



## **Awareness among smokers related to adverse effects of tobacco smoking on periodontal health and the challenges faced to quit the habit: a cross sectional survey**

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### **Abstract**

**Background:** Periodontitis is an inflammatory disease of tooth-supporting structures caused mainly by specific microorganisms or groups of specific microorganisms present in dental plaque. Smoking is considered as a global epidemic. Its adverse effects are well known which ranges from staining of teeth to life threatening diseases such as cancer.

**Aims & objective:** The aim of the study is to assess awareness of smokers about the adverse effects of tobacco smoking on periodontal health and the challenges faced to quit the habit- a cross sectional survey.

**Material& Methods:** A total number of 993 male smoker subjects were included, divided into three study groups. Group I-young age adults 18-35 yrs. (n=333), GroupII- middle age adults 36-55 yrs. (n=331) and Group III- old age adults  $\geq 55$  yrs. (n=329). Participants were subcategorized by education into primary (I to VIII), secondary (IX to XII) and tertiary education (graduate, postgraduate and PhD.) in individual each age group. Case history and questionnaire was recorded.

**Result:** In our study, proportion of awareness was maximum in middle age group with tertiary education followed by young age group with tertiary education then old age group with tertiary education among smokers. A significant difference was observed in a proportion of awareness status among smokers ( $p < 0.001$ ).

**Conclusion:** Overall, it has been concluded that oral and periodontal health awareness was found to be very poor among smokers. Middle aged smokers with tertiary education levels had relatively better oral health awareness compared to that of younger and older age individuals.

**Keywords:** Smoker, awareness, periodontal disease.

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## Introduction

Periodontal disease is an infectious, chronic, inflammatory disease characterized by the loss of connective tissue attachment and alveolar bone in association with the formation of a pocket and subsequent tooth loss.<sup>1</sup> Smoking is an important risk factor for the development of periodontal disease, especially severe periodontitis. Studies<sup>2,3,4</sup> revealed that clinical, epidemiologic, and laboratory correlation showed a positive association between smoking and the prevalence of periodontal disease and strongly associated with loss of attachment and bone.<sup>5</sup> According to the World Health Organization (WHO), tobacco use continues to be a major public health burden and the most preventable cause for mortality worldwide.<sup>6</sup> In 2020 WHO states that 22.3% of the global population used tobacco worldwide, 36.7% of all men and 7.8% of the world's women.<sup>7</sup> India is home to 267 million tobacco users<sup>8</sup>, second largest number of tobacco consumers in the world and the country faced a substantial tobacco related mortality and morbidity burden.<sup>9,10</sup> The study was conducted by GATS, from 2016 to 2017 in all over India, they were found the prevalence of tobacco 28.6% and 35.5% in Uttar Pradesh.<sup>11</sup> There are two forms of tobacco include smoke tobacco and smokeless tobacco. In smoke tobacco is most commonly type of product is cigarette, cigarillos, cigars, pipes. Cigarette smoke contains several carcinogens that alter biochemical defence systems in the body leading to lung cancer the strongest determinant being the duration of smoking and risk increasing with the number of cigarettes smoked. Smoking causes a wide range of diseases, including many types of cancers, coronary heart disease, stroke and peripheral vascular diseases.<sup>12</sup> Cigarette smokers are 5 times more likely to develop severe periodontitis than non-smokers. Many studies suggest that cigarette smoking increases the susceptibility to periodontal pathogens and to tissue destruction.<sup>13</sup> Local effects of smoking include vasoconstriction caused by nicotine as well as decreased oxygen tension, which may create a favourable subgingival environment for colonization by anaerobic bacteria.<sup>14</sup> There are more than 4000 chemicals in a cigarette that slow down the healing process during periodontal treatment which includes formaldehyde, carbon monoxide, ammonia, and arsenic. Thus, smoking also decreases the periodontal response to treatment and causes refractory disease.<sup>15</sup> Hence this study was designed to assess knowledge and awareness level among smokers about the adverse effects of tobacco smoking related to oral and periodontal health and also to determine the challenges faced by them to quit the smoking habit, in Kanpur city Uttar Pradesh.

## **Material and Methods**

This questionnaire survey was conducted among current smokers who visited in outpatient department of periodontology, Rama Dental College, Kanpur UP. Based on the following inclusion and exclusion criteria age and education level matched 1008 smokers were included out of this only 993 subjects were considered remaining 15 subjects could not complete the questionnaire were excluded. Total participants were divided into three study groups. Group I- young age adults 18-35 yrs. (n=333), Group II- middle age adults 36-55 yrs. (n=331) and Group III- old age adults  $\geq 55$  yrs. (n=329). Participants were subcategorized by education into primary (I to VIII), secondary (IX to XII) and tertiary education (graduate, postgraduate and PhD.). Convenient sampling method was adapted. For the study, Ethical clearance was obtained by ethical committee from the institute. The purpose of the study was explained to all the study participants and informed consent was obtained. A pretested Questionnaire proforma consisting of 20 questions and was given to the study participants, divided into three sections. First section had 7 questions to assess oral health awareness. Second included 8 questions to assess periodontal health awareness and 5 questions included in 3<sup>rd</sup> section to evaluate the challenges/difficulties faced by smokers to quit smoking habit. The confidentiality of the data received was assured to all participants. Inclusion criteria were; current Smokers (NHIS definition)<sup>8</sup>, smokers aged between 18 to 70 years, participants should be educated, should have minimum primary education and up to tertiary education, Exclusion criteria were; uncooperative patients, mentally retarded patients. Sample size was calculated and finalized as 481.

## **Results**

The data obtained from study subjects was analysed using descriptive statistics to get the result. Data were analysed using the software MS Office Excel software & SPSS 23 for Windows. Mann Whitney test was performed to compare the knowledge in oral and periodontal health among smokers in terms of percentages. It indicates significant difference at  $p \leq 0.05$ . To compare the oral and periodontal health related knowledge, challenges faced in quitting the habit among smokers in different age groups and education level in terms of percentages and it indicates that significant difference, Kruskal Wallis test was performed and p value was  $p \leq 0.05$ . Although there were discrepancies in the participant's responses to the questionnaire after taking into consideration the age and education level of the patients, these discrepancies were statistically significant ( $p > 0.05$ ). Regarding the patient's perception about their own oral and periodontal health, it can be said that majority have a medium or poor awareness about it. Demographic Distribution of Subjects: Table 1 shows the demographic details of study participants in each group. Comparison of oral health related knowledge (in %) among different education categories according to age groups: Table 2 shows the comparison of oral health related knowledge (in %) among different education categories according to age groups. Highest knowledge was observed in middle age respondents (36-55 years age group) with tertiary education (42.46%) followed by young age respondents (18-35 years age group) with tertiary education and old age respondents ( $>55$  years age) with tertiary education (24.55%). Comparison of periodontal health related knowledge (in %) among different education categories according to age groups. Table 3 shows the comparison of periodontal health related knowledge among different education categories according to age groups. Highest knowledge was observed in middle age

respondents (36-55 years age group) with tertiary education (22.71) followed by middle age respondents with secondary education (16.15%) and old age respondents (>55 years age) with tertiary education (15.23). Comparison of Oral health and Periodontal health related knowledge (in %) among smokers. Table 4 shows the comparison of Oral health and Periodontal health related knowledge (in %) among smokers. Oral health related knowledge (18.95%) was slightly better than periodontal health related knowledge (11.71%) among smokers and the difference between two was statistically significant. Comparison of percentage of challenges faced among different education categories according to age groups. Table 5 shows the comparison of challenges faced (in %) among different education categories according to age groups. Maximum challenges faced were reported in young age respondents (18-35 years age group) with secondary education (60.56%) followed by young age respondents (18-35 years age group) with tertiary education (56.28%) and old age respondents (>55 years age) with primary education (54.13%).

**Table 1: Demographic distribution of Subjects**

Education	Group 1 Age group 18-35 (n=331)	Group 2 Age group 36-55 (n=333)	Group 3 Age group >55 (n=329)
Primary	110 (33.2%)	111 (33.3%)	109 (33.2%)
Secondary	110 (33.2%)	112 (33.4%)	110 (33.4%)
Tertiary	111 (33.6%)	111 (33.3%)	110 (33.4%)

**Table 2: Comparison of oral health related knowledge (in %) among different education categories according to age groups**

Knowledge	Mean percentage	SD	p value
Young Age Primary (YAP)	10.00	21.33	<0.001*
Young Age Secondary (YAS)	12.30	22.90	
Young Age Tertiary (YAT)	27.18	29.45	
Middle Age Primary (MAP)	16.86	28.97	
Middle Age Secondary (MAS)	21.11	30.43	
Middle Age Tertiary (MAT)	42.46	38.41	
Old Age Primary (OAP)	4.85	10.33	
Old Age Secondary (OAS)	10.91	20.56	
Old Age Tertiary (OAT)	24.55	27.17	

**Table 3: Comparison of periodontal health related knowledge (in %) among different education categories according to age groups**

Knowledge	Mean percentage	SD	p value
Young Age Primary (YAP)	3.18	9.64	<0.001*
Young Age Secondary (YAS)	5.44	9.25	
Young Age Tertiary (YAT)	8.85	10.39	
Middle Age Primary (MAP)	13.06	22.57	
Middle Age Secondary (MAS)	16.15	25.64	
Middle Age Tertiary (MAT)	22.71	29.81	
Old Age Primary (OAP)	8.60	16.47	
Old Age Secondary (OAS)	12.05	21.48	
Old Age Tertiary (OAT)	15.23	22.99	

**Table 4: Comparison of Oral health and Periodontal health related knowledge (in %) among smokers**

Knowledge	Mean percentage	SD	p value
Oral health	18.95	28.59	<0.001*
Periodontal health	11.71	20.71	

**Table 5: Comparison of percentage of challenges faced among different education categories according to age groups**

Knowledge	Mean percentage	SD	p value
Young Age Primary (YAP)	53.45	12.74	<0.001*
Young Age Secondary (YAS)	60.56	12.06	
Young Age Tertiary (YAT)	56.28	23.54	
Middle Age Primary (MAP)	52.43	10.46	
Middle Age Secondary (MAS)	53.81	9.29	
Middle Age Tertiary (MAT)	53.21	10.26	
Old Age Primary (OAP)	54.13	9.15	
Old Age Secondary (OAS)	53.82	9.29	
Old Age Tertiary (OAT)	53.27	10.24	

## Discussion

Oral and periodontal health has been noted as a persistently underappreciated and significant societal issue. The vast majority of people lack oral health knowledge. Most diseases first manifest through oral signs and symptoms and because of this lack of awareness, they go undetected or untreated. The focus on disease prevention for the past 20 years has significantly increased compared to the treatment side of things. With the right preventive dental care, we can maintain healthy teeth for lifetime. Preventive oral health knowledge, awareness and attitude are the important ways of keeping our teeth healthy. It has been determined that smoking poses a serious risk for periodontal disease. Hence, in this study attempts were made to evaluate oral health knowledge, awareness and attitude of the population in Kanpur city. Oral and periodontal health awareness was found to be poor among smokers but oral health awareness was slightly better (18.95%) than periodontal health awareness (11.71%) irrespective of their age and education levels in our study. In favour of our study, a study done by Lung et al. (2012)<sup>16</sup> oral (21.3%) and periodontal health awareness (7%) was found to be poor among smokers, in contrast of our study done by Munlandy (2019)<sup>11</sup> they found oral and periodontal health awareness was found to be better among smokers. In their study they found the subjects were aware that better oral (68%) and periodontal health (47%) awareness in compare to our study because they included both smoker and non-smoker subjects and found non-smokers had more knowledge and awareness than smokers. Oral health awareness was comparatively better in middle aged smokers with tertiary education followed by young and older individuals with secondary and primary education. In our study the subjects were aware that smoking causes tooth and tongue staining (44.9%), and halitosis (44.1%), oral cancers (33.8%), altered taste sensation (15.5%), pigmentation in oral mucosa (13.5%), oral ulcer and burning sensation in oral mucosa (11.2%), but a smaller number of subjects knew that smoking causes red, white patches on oral mucosa (7.9%), periodontal diseases (6%) and dryness of mouth (5.8%). In our study we have pointed out that one of the key determinants of a person's knowledge, awareness and

attitude was their level of education. The result was in favour of our study done by Jain N et al. in 2016<sup>17</sup>. In their study they found the subjects were aware that smoking causes oral cancer (14.6%), tooth staining (40.6%), periodontal diseases (30.59%) and oral ulcers (27.96%). In contrast of our study done by Singhal and Bansal<sup>18</sup> et al. in 2016. In their study they found the subjects were aware that smoking causes oral cancer (73.36%), staining of teeth (60.86%), decayed teeth (42.43%), and halitosis (36.51%). However, many peoples didn't know about smoking causes other diseases and conditions like alveolar bone loss (17.76%), periodontal diseases (30.59%), oral ulcers (27.96). They found better oral health awareness in compare to our study because they included both smoker and non-smoker subjects and found non-smokers had more knowledge and awareness than smokers. Periodontal health awareness was relatively better in middle aged smokers with tertiary education followed by older and young individuals with secondary and primary education. In our study we found that many subjects were not aware of the adverse effect of tobacco smoking to the oral and periodontal health. The awareness of smoking's impact on periodontal diseases ( $P = 0.002$ ) was highly correlated with smoking status. There were only 7.6% ( $n=75$ ) were aware that smoking can increase calculus/tartar deposition on teeth. 44.1% ( $n=438$ ) respondents knew that smoking causes bad breath. 15.2% ( $n=151$ ) subjects aware that smoking causes pigmentation of gingiva (gums). Only 6% ( $n=60$ ) respondents knew that smoking is one of the risk factors for severe pyorrhoia (periodontitis). Only 4.3% ( $n=43$ ) respondents were aware that smoking can decrease the immunity (resist the body to fight with infection - defence mechanism of body). Very few respondents [2.1%;  $n=321$ ] respondents knew that smoking causes significantly higher levels harmful oral bacteria, which can cause severe periodontal(gum) infection and 5.9% ( $n=59$ ) respondents knew that smoking raises the risk of loosening of teeth (due to bone loss around teeth) and eventually leads to tooth loss. Around 8.4% ( $n=83$ ) respondents were aware that smoking can lead to delayed wound healing after periodontal (gum) treatment, Overall knowledge about periodontal health (11.71%) was very poor among smokers. In favour of our study, study done by Lung et al. (2012)<sup>16</sup> was found awareness about periodontal health was only 7%, Nwhator et al. (2010)<sup>19</sup> were found awareness about periodontal health was 2.2%, Shetty et al. (2015)<sup>20</sup> were found awareness about periodontal health was 11.3%. This may be caused by local organisations, lack of efforts to raise awareness, conduct health education programmes, provide counselling and open stop-smoking clinics in all places. It has been found that in this study, non-smokers are more aware and knowledgeable than smokers about the topic of healing following periodontal surgery and reversibility of the negative effects of smoking after cessation. In contrast of our study Munlandy et al.(2019)<sup>11</sup> they found the most of the subjects were aware from the adverse effect of tobacco smoking to the oral and periodontal health. In our study we found that challenges face by smokers while quitting was more than half of the respondents (69.9%;  $n=694$ ) reported that they had attempted to stop/quit smoking, 75.2% could not stop smoking because of fear of withdrawal symptoms such as Depression, anxiety, restlessness, irritability, sleeplessness, cravings, etc. Only 20% respondents were aware of tobacco deaddiction centers / counsellors who can guide in quit smoking and have accessibility of tobacco deaddiction centers. Majority of the respondents (71.1%) felt more difficulty in handling stresses without smoking and 16.1% respondents reported fear of gaining weight without smoking and have experienced it. Maximum challenges faced were reported in young age respondents (18-35 years age group) with

secondary education (60.56%) followed by young age respondents (>55 years age group) with tertiary education (56.28%) and old age respondents (>55 years age) with primary education (54.13%). In favor of our study numerous studies have shown that persons who quit smoking are likely to gain weight, the prospect of gaining weight can discourage smokers from quitting, as reviewed by Ward et al. (2001)<sup>21</sup> and Filozof et al. (2004)<sup>22</sup>. The largest and most significant smoking group, with 59.3% of smokers, was between the ages of 21 and 30. This would signify the effective marketing and influence of tobacco firms on young people, as well as Malaysians lack of awareness of the negative consequences of tobacco use, as well as the cost, accessibility and ease of availability of tobacco products. In our study we have pointed out that one of the key determinants of a person's knowledge, awareness and attitude was their level of education. Youth is the age where expectations from themselves and others put pressure on the individual, where they consider smoking is an easy way to cope up with their stress. Where it is clear that stress is the main cause of beginning to smoke. As the age advances, people stop smoking either because of respiratory ailments and other health problems brought on by smoking, or because they are more conscious of its negative effects. In our study, smoking was found to be more prevalent and greater in those with low education level people than in those with high education people. Low socioeconomic position could potentially be a factor of smoking because literacy affects economic standing. Unsurprisingly awareness of oral and periodontal health is very poor in India. Most of the participants were unaware of the negative effects of smoking on oral and periodontal health. Hence there is a need to educate and spread knowledge to an individual about the adverse effects of smoking in oral and periodontal health through the dentists, outreach programs, print/press media, audio/radio/television, internet and organizing social activities to make a healthy individual and a healthy society.

## **Conclusion**

It has been concluded that both oral and periodontal health awareness and knowledge was found to be poor among smokers irrespective of their age and education level. Majority of smokers have tried to quit smoking but all of them have faced many challenges/difficulties as they feared of withdrawal symptoms and also felt difficulty in handling stress without smoking. Most of them were unaware of the tobacco cessation programs and also could not have accessibility tobacco de-addiction centres. More challenges were faced by older aged smokers with primary education and least in middle aged with tertiary education.

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