

## RESEARCH ARTICLE

# Insights into Smoking and its Cessation among Current Smokers in India

Almas Binnal<sup>1</sup>, GuruRaghavendran Rajesh<sup>2\*</sup>, Junaid Ahmed<sup>1</sup>, Ceena Denny<sup>1</sup>, Sangeetha U Nayak<sup>3</sup>

### Abstract

**Background:** Initiation, perpetuation and cessation of smoking are all multifactorial. It is essential to explore interactions among various parameters influencing smoking and its cessation for effective smoking cessation interventions. **Objectives:** To obtain insights into smoking and its cessation among current smokers in India. **Materials and Methods:** The present study was conducted among current smokers visiting the Department of Oral Medicine and Radiology, Manipal College of Dental Sciences (MCOADS), Manipal University, Mangalore. Knowledge, attitudes, behavior, worksite practices towards smoking and its cessation, barriers to smoking cessation and socio-demographic variables were explored using a structured, pretested, self-administered questionnaire. **Results:** A total of 175 current smokers participated in the study. Mean knowledge, attitude, worksite practice and barrier scores were  $15.2 \pm 5.67$  (66.1%),  $57.5 \pm 7.67$  (82.1%),  $4.18 \pm 2.02$  (41.8%) and  $57.4 \pm 12.37$  (63.7%) respectively. Correlation analysis revealed: association of knowledge with education, occupation and religion; attitude with education and occupation; worksite practices with occupation; knowledge with attitude; and barriers negatively with worksite practices. The majority (85.7%) of respondents intended to quit smoking and this was associated with higher attitude scores, whereas actual quit attempts were associated with high knowledge, attitudes, worksite practices and low barrier scores. **Conclusions:** Various socio-demographic factors associated with smoking and its cessation were identified. The present study highlights the importance of identifying and targeting these interactions while framing guidelines and interventions for effective tobacco cessation in a developing country like India.

**Keywords:** Smoking cessation - current smokers - worksite practices - barriers - India

*Asian Pacific J Cancer Prev*, 14 (5), 2811-2818

### Introduction

Tobacco has become an ever growing global menace and has emerged as the leading cause of death worldwide [World Health Organization (WHO, 2009; 2011; US Department of Health and Human Services: US DHHS, 2012). Tobacco usage is associated with many of the fatal diseases (Johnson, 2001; Winn, 2001; Zhang and Cai, 2003; Ezzati et al, 2005a; 2005b; Mellsted, 2006; White 2007; Lloyd-Jones et al., 2010; Deatona et al., 2011). Besides its impact on health, usage of tobacco is associated with high social, economic and environmental burden (Global Adult Tobacco Survey: GATS India, 2010).

The prevalence, morbidity and the mortality associated with tobacco usage is on the rise, (Ezzati and Lopez, 2004; Murthy and Mathew, 2004; Mathers and Loncar, 2006; WHO, 2009; 2011; Tobacco Atlas, 2012) causing high economic burden worldwide (John et al., 2009; WHO, 2011; Wu and Sin, 2011). A definite shift of tobacco related

trend has been observed from developed to developing part of the world (WHO, 2011; Tobacco Atlas, 2012). It is reported that almost 6 million people died worldwide in the year 2011, with 80% of them belonging to low and middle income countries (Tobacco Atlas, 2012). It is also estimated that around 1 billion people might die in the 21<sup>st</sup> century if a similar trend continues (WHO, 2011; Tobacco Atlas, 2012). Smoking being commonest form of tobacco usage, it has been observed that 20% of the world population smokes tobacco (Tobacco Atlas, 2012).

India is no exclusion to this global scenario owing to the expanding prevalence of tobacco usage in India. This increase in tobacco usage could be attributed to increased economic growth witnessed in India over the past few decades. It has been estimated that 26.2% and 3.6% of Indian males and females respectively are smokers (GATS India, 2010; Tobacco Atlas, 2012). Also there is growing concern over increasing exposure to secondhand smoke (GATS India, 2010; Tobacco Atlas, 2012). GATS India

<sup>1</sup>Department of Oral Medicine and Radiology, <sup>2</sup>Department of Public Health Dentistry, <sup>3</sup>Department of Periodontics, Manipal College of Dental Sciences, Manipal University, Mangalore, Karnataka, India \*For correspondence: [drrajeshgrao@gmail.com](mailto:drrajeshgrao@gmail.com)

reported that 52% of the Indian adults were exposed to secondhand smoke at home (GATS India, 2010). India witness's highest tobacco related mortality in the world (Shah et al., 2008; Murthy and Saddicchha, 2010). As a result of growing trends in consumption of tobacco, tobacco related morbidity and mortality in India are on the rise (Murray and Lopez, 1997). To further aggravate the situation, there is definite paucity of resources to deal with this rising incidences of tobacco related illnesses in India (Gajalakshmi et al., 2003; Murthy and Saddicchha, 2010).

Short term as well as long term benefits of tobacco cessation is well documented in the literature (US DHHS, 1990; Samet, 1992; Kenfield et al., 2008; Murthy and Saddicchha, 2010; Wu and Sin, 2011). Most of the tobacco related deaths can be prevented if effective cessation measures are implemented (World Bank, 2000; Murthy and Saddicchha, 2010).

Initiation, perpetuation and cessation of smoking involve interaction of multiple factors (Sims, 2009). It is essential to identify these factors in order to undertake tailor-made interventions for prevention and cessation of smoking. However, there is definite dearth of information related to comprehensive assessment of various issues related to smoking and its cessation as earlier investigations have focused on one or a few of the concerned issues. Most of the earlier studies focused mainly on prevalence and practices of smoking among targeted populations such as school children, adolescents, students, professionals, etc. (Sinha et al., 2007; Saade et al., 2009; Khami et al., 2010; Jayakrishnan et al., 2011; Al-Naggar et al., 2012). Socio-demographic determinants might play a crucial role in smoking and its cessation. Simultaneous investigation of all the issues in a single population is essential to explore various interactions among factors involved in smoking and its cessation. End result might be critical to implement targeted interventions pertaining to smoking cessation.

The present study was undertaken to assess knowledge, attitude, practices of the current smokers in India towards smoking and its cessation. The aim of the study was also to assess the factors which act as barriers in smoking cessation and to determine if any association existed between the aforementioned parameters with respect to each other and with respect to socio-demographic variables. This is the first investigation to explore various issues related to smoking and its cessation simultaneously among current smokers in India.

## Materials and Methods

The present study was conducted among current smokers visiting the Department of Oral Medicine and Radiology, Manipal College of Dental Sciences (MCOBS), Manipal University, Mangalore, Karnataka, India. Prior to the study, ethical clearance was obtained from the Institution Ethics Committee, MCOBS, Mangalore. Purposes of the study were explained to the current smokers and were invited to be part of the study. A total of 175 subjects participated in the study. A cross-sectional questionnaire design was employed

in the present study using a structured, pretested, self-administered questionnaire. The questionnaire comprised of a total of 85 items apart from the demographic data such as age, gender, education, occupation, religion and marital status. Education and occupational status of respondents in the present study were classified according to Kuppaswamy's scale (Kuppaswamy, 1981).

A total of 23 questions were employed to assess the knowledge of current smokers towards adverse effects of tobacco on oral and general health, and health of the children and women; nicotine dependence; passive smoking; safety of smokeless tobacco; and, importance of quitting tobacco. Attitude of the study subjects were explored using 14 items on a 5-point Likert scale. The attitude domain focused mainly on parents as role models for their children; passive smoking; price, selling and advertisement of tobacco products; tobacco ban; sponsorship by tobacco industry; smoke-free environment and work places; importance of tobacco cessation.

A total of 15 items explored various smoking related practices such as age when started to smoke; frequency, type, frequent place and expenditure of smoking; reason to start and for not being able to quit; methods used to quit; and, when do they plan to quit smoking. Respondents behavior towards smoking cessation was assessed using items which enquired if they wish to quit smoking; find it difficult to quit smoking; ever stopped smoking for at least a week; ever approached doctor or dentist to seek help in quitting smoking; and, were ever counseled to quit smoking. Smoking and its cessation related worksite practices were explored using questions which enquired about prohibition of selling of tobacco products in and near the worksite; tobacco related policies in place; health education programs conducted; influence of peers and workplace environment on tobacco use and its avoidance, etc.

Various aspects of smoking which might hinder tobacco cessation were addressed in the barrier domain of the questionnaire comprising of 18 items. Barrier domain enquired about enjoyment, craving, weight changes, withdrawal symptoms, relief of boredom and stress associated with smoking; interest in quitting smoking; peer and social pressure; fear of failure; and, lack of awareness, time and money.

The possible range of scores for knowledge, attitude, work-site related practices and barriers were 0-23, 14-70, 0-10 and 1-90 respectively. Each answer for knowledge and worksite related practices were scored as 1 or 0 based on the accuracy of the answer. For attitude and barrier domains 5-point Likert scale with options of 'strongly agree', 'agree', 'unsure', 'disagree' and 'strongly disagree' was used.

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. Internal consistency of the knowledge, attitude and barrier domains were analyzed for Cronbach's alpha and split half reliability. Differences among various domains based on demographics such as age, sex, education, occupation, religion and marital status were evaluated using student's t-test. Various

domain scores with respect to smoking cessation practices were compared by employing student's t-test. Pearson's correlation analysis was employed to assess the correlation between demographic variables and the domains; and also among the various domains. Chi square test was employed to assess correlation of smoking cessation related practices with demographic variables.

## Results

Results of the pilot study indicated that the Cronbach's alpha and split half reliability values for knowledge, attitude and barrier domains were 0.89 and 0.80; 0.82 and 0.73; and, 0.83 and 0.68 respectively. A total of 175 current smokers participated in the main study. The mean age of the respondents was 28.61( $\pm$ 8.95) years and a majority of the respondents were males (n=174, 99.43%). Highest number of study subjects were graduates and above (n=105, 60%), semiprofessionals or professionals (n= 106, 60.57%), single (n=128, 73.14%) and belonged to Hindu religion (n=126, 72%).

The mean knowledge and attitude scores of respondents who were graduates and above (p<0.05) were significantly higher than those with lower educational status.

Semiprofessionals and professionals (p<0.05) had better mean knowledge and attitude scores than those who had lower occupational status. Subjects who belonged to religions other than Hindu (p<0.05) had higher mean knowledge scores than those who belonged to Hindu religion (Table 1).

Results of the correlation analysis indicated that education of the respondents showed significant association with their knowledge (r=0.24, p<0.00) and attitude (r=0.21, p<0.01) scores. Occupation showed significant correlations with knowledge (r=0.23, p<0.00), attitude (r=0.17, p<0.03) and work-site practice (r=0.17, p<0.02) scores whereas religion showed significant correlation with knowledge (r=0.16, p<0.04) scores (Table 2). Results also indicated that knowledge showed significant correlation with attitude (r=0.36, p<0.00), while barriers in smoking cessation were negatively associated with work-site related practices (r=-0.29, p<0.00) (Table 3).

Correlation analysis indicated that age was significantly associated with quit attempts by respondents ( $\chi^2=6.87$ , p<0.01) and attempts to seek help of doctor ( $\chi^2=7.02$ , p<0.01). It can also be observed that marital status of the respondents was significantly associated with attempts to

**Table 1. Intragroup Comparison of Various Parameters among Study Subjects**

Demographic variables		Study subjects		Knowledge		Attitude		Work-site practices		Barriers	
		No.	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	≤25 years	76	43.43	14.89	5.75	56.97	8.06	4.38	2.27	57.22	13.25
	≥26 years	99	56.57	15.45	5.63	57.87	7.38	4.03	1.79	57.48	11.71
Sex	Male	174	99.43	15.21	5.68	57.53	7.67	4.17	2.02	57.46	12.35
	Female	1	0.57	15	-	49	-	6	-	42	-
Education	≥Graduation	105	60	15.97*	5.5	58.69*	7.9	4.32	1.94	57.01	13.20
	<Graduation	70	40	14.07*	5.77	55.67*	6.99	3.97	2.12	57.91	11.07
Occupation	≥Semi profession	106	60.57	16.08*	5.2	58.62*	7.62	4.37	1.87	56.48	12.81
	Others	69	39.43	13.88*	6.11	55.72*	7.47	3.9	2.2	58.74	11.62
Marital status	Single	128	73.14	14.91	5.6	57.12	7.64	4.19	2.12	57.45	12.46
	Married	47	26.86	16.04	5.82	58.45	7.77	4.17	1.71	57.17	12.25
Religion	Hindu	126	72	14.65*	5.61	57.17	7.98	4.31	2	57.06	12.50
	Others	49	28	16.65*	5.62	58.29	6.85	3.86	2.02	58.16	12.12
Total		175	100	15.21	5.67	57.48	7.67	4.18	2.02	57.37	12.37
				66.13%		82.11%		41.80%		63.74%	

\*Significant at 5% level of significance

**Table 2. Correlation Analysis of Various Parameters with Respect to Demographics**

Demographic variables		Study subjects		Knowledge		Attitude		Work-site practices		Barriers	
		No.	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	≤25 years	76	43.43	14.89	5.75	56.97	8.06	4.38	2.27	57.22	13.25
	≥26 years	99	56.57	15.45	5.63	57.87	7.38	4.03	1.79	57.48	11.71
Sex	Male	174	99.43	15.21	5.68	57.53	7.67	4.17	2.02	57.46	12.35
	Female	1	0.57	15	-	49	-	6	-	42	-
Education	≥Graduation	105	60	15.97*	5.5	58.69*	7.9	4.32	1.94	57.01	13.20
	<Graduation	70	40	14.07*	5.77	55.67*	6.99	3.97	2.12	57.91	11.07
Occupation	≥Semi profession	106	60.57	16.08*	5.2	58.62*	7.62	4.37	1.87	56.48	12.81
	Others	69	39.43	13.88*	6.11	55.72*	7.47	3.9	2.2	58.74	11.62
Marital status	Single	128	73.14	14.91	5.6	57.12	7.64	4.19	2.12	57.45	12.46
	Married	47	26.86	16.04	5.82	58.45	7.77	4.17	1.71	57.17	12.25
Religion	Hindu	126	72	14.65*	5.61	57.17	7.98	4.31	2	57.06	12.50
	Others	49	28	16.65*	5.62	58.29	6.85	3.86	2.02	58.16	12.12
Total		175	100	15.21	5.67	57.48	7.67	4.18	2.02	57.37	12.37
				66.13%		82.11%		41.80%		63.74%	

\*Significant at 5% level of significance, \*\*Significant at 1% level of significances

seek help of doctor ( $\chi^2=4.03, p<0.01$ ) (Table 4).

Results also indicated that respondents who wished to quit smoking reported significantly greater attitude scores than those who did not wish to quit ( $p<0.01$ ). Subjects who found it difficult to quit smoking reported higher barrier scores than those who did not find it difficult to quit ( $p<0.01$ ). Respondents who had attempted to quit smoking for at least a week reported higher knowledge ( $p<0.01$ ), attitude ( $p<0.01$ ), worksite practice ( $p<0.05$ ) scores and lower barrier scores ( $p<0.001$ ) than those who had not attempted to quit smoking. Those who had sought the help of doctor to quit smoking reported higher barrier scores than those who had not sought doctor's help ( $p<0.05$ ). Higher work-site practice scores were reported by respondents who were counseled to quit smoking than by those who were not counseled ( $p<0.05$ ) (Table 5).

The mean age at which the respondents first tried and started regular smoking was 20.14 ( $\pm 4.29$ ) years and 22.30 ( $\pm 4.88$ ) years respectively. A total of 161 respondents smoked daily whereas 14 smoked occasionally. Almost all of the study subjects ( $n=170, 97.1\%$ ) smoked cigarettes while the remaining subjects smoked biri or other forms of tobacco with or without cigarettes. Stress ( $n=47, 26.9\%$ ) emerged as the main reason to start smoking followed by other reasons such as pleasure ( $n=39, 22.3\%$ ), peer and social pressure ( $n=38, 21.7\%$ ), experimentation ( $n=24, 13.7\%$ ), cool and glamorous ( $n=19, 10.9\%$ ) and association of smoking with maturity ( $n=8, 4.6\%$ ). Majority of the subjects ( $n= 100, 62.1\%$ ) smoked 1 to

**Table 3. Correlation Analysis of Various Parameters among Study Subjects**

	Knowledge		Attitude		Work-site practices		Barriers	
	r value	p-value	r value	p-value	r value	p-value	r value	p-value
Knowledge	-	-	-	-	-	-	-	-
Attitude	0.36*	0	-	-	-	-	-	-
Work-site practices	0.05	0.52	0.01	0.88	-	-	-	-
Barriers	-0.14	0.07	-0.04	0.59	-0.29*	0	-	-

\*Significant at 0.1% level of significance

**Table 4. Intragroup Comparison of Smoking Cessation Related Practices among Current Smokers**

Demographic variables	Wish to quit smoking		Find it difficult to quit smoking		Ever stopped smoking for atleast 1 week		Ever sought help of doctor		Ever counseled to quit smoking	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Age										
≤25 yrs	64	12	39	37	56**	20	6**	70	15	61
≥26 yrs	86	13	64	35	54**	45	22**	77	19	80
Sex										
Male	150	24	103	71	109	65	28	146	33	141
Female	0	1	0	1	1	0	0	1	1	0
Education										
≥Graduation	90	15	58	47	71	34	13	92	23	82
<Graduation	60	10	45	25	39	31	15	55	11	59
Occupation										
≥Semi profession	92	14	60	46	71	35	13	93	22	84
Others	58	11	43	26	39	30	15	54	12	57
Marital status										
Single	107	21	72	56	80	48	16*	112	24	104
Married	43	4	31	16	30	17	12*	35	10	37
Religion										
Hindu	106	20	71	55	77	49	19	107	23	103
Others	44	5	32	17	33	16	9	40	11	38
Total	150	25	103	72	110	65	28	147	34	141

\*Significant at 5% level of significance, \*\*Significant at 1% level of significances

**Table 5. Smoking Cessation Related Practices and Various Domain Scores**

	Knowledge		Attitude		Work-site practices		Barriers	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Wish to quit smoking								
Yes (150)	15.52	5.51	58.21**	7.43	4.21	1.96	57.08	12.46
No (25)	13.36	6.33	53.08**	7.81	4.04	2.35	59.12	11.88
Find it difficult to quit smoking								
Yes (103)	14.93	5.94	57.43	8.16	4.06	1.93	59.83**	10.89
No (72)	15.61	5.27	57.56	6.98	4.36	2.13	53.86**	13.54
Ever stopped smoking for atleast 1 week								
Yes (110)	16.29**	5.18	58.76**	7.6	4.43*	2.01	54.63***	12.9
No (65)	13.38**	6.02	55.31**	7.34	3.77*	1.97	62.02***	9.87
Ever seeked help of doctor								
Yes (28)	16.18	6.5	57.25	7.64	4.32	1.42	62.86*	10.91
No (147)	15.03	5.5	57.52	7.7	4.16	2.11	56.33*	12.39
Ever counseled to quit smoking								
Yes (34)	16.74	6.04	57.71	8.07	4.85*	2.11	60.38	13.5
No (141)	14.84	5.54	57.43	7.6	4.02*	1.97	56.65	12.02

\*Significant at 5% level of significance, \*\*Significant at 1% level of significances, \*\*\*Significant at 0.1% level of significances

5 smokes per day whereas 38 (23.6%), 16 (9.9%) and 7 (4.3%) subjects smoked 6-10, 11-15 and ≥16 smokes per day. Occasional smokers smoked 1-15 smokes per month. While 19 (10.9%) subjects had no fixed timing for smoking, 64 (36.6%), 36 (20.6%), 10 (5.7%), 13 (7.4%) of the respondents reported that they smoke their first cigarette of the day within 1, 2, 3 and 4 hours of waking respectively. On an average, respondents spent Rs. 818 per month on smoking with range of Rs. 15 to 5000. A total of 123 (70.3%) subjects smoked at worksite and 106 (60.6%) subjects did not smoke when nonsmokers were around.

Majority of the 150 study subjects (85.7%) wished to quit smoking and responded to the reasons for their wish. Fifty three (30.3%) of them worried about tobacco related diseases, 46 (26.3%) feared cancer, 21 (12%) felt pressure from family and friends, 15 (8.6%) were worried about family, 8 (4.6%) had heard a health talk and 7 (4%) were worried of social boundaries. Although 103 subjects (58.9%) found it difficult to quit smoking, 111 (63.4%) did not try any methods to quit smoking while 11 (6.3%) of the remaining used medication, 23 (13.2%) used traditional remedies and 30 (17.2%) used other methods such as chewing tobacco, gum etc.

Even though 147 respondents (84%) never approached doctor or dentist to seek help in quitting smoking, 110 (62.9%) of the study subjects had stopped smoking for at least a weak. Lack of knowledge on how to quit smoking (51.4%) emerged as the main reason for not able to quit smoking followed by not wanting to quit (16.6%), withdrawal effects (14.9%), fear of not succeeding (9.7%) and fear of rejection in peer and social group (7.4%). Twenty six (14.9%) and 80 (45.7%) of the respondents always and sometimes felt the need of assistance in quitting smoking respectively. Majority of 141 (80.6%) study subjects reported that they were not counseled by doctor or dentist to quit smoking. When enquired about their thoughts on quitting smoking, 16 (9.1%) subjects reported that they did not want to quit, whereas 89 (50.9%) responded that they were ready to quit immediately. A total of 38 (21.7%), 20 (11.43%) and 12 (6.9%) subjects were thinking to quit in a month, 2-6 months and 7-12 months respectively.

## Discussion

Smoking is a major but modifiable cause of premature death worldwide (Gavin, 2004). As quitting tobacco improves health significantly, there is increased focus on cessation of tobacco usage worldwide. Since smoking and its cessation is multifactorial, identifying the smoking and cessation related factors and their associations might be critical to implement targeted interventions pertaining to tobacco cessation. The present study was the first exploration to assess various factors associated with smoking which influences its cessation comprehensively among a population of current smokers in the India.

The role of increasing knowledge in reducing smoking initiation, facilitating smoking cessation and long term abstinence from smoking is well appreciated (Curry et al., 1997; Hyland et al., 2004; WHO, 2008). Awareness about health hazards associated with smoking is a significant parameter in predicting smoking related behavior. However, there is scarcity of explorations which have reported on knowledge of smokers towards tobacco and its cessation, especially in the Indian context.

The respondents in the present study had mean knowledge score of 15.21 (66.13%). The knowledge scores are higher than those reported by Yang et al. (2010) and Sansone et al. (2012) who reported a mean score of 3.82 and 2.59 on a scale of 8 among current smokers in China and India respectively. Various other investigators have also reported that although smokers were aware that smoking was injurious to their health on a whole, they did not have a clear knowledge about the specific risks of diseases (Reddy et al., 1996; Takano et al., 2001; Weinstein et al., 2004; Oncken et al., 2005; GATS India, 2010; Raupach et al., 2011; Minh An et al., 2013;). These results indicate that there is further need to formulate and exercise measures to improve knowledge of tobacco users. It was also observed that the knowledge scores of respondents belonging to other religions were significantly greater than those belonging to Hindu religion in the present study. Further studies are required to elucidate more on this aspect of knowledge.

The mean attitude score of 82.11% in the present study is consistent with the reports of Sansone et al, who noted that smokers had a negative opinion about smoking and believed that it was bad for their health (Sansone et al., 2012). However, Sansone et al. (2012) also pointed that their study subjects believed that they were in good health and smoking did not harm them; and very few of them intended to quit smoking.

Osuchowski et al. (2009) reported that majority of their study subjects believed that employer should protect the non-smokers from second hand smoking and help the employees who smoke in quitting. In a similar study conducted in European Union, individuals who supported implementation of smoke free policies varied from 62.4% to 95.0% in restaurants; 43.7% to 93.1% in bars, pubs, and clubs; and, 66.2% to 94.7% in offices and other indoor workplaces (Martinez-Sanchez, 2010). The literature pertaining to worksite related smoking practices in India is sparse. The mean worksite smoking practice related scores in the present study was 41.8%, which indicates

that although smoking was banned or restricted in India, it was not being followed effectively. Stringent measures are thus required to be implemented in order to make this law a reality in India.

Although many smokers wish to quit smoking, very few succeed in quitting the habit spontaneously. Jha et al have observed that only 2% smokers were successful in quitting smoking spontaneously (Jha et al., 2008). In order to facilitate tobacco cessation, it is of utmost importance to identify the factors which prevent smokers from quitting smoking. The mean barrier scores among present study subjects were 63.74%, indicating that these factors need to be eliminated or controlled to bring about effective smoking cessation. Further studies are required to confirm the results of the present study.

Correlation analysis revealed that knowledge was significantly associated with education, occupation and religion, which is consistent with the reports of Sensone et al. (2010). Individuals with higher education and occupational levels may be more aware of harmful effects of tobacco. Attitude of the study subjects showed significant correlation with their education and occupational status. Individuals with lower education and occupational levels need to be particularly targeted to instill positive attitude towards tobacco cessation in order to control the tobacco menace. Worksite practices showed significant correlation with occupation of the subjects. This implies that work places at lower occupational levels need to implement better anti-tobacco practices. Worksite practices also showed negative correlation with barriers to quit smoking in the present study. This indicates that respondents working at higher occupational status are more likely to report lesser barriers than those working at lower occupation levels. Hence improvement at worksite is crucial to effective smoking cessation practices. Health education programs pertaining to tobacco usage and its cessation need to be implemented at work places. Knowledge was associated with attitude of the study subjects, while no associations were observed between the other domains. Further research is required to shed more light on the same.

Intention to quit smoking was greater among subjects with higher attitude scores. In a similar study, intention to quit smoking was higher among subjects with high knowledge scores (Sansone et al., 2012). However actual quit attempts were higher among respondents with high knowledge, attitude and worksite practices and low barrier scores in the present study. Hyland et al. (2004; 2006) reported that intentions to quit are significant predictors of quit attempts.

Earlier studies reported level of quit intention to be 10% and 12% among their study subjects (GATS India, 2010; Sansone et al., 2012). In contrast, majority of the respondents (85.71%) in the present study reported that they wanted to quit smoking, while 51.43% reported that they did not know how to quit and 58.86% admitted that they find it difficult to quit smoking. These findings indicate that although many smokers wish to quit, they may not know how to quit and whom to approach. A total of 84% of the subjects reported that they were not counseled by a doctor or a dentist to quit smoking, which is

similar to the reports of Raupach et al. (2011). In contrast, Yu et al. (2004) reported that 74% of their subjects were counseled for quitting smoking (Yu et al., 2004). There is urgent need to spread awareness among the general public on whom to approach if they need help in quitting smoking. Further studies need to be undertaken to explore further on these issues.

Average age at which most of the study subjects in the present study first tried smoking was  $20.14 \pm 4.29$  years and when they started smoking regularly was  $22.30 \pm 4.88$  years. This is higher than that reported by investigators in GATS India 2010, who observed that their study subjects initiated tobacco usage at the age of 17.8 years (GATS India, 2010). GATS India 2010 reported that cigarette smoking was common in urban areas, whereas bidi smoking was common in rural population. Mangalore is an urban and economically well placed region which could be reflected in the population's smoking practices, where most of the subjects smoked cigarettes.

Stress emerged as the major reason to start smoking in the present study, followed by pleasure, and peer and social pressure. In a study conducted among Malaysian school teachers, stress emerged as the second most common cause to start smoking (Al-Naggar et al., 2012). In a similar study among adolescents peer pressure emerged as major reason to start smoking (Bhojani et al, 2009). Although being under stress constantly is not normal, it has become an integral part of modern life. Various activities should be initiated to target stress, thereby preventing public from falling prey to the clutches of smoking and other harmful habits.

Most of our study subjects (70.29%) reported that they smoke when they were outside their house, which indicates the potential role that family can play in prevention and cessation of smoking. Family members of the smokers can be counseled along with the smokers to facilitate quitting smoking. Smoking is either banned or restricted in public places in India. However, 39.43% of the respondents in the present study reported that they indulge in smoking when nonsmokers were around. Further measures are required for effective implementation of the anti-tobacco laws in India. Second hand smoke is a major cause of concern and there is need to increase awareness of the public about the same.

Majority (60.57%) of the subjects in the present study felt the need for assistance in quitting smoking. A small percentage (6.29%) of the respondents had received medicinal remedies to quit smoking and 63.43% of the respondents never used any methods to quit smoking. There is need to identify smokers and provide them with adequate assistance in quitting smoking. There is also a definite lack of resources required to control tobacco menace in India. Medical professionals along with the other health professionals and volunteers need to be trained to increase the shortage of trained manpower. There is also a need to establish tobacco cessation clinics at the regional level, which will identify smokers and help them in quitting smoking. Screening of individuals for tobacco usage must be mandatory at health establishments, so that tobacco use can be targeted effectively.

Majority (84%) of the study subjects in the present

investigation reported that they wanted to quit smoking within next 6 months and only a small number (9.14%) of individuals did not wish to quit smoking. This is in contrast to the reports of Sansone et al who reported that only 10% of their study subjects were ready to quit smoking in next 6 months and 37% individuals did not wish to quit smoking (Sansone et al., 2010). The variation in these findings could be attributed to the variations in cultural and socioeconomic background of the respondents.

The results of the present study must be analyzed in the view of its limitations. There is possibility of acquiescence (yea-saying), deviation (faking bad) and social desirability (faking good) biases in the questionnaire based studies. The results of the present study must be affirmed among a larger sample size.

The present investigation highlights the importance of implementing measures to improve knowledge about smoking and its cessation among the general public. There is definite need of meaningful involvement of health and allied health professionals in identifying and assisting smokers to quit smoking. Other professionals and volunteers can be trained in order to tackle the shortage of manpower issues in India to assist smokers to quit smoking. Policy makers need to implement tobacco related laws more stringently. Worksite environment and family members of smokers can play a vital role in facilitating tobacco cessation among smokers. Barriers in smoking cessation need to be targeted in order to facilitate cessation of smoking. Various interactions among smoking and its cessation related factors and socio-demographic factors also need to be considered while framing guidelines and interventions for effective smoking cessation in a developing country like India.

Following conclusions can be drawn from the present study, 1) Knowledge of the respondents towards smoking and its cessation was low. 2) Respondents had high attitude scores towards cessation of smoking whereas their practices towards cessation were low. 3) Smoking related worksite practices of smokers were poor and a number of factors were identified as barriers in quitting smoking. 4) Graduation and higher educational status, and semiprofessional and professional occupations had higher knowledge and attitude scores. Knowledge of subjects belonging to Hindu religion was lower than those belonging to other religion. 5) Significant association were observed among knowledge with education, occupation and religion; attitude with education and occupation; knowledge with attitude; worksite practices with occupation and negatively with respect to barriers in smoking cessation. 6) Age was associated with earlier quit attempts and attempts to seek help of doctor by the respondents. Marital status of the respondents was significantly associated with attempts to seek help of doctor. 7) Respondents who wished to quit smoking reported higher attitude scores and subjects who found it difficult to quit smoking reported higher barrier scores. 8) Respondents who had attempted to quit smoking for at least a week reported higher knowledge, attitude, worksite practice scores and lower barrier scores. 9) Those who had sought the help of doctor to quit smoking reported higher barrier scores. 10) Higher work-site practice scores

were reported by respondents who were counseled to quit smoking.

## References

- Al-Naggar RA, Jawad AA, Bobryshev YV (2012). Prevalence of cigarette smoking and associated factors among secondary school teachers in Malaysia. *Asian Pac J Cancer Prev*, **13**, 5539-43.
- Bhojani UM, Chander SJ, Devadasan N (2009). Tobacco use and related factors among pre-university students in a college in Bangalore, India. *Natl Med J India*, **22**, 294-7.
- Curry SJ, Grothaus L, McBride C (1997). Reasons for quitting: intrinsic and extrinsic motivation for smoking cessation in a population-based sample of smokers. *Addict Behave*, **22**, 727-39.
- Deatona C, Froelicher ES, Wuc LH (2011). The global burden of cardiovascular disease. *Eur J Cardiovasc Nursing*, **10**, 5-13.
- Eriksen M, Mackay J, Ross H (2012). The Tobacco Atlas. 4<sup>th</sup> Ed. Atlanta, GA: American Cancer Society, and, New York, NY: World Lung Foundation.
- Ezzati M, Henley SJ, Lopez AD, Thun MJ (2005a). Role of smoking in global and regional cancer epidemiology: current patterns and data needs. *Int J Cancer*, **116**, 963-71.
- Ezzati M, Henley SJ, Michael J, Thun MJ, Lopez AD (2005b). Role of smoking in global and regional cardiovascular mortality. *Circulation*, **112**, 489-97.
- Ezzati M, Lopez AD (2004). Regional, disease specific patterns of smoking-attributable mortality in 2000. *Tob Control*, **13**, 388-95.
- Gajalakshmi V, Peto R, Kanaka TS, Jha P (2003). Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43000 adult male deaths and 35000 controls. *Lancet*, **362**, 507-15.
- Gavin A (2004). Smoking is a major cause of premature death worldwide. *Evidence-based Healthcare*, **8**, 95-6.
- Hyland A, Borland R, Li Q, et al (2006). Individual-level predictors of cessation behaviors among participants in the international tobacco control (ITC) four country survey. *Tob Control*, **15**, 83-94.
- Hyland A, Li Q, Bauer JE, et al (2004). Predictors of cessation in a cohort of current and former smokers followed over 13 years. *Nicotine Tob Res*, **6**, 363-9.
- Jayakrishnan R, Geetha S, Binukumar B, Sreekumar, Lekshmi K (2011). Self-reported tobacco use, knowledge on tobacco legislation and tobacco hazards among adolescents in rural Kerala State. *Indian J Dent Res*, **22**, 195-9.
- Jha P, Jacob B, Gajalakshmi V, et al (2008). A nationally representative case-control study of smoking and death in India. *N Engl J Med*, **358**, 1137-47.
- John RM, Sung HY, Max W (2009). Economic cost of tobacco use in India, 2004. *Tob Control*, **18**, 138-43.
- Johnson N (2001). Tobacco use and oral cancer: a global perspective. *J Dent Educ*, **65**, 328-39.
- Kenfield SA, Stampfer MJ, Rosner BA, Colditz GA (2008). Smoking and smoking cessation in relation to mortality. *JAMA*, **299**, 2037-47.
- Khami MR, Murtomaa H, Razeghi S, Virtanen JI (2010). Smoking and its determinants among Iranian dental students. *Med Princ Pract*, **19**, 390-4.
- Kuppuswamy B (1981). Manual of socioeconomic status scale (urban). Delhi: Manasayan.
- Lloyd-Jones D, Adams RJ, Brown TM, et al (2010). Heart disease and stroke statistics-2010 update: a report from the American heart association. *Circulation*, **121**, 46-215.
- Martinez-Sanchez JM, Fernandez E, Fu M, et al. (2010). Smoking behaviour, involuntary smoking, attitudes towards smoke-free legislations, and tobacco control activities in the European Union. *PLoS One*, **5**, 13881.
- Mathers CD, Loncar D (2006). Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med*, **3**, 442.
- Mellsted H (2006). Cancer initiatives in developing countries. *Annals Oncol*, **17**, 24-31.
- Minh An DT, Van Minh H, Huong le T, et al (2013). Knowledge of the health consequences of tobacco smoking: a cross-sectional survey of Vietnamese adults. *Glob Health Action*, **6**, 1-9.
- Murray CJ, Lopez AD (1997). Alternative projections of mortality and disability by cause, 1990-2020: global burden of the disease study. *Lancet*, **349**, 1498-504.
- Murthy NS, Mathew A (2004). Cancer epidemiology, prevention and control. *Current Science*, **86**, 518-27.
- Murthy P, Saddicchha S (2010). Tobacco cessation services in India: Recent developments and the need for expansion. *Indian J Cancer*, **47**, 69-74.
- Oncken C, McKee S, Krishnan-Sarin S, O'Malley S, Mazure CM (2005). Knowledge and perceived risk of smoking-related conditions: a survey of cigarette smokers. *Prev Med*, **40**, 779-84.
- Osuchowski F, Penar-Zadarko B, Bukafa-Siedlecka I, Binkowska-Bury M (2009). The opinions of employees about smoking in the workplace. *Przegl Lek*, **66**, 801-4.
- Raupach T, Merker J, Hasenfuss G, Andreas S, Pipe A (2011). Knowledge gaps about smoking cessation in hospitalized patients and their doctors. *Eur J Cardiovasc Prev Rehabil*, **18**, 334-41.
- Reddy P, Meyer-Weitz A, Yach D (1996). Smoking status, knowledge of health effects and attitudes towards tobacco control in South Africa. *Afr Med J*, **86**, 1389-93.
- Saade G, Warren CW, Jones NR, Mokdad A (2009). Tobacco use and cessation counseling among health professional students: Lebanon global health professions student survey. *J Med Liban*, **57**, 243-7.
- Samet JM (1992). The health benefits of smoking cessation. *Med Clin North Am*, **76**, 399-414.
- Sansone GC, Raute LJ, Fong GT, et al (2010). Knowledge of Health Effects and Intentions to Quit Among Smokers in India: Findings From the Tobacco Control Policy (TCP) India Pilot Survey. *Int J Environ Res Public Health*, **9**, 564-78.
- Shah PB, Pednekar MS, Gupta PC, Sinha DN (2008). The relationship between tobacco advertisements and smoking status of youth in India. *Asian Pac J Cancer Prev*, **9**, 637-64.
- Sims TH (2009). The committee on substance abuse. technical report—tobacco as a substance of abuse. *Pediatrics*, **124**, 1045-53.
- Sinha DN, Gupta PC, Gangadharan P (2007). Tobacco Use among Students and School Personnel in India. *Asian Pac J Cancer Prev*, **8**, 417-21.
- Takano Y, Kohroggi H, Matsumoto M, Suga M, Ando M (2001). Lack of knowledge about smoking-related risks for diseases in the general public in Japan. *Nihon Kokyuki Gakkai Zasshi*, **39**, 389-93.
- Tobacco use. Global Adult Tobacco Survey: India Report 2009-2010 (2010). Ministry of Health and Family Welfare, Government of India.
- US Department of Health and Human Services (1990). The health benefits of smoking cessation: a report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, Centers for Disease Control, Office on Smoking and Health.
- US Department of Health and Human Services (2012). 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.
- Weinstein N, Slovic P, Waters E, Gibson G (2004). Public understanding of the illnesses caused by cigarette smoking. *Nicotine Tob Res*, **6**, 349-55.
- White WB (2007). Smoking related morbidity and mortality in the cardiovascular setting. *Prev Cardiol*, **10**, 1-4.
- Winn DM (2001). Tobacco use and oral disease. *J Dent Educ*, **65**, 306-12.
- World Bank (2000). World Development Report 1999/2000: Entering the 21<sup>st</sup> Century. New York: Oxford University Press.
- World Health Organisation Report on the global tobacco epidemic, 2008: the MPOWER package (2008). Geneva: World Health Organization.
- World Health Organisation (2009). WHO Report on the Global Tobacco Epidemic 2009: Implementing Smoke-free Environments. Geneva: WHO.
- World Health Organisation (2011). Economics of tobacco toolkit: assessment of the economic costs of smoking. Geneva: WHO.
- Wu J, Sin DD (2011). Improved patient outcome with smoking cessation: when is it too late? *Int J COPD*, **6**, 259-67.
- Yang J, Hammond D, Driezen P, Fong GT, Jiang Y (2010). Health knowledge and perception of risks among Chinese smokers and non-smokers: findings from the Wave 1 ITC China Survey. *Tob Control*, **19**, 1823.
- Yu DK, Wu KK, Abdullah AS, et al (2004). Smoking cessation among Hong Kong Chinese smokers attending hospital as outpatients: impact of doctors' advice, successful quitting and intention to quit. *Asia Pac J Public Health*, **16**, 115-20.
- Zhang H, Cai B (2003). The impact of tobacco on lung health in China. *Respirology*, **8**, 17-21.