Evaluation of the Oral Health Knowledge Among Undergraduate Students

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Abstract

Objective of the study is to evaluate the oral health knowledge, attitude and oral hygiene practice behavior among undergraduate students of biomedical sciences in Punjab, Pakistan. Methodology consisted of a questionnaire study of 501 sample size (182 males and 319 females). The mean age of the participants was 19 years. The data collected by the study was analyzed by IBM SPSS Statistics v. 25.0. Pearson's Chi-square test was used to compare the data. *P*-value less than 0.05 were considered to be statistically significant. Results showed284 (56.6%) participants brushed their teeth only once a day,253 (50.4%) brushed their teeth right after waking up, for no less than 2 minutes. 342 (68.2%) participants replaced their tooth brush after every 3 months and 367 (73%) participants do not feel an obligation to brush teeth after consuming sugary foods. 203 (40.5%) participants only use horizontal motions for brushing and 234 (46.7%) participants rely only on brushing to maintain oral hygiene.290 participants (58%) believe visiting the dentist after every 6 months can help in prevention of oral diseases, while 159 (32%) participants believe in fluoride application and getting scaling done once a year. 64.4% participants believe scaling is the removal of deposits on teeth and it should only be done when required. 63% participants visited the dentist only when they suffered from an oral disease. The findings of this study will be helpful in making strategies for awareness programs related to oral hygiene practices.

Key words: Evaluation, Oral health knowledge, Attitude, Oral hygiene.

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Background

Oral health is a fundamental component of the general well-being of humans [1]. Oral health is defined as disease free teeth and oral-facial system which contributes to the physiological function as well as esthetics of the face [2]. World Health Organization (WHO) described oral health as a state of being free from pain, infection or any disease that limits the capacity to speak, bite, and chew and psychosocial wellbeing of the individual [3]. The meaning of oral health was further redefined by Federal Dental International (FDI) in 2016 as a multifaceted attribute including the ability to smell, speak, smile, taste, swallow, touch, chew and convey emotions through facial expressions without any discomfort and pain of the craniofacial complex [4].

Oral cavity serves as an intersection of dentistry and medicine which acts as a focal contact point of the body with external environment [1]. Multiple oral pathologies are known to affect oral health such as dental caries, gingivitis, periodontitis, oral cancer, Kaposi sarcoma associated with HIV, xerostomia and orofacial pain. Among these oral diseases, dental caries is the most common infectious disease which affects both functional and psychological behavior of the individual [5]. Most of these oral pathologies are avertible by maintaining good oral hygiene through preventive measures [6]. Modes of prevention include effective tooth brushing, flossing, behavioral factors, dietary patterns and regular visits to dental clinics for early detection of any pathology [7]. Inadequate measures to maintain oral hygiene are held responsible for frequent oral infections resulting in a negative impact on both oral and systemic health [8]. Some systemic diseases which are affected by the infection of oral cavity include rheumatic fever, bacterial pneumonia, infective endocarditis, coronary heart disease and brain abscess [9, 10]. Numerous systemic diseases such diabetes mellitus, stroke, behcet's disease, crohn's disease, syndromes and psychological disorders manifests their symptoms as oral problems [11, 12].

Prevalence of oral diseases is increased in the Middle East region including Pakistan due to insufficient dental knowledge, low socioeconomic status, difficult access to standardized dental services, lack of funding and low priority for the oral health [13]. According to a meta-analysis study done in 2021, 60 percent of Pakistani population have caries [14]. Such high prevalence of dental problems might be caused by lack of public awareness about oral hygiene measures. A study conducted in the rural clinics of Punjab reveals that almost 41% of population never cleaned their teeth at all and 90% of the population visited dental clinic only in case of unbearable oral discomfort [15].

According to research done at a teaching hospital in Rawalpindi, 34.5% patients were found to be having CPI score ≥ 3 which meant periodontitis. Age, gender, occupation, smoking, diabetes, arthritis, cardiovascular disease, kidney disease, stress, medications, and oral hygiene habits of using tooth brushing or alternate methods were significantly associated with periodontal status [16].

Oral hygiene habits play important role in the disease progression of oral cavity. A study was done in Portugal to access the impact of oral hygiene habits on the oral health status. The study reported 96.7% population brushed their teeth once daily and among them 76.7% people relied only on tooth brushing as a mode to maintain oral hygiene with no use of dental floss or mouthwash. 70.3% of the total population has lost more than six permanent teeth due to inadequate brushing [17].

Knowledge of the population on the maintenance of oral health plays a prime role in the disease progression. A study was conducted in India regarding the knowledge of oral hygiene habits among dental professionals. It concluded that only 19.6% of dental professionals followed the recommended levels of oral self-care. This study also showed that 55.9% dental professionals were brushing their teeth twice daily and 59.4% of the professionals consumed sugary snacks once daily or even less than that [18]. Research was done in Lahore, Pakistan which investigated the causes of extraction in the tertiary care centers. This study included 1026 patients which were recommended extraction of permanent tooth due to various dental problems. In 63.1% patients, the cause of tooth extraction was dental caries. 52.6% patients had poor oral hygiene which lead to various dental problems such as periodontitis, gingivitis and dental caries [19].

Scaling involves the removal of tartar from tooth surfaces, which if not removed can lead to gingivitis and periodontitis respectively. The study revealed that anxiety, painful side effects and high costs were the reasons patients were hesitant in getting scaling procedures done. While, others feared that scaling will loosen their teeth and increase gaps between them [20]. A study conducted in Rawalpindi, Pakistan revealed that 208 people out of 238 have experienced scaling only once in their life and 38 participants never experienced scaling. Only 12.2% have got their scaling procedure done to reduce bleeding problem and the rest 87.8% have undergone scaling for teeth whitening [21].

Majority of the common man of Pakistan lack basic dental awareness. Hence, this study is conducted in Punjab, Pakistan to evaluate the basic oral health knowledge, attitude and oral hygiene practice behavior among undergraduate students of various biomedical sciences disciplines.

Methods

Sample collection

It was a cross sectional study done across various cities of Punjab with random sampling design. In total 509 questionnaires were distributed and 501 were collected. From 501 students, 182 males and 319 females participated, with a mean age of 19 years. The first and second year students of biomedical sciences (BS biomedical sciences, BS public health, BS genetics, BS transfusion medicine, doctor of physiotherapy (DPT), bachelor of medicine & bachelor of surgery (MBBS), bachelor of dental surgery (BDS), B.Sc nursing & B.Sc nutrition) of Punjab province were selected for this questionnaire study. All the students were briefed about the nature and purpose of the

study. The students who gave written consent were provided with the questionnaire form. The forms were filled by the students under supervision and they were collected efficiently on completion.

Questionnaire design

Firstly, the demographic details of the study participants were requested to be filled which included gender, age and their respective discipline. The questionnaire consisted of a total of twenty questions that were designed specifically to evaluate the dental health knowledge of first- and second-year students of biomedical sciences. The first seven questions (1-7) were designed to evaluate the oral hygiene habits of participants including 1) how many times do you brush your teeth, 2) what are the most appropriate times of a day for brushing your teeth, 3) what is your duration of tooth brushing, 4) after how many months do you replace your tooth brush, 5) which technique do you use for brushing your teeth, 6) do you use any alternate oral hygiene method besides brushing your teeth, 7) do you brush your teeth after consuming sugary food. The next questions 8-13 assessed the knowledge of students regarding oral health including 8) in your opinion, which of the following can lead to dental caries, 9) in your opinion, what measures can be taken to prevent oral diseases, 10) in your opinion what systemic disease/s can be linked to oral health, 11) in your opinion, what underlying systemic condition/s can influence oral diseases, 12) in your opinion, what are the causes of bleeding gums, 13) in your opinion, what is the influence of improper oral hygiene. In questions 14-18 awareness of students related to scaling was studied; 14) what is scaling, 15) after how much time you prefer to get your scaling done, 16) in your opinion how does scaling affect your teeth, 17) in your opinion how soft drinks affect your teeth, 18) in your opinion, what is more important for maintaining oral hygiene. Finally, question 19 & 20 investigated about the dental problems faced by participants frequently and the frequency of visiting the dental surgeon respectively. Students were allowed to choose multiple options in most of the questions (ANNEX-1).

Statistical analysis

The data collected by the study was analyzed by IBM SPSS Statistics v. 25.0. Pearson's Chi-square test was used to compare the data. *P*-value less than 0.05 were considered to be statistically significant.

Results

In total 509 questionnaires were distributed and 501 were collected. From 501 students, 182 males and 319 females participated, with a mean age of 19 years. Female participants comprised significantly in greater proportion than males in all disciplines. Demographic characteristic of participants is shown in table 1.

Table 1: Demographic characteristics of participants participated in the survey (n)

	Gender		Total
	Male	**Female**	
Discipline			
BS Genetics	4	10	14
BS Public Health	4	15	19
DPT	0	27	27
BS Biomedical Sciences	0	19	19
MBBS	172	228	400
BS Transfusion Medicine	0	6	6
BDS	2	14	16
Total	**182319**		**501**

Table 2: Oral hygiene habits of students

Table 2: Pearson's Chi-square test, bold numbers meant *P*<0.05

Question	Male	Female	P value
Frequency of brushing your teeth (≥ twice)	25.7%	46.2%	**0.000**
most appropriate times of a day for brushing your teeth	15.2%	21.2%	0.032
Duration of tooth brushing (≥ 2mins)	16.8%	11.4%	**0.006**
Replacing your tooth brush	80.4%	66.2%	**0.000**
Technique for tooth brushing	15.8%	31.7%	**0.001**
Alternate oral hygiene methods used	3.3%	3.4%	0.657
Brushing teeth after consuming sugary foods	25.5%	28.3%	0.535

The questionnaire was categorized under three headings to identify oral hygiene habits of students, knowledge of students regarding oral heath, and their awareness regarding scaling. The questions in the questionnaire study were according to the dichotomous pattern of Yes/No with the correct answer denoted as a yes. The table presented under every heading shows the percentages of students who identified the correct answers.

Oral hygiene habits of students

Table 2 illustrates the knowledge of undergraduate students regarding oral hygiene habits. Majority of participants of both gender brushed their teeth only once a day (n=284), right after waking up (n=253), for no less than 2 minutes (n=267), replaces tooth brush after every 3 months (n=342), and do not feel an obligation to brush teeth after consuming sugary foods (n=367). For the correct technique of brushing, many participants (n=203) only uses horizontal motions; however, only a small proportion of participants (n=5) uses all 3 motions i.e. vertical, horizontal, and circular to brush teeth. To our surprise, most of the participants (n=234) do not use any alternate method to maintain oral hygiene alongside brushing, as only 160 participants use mouthwash, and only 17 participants make use of dental floss as an alternate method to maintain oral health status.

Knowledge of students regarding oral health

Table 3 illustrates knowledge/awareness of undergraduate students regarding the maintenance of oral health status. Most of the undergraduate students thought that the frequent consumption of sugary foods (n=200) and inadequate brushing of teeth (n=183) results in dental caries.In concern to the prevention of oral diseases,more than half of participants (n=290) believe visiting the dentist after every 6 months can help in prevention of oral diseases, while a few participants also believe in fluoride application (n=159), and getting scaling done once a year (n=33).Significant results were observed regarding the consequences of improper oral hygiene amongst participants. Unfortunately, both genders exhibited a poor understanding of relation between systemic diseases and oral health and about the influence of systemic diseases on oral diseases as, the result were insignificant. Similarly, poor knowledge was evaluated regarding the causes of bleeding gums

Table 3: Knowledge of students regarding oral health

Table 3: Pearson's Chi-square test, bold numbers meant *P*<0.05

Question	Male	Female	P value
Causes of dental caries	48.4%	48.6%	0.119

Prevention of oral diseases	54.9%	66.5%	**0.001**
Systemic diseases linked to oral health	42.4%	44.6%	0.771
Systemic conditions influencing oral diseases	25.5%	25.5%	0.504
Causes of bleeding gums	48.4%	44.9%	0.760
Influence of improper oral hygiene	87%	90.8%	0.074

Awareness of students regarding scaling

Table 4 illustrates the awareness of undergraduate students regarding scaling. A large number of participants of both genders believe scaling is the removal of deposits on teeth (n=323), and that it should only be done when required (n=320). But many of the undergraduate students are unaware of the effects of the scaling as many thought that scaling makes teeth look whiter (n=209), some believe that it makes teeth weaker (n=105) and only (n=112) participants actually believe that scaling makes teeth stronger. According to majority of the participants oral hygiene is maintained by self-care at home (n=352).

Table 4: Awareness of students regarding scaling

Table 4: Pearson's Chi-square test, bold numbers meant *P*<0.05

Question	Male	Female	P value
What is scaling	65.8%	68.3%	0.460
Duration of getting scaling done	61.4%	69.2%	0.344
Effect of scaling on teeth	20.7%	22.8%	0.805
Effect of soft drinks on teeth	54.9%	41.8%	0.017
Maintain oral hygiene	27.2%	24.3%	0.525

When inquired about frequency of visits to dentists (fig.1), a large number of students stated that they visited the dentist only when they suffered from an oral disease (n= 315).

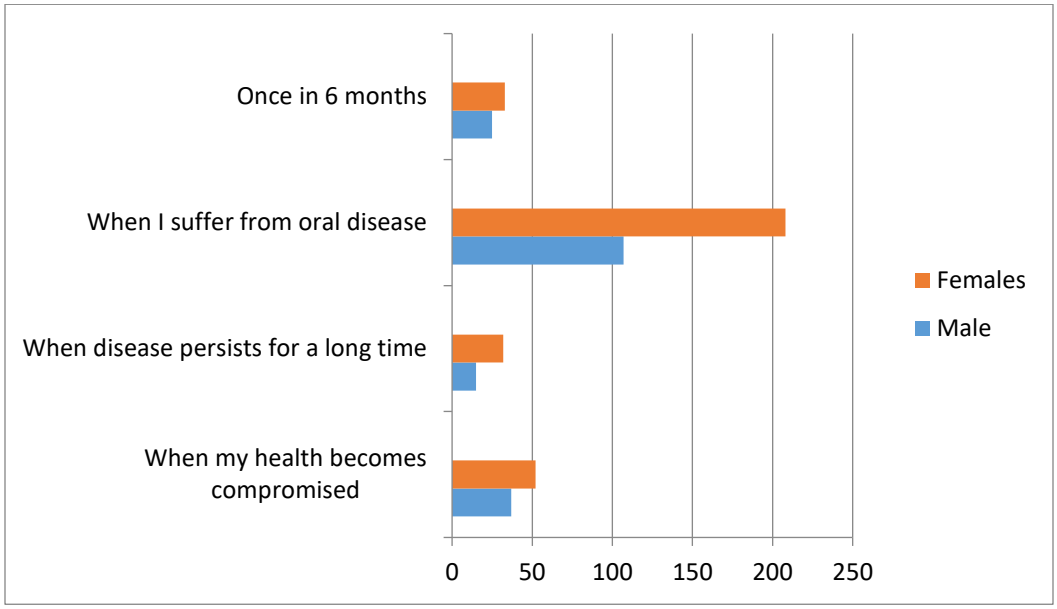

Figure 1: Frequency of dental visits by undergraduate students

Upon investigating the oral health problems faced by undergraduate students, the results (fig.2) revealed that the most common problem faced by students is bleeding of gums (n=90).

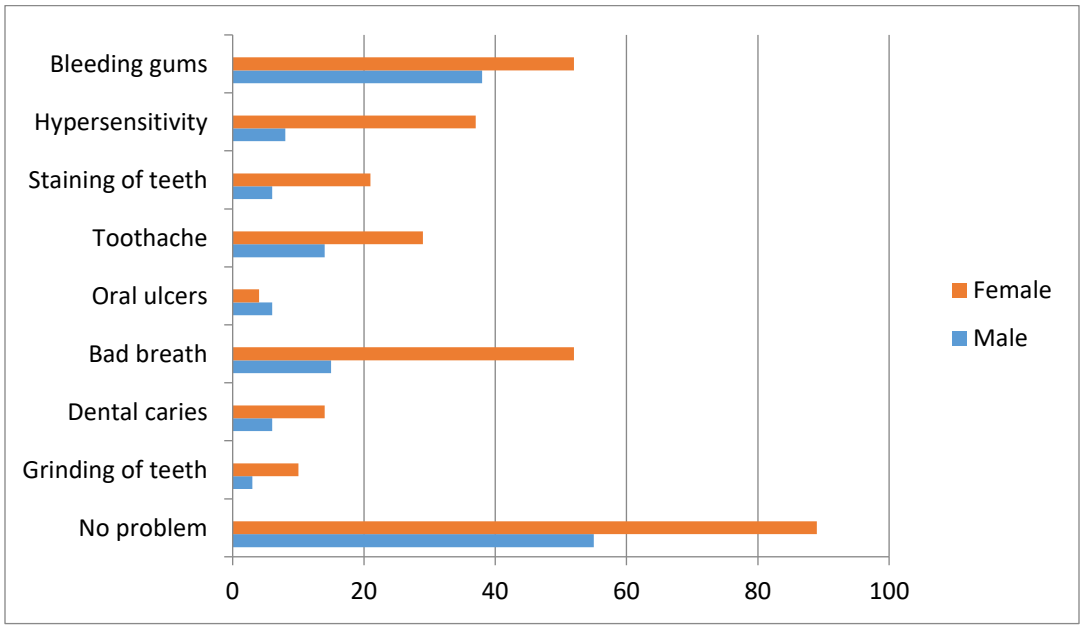

Figure 2: Oral health problems faced by undergraduate students.

Discussion

Evaluation of the Oral Health Knowledge Among Undergraduate Students.

Oral diseases are clearly related to behavior, and the prevalence of oral diseases such as dental caries and periodontal diseases have decreased with improvements in oral hygiene methods [22]. Studies have shown that there is an association between increased knowledge relating to oral health and consequently better oral hygiene [23, 24]. The oral health status of undergraduate students not only affects their own quality of life but it is also a reflection of their oral health behaviors and habits which is equally important. Therefore, it is essential to find out their knowledge regarding oral health and oral hygiene habits. The first- and second-year students of several health sciences disciplines involved in our study have not received any oral health related education and training. Hence, the aim of conducting a self-questionnaire study was to un-veil the oral health related situation among students which can provide a reference for education reform.

In our study, the oral health knowledge of health sciences students did not reach a desirable level. Major misconception students had in our study was that the best time for brushing your teeth is only immediately after waking up, while studies have proved that for prevention of dental diseases tooth brushing should be done before going to sleep and after consuming breakfast [25].

Among students, more than 40% used wrong technique for brushing their teeth and only mere 26% students knew the correct method. Unfortunately, students exhibited a poor understanding of relationship about the influence of systemic diseases on oral health and more than 50% did not realize that bleeding gums can be a symptom of systemic disease. This can be due to the fact that during first and second year the exposure to oral health knowledge was comparatively less. The findings of a study revealed that higher level of studies had better knowledge of periodontal diseases, their signs, symptoms and preventive measures that can be taken to decrease their likelihood [26].

While a large percentage of students (67.4%) knew that scaling involves the removal of deposits on the tooth surface and it should be get done only when required (66.4%), major misconceptions students had was that scaling weakens the tooth structure (20.6%) and its only purpose is to whiten the teeth (49.7%). It was noteworthy in our study that only 44.8% of undergraduates were problem free and the most common oral problem encountered was bleeding of gums (17.7%). In a survey of medical and dental students of Karachi, Pakistan, the study showed that medical students were more concerned about their oral hygiene and health than dental students. Among them, females were more concerned about oral hygiene than male students, and students in clinical years were more aware of oral hygiene habits than pre-clinical students [27]. In our study, students from all disciplines need to strengthen their knowledge and change their behavior towards oral health and be competent to improve their oral health status.

Conclusion

Our study revealed that undergraduate students of health sciences need to improve their knowledge and practices of oral health. More emphasis should be laid on methods of tooth brushing, relationship between systemic diseases and oral health, awareness regarding frequent visits to dentists for regular oral examination and maintenance of oral health.

Conflict of interest

Authors declare no conflict of interest.

Funding disclosure

None.

Ethical approval

Not required.

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ANNEX-1

EVALUATING THE ORAL HEALTH KNOWLEDGE AMONG UNDERGRADUATE STUDENTS

Date _____

First Name: _____

Last Name: _____

Gender Male ☐ Female ☐

Age: _____

Discipline: _____

Mark appropriate option from the below questionnaire. You may choose more than one option.

1. How many times do you brush your teeth?
    a) Once a day
    b) Twice a day
    c) Three times or more a day
    d) Alternate day
2. What are most appropriate times of a day for brushing your teeth?
    a) Immediately after waking up
    b) Before going to bed
    c) After breakfast
    d) After every meal
3. What is your duration of tooth brushing?
    a) 1 minute or less
    b) 2 minutes
    c) 3 minutes or more
4. After how many months do you replace your tooth brush?
    a) 3 months
    b) 6 months
    c) Until it cannot be used
5. Which technique do you use for brushing your teeth?
    a) Vertical
    b) Horizontal
    c) Circular

6. Do you use any alternate oral hygiene method besides brushing your teeth?
    a) Dental floss
    b) Tooth pick
    c) Mouth wash
    d) None
7. Do you brush your teeth after consuming sugary foods?
    a) Yes
    b) No
8. In your opinion, which of the following can lead to dental caries?
    a) Using toothpaste without fluoride
    b) Frequent consumption of sugar
    c) Disruption in micro-flora of oral cavity
    d) Inadequate brushing of teeth
    e) Don't know
9. In your opinion, what measures can be taken to prevent oral diseases?
    a) Scaling once a year
    b) Fluoride application
    c) Visiting a dentist after every 6 months
    d) Don't know
10. In your opinion, what systemic disease/s can be linked to oral health?
    a) Heart diseases
    b) Diabetes
    c) Pneumonia
    d) Osteoporosis
11. In your opinion, what underlying systemic conditions can influence oral diseases?
    a) Heart diseases
    b) Diabetes mellitus
    c) Cancer
    d) Hypertension
    e) Gastrointestinal disturbances
    f) Don't know
12. In your opinion, what are the causes of bleeding gums?
    a) Gum diseases
    b) Systemic diseases
    c) Brushing with excessive force
    d) Don't know

13. In your opinion, what is the influence of improper oral hygiene?
    a) Dental caries
    b) Gum diseases
    c) Bad breath
    d) Don't know

14. What is scaling?
    a) Removal of deposits on tooth surface
    b) Root canal treatment
    c) Polishing of tooth surface
    d) Plaining of tooth surface
15. After how much time you prefer to get your scaling done?
    a) Once a year
    b) Twice a year
    c) Once in two years
    d) None
16. In your opinion, how does scaling affect your teeth?
    a) Makes your teeth weaker
    b) Makes your teeth stronger
    c) Don't know
17. In your opinion, how soft drinks affect your teeth?
    a) Staining of teeth
    b) Hypersensitivity of teeth
    c) Erosion of teeth
    d) Don't know
18. In your opinion, what is more important for maintaining oral hygiene?
    a) Visiting a dentist
    b) Self-care at home
19. Which dental problems you face frequently?
    a) Bad breath
    b) Grinding/clenching of teeth
    c) Dental caries
    d) Bleeding from gums
    e) Oral ulcers
    f) Toothache
    g) Staining of teeth
    h) Hypersensitivity of teeth

i) No problem

20. What is your frequency of visiting a dental surgeon?
    a) Once in 6 months
    b) When you suffer from an oral disease
    c) When disease persists for a long time
    d) When your health becomes compromised by oral disease
21. Are you suffering from any acute or chronic disease?
    a) Yes
    b) No