

**Evaluation of Awareness, Sources of Information and Knowledge about Common Risk Factors of Oral and General Health among Recent Healthcare Graduates: A Questionnaire Based Descriptive Cross-Sectional Study**

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**Abstract**

**Introduction:** Both oral and systemic health share common risk factors and are interconnected such that one leads to another. These risk factors include poor oral hygiene, stress, dietary habits, lifestyle modifications, alcohol abuse, smoking, chewing tobacco, trauma, and socioeconomic factors among others.

**Materials and Methods:** The study was a questionnaire-based descriptive cross-sectional survey. A total of 400 recent graduates from four healthcare courses, MBBS, BDS, BAMS, and B.Sc. Nursing were selected. The

questionnaire has 8 questions along with the socio-demographic details of the participants. All questions are related to common risk factors of oral and general health while the last question was on health information sources.

**Results:** 93.5% of participants said that a high sugar diet can lead to obesity and dental caries. 81.8% agreed that stress may lead to heart diseases and gum diseases. 94.5% believed that smoking caused lung disease and oral diseases. 89.8% expressed that lack of hygiene leads to skin and oral diseases. 85.3% said that excessive alcohol consumption may lead to liver and oral cancer. Family

Doctors and Physicians (37.3%) were the most utilized information source among the study population.

**Conclusion:** Most of the graduates have gained their knowledge from expert opinions, which is the lowest level of learning in evidence-based dentistry. However, their knowledge should be based on the top order of the hierarchy of evidence-based dentistry, which is research-based evidence and studies. Therefore, imparting knowledge about dental health in healthcare students in their curriculum is important.

**Keywords:** Oral health, General Health, Risk factors, Information sources

### **Introduction**

Oral health can be defined as a standard of health of the oral and related tissues, which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being.<sup>[1]</sup> An individual can only be considered as healthy when he or she is free from oral and craniofacial disease.<sup>[2]</sup>

Dental diseases are often considered as minor ailments of the gums and teeth but they are equally as harmful and as dangerous as diseases of other parts of the body. They can have serious effects on the quality and longevity of the patient's life as a result of their systemic consequences. Thus, oral health cannot be omitted or separated from the concept of health,<sup>[3]</sup> and has been documented to be as important as general health. Moreover, knowledge about oral health has been cited as an important factor that determines overall health.<sup>[4]</sup>

Generally, people have a tendency to ignore health issues, especially dental problems until the pain becomes unbearable or the disease begins to interfere in their daily routine activities. However, these small dental diseases can escalate, and later have severe adverse effects on general health of individual. This ignorance has led millions of individuals ending up with few or no teeth.

This, in turn, hampered their routine activities such as eating, speaking, and laughing, adversely affected their confidence, and lead to debilitating diseases such as diabetes.<sup>[5]</sup> WHO has defined health as a state of physical, mental and social wellbeing and not merely the absence of disease or infirmity.<sup>[6]</sup> Therefore, as dental diseases can influence physical, mental and social well-being of the individual, being healthy without good oral health is not possible.<sup>[3]</sup>

Medical practitioners and other healthcare workers play a vital role in oral health promotion. Not only knowledge of oral diseases, but correct knowledge and attitude towards dental health are crucial to all medical professionals. The primary reasons for this are that periodontal disease is associated with multiple systemic conditions, several systemic diseases have oral manifestations, and many drugs demonstrate adverse drug reactions in the oral cavity.<sup>[3]</sup> They can play an active role in educating their patients about oral health and its risk factors. Therefore, it is important to impart correct knowledge about oral health among healthcare students during the course of their study. Henceforth, they can provide their patients with correct information about oral health. .<sup>[3]</sup>

Both oral and systemic health share common risk factors and are interconnected such that one leads to another. These risk factors include poor oral hygiene, stress, dietary habits, lifestyle modifications, alcohol abuse, smoking, chewing tobacco, trauma, and socioeconomic factors among others. Thus, identifying that oral and general health are strongly associated with one another is imperative to educate the general population and enforce oral health programs, policies and strategies at individual and community level. This approach can help increase awareness, and change the attitude of the general public towards dental and oral health. Hence, healthcare

graduates should possess proper knowledge and understanding about oral health, and its maintenance.<sup>[7]</sup>

Therefore, the current study was undertaken to assess knowledge, attitude and practice of dental awareness among recent graduates of four different healthcare programs, .

### Materials And Methods

The study was a questionnaire based descriptive cross-sectional survey on Knowledge And Information Sources Regarding Common Risk Factors Of Oral And General Health Among Recent Healthcare Graduates.

The study was carried out between the months of September-October 2019 among the recent graduates of MBBS, BDS, BAMS and B.Sc. Nursing of New Delhi. Graduates who gave consent for participation were included in the study. Graduates who refused to participate in the study and who could not comprehend the questions of the study despite the assistance were excluded.

A total of 400 subjects were selected on the basis of sample size formula. The questionnaire has 8 questions along with the socio-demographic details of the participants. The responses were assessed based on two demographic parameters, gender, and course of study.

All questions are related to common risk factors of oral and general health and the measuring scale included 'YES', 'NO' and 'DON'T KNOW' options, last question was on health information sources. The items for this questionnaire were generated from previous research studies and content validity performed before the main study.

### Annexure 1: Questionnaire for the study

The collected data was subjected to statistical analysis by using statistical package SPSS version 2.0. Descriptive statistics were obtained and percentage distribution of responses to question was calculated. Chi-square test was

used to compare the responses between male and female and between educational qualifications. The results were considered statistically significant at P value  $\leq 0.05$ .

### Results

The survey brings forth information about the knowledge, awareness, and attitude of recent graduates of different healthcare study courses towards common risk factors of oral and systemic diseases in New Delhi. A total of 400 participants were included in the study, out of which 192 (48%) were males and 208 (52%) were females. The demographic data of the participants has been summarized in Table 1. Distribution of responses among study subjects is depicted in Table 2. Association between gender and course of study to responses to the questions is given in Tables 3 and 4, respectively.

### Table 1: Demographic Data of the study participants

### Table 2: Distribution of study participants based on their responses

Nearly 93.5% participants said that high sugar diet can lead to obesity and dental caries while 5% believed that this was not the case, . 81.8% study subjects agreed that stress may lead to both heart diseases and gum diseases, whereas 13.3% opted for the opposing view..

Although majority of the respondents (94.5%) responded yes when asked whether smoking may lead to lung disease and oral diseases, and 3.3% answered no. 85.3% subjects said that consumption of alcohol may lead to both liver and oral cancer simultaneously while 10.5% believed that this was not the case,. Near to 89.8% graduates expressed that lack of hygiene (brushing and bathing) lead to skin and oral diseases while 6.8% opted for opposing view.

88.8% study subjects reflected that level of education can have impact together on both general and oral health while 6.5% answered no. 82.3% graduates contemplated that level on income can have impact on both general and oral health whereas 13.8% said no.

**Chart 1: Sources of information among study subjects**

Among the participants, Family Doctors and Physicians (37.3%) were the most utilized information source followed by books and lectures (28.1%), Specialist Dentists (14.5%), friends and family (12.0%), Internet (4.8%), radio (1.5%), news (1.0%), Journals (0.5%) and television (0.3%) respectively.

**Table 3: Association between gender and responses to questions**

Table 3 shows the gender wise distribution of study subjects. High sugar diet was identified as a risk factor for obesity and dental decay more by females (95.67%) as compared to males (91.14%). Female participants (82.69%) recognized stress as a common risk factor for heart and gum diseases more than males (80.72%). Smoking was considered more by women (99.51%) than men (92.18%) as a risk factor for lung and oral diseases.

83.85% male graduates identified alcohol as a common risk factor for liver diseases and oral cancer as compared to their female counterparts (86.53%). Knowledge on lack of hygiene (brushing and bathing) as a common risk factor for skin and oral diseases was demonstrated almost equally by (89.90%) female and (89.58%) male subjects. Effect of education on the knowledge of oral and general health was more pronounced among males (92.18%) than females (85.57%). 83.17% females and 81.25% males described level of income as a significant barrier in oral and general health awareness.

Among Males (38.02%), Family Doctors and Physicians were the most useful source of information followed by Books and lectures (30.20%), Family and Friends (15.10%), Specialist Dentists (8.33%), Internet (5.72%), Radio (2.08%), Journals (0.52%) whereas Newspaper and Television were not utilized by them at all.

In the opinion of Females, again Family Doctors and Physicians (36.71%) are the most liable source of

information along with Books and lectures (26.08%), Specialist Dentists (20.28%), Family and Friends (9.17%), Internet (3.86%), Newspaper (1.93%), Radio (0.96%), Television (0.48%) and Journals (0.48%).

**Table 4: Association between educational qualification and responses to questions**

Table 4 shows the education wise distribution of study subjects identifying common risk factor. MBBS graduates 98.98% considered high sugar diet as a common risk factor for obesity and dental decay the most followed by BAMS (97.02%), BDS (90%) and least by nursing graduates (88%). Dental graduates (89%) described stress as a common risk factor for both heart and gum disease the most, graduates of BAMS (87.12%), Medicine (77.77%) and least by nursing (73%). Smoking was pointed out as a common risk factor for lung and oral diseases by MBBS graduates (98.98%) most, followed by Ayurveda (94.05%), then dental (94%) and least by Nursing (91%).

Alcohol as a common risk factor for liver diseases and oral cancer was identified most by graduates of Ayurveda (91.08%), then Medicine (86.86%), dentistry (85%) and least answered by the nursing ones (78%). Lack of hygiene (bathing and brushing) as a common risk factor for skin and oral infections was analyzed most by nurses (96%) followed by BDS (91%), MBBS (87.87%), and BAMS graduates (57.42%).

Level of education was appraised in order by BAMS (91.08%), MBBS (90.90%), Nursing (87%), and BDS graduates (86%), to alter oral and general health awareness. Impact of level of income was analyzed to have an effect on oral and general health knowledge highly by medicos (93.93%), followed by Ayurvedic physicians (89.10%), dentists (79%) and then nurses (67%).

According to MBBS graduates, Family Doctors and Physicians (59.18%) were the primary source of the information about common causation of oral and systemic diseases, followed by books and lectures (29.59%), Specialist Dentists (6.12%), Family and Friends (4.08%), and Internet (1.02%). Journals. Dental graduates however, believed their Dentist (31%) to be the most common source of information followed by Books and lectures (30%), Family Doctors and Physicians (22%), Internet (5%), Radio (5%), Family and Friends (4%), Newspaper (2%), and Journals (1%).

BAMS graduates considered their knowledge had come from the sources in following order, Family Doctors and Physicians (30.69%), Family and Friends (24.75%), Books and lectures (20.79%), Specialist Dentist (18.18%), Newspaper (0.99%), Journals (0.99%), Television (0.99%), Radio (0.99%), Internet (0.99%). Nursing graduates believed Family Doctors and Physicians (38%) were the most utilized source of information followed by Books and lectures (32%), Family and Friends (15%), Internet (12%), Specialist Dentists (2%), and Newspaper (1%).

### **Discussion**

General health and oral health share a strong association. They also have a lot of risk factors in common and are interconnected in such a way that one may lead to another. Trauma, smoking, stress, unhealthy diet, tobacco use, harmful alcohol use and poor oral hygiene, and social determinants are risk factors for both oral and systemic diseases.<sup>[8]</sup> The adoption of collaborative common risk factor approach which shall address common risk factors and their underlying social determinants would be more effective than a targeted disease specific approach.

In the present times knowledge regarding the multiplicity of causation of common diseases covering both oral health and general health remains questionable. The present

study was conducted to assess the knowledge and information sources regarding common risk factors of oral and general health among recent healthcare graduates. The awareness of these recent graduates is important as they can help in oral health promotion by educating their patients on the importance of oral health.<sup>[7]</sup>

The present study revealed that 93.5% participants understood that high sugar diet is a major risk factor for both obesity and dental caries. Literature proves that sugar consumption leads to enhanced dental decay<sup>[9]</sup> and obesity,<sup>[10],[11]</sup> respectively. Moreover, many studies have also established an association between the two based on diet.<sup>[12],[13],[14]</sup> Many studies conducted to assess knowledge of the general population on the subject have shown that the people are not well aware of the fact that high sugar intake can lead to obesity<sup>[15]</sup> and dental caries<sup>[16]</sup>. 81.8% of the study subjects believed that stress was a common risk factor for diseases of the heart and the periodontium. This knowledge was slightly more among the females and the dental graduates as compared to their counterparts, respectively. The role played by stress in manifestation of cardiovascular diseases is well known.<sup>[17]</sup> However, the fact that it leads to deterioration of periodontal and gingival health is widely unknown. Research has shown that stress can lead to periodontal and gingival problems.<sup>[18],[19]</sup> Many factors have been speculated such as the altered response of the periodontium to microbial toxins caused by variation in levels of adrenal hormones, alteration in brushing habits leading to poor oral hygiene, dietary changes, changes in salivary composition and flow, alteration in host response mechanisms, reduced wound healing capacity.<sup>[7],[20],[21],[22]</sup> Stress is also associated with the onset of habits like alcohol consumption, smoking, tobacco chewing, bruxism among adults, and tongue thrusting, thumb sucking among children. Smoking and tobacco use are commonly

associated with periodontal problems<sup>[23]</sup> and the other oral habits can lead to trauma from occlusion and subsequent tooth wear. Moreover, as stress affects the cardiovascular system, it alters the circulation of the entire body including the periodontium.<sup>[7]</sup>

The association between smoking, lung and oral disease seems to be the most widely known among the study participants. 94.5% subjects agreed that smoking was a common predisposing factor for lung and oral diseases. Smoking has been identified as the primary risk factor for respiratory diseases such as COPD, asthma, and emphysema.<sup>[24]</sup> Further, smoking plays an active role in oral mucosal and periodontal problems such as clinical attachment loss, bone loss, pocket formation, impaired wound healing, and even oral cancer.<sup>[23],[25]</sup> The awareness of the harmful effects of smoking is also limited among smokers, worldwide.<sup>[26],[27],[28],[29]</sup> In fact, in a similar study conducted to assess the knowledge of dentists and dental students in Croatia, it was concluded that there was a need to impart more knowledge about the harmful effects of smoking.<sup>[30]</sup>

85.3% subjects said that consumption of alcohol in excessive amounts may lead to both liver and oral cancer simultaneously. Metabolism of alcohol occurs in the liver, and leads to generation of oxidative stress due to reactive oxygen species.<sup>[31]</sup> It also causes a decline in the CD8+T cell count, and a decrease in cytotoxicity of Natural Killer cells, both of which are essentially anti-tumorigenic.<sup>[32]</sup> Therefore, alcohol is a common predisposing factor in carcinogenesis of the liver, digestive tract and the oral cavity.<sup>[31],[33]</sup> In an Australian study, it was found that not even half of the subjects were aware of its carcinogenic potential.<sup>[34]</sup>

Personal hygiene includes proper cleaning of the body by means of bathing, washing hands, brushing, etc.<sup>[35]</sup> 89.8% of the participants agreed that lack of hygiene could lead

to skin and oral diseases. A study conducted among school children revealed that only 40% of the participating children took bath every day. Another study in Chennai showed that only 35% subjects brushed their teeth.<sup>[36]</sup> A strong association has been demonstrated between personal hygiene and skin diseases,<sup>[37]</sup> and oral hygiene and dental diseases.<sup>[38]</sup> Formation of dental plaque, which is the primary etiological factor in most dental diseases, is also a result of poor oral hygiene practices.<sup>[39]</sup> Socioeconomic status was a major factor that determined hygiene maintenance.<sup>[40]</sup>

The effects of two major determinants, education and income, on knowledge of the participants are worth appreciating. 88.8% of the subjects believed that level of education influenced their knowledge of oral and general health whereas 82.3% felt that socioeconomic status affected their choices. A literature review revealed that people from developed countries and those from the high income group were more aware than their counterparts from developing countries and low income strata.<sup>[26]</sup> Similar results were obtained from another study.<sup>[41]</sup>

In the present study, Family Doctors and Physicians (37.3%) were the most utilized information source which is similar to a study in USA where Family Doctors and Physicians were the source for 75% of the study population.<sup>[42]</sup> Specialist Dentists (14.5%) were the third most important source of oral health information for these graduates. Only 28.1% graduates thought that their course textbooks and lectures were a significant source. Friends and family (12.0%), Internet (4.8%), radio (1.5%), news (1.0%), Journals (0.5%) and television (0.3%) were other sources of importance, in order.

Medical professionals being the primary source of information must possess correct knowledge about the risk factors and determinants of various dental and general health conditions and diseases. Therefore, it is important

that such information be included in their course books and lectures. Only 28.1% students received this knowledge from their books and lectures or their professors while senior medical practitioners remained the source for the majority.

In the hierarchy of evidence-based learning in dentistry, opinions of medical professionals take the bottom stratum while the higher strata are occupied by knowledge gained from research based evidence and studies. Therefore, it is of all the more importance that the young medical students are able to learn about the subject via the top-notch sources. So that when they further impart this knowledge to the general public, their knowledge is based on real evidence and not just the opinions of their seniors or family doctors.<sup>[43]</sup>

### Conclusion

As healthcare professionals are the information source for the majority of the study population, it is important that

Table 1: Demographic Data of the study participants

Demographic Data (N=400)	Number
Gender, n (%)	
• Male	192 (48.0)
• Female	208 (52.0)
Course of study, n (%)	
• MBBS	99 (24.8)
• BDS	100 (25.0)
• BAMS	101 (25.3)
• B.Sc. Nursing	100 (25.0)

Table 2: Distribution of study participants based on their responses

Question, N (%)	Yes	No	Don't Know
Q1 Do you know high sugar containing diet may lead to both obesity and dental decay simultaneously?	374 (93.5)	20 (5.0)	6 (1.5)
Q2 Do you know stress may lead to both heart diseases and gum diseases simultaneously?	327 (81.8)	53 (13.3)	20 (5.0)
Q3 Do you know smoking may lead to both lung diseases and oral	378 (94.5)	13 (3.3)	9 (2.3)

they possess the correct knowledge and understand the importance of oral health, and its common risk factors with general health.<sup>[7]</sup>

The primary source of information most of the recent healthcare graduates was not their course books or lectures during the course of their study. Therefore, imparting knowledge about dental health in healthcare students in their curriculum is important.

It is of significance that their knowledge stems from the top order of the ladder of evidence based dentistry rather than being based on the standpoints of their physicians, which occupies the lowest order in the evidence based learning hierarchy.<sup>[43]</sup> Thus, changes need to be made in their curriculum to involve oral health knowledge, so that these professionals can further spread the correct awareness among their prospective patients.

	diseases simultaneously?			
Q4	Do you know consumption of alcohol in excess amounts may lead to both liver diseases and oral cancer simultaneously?	341 (85.3)	42 (10.5)	17 (4.3)
Q5	Do you know lack of hygiene (brushing and bathing) may lead to both skin and oral diseases simultaneously?	359 (89.8)	27 (6.8)	14 (3.5)
Q6	Do you think level of education can have impact together on both general and oral health?	355 (88.8)	26 (6.5)	19 (4.8)
Q7	Do you think your level of income can have impact together on both general and oral health?	329 (82.3)	55 (13.8)	16 (4.0)

Chart 1: Sources of information among study subjects

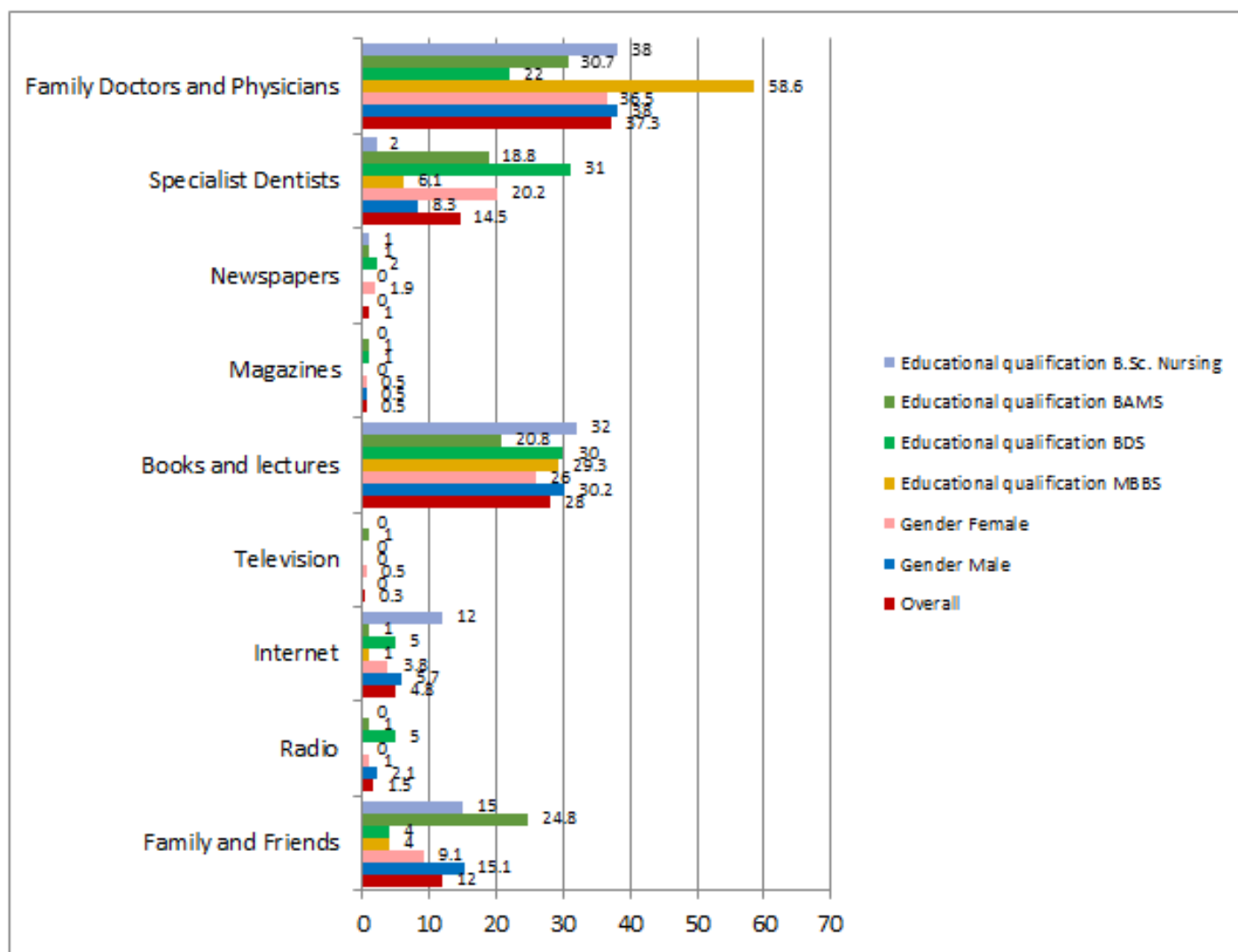




Table 3: Association between gender and responses to questions

Questions, n (%) <sup>*</sup>	Male (N=192)	Female (N=208)	P value <sup>†</sup>
High sugar containing diet may lead to both obesity and dental decay simultaneously	175 (91.14)	199 (95.67)	0.1283
Stress may lead to both heart diseases and gum diseases simultaneously	155 (80.72)	172 (82.69)	0.5444
Smoking may lead to both lung diseases and oral diseases simultaneously	177 (92.18)	201 (99.51)	0.113
Consumption of alcohol in excess amounts may lead to both liver diseases and oral cancer simultaneously	161 (83.85)	180 (86.53)	0.3701
Lack of hygiene (brushing and bathing) may lead to both skin and oral diseases simultaneously	172 (89.58)	187 (89.90)	0.3572
Level of education can have impact together on both general and oral health?	177 (92.18)	178 (85.57)	0.0003
Do you think your level of income can have impact together on both general and oral health?	156 (81.25)	173 (83.17)	0.229

\* n is frequency of subjects who responded “Yes” to the question. Percentage was calculated from respective gender group.chi

† P value is calculated by using Chi-square test.

Table 4: Association between educational qualification and responses to questions

Question, N (%) <sup>*</sup>	MBBS (N=99)	BDS (N=100)	BAMS (N=101)	B.Sc. Nursing (N=100)	P value <sup>†</sup>
High sugar containing diet may lead to both obesity and dental decay simultaneously	98 (98.98)	90 (90)	98 (97.02)	88 (88)	<0.0001
Stress may lead to both heart diseases and gum diseases simultaneously	77 (77.77)	89 (89)	88 (87.12)	73 (73)	0.0109
Smoking may lead to both lung diseases and oral diseases simultaneously	98 (98.98)	94 (94)	95 (94.05)	91 (91)	0.1307
Consumption of alcohol in excess amounts may lead to both liver diseases and oral cancer simultaneously	86 (86.86)	85 (85)	92 (91.08)	78 (78)	0.1003
Lack of hygiene (brushing and bathing) may lead to both skin and oral diseases simultaneously	87 (87.87)	91 (91)	85 (84.15)	96 (96)	0.0671

Level of education can have impact together on both general and oral health?	90 (90.90)	86 (86)	92 (91.08)	87 (87)	0.0496
Do you think your level of income can have impact together on both general and oral health?	93 (93.93)	79 (79)	90 (89.10)	67 (67)	<0.0001

\* n is frequency of subjects who responded “Yes” to the question. Percentage was calculated from respective course group.

† P value is calculated by using Chi-square test.

**Annexure 1: Questionnaire for the study**

1. Do you know high sugar containing diet may lead to both obesity and dental decay simultaneously?
  1. Yes
  2. No
  3. Don't Know
2. Do you know stress may lead to both heart diseases and gum diseases simultaneously?
  1. Yes
  2. No
  3. Don't Know
3. Do you know smoking may lead to both lung diseases and oral diseases simultaneously?
  1. Yes
  2. No
  3. Don't Know
4. Do you know consumption of alcohol in excess amounts may lead to both liver diseases and oral cancer simultaneously?
  1. Yes
  2. No
  3. Don't Know
5. Do you know lack of hygiene (brushing and bathing) may lead to both skin and oral diseases simultaneously?
  1. Yes
  2. No
  3. Don't Know

6. Do you think level of education can have impact together on both general and oral health?
  1. Yes
  2. No
  3. Don't Know
7. Do you think your level of income can have impact together on both general and oral health?
  1. Yes
  2. No
  3. Don't Know
8. Who gave you this information?
  1. Family Doctors and Physicians
  2. Specialist Dentists
  3. Newspaper
  4. Journals
  5. Books and lectures
  6. Television
  7. Internet
  8. Radio
  9. Family and friends.

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