The knowledge and awareness of dental patients about the effects of smoking on periodontal health has been estimated. Few studies which have been conducted in which knowledge and awareness of ill-effects of smoking on general and oral health. However, not many studies have been conducted in which awareness regarding harmful effects of smoking on periodontal health has been estimated. Few studies which have been conducted in the past found that patients are less aware about the adverse effects of smoking on periodontal health.

Thus, the aim of the present study was to assess awareness and knowledge of dental patients about effects of smoking on periodontal health, and using the findings of the study, motivating the patients to quit the habit.
Results
Sample characteristics and prevalence of smoking

Out of the 304 patients, 217 (71.38%) were males and 87 (28.62%) were females. Total number of self-reported smokers included 149 (49.01%), out of which 68.66% of total males who participated in the study were smokers and 31.34% were non-smokers, while none of the females smoked (Table 1).

The highest rates of smokers (64.43%) were among 25-50 years of age group. The other socio-demographic like marital status, age group and literacy level are reported in Table 1.

Literacy level and smoking

Table 2 shows that smoking is more popular among those who have graduated in any field (36.91%) followed by people who have attained education till higher secondary (27.52%). Analysis in terms of type of smoking shows that cigarette smoking is more common in the graduates (47.83%) and negligible among illiterates (0%). On the other hand, bidi smoking was found to be more common among high school group (52.94%) and nonexistent among post graduates (0%). Similarly, use of both bidi and cigarettes was more prevalent in people who attained education till high school (64.71%).

Reasons for starting smoking

It has been observed that most of the people started smoking mainly due to peer pressure or because of friends, followed by stress. Few gave other reasons such as status symbol, pain in teeth and liking (Figure 1). The results demonstrate that friend circle was the main reason for starting smoking in the age group <25 years, while stress was the chief reason in the 25-50 years of age group (Table 3).

Attitudes, awareness and knowledge

Most of the respondents (both smokers and non-smokers) were aware that smoking is not good for general health, while non-smokers were much more aware than smokers that smoking is not good for oral and dental health (p<0.05) (Table 4). Non-smokers had more knowledge than smokers regarding effect of smoking on healing after periodontal surgery (p<0.05). However, both smokers and non-smokers did not have knowledge about the reversibility of side effects of smoking after cessation (Table 4).

Figure 2 illustrates the perception of effect of smoking on oral health. Both smokers and non-smokers believed that smoking mainly causes oral cancer (73.36%), staining of teeth (60.86%) and decayed teeth (42.43%). However, less number of patients were aware of the other adverse effects such as halitosis (36.51%), mouth ulcers (27.96%), and decreased mouth opening (0.66%).

Discussion

Smoking is on the rise in the developing world, but falling in developed nations [21]. Use of tobacco and, knowledge and awareness of populations regarding its use has been evaluated in the past. About 15 billion cigarettes are sold daily or 10 million every minute [7]. National Household Survey of the drug and alcohol abuse in India 2002 has quoted that prevalence of tobacco use among 12-18 years old as 55.8%. [22] According to the World Health Organization (WHO), it is estimated that tobacco use will be responsible for 13.3% of all the deaths in India by the year 2020 [6].

The majority of the participants in the study were males (71.38%). Among these, 49.01% smoked, while none of the females (28.62%) smoked. This may be either due to the social image that females do not smoke or they do not reveal about it. Among males, increased prevalence of smoking was found in married subjects, which may be due to increased occupational stress [2], even though it cannot be attributed as the sole reason for smoking.

| Variable          | Total (n=304) | Smokers (n=149) | Non-smokers (n=155) |
|-------------------|--------------|----------------|---------------------|
| Gender            |              |                |                     |
| Male              | 217 (71.38)  | 149 (100)      | 68 (43.87)          |
| Female            | 87 (28.62)   | 0 (0)          | 87 (56.13)          |
| Marital status    |              |                |                     |
| Married           | 214 (70.39)  | 108 (72.48)    | 106 (68.39)         |
| Unmarried         | 90 (29.61)   | 41 (27.52)     | 49 (31.61)          |
| Age group         |              |                |                     |
| <25 years         | 87 (28.62)   | 40 (26.85)     | 47 (30.32)          |
| 25-50 years       | 193 (63.49)  | 96 (64.43)     | 97 (62.58)          |
| >50 years         | 24 (7.89)    | 13 (8.72)      | 11 (7.10)           |
| Literacy level    |              |                |                     |
| Illiterate        | 7 (2.30)     | 1 (0.67)       | 6 (3.87)            |
| High school       | 55 (18.09)   | 32 (21.48)     | 23 (14.84)          |
| Higher secondary  | 88 (28.95)   | 41 (27.52)     | 47 (30.32)          |
| Graduation        | 114 (37.5)   | 55 (36.91)     | 59 (38.06)          |
| Post-graduation   | 40 (13.16)   | 20 (13.42)     | 20 (12.90)          |

Table 1: Socio-demographic variables of study patients.

| Literacy level | No. of smokers (n=149) | Only Cigarette (n=115) | Only Bidi (n=17) | Both Cigarette and Bidi (n=17) |
|----------------|------------------------|------------------------|-----------------|-------------------------------|
| Illiterate     | 1                      | 0                      | 1               | 0                             |
| High school    | 32                     | 12                     | 9               | 11                            |
| Higher secondary | 41                   | 28                     | 7               | 6                             |
| Graduation     | 55                     | 55                     | 0               | 0                             |
| Post-graduation | 20                    | 20                     | 0               | 0                             |

Table 2: Literacy level and smoking status.

Figure 1: Reasons for starting smoking among smokers.
Most of the smokers are under the age group of 25-50 years. Youth is the age where expectations from self and others create pressure on the individual, where they consider smoking is an easy way out of releasing the stress. This is in accordance with the findings in the Table 3, where it can be seen that stress is the most common reason for starting smoking. As the age advances, people quit smoking either due to respiratory diseases and various other health hazards caused due to smoking, and increase in awareness about its harmful effects.

In this study, smoking was found higher in illiterate people as well as those who have attained graduation. Bidi is found to be common due to smoking, and increase in awareness about its harmful effects.

In this study it has been found that friend circle (69.80%) influences the most followed by stress (30.87%), status symbol (6.71%) and pain in teeth (3.36%). The result is similar to the research done by Prasanth YM and Bhat M in 2014 [24]. It was also seen that people below 25 years of age were influenced most by peer group and initiated smoking, while people in the age group of 25-50 years started smoking due to stress.

Smoking plays a significant role in the development of refractory periodontitis. Smokers have poorer success rate with periodontal treatments including scaling, curettage and even after periodontal surgeries [9]. Varsha Rathod in 2010 reported that increase in gingival inflammation, calculus formation is associated with individuals in the age group of 20-35 years, and moderate pocket formation is seen in individuals in age group of 36-55yrs of age [22]. In this study, awareness on the topic of healing after periodontal surgery and reversibility of the side effects of smoking after cessation is found to be more in non-smokers as compared to smokers.

Reduced gingival bleeding in smokers may be attributed to vasosconstriction caused due to nicotine, and increased gingival keratinization [7]. Increase in probing pocket depth is due to alveolar bone loss [13]. Smoking is a known risk factor for the development of early onset periodontitis, and smokers have poor prognosis or negative impact on periodontal treatment [14]. It also causes alteration in neutrophil functions such as chemotaxis and phagocytosis [25].

The majority of subjects in this study were aware that smoking causes oral cancer (73.36%), tooth staining (60.86%), decayed teeth (42.43%), and halitosis (36.51%). Due to advertisements, audio-visual aids and print media, increase in awareness about oral cancer has been seen over the years [14]. However, the other diseases and conditions like alveolar bone loss (17.76%), periodontal diseases (30.59%), oral ulcers (27.96%) caused by smoking are not known to many people.

It was also seen that quite a lot of the smokers (64.08%) wanted to quit the habit but were not able to do so. Health institutions, both dental and medical, and their staff play an important role in supporting the people who wish to quit tobacco. It is recommended that 4I approach may be adopted to help people quit smoking, where:

**Identify:** the habit by asking

**Interpret:** Interpret or understand the reason behind smoking

**Illustrate:** Illustrate or explain the harmful effects of smoking through posters, videos, photographs, pamphlets, etc.

**Incite:** Incite or encourage and motivate to quit the habit at frequent intervals.

Apart from the general and oral side effects of smoking, people

---

**Table 3:** Number of smokers with reasons for initiating the habit.

| Reason                        | <25 years n (%) | 25-50 years n (%) | >50 years n (%) |
|-------------------------------|----------------|------------------|----------------|
| Stress                        | 1 (2.17)       | 36 (78.26)       | 9 (19.57)      |
| Friend circle                 | 39 (37.5)      | 61 (58.65)       | 4 (3.85)       |
| Status symbol                 | 3 (30)         | 6 (60)           | 1 (10)         |
| Pain in teeth                 | 1 (20)         | 3 (60)           | 1 (20)         |
| Just a liking                 | 1 (33.33)      | 2 (66.67)        | 0 (0)          |

**Table 4:** Awareness and knowledge between smokers and non-smokers.

| Variable                           | Smokers (n=149) | Non-smokers (n=155) | χ²  | p-value |
|------------------------------------|----------------|---------------------|-----|---------|
| **Awareness**                      |                |                     |     |         |
| Smoking is not good                | 145 (97.32%)   | 150 (96.77%)        | 0.07| 0.78    |
| Smoking is not good for general health| 133 (89.26%)   | 147 (94.84%)        | 3.25| 0.07    |
| Smoking is not good for oral & dental health | 116 (77.85%) | 147 (94.84%) | 18.787 | 0.0001 |
| **Knowledge**                      |                |                     |     |         |
| Smoking affects healing after periodontal surgery | 39 (26.17%) | 89 (57.42%) | 30.425 | 0.00    |
| Reversibility of the side effects of smoking after its cessation | 67 (44.97%) | 75 (48.39%) | 0.357 | 0.55    |

**Figure 2:** Perception of effect of smoking on oral health.
should also be made aware of the adverse effects of smoking on periodontal health as well as its effects on the periodontal treatments.

Conclusion

Within the limitations of this study, the results of this study show that smokers have significantly less awareness about the adverse effects of smoking on oral and periodontal health as compared to non-smokers. More studies need to be conducted with larger sample size covering more geographical areas, relation between smoking and socioeconomic status for better understanding on the subject.

Dental health professionals, along with medical and other allied professionals play a key role in educating and informing patients about the risks of tobacco consumption and also supporting smokers in the cessation of the habit. 4 I that have been proposed in this study can be implemented for helping smokers quit the habit. A proper training and education may be the most efficient method in increasing the awareness against smoking among dental patients and the population in general.

References

1. Ferrante M, Saulle R, Ledda C, Pappalardo R, Fallico R, et al. (2013) Prevalence of smoking habits, attitudes, knowledge and beliefs among Health Professional School students: a cross-sectional study. Ann Ist Super Sanita 49: 143-149.
2. Radi S, Ostry A, Lamontagne AD (2007) Job stress and other working conditions: Relationships with smoking behaviors in a representative sample of working Australians. Am J Ind Med 50: 584-596.
3. Narain JP, Sinha DN (2011) Tobacco epidemic in South-East Asia region: challenges and progress in its control. Indian J Public Health 55: 151-154.
4. Peter S. Essentials of Preventive and Community Dentistry. 4th Ed. India. Arya Publishing House. P136-139.
5. Pradeep SA, Kavitha PK, Chandrashekar BR, Anil S (2012) Relationship of Smoking and Smokeless Tobacco Use to Tooth Loss in a Central Indian Population. Oral Health Prev Dent 10: 243-252.
6. (2014) Tobacco use and cessation: India. May 31, 2014.
7. Gautam DK, Jindal V, Gupta SC, Tuli A, Kotwal B, et al. (2011) Effect of cigarette smoking on the periodontal health status: A comparative, cross sectional study. J Indian Soc Periodontol 15: 383-387.
8. Mangalath U, Aslam SA, Abdul Khadar AK, Francis PG, Mikacha MS, et al. (2014) Recent trends in prevention of oral cancer. J Int Soc Prevent Dent 4: S131-138.
9. Newmann MG, Takei H, Carranza FA, Klokkevold PR (cxxxxx) Carranza’s Clinical Periodontology, 9th ed. USA. W.B Saunders Company. P 251-256.
10. Tin-Do MM, Aung TT, Saddki N, Aung TM (2013) Awareness of the Effects of Smoking on Oral Health among Dental Patients at the Defense Service General Hospital, Myanmar. International Medical Journal 20: 1-3.
11. US Department of Health and Human Services (2014) The health consequences of smoking-50 years of progress: a report of the Surgeon General. Atlanta, GA: US 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. 17.
12. Baig MR, Rajan M (2007) Effects of smoking on the outcome of implant treatment: A literature review. Indian J Dent Res 18: 190-195.
13. Bergström J, Eliasson S, Preber H (1991) Cigarette smoking and periodontal bone loss. J Periodontol 62: 242-246.
14. Puranik AK, Mishra P, Kumar S, Dhodapkar SV (2013) Dental Patient’s Knowledge and Awareness Regarding Effects of Smoking on Oral Health among Smokers and Nonsmokers: A Comparative Study. J Orofac Res 3: 77-80.
15. Ye X, Tse ZTH, Tang G, Song G (2015) Mechanical properties and phase transition of biomedical titanium alloy strips with initial quasi-single phase state under high-energy electropolishing. Journal of the Mechanical Behavior of Biomedical Materials. 42: 100-115.
16. Ye X, Wang L, Tse ZTH, Tang G, Song G (2015) Effects of high-energy electro-pulsing treatment on microstructure, mechanical properties and corrosion behavior of Ti-6Al-4V alloy. Materials Science and Engineering: C. 49: 851-860.
17. Khalaf F, Mohamed A, Jassem M, Yousif S, Eino J (2006) Dental patient awareness of smoking effects on oral health: Comparison of smokers and non-smokers. J Dent 34: 173-178.
18. Lung ZHS, Kelleher MGD, Porter RWJ, Gonzalez J, Lung RFH (2005) Poor patient awareness of the relationship between smoking and periodontal diseases. British dental journal 199: 731-737.
19. Smejkalova J, Jacob V, Hodacova L, Fiala Z, Slezak R, et al. (2012) The Influence of Smoking on Dental and Periodontal Status. Oral Health Care - Pediatric, Research, Epidemiology and Clinical Practices. Edited by Prof. Mandeep Virdi 249-270.
20. Terrades M, Couiller WA, Clarke H, Mullally BH, Stevenson M (2009) Patients knowledge and views about the effects of smoking on their mouths and the involvement of their dentists in smoking cessation activities. British dental journal 207: E22-E22.
21. Rassool GH (2011) Understanding addiction behaviors- Theoretical and clinical practice in health and social care. 1st ed. China. Palgrave and Macmillan. P 144-145.
22. Agarwal AK, Kumar S, Agarwal M, Tripathi N, Vandana Patel (2011) Factors leading to the initiation of smokeless tobacco use among adolescents. Pediatric oncall J 8.
23. Kumar R, Prakash S, Kushwah AS, Vijayan VK (2010) Breath carbon monoxide concentration in Cigarette and Bidi smokers in India. The Indian J Chest Dis Allied Sci 52: 19-24.
24. Prasanth YM, Bhat M (2014) Tobacco use and awareness patterns among students of an Industrial training Institute in Mangalore, South India. International Journal of Biomedical Research 5: 368-370.
25. Srinivas M, Chethana KC, Padma R, Suragimath G, Anil M, et al. (2012) A study to assess and compare the peripheral blood neutrophil chemotaxis in smokers and nonsmokers with healthy periodontium, gingivitis, and chronic periodontitis. J Indian Soc Periodontol 16: 54-58.
26. Bergstrom J, Eliasson S (1987) Noxious effect of cigarette smoking on periodontal health. J Periodont Res 22: 513-517.

Citation: Singhal D, Bansal A (2016) Knowledge and Awareness of Dental Patients Regarding Adverse Effects of Smoking on Periodontal Health. J Dent Probl Solut 3(1): 024-027. DOI: 10.17352/2394-8418.000028