block et al., 1999; Walsh and Ellison, 2005). Dental professionals have a crucial role in the delivery of Tobacco cessation services (Jannat-Khah et al., 2014). Dentists thus might constitute an untapped resource for combating Tobacco use more effectively and efficiently.

A comprehensive view of knowledge, attitude and behavior, perceived effectiveness, barriers, demographic factors such as age, gender, etc., cannot be overlooked. Cabana et al., (1999) have observed that knowledge, attitude and behavior are critical parameters for implementation of various clinical practice guidelines. Receptivity towards learning Tobacco cessation counselling is indicated by attitudes and willingness of dental students (Victoroff et al., 2004). One has to investigate the potential link between knowledge and Tobacco cessation activities among dental students (Chowdhury et al., 2010). If dental students report

Table 8. Multiple Logistic Regression Analysis of Previous Counselling with Various Variables

	B	S.E.	Wald	df	Sig.	OR	95% CI for EXP(B)	
							Lower	Upper
Age	-0.082	0.174	0.222	1	0.638	0.921	0.654	1.297
Sex	0.343	0.462	0.551	1	0.458	1.409	0.57	3.481
3 rd Year			12.565	2	0.002**			
4 th Year	1.77	0.709	6.228	1	0.013*	5.873	1.462	23.586
Interns	2.606	0.75	12.074	1	0.001***	13.548	3.115	58.928
Address (1)	0.458	0.404	1.285	1	0.257	1.581	0.716	3.493
Knowledge	0.042	0.094	0.197	1	0.657	1.042	0.868	1.253
Attitude	0.078	0.038	4.254	1	0.039*	1.081	1.004	1.163
Behavior	0.089	0.023	15.141	1	<0.001***	1.093	1.045	1.143
Perceived Effectiveness	0.001	0.105	0	1	0.993	1.001	0.815	1.229
Barriers	-0.09	0.033	7.204	1	0.007**	0.914	0.856	0.976
Constant	-4.131	4.464	0.856	1	0.355	0.016		

*, significant at 5% level of significance; **, significant at 1% level of significance; ***, significant at 0.1% level of significance

inadequate skills in Tobacco cessation counseling, they might perceive the same as a low priority area (Arnett et al., 2012). This in turn might lead to poor Tobacco cessation practices (McCartan, 1995a) The importance of skills training in Tobacco cessation counseling among dental undergraduates has been emphasized by Rikard-Bell et al., (2003).

Findings of the present investigation revealed that the participants had poor knowledge related to Tobacco cessation counselling. There are no studies reported in the literature which investigates knowledge specific to counselling aspect of Tobacco cessation among dental students. The results indicate that there is a definite need to enhance the knowledge related to the same among the respondents. The present investigation also emphasizes the need for curriculum changes to address this crucial aspect of Tobacco cessation.

Attitude scores of the study subjects towards counselling for helping patients quit Tobacco in the present study was around 65%, which is similar to that reported by Cannick et al., (2006), McCartan et al., (2008), Anders et al., (2014) and Halawany et al., (2013) but contrasting to that reported by Uti and Sofola (2011), who reported low attitude scores among Nigerian dental students. In a systematic review on the attitudes of dental students towards the provision of Tobacco cessation services, Virtue et al., have reported that students were positively inclined towards the same (Virtue et al., 2017). The results of the present study are encouraging as it indicates that the respondents have a positive inclination towards counselling individuals with Tobacco use. This also might pave the way for implementation of training programs for the cessation of Tobacco use.

The behavior scores of the participants were found to be poor in the current investigation, which are in agreement with those reported by Rikard-Bell et al., (2003) among Australian dental students. Low knowledge scores coupled with low behavior scores indicate that they may feel that counselling might have little role to play in effective Tobacco cessation practices. It can also be due to their perception that counselling individuals for Tobacco use is not a part of their repertoire as a dentist nor are they equipped with the skills that are fundamental for application of counselling for Tobacco cessation. Counselling is an important arsenal against Tobacco use and this facet needs further attention among dental students. As dentists, they are perceived to be respected doctors and responsible members of the society. Hence, their advice or suggestions regarding Tobacco cessation might have greater impact and be more acceptable among the clients.

Study subjects aged ≥ 23 years had greater knowledge and behavior scores compared to those aged ≤ 22 years. Interns had greater knowledge and behavior scores than their counterparts in III and IV BDS. Greater training periods might lead to experiences which promote counselling for Tobacco use among study subjects. Study subjects residing in hostels had higher attitude scores towards counselling for Tobacco cessation than those who were not residing in hostels. Experiences in hostel related to Tobacco use might have influenced the attitudes of the

respondents in a positive manner in favor of counselling for Tobacco use.

A majority of the respondents reported that they had not conducted Tobacco cessation counselling. This is similar to the findings reported by Rikard-Bell et al., (2003) who observed that 58% of their respondents did not counsel their patients about Tobacco cessation. In the current investigation, a majority of the participants indicated their willingness to counsel their patients about Tobacco cessation and were also willing to undergo further training regarding the same. These findings are encouraging as the respondents show positive inclination towards further training. A majority of the subjects also reported that they had never undergone any training and were not familiar with any guidelines regarding counselling for Tobacco control. These findings are similar to those reported among health professional students from the 10 countries survey by Centre for Disease Control (CDC) and Global Health Professions Student Survey (GHPSS) (CDC, 2006; Lea et al., 2011). These findings highlight the need for changes in dental curriculum with a greater emphasis on practical training including counselling for cessation of Tobacco (Polychonopoulou, et al., 2004). Similar observations have been reported by earlier investigations on dental curriculum by various investigators (McCartan, 1995b; McCartan and Shanley, 2005; Arnett et al., 2012; Ramseier et al., 2012). O'Donnell et al., (2010) have demonstrated that training dental students in Tobacco cessation activities is feasible and can have positive results.

Statistically significant associations were observed amongst knowledge, attitude, behavior, perceived effectiveness and barrier scores. This might have significant implications for reducing barriers and enhancing counselling practices among dental students. Enhancing knowledge might be fundamental to increasing perceived effectiveness and reducing barriers (Vanobbergen et al., 2007).

Year of study showed significant correlations with the respondents having ever counselled patients for Tobacco cessation. Interns might be given greater freedom in their interactions with patients, as compared to III and IV year students. This might promote greater interactions between the clinicians and their patients. This might pave the way for better counselling practices for Tobacco cessation among the respondents.

Results also indicate that ever counselled for Tobacco cessation was significantly correlated with knowledge, attitude and behavior scores of the study subjects. This indicates that individuals who had counselled their patients for Tobacco control might be interested to know more about the same. They might also have positive attitude towards Tobacco cessation counselling. Willingness to counsel patients for Tobacco control had significant correlations with knowledge and attitude scores; whereas willingness to undergo training had significant correlations with attitude scores of the respondents. Attitude might be fundamental to willingness reported by the respondents in the present study.

Previous training on counselling for Tobacco cessation showed significant correlations with attitude, behavior, perceived effectiveness and barriers scores. Familiarity

with guidelines was significantly associated with behavior, perceived effectiveness and barriers scores. Previous training might impart greater confidence and hence might lead to greater perceived effectiveness. Previous training might also have a positive impact on the counselling practices of study subjects. Rosseel et al., (2009) have reported that support from experienced colleagues increased the likelihood of dental health professionals providing counselling services to their patients. Therefore, training dentists might lead to positive ripple effect in their entire team. Familiarity with guidelines for counselling and previous training might sensitize respondents to report greater barrier scores.

Results indicate that lack of motivation in majority of patients, lack of interest or poor attitude among patients and lack of knowledge and skills emerged as barriers for Tobacco cessation counselling. These findings concur with those observed by earlier investigators (Rikard-Bell et al., 2003; Clareboets et al., 2010; Pendharkar, 2010; Ebn Ahmady et al., 2011; Uti and Sofola, 2011; Murugaboopathy et al., 2013). The respondents indicate patient factors to be major barriers for counselling them about Tobacco cessation. They also indicate that their knowledge and skills as barriers for delivering Tobacco cessation counselling. Eliminating barriers is central to effective practice of Tobacco cessation counselling. Patient factors can be addressed by initiating measures that might motivate patients to quit Tobacco use. Providing pamphlets and other materials in clinical care setting might increase awareness and impact the attitude of the patients. Definite measures need to be taken to enhance the knowledge and skills of the dental students regarding Tobacco cessation counselling.

Regression analysis revealed that year of study, attitude, behavior and barrier scores emerged as significant predictors of respondents having counselled their patients for Tobacco control. This indicates that enhancing attitude of the respondents and addressing their perceived barriers has a significant impact on counselling practices. The present study highlights the importance of curriculum changes that address the attitudes and barriers of dental students in undertaking counselling for Tobacco cessation among the patients.

The current undergraduate curriculum includes various facets of use of Tobacco and its cessation. Tobacco use among patients is addressed at the Departments of Oral Medicine and Radiology, Periodontology and Public Health Dentistry (Dental Council of India, 2007). Bringing in changes in the undergraduate dental curriculum is a good initial point to bring about meaningful and effective changes in the nature of dental practice (Lamster et al., 2008). As future dentists, the way dental students are molded into becoming efficient counsellors for Tobacco cessation is crucial. Their attitudes, behaviors, perceived barriers and effectiveness might be vital indicators of their future practice of Tobacco cessation activities. Inadequate knowledge and skills during their learning periods might lead to inadequate Tobacco cessation practices in real set-up (Davis et al., 2010).

The Dental Council of India has published the

operational guidelines for establishing a Tobacco cessation centre (Dental Council of India, 2018). Focus on skill transfer for students will be central to effective implementation of the operational guidelines. Dental students should be taught not only about cessation of Tobacco use among current users, but should also be educated about discouraging non-users from falling prey to the Tobacco menace. They should also be sensitized towards working for rendering communities which are tobacco-free by active participation in community and political action (Newton, 2004). The present study also has important implications for clinical practice. Practical skills instilled in the undergraduate training are more likely to be implemented in clinical practice than mere theoretical knowledge. Imparting practical and scientifically sound counselling skills will further the cause of Tobacco cessation in communities that the students serve in their future dental practice.

Outcomes of the current investigation must be inferred by considering its limitations. Participants of the present study were dental students in a dental school in Mangalore. Hence, the results of the study cannot be extrapolated to the entire dental student population. As the present study is based on a questionnaire, it is susceptible to acquiescence, social desirability and faking bad biases (Streiner et al., 2015). Further studies with larger sample size are required to confirm the results. An inherent limitation of the present study is the cross-sectional design which does not give any insights into the predictability of results. Longitudinal studies on a varied sample can give information about the causal relationship between Tobacco cessation counselling and its determinants.

The present study draws attention towards involvement of multiple factors along with their complex interactions in conducting counselling for Tobacco use. Socio-demographics play a significant role in various aspects of Tobacco cessation counselling. In a country like India with growing population and limited resources it is essential to consider these multitude of factors and adopt a multifactorial Tobacco control approach. There is a definite need to consider significant changes in dental curriculum to make counselling for Tobacco use more relevant to the dental student population. Policy changes regarding Tobacco control should also include dental students to fight the Tobacco menace more efficiently.

There is a definite need to harness various resources in our battle against Tobacco related diseases. Dental team might constitute one such resource which has largely been untapped and underutilized. Dental professionals rendering Tobacco cessation counselling might have a significant public health impact (Gordon et al., 2006). Administrative, curriculum and policy changes that facilitate effective integration of various health professionals including dental team members is the need of the hour.

In conclusion, the present study was conducted on a representative sample of 241 undergraduate students in a private dental institution in Mangalore to assess various aspects pertaining to Tobacco cessation counselling. It can be concluded that knowledge and behavior scores of the

respondents towards Tobacco cessation counselling were low, while their attitude scores were high. Study subjects also reported high perceived effectiveness scores along with high barrier scores. A majority of the study subjects had not counselled their patients for Tobacco cessation, but were willing to counsel and undergo training for the same.

A number of socio-demographic determinants that might influence Tobacco cessation counselling were identified in the present study. In the light of this study, lack of motivation among patients, poor attitude of the patients and lack of knowledge and skills emerged as barriers. Multiple logistic regression analysis indicated that year of study, attitude, behavior and barriers emerged as significant predictors of counselling among study subjects. The present study has critical implications for administrative, policy and curriculum changes and also highlights the need for multidisciplinary approach to fight the Tobacco menace.

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Conflict of interest

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