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# A Comparative Evaluation of Self-Reported Oral Hygiene Practices Among Medical and Engineering University Students with Access to Health-promotive Dental Care

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## Abstract

**Aim:** This study was conducted to test the null hypothesis that no difference exists in the oral hygiene knowledge and practices of university students in different courses when they have equal opportunity to access health-promotive dental care.

**Methods and Materials:** The study was conducted using 120 students each from the medical and engineering colleges at the University of Manipal Academy of Higher Education who had easy access to the dental college within the campus which provides health-promotive dental care to all its patients. A self-administered structured questionnaire consisting of questions on demographic data, oral hygiene knowledge and practices, and dental service utilization patterns was distributed among the students. The data collected was analyzed using SPSS 10 version.

**Results:** Statistically significant differences were found between the two groups with respect to the knowledge of fluoridated toothpastes, frequency of toothbrush renewal, use of dental floss, and a tongue cleaner ($p<0.001$). The groups were similar in all other practices including the utilization of dental services. There were no significant differences between the self-reported oral hygiene knowledge and practices among medical and engineering university students, but the knowledge levels of the students were considerably lower than expected.

**Keywords:** Oral hygiene, oral health promotion, university students

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## Introduction

Since the adoption of the World Heath Organization's (WHO) definition of health, resources around the world have been trying to raise the critical consciousness of people to affect a change from the existing disease-centric, pain-relieving notion of healthcare to promoting a health-centric and well-being concept.

Central to these attempts has been the idea of health promotion through education, instruction, and motivation. Creating supportive environments, strengthening community action, and development of personal skills were among the principles outlined by the Ottawa charter of WHO in 1986 for health promotion.[1] An environment which is conducive for shifting the onus of public health from the shoulders of healthcare personnel to 'people's own hands' would essentially thrive upon the health literacy of the population through its accurate knowledge and understanding of scientifically supported information and facts.

Health promotion in a developing country like India, where the geo-socio-political and economic factors offer meager and inadequate healthcare resources to its rapidly growing population, make this an uphill task. Moreover, the low literacy rates (65.38%)[2] further weakens the effort. The critical need in such a scenario is the sharing of responsibilities. The small number of factors namely: diet, smoking, alcohol, injury, hygiene, stress, and exercise are linked to a wide range of important diseases forming the fundamental basis of the common risk factor approach (WHO 2000) to prevent a range of conditions including oral diseases.[3] Among these, hygiene is the single most significant factor when it comes to the prevention of oral diseases. The concept, importance, and practice of oral hygiene is expected to be easily understood by all literate members of a population. This is the goal of oral health promotion – for knowledge to be shared with members outside of the dental profession.

One group from the population that could be easily used for this purpose is university students. With a higher educational background the concept of prevention and well-being could be more easily understood, irrespective of their course of study (medical or non-medical). The simple concept of oral hygiene should be equally understood and put into practice by them. Studies on the knowledge, attitude, and behavior of university students toward oral health have been sparse and have primarily been conducted among dental/dental hygiene students.[4-6] A need for studies which examine the general student population have been stressed.[6]

The campus of the Manipal Academy of Higher Education, India provided a unique opportunity for assessing the oral hygiene knowledge and practices of medical and non-medical university students studying in the University's medical (Kasturba Medical College) and engineering (Manipal Institute of Technology) colleges, respectively. Irrespective of their courses of study, students in the university had an equal opportunity to access dental care from the dental college (Manipal College of Dental Sciences) on the campus.

The charge of the dental college is to provide instruction, and the motivation model of health promotion with oral hygiene instructions being the central goal of its message to its patients. Thus, this study was conducted to test the null hypothesis that no difference exists in the oral hygiene knowledge and practices of university students in different courses when they have equal opportunity to access health-promotive dental care.

## Methods and Materials

A self-administered structured questionnaire written in English and validated through a pilot survey (Cronbach's $\alpha$ = .74) was used in this study (Figure 1). It was answered by 240 students, 120 each from the medical and the engineering colleges. The respondents, who were instructed to fill in the questionnaire without discussion with each other, took an average of ten minutes to complete the procedure. The questionnaire consisted of 19 questions. The preliminary section was designed to gather demographic data. Anonymity of the respondents

## Manipal College of Dental Sciences, Manipal
## Department of Community Dentistry

**INSTRUCTIONS:**
Anonymity will be maintained. Please:
• Do not write your name • Pick the best answer • Answer all questions • Avoid discussions

**1. Your Profile**
Age : _____ Sex : Male / Female College: _____

**2. How do you clean your teeth?**
___Toothpaste ___Toothbrush ___Toothpowder ___Finger
___Any Other, specify: _____

**3. If you brush, what kind of brush do you use?**
___ Soft ___ Medium ___ Hard ___ Don't Know

**4. What do you look for when you buy a toothbrush?**
___ Type of toothbrush ___ Manufacturer (Brand) ___ Cost of toothbrush ___ No specific reason

**5. Do you know about fluoridated toothpaste?** ___ Yes ___ No

**6. If yes, do you use fluoridated toothpaste?** ___ Yes ___ No

**7. When do you brush your teeth?**
___ Morning ___ Night ___ Both the times ___ After every meal

**8. Time spent on brushing?**
___ 1-3 mins ___ 3-5 mins ___ More than 5 mins

**9. Do you brush your teeth in front of the mirror?** ___ Yes ___ No

**10. How often do you change your brush?**
___ Every month ___ 3 months ___ 6 months ___ Other, Specify: _____

**11. Reason for you to change your brush?**
___ Fraying of the bristles ___ Fading of the color indicator ___ No specific reason

**12. Other aids used with brushing?**
___ Dental floss ___ Mouthwash ___ Interdental brush ___ None
___ Other specify: _____

**13. Do you clean your tongue?** ___ Yes ___ No

**14. If yes, how do you clean your tongue?**
___ Tongue cleaner ___ Brush ___ Any other, specify: _____

**15. Do you rinse your mouth after every meal?** ___ Yes ___ No

**16. Which of the following habits you think is harmful to the oral cavity?**
___ Smoking ___ Betel nut chewing ___ Pan chewing ___ Tobacco chewing
___ All of the above ___ None of the above

**17. Which of the following substances you think is harmful to the oral cavity?**
___ Tea ___ Juices ___ Coffee ___ Carbonated drinks
___ All of the above ___ None of the above

**18. Have you visited a dentist before?** ___ Yes ___ No

**19. If yes, how often do you visit the dentist?**
___ Every month ___ Once in 3 months ___ Once in 6 months ___ Only when required as in pain

**Figure 1.** Sample questionnaire used in the study.

was assured. The second section concerned oral hygiene awareness and practices, while the last section of the questionnaire inquired about their dental service utilization patterns.

The data collected was analyzed using SPSS V.10 software (SPSS, Inc., Chicago, IL, USA). The Chi-square test was used for comparison between the two groups with respect to their oral hygiene awareness and practices and their patterns of dental services utilization.

## Results

Out of the 240 students surveyed, there were 120 males and 120 females. The response rate to the survey was 100%. All of the participants included in the survey used a toothbrush and toothpaste to clean their teeth. In the medical group 89.2% were aware of the type of toothbrush they used as far as the bristle consistency was concerned and 36.6% of them bought the toothbrush based on the brand name. In the engineering group 84.2% were aware of the type of toothbrush they used as far as the bristle consistency was concerned and 36.6% of them bought the toothbrush based on the brand name. There was no statistically significant difference between the two groups (Table 1).

While statistically significant results were seen when the two groups were compared for their knowledge of fluoridated toothpaste (medical group=27.5% unaware, engineering group=48.4% unaware), there was no significant difference in usage of fluoridated toothpaste between the two groups (medical group=58.7% used, engineering group=48.3% used).

Among the medical group 44.1% of the respondents brushed twice daily and 10.9% after every meal, while in the engineering group 39.1% brushed twice daily and only 0.9% brushed after every meal. The difference was statistically significant (Table 2). Comparison of the two groups for the frequency of renewal of toothbrush showed a statistically significant result with 32.5% respondents among the engineering group changing their brush every month as compared to 13.3% among the medical group. Fraying was the most common reason cited for renewal of toothbrush in both the groups (Table 3).

The use of other oral hygiene aids was limited: mouthwash (24.1%-medical group; 20%-engineering group), dental floss (12.5%-medical group; 5%-engineering group), toothpick (11.7%-medical group; 15%-engineering group). The

**Table 1. Dentifrice and toothbrush use/choice.**

| | Dentifrice Used | | | Aid Used | | Toothbrush | | | | You Buy Toothbrush Looking for: | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tooth paste | Tooth powder | Others | Tooth brush | Finger | Soft | Medium | Hard | Don't know | Type | Cost | Brand | No specific reason |
| Medical Students | 120 (100) | 0 (0) | 0 (0) | 120 (100) | 0 (0) | 43 (35.8) | 58 (48.4) | 6 (5) | 13 (10.8) | 56 (46.6) | 3 (2.5) | 44 (36.6) | 17 (14.3) |
| Engineering Students | 120 (100) | 0 (0) | 0 (0) | 120 (100) | 0 (0) | 41 (34.2) | 66 (55) | 6 (5) | 7 (5.8) | 58 (48.3) | 4 (3.4) | 34 (28.3) | 24 (20) |

**Table 2. Fluoridated dentifrice and toothbrushing practices.**

| | Fluoridated Toothpaste | | | | Brushing | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | When | | | | Time Spent | | | In Front of Mirror | |
| | Know | Don't know | Use | Do not use | Morning | Night | Both times | After every meal | 1-3 min | 3-5 min | More than 5 min | Yes | No |
| Medical Students | 87 * (72.5) | 33 (27.5) | 51 (58.7) | 36 (41.3) | 54 (45) | 0 (0) | 53 (44.1) | 13 * (10.9) | 46 (38.3) | 57 (47.6) | 17 (14.1) | 96 (80) | 24 (20) |
| Engineering Students | 62 (51.6) | 58 (48.4) | 30 (48.3) | 32 (51.7) | 72 (60) | 0 (0) | 47 (39.1) | 1 (0.9) | 53 (44.2) | 50 (41.6) | 17 (14.2) | 102 (85) | 18 (15) |

* $p < 0.001$

difference was found to be statistically significant, wherein 51.7% of the medical group and 60% of the engineering group did not use any other oral hygiene aid (Table 4).

There was no statistically significant difference found between the two groups as far as tongue cleaning, rinsing of mouth after meals (Table 4), duration of brushing, and whether brushing was carried out in front of a mirror or not (Table 3). Tongue cleaning was regularly done by 80% of medical and 83.3% of the engineering groups; a tongue cleaner was used most commonly in both the groups. Among the engineering group 10% of respondents reported they do not rinse their mouth after meals as compared to 14.2% among the medical group (Table 4).

No statistically significant difference was found between the two groups when they were asked about diet and habits they thought were harmful to the oral cavity (Table 5). The dental services utilization pattern was similar in both the groups with 68.4% in the medical group and 68% in the engineering group reporting to be visiting the dentist only when in pain (Table 6).

## Discussion

Knowledge and awareness studies on oral health among students have been primarily conducted among dental college students or students with health sciences backgrounds. Keeping in mind the expected role to be played by the student community on the whole in effecting a behavioral change in the society, a need is felt for assessing

**Table 3. Frequency of toothbrush renewal.**

| | Renewal of Toothbrush | | | | | | |
|---|---|---|---|---|---|---|---|
| | Every month | Every 3 months | Every 6 months | Other | Fraying | Fading | No specific reason |
| Medical Students | 16 * (13.3) | 63 (52.5) | 32 * (26.7) | 9 (7.5) | 85 (70.9) | 14 (11.6) | 21 (17.5) |
| Engineering Students | 39 (32.5) | 62 (51.6) | 19 (15.9) | 0 (0) | 79 (65.9) | 11 (9.1) | 30 (25) |

* p< 0.001

**Table 4. Other oral hygiene practices.**

| | Other Aids | | | | | | Rinsing Mouth After Meals | | Tongue Cleaning | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | Interdental brush | Floss | Tooth-pick | Mouthwash | Yes | No | Yes | No | Tongue Cleaner | Brush | Other |
| Medical Students | 58 (48.3) | 62 * (51.7) | 0 (0) | 15 * (12.5) | 14 (11.7) | 29 (24.1) | 103 (85.8) | 17 (14.2) | 96 (80) | 24 (20) | 49 (51) | 46 (47.9) | 1 (1.1) |
| Engineering Students | 48 (40) | 72 (60) | 0 (0) | 6 (5) | 18 (15) | 24 (20) | 108 (90) | 12 (10) | 100 (83.3) | 20 (16.7) | 61 (61) | 38 (38) | 1 (1.) |

* p< 0.001

**Table 5. Harmful habits and substances.**

| | Habits Thought to be Harmful to Oral Cavity | | | | | Substances Thought to be Harmful to Oral Cavity | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Smoking | Pan / betelnut | Tobacco Chewing | All of them | None | Tea | Coffee | Carbonated drinks | Juices | All | None |
| Medical Students | 3 (2.5) | 0 (0) | 4 (3.4) | 111 (92.5) | 2 (1.6) | 3 (2.5) | 7 (5.8) | 31 (25.9) | 0 (0) | 54 (45) | 25 (20.8) |
| Engineering Students | 6 (5) | 2 (1.8) | 6 (5) | 93 (77.4) | 13 (10.8) | 8 (6.6) | 14 (11) | 39 (32.5) | 0 (0) | 27 (22.5) | 32 (26.7) |

**Table 6. Utilization of dental services.**

| | Ever Visited a Dentist? | | Frequency of Dental Visit | | | |
|---|---|---|---|---|---|---|
| | Yes | No | Once every month | Once in 3 months | Once in 6 months | Once only in pain |
| Medical Students | 95 (79.2) | 25 (20.8) | 3 (3.2) | 8 (8.4) | 19 (20) | 65 (68.4) |
| Engineering Students | 94 (78.4) | 26 (21.6) | 4 (4.4) | 9 (9.6) | 17 (18) | 64 (68) |

the oral health related knowledge, attitude, and behavior of university students with different educational backgrounds.

Dental colleges traditionally have been imparting the education, motivation, and instruction model of health promotion services to all their patients. It is of common knowledge and also always expected the simple messages concerning oral health promotion are easily understood by anyone with an adequate literacy level. Therefore it is expected, irrespective of their course background, all university students who have an equal opportunity to access such service should engage in similar oral hygiene practices.

Students in the University of Manipal Academy of Higher Education with its main constituent colleges provided a unique opportunity for studying the effect of easy access to dental care as well as preventive health education messages on university students in different courses of study (medical and engineering).

In spite of their non-medical background it is to be expected the knowledge, attitude, and behavior of engineering students should be the same as medical students since both have an equal opportunity, access, and adequate literacy levels to understand the concept and importance of oral health.

Oral hygiene is fundamental to the maintenance of oral health; therefore, oral hygiene knowledge and practice were taken as primary data for comparison between the two groups. The sample selected in the study included two groups which were similar in all aspects except their course of study. All of the students belonged to the same campus with similar life style behavior and atmosphere. The students lived in hostels; such groups behave as independent adults making their own decisions and have an inherent tendency to adopt the group's behavior through interpersonal communication.

Before carrying out the actual study, a pilot study was conducted to ascertain the validity of the questionnaire. The questionnaire was written in English, which is the common language of instruction at the university. Since the greater motive of the study was to assess whether university students can be used to propagate oral health promotion messages, self-reported data was required. Anonymity of the respondents was pledged to ensure genuine responses.

Oral hygiene practices in India are deeply based in tradition and culture with use of indigenous substances being widely prevalent.[7] This study revealed all of the respondents were using a toothbrush and toothpaste to clean their teeth. This result reflects on the homogeneity of the study group with the current lifestyle (hostel, campus, and access to dental care) influences overpowering the varying cultural backgrounds from which the students come.

While the differences in the awareness of the type of toothbrush used based on the bristle consistency or the criterion while buying a toothbrush were not significant between the two groups, about 8.5% of the total population surveyed were not aware of the type of toothbrush they were using. The type of toothbrush and the brand were the most important criteria for both the groups, while buying a toothbrush suggested an equally important role played by marketing and advertisement in influencing people's choices towards better oral health.

Knowledge about the benefits of fluoridated toothpaste was expected to be high among students with a medical background. A medical student, who may not be studying dental care, may still know about fluoridated toothpaste. On the other hand, an engineering college student is more unlikely to have such knowledge. As expected, the study reveals a significantly higher knowledge among the medical group, and the fact no difference is found in the usage of fluoridated toothpaste suggests an equal effect of the health-promotive dental care. Similar results can be concluded from the comparison of awareness of habits and diet harmful to the oral cavity, rinsing of mouth after meals, and tongue cleaning.


On the other hand, the effect of such dental care is reflected to be non-uniform by the statistically significant difference between the two groups when awareness of other oral hygiene aids, frequency of brushing, and frequency of renewal of toothbrushes are compared. However, the difference in all three of these variables cannot be attributed to the course of study or educational background of the subjects alone and is more suggestive of differences in personal motivation levels.


There was no difference in the frequency of dental visits, and the most common reason for a dental visit was cited to be pain. The results depict, in spite of the health promotion messages being given by the dental college, the practice of a periodic dental check up was not common among the students.

## Conclusion

There were no statistically significant differences between the self-reported oral hygiene knowledge and practices among medical and engineering university students. The knowledge levels of the students were considerably lower than what would be expected of this group, which had high literacy levels and easy access to dental care.

While this study examined the knowledge and oral hygiene practices of students, more detailed studies probing in depth the health promoting activities of the dental college based on a baseline data – intervention – evaluation model are required to validate the results further.

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