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# A comparative study of oral health knowledge, attitude and behaviour of first and final year dental students of Udaipur city, Rajasthan, India

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**Abstract:** *Objective:* To assess and compare differences in oral health knowledge, attitudes and behaviour among first and final year dental students in Udaipur city, Rajasthan, India. *Material and methods:* In a cross-sectional study, 182 first year students (59 males and 123 females) and 157 final year students (75 males and 82 females) of the two dental colleges in Udaipur city; Rajasthan, were surveyed using a self-administered structured questionnaire including 37 multiple choice questions pretested through a pilot survey. The data was analysed using the spss version 10.0. The mean percentage scores, standard deviation and frequency distribution were calculated. The Student's *t*-test and anova test were used as test of significance. The linear regression analysis were used to assess the relation of knowledge, attitude and behaviour. *Results:* The mean % score for oral health knowledge, attitude and behaviour were significantly higher in final year students compared to first year students ($P < 0.001$). The linear regression analysis showed a statistically significant linear relationship of attitude with the knowledge ($P < 0.001$) and behaviour with the attitude ($P < 0.001$) of the students. *Conclusion:* Besides the positive changes revealed in the oral health knowledge, attitude and behaviour, among the students from first to final year of dental studies, preventive behaviour among the students could still be improved.

**Key words:** attitude; oral health behaviour; oral health knowledge

## Introduction

Knowledge is defined as 'Oxford dictionary' is the 'expertise, and skills acquired by a person through experience or education'. Knowledge acquisition involves complex cognitive processes: perception, learning, communication, association and reasoning. The term knowledge is also used to mean the confident understanding (theoretical or practical) of a subject with the ability to use it for a specific purpose. An attitude is a relatively enduring organization of beliefs around an object, subject or concept which predisposes one to respond in some preferential manner. Attitude is an acquired characteristic of an individual. People demonstrate a wide variety of attitudes towards teeth, dental care and dentists. These attitudes naturally reflect their own experiences, cultural perceptions, familial beliefs and other life situations and they strongly influence the oral health behaviour (1–4). Attitudes are not learnt from text books, they are acquired by social interaction. Previous studies have shown that mass media, dental professionals and dental literature are the main sources of oral health information (5). The attitude towards oral health determines the health status of the oral cavity. Health behaviour as defined by Steptoe *et al.* (1994) (6) is 'the activities undertaken by people in order to protect, promote or maintain health, and to prevent disease'. The broad categories of factors that may influence individual and community health behaviour include: knowledge, beliefs, values, attitudes, skills, finance, materials, time and the influence of family members, friends, co-workers, opinion leaders and even health workers themselves (7). The people who have assimilated the knowledge and feel a sense of personal control over their oral health are more likely to adopt self-care behaviour (8). The health beliefs and attitudes of dental students, as future dental health providers, not only affects their oral self-care habits but also potentially influence their patient's ability to take care of their teeth (9–12) and shape the public's oral health education level (13). Dental health providers need to set an example for their patients, family and friends by maintaining good oral health in their own mouth.

Realizing that positive attitudes towards health promotion need to be developed during student days rather than afterward, the Federation Dental International has recommended that substantial change in the dental curriculum be implemented to give dentists, the knowledge, skills and attitudes they will need in future practice (14). But relatively little curricular change seems to have taken place over the years (15). Comprehensive programmes in preventive care, including oral self-care regimens, should be an essential part of undergraduate dental education (16). Professional education of dental students should create stable health behaviours which will overcome differences in personal characteristics (17).

Through their undergraduate study, it is logical for students in the field of dentistry to develop and modify their attitude and behaviour towards their own oral health. In passing through the undergraduate curriculum, the dental students should be able to be an oral health model. Since today's students of dentistry will provide dental services in the future and will be responsible for public oral health education, it is important to study their oral health knowledge, attitude and behaviour and also the change in knowledge, attitude and behaviour towards oral health, through the course of study from first to the final year of dental graduation. The present study aims to the comparison of oral health knowledge, attitude and behaviour of first and final year dental students of the dental colleges in Udaipur City, Rajasthan, India.

## Materials and methods

All the first and final year BDS students from Pacific dental college and hospital; Debari and Darshan dental college and hospital; Loyara, in Udaipur city were invited to participate in this survey using a self-administered structured questionnaire written in English and validated through a pilot survey, at the beginning of the academic year 2007–2008. Permission to conduct the survey was obtained from the Principals of both the colleges. Students were requested to remain in the class at the end of a lecture to participate in the survey on a voluntary basis. No attempt was made to follow up with students who were absent on the day of the survey.

The questionnaire included 37 items designed to evaluate the oral health knowledge, attitude and behaviour of the students (18, 19). The students were asked to respond to each item according to the response format provided in the questionnaire. Response format included multiple choice questions in which the students were instructed to choose only one response from provided list of options. The students received a full explanation of how to fill in the questionnaire. Furthermore, the investigator was always available during the completion of the questionnaire and the participants were encouraged to approach the investigator, whenever they needed to clarify at any point. The students who were asked to fill in the questionnaire without discussion with each other, took an average of 20 min to complete the procedure. It was later checked by the investigator that none of the questions were left unattempted. Anonymity of the respondents was assured. A total of 182 students (59 males and 123 females) from the first year

157 students (75 males and 82 females) from the final year of both the colleges participated in the survey.

So the response rate was 91% from the first year students and 78.5% from the final year students of both the colleges in Udaipur city.

#### Statistical analysis

For the purpose of analysis each correct answer was given score 'one' and wrong and do not know answer was given score 'zero' in the items included in knowledge and attitude questions. In the behaviour section, 'zero', 'one' and 'two' scores were given according to the appropriateness of the option selected by the respondent. The data was analysed using the SPSS version 10.0 software. The individual scores were summed up to yield a total score. Descriptive statistics were obtained and mean percentage scores, standard deviation and frequency distribution were calculated. The difference in the oral health knowledge, attitude and behaviour between first and final year students was assessed by Student's *t*-test and the difference among the males and females of first and final year was assessed with the ANOVA test and *post hoc* test. The linear regression analysis was used to find the relation in oral health behaviour with the knowledge and attitude of the students and to find whether the attitude is dependent to the knowledge of the students respectively.

## Results

The result indicates that the mean percentage score for oral health knowledge, attitude and behaviour increased significantly in the final year of dental studies ($P < 0.001$ for knowledge and attitude and $P < 0.01$ for behaviour) (Table 1).

Table 2 represents there is statistically significant difference in the mean percentage sores for knowledge, attitude and behaviour between different groups (first year males, first year females, final year males and final year females) ($P < 0.001$ for knowledge and attitude and $P < 0.01$ for behaviour).

Table 3 represents the comparison of mean percentage knowledge, attitude and behaviour scores in each year – gender (first year males, first year females, final year males, and final year females) combination.

More than 50% of the first year students did not give the correct response for the knowledge items regarding the

Table 1. **Student's *t*-test for comparison in mean percentage score for knowledge, attitude and behaviour of all first and final year students**

| | 1st year ($n$ = 182) | | 4th year ($n$ = 157) | | | | |
|---|---|---|---|---|---|---|---|
| | Mean P score | SD | Mean P score | SD | SE | *t*-value | *P*-value |
| K | 56.78 | 11.29 | 87.59 | 8.87 | 1.096 | −28.117 | 0.000*** |
| A | 82.75 | 20.36 | 94.01 | 10.24 | 1.72 | −6.563 | 0.000*** |
| B | 55.33 | 13.03 | 59.12 | 13.06 | 1.421 | −2.668 | 0.008** |

K, knowledge; A, attitude; B, behaviour; P, percentage.
***$P < 0.001$; **$P < 0.01$.

Table 2. **ANOVA test for comparison in the mean percentage scores for knowledge, attitude and behaviour of males and females in first and final year**

| | Year & gender | $n$ | Mean | SD | SE | $F$ | $P$-value |
|---|---|---|---|---|---|---|---|
| K–P | 11 | 59 | 57.223 | 10.739 | 1.398 | 256.51 | 0.000*** |
| | 12 | 123 | 56.562 | 11.577 | 1.044 | | |
| | 41 | 75 | 86.095 | 9.020 | 1.042 | | |
| | 42 | 82 | 88.966 | 8.560 | 0.9453 | | |
| A–P | 11 | 59 | 78.31 | 22.37 | 2.91 | 15.50 | 0.000*** |
| | 12 | 123 | 84.88 | 19.05 | 1.72 | | |
| | 41 | 75 | 94.40 | 9.04 | 1.04 | | |
| | 42 | 82 | 93.66 | 11.28 | 1.25 | | |
| B–P | 11 | 59 | 52.942 | 13.199 | 1.955 | 4.14 | 0.007** |
| | 12 | 123 | 56.481 | 12.842 | 1.213 | | |
| | 41 | 75 | 57.490 | 13.593 | 1.573 | | |
| | 42 | 82 | 60.618 | 12.459 | 1.309 | | |

K, knowledge; A, attitude; B, behaviour; P, percentage; 11, first year males; 12, first year females; 41, final year males; 42, final year females.
***$P < 0.001$; **$P < 0.01$.

Table 3. ***Post hoc* tests for comparison in each year – gender combination**

| | | | Mean difference | SE | $P$-value |
|---|---|---|---|---|---|
| K–P | 11 | 12 | 0.6614 | 1.619 | 0.683 |
| | | 41 | −28.872 | 1.779 | 0.000*** |
| | | 42 | −31.743 | 1.745 | 0.000*** |
| | 12 | 41 | −29.533 | 1.497 | 0.000*** |
| | | 42 | −32.404 | 1.457 | 0.000*** |
| | 41 | 42 | −2.871 | 1.633 | 0.080 |
| A–P | 11 | 12 | −6.57 | 2.59 | 0.012* |
| | | 41 | −16.09 | 2.85 | 0.000*** |
| | | 42 | −15.35 | 2.79 | 0.000*** |
| | 12 | 41 | −9.52 | 2.40 | 0.000*** |
| | | 42 | −8.78 | 2.33 | 0.000*** |
| | 41 | 42 | 0.74 | 2.61 | 0.777 |
| B–P | 11 | 12 | −3.539 | 2.056 | 0.086 |
| | | 41 | −4.549 | 2.259 | 0.045* |
| | | 42 | −7.676 | 2.216 | 0.001** |
| | 12 | 41 | −1.01 | 1.902 | 0.596 |
| | | 42 | −4.137 | 1.851 | 0.026* |
| | 41 | 42 | −3.127 | 2.074 | 0.133 |

11 – first year males; 12 – first year females; 41 – final year males; 42 – final year females.
*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

number of sets of dentition, meaning of plaque, reason for gum bleeding, methods of prevention of gum bleeding, reason for tooth decay, method to prevent tooth decay, effect of fluoride on teeth and reason of tooth loss in old age. The percentage of students giving correct response were significantly higher in the final year of dental studies: 51.6% of the first year students and 98.7% of the final year students had the correct knowledge of the effect of sweet retention on teeth; 40.3% of the first year students and 98.1% of the final year students had the knowledge regarding the effect of fluorides on teeth; 93.9% of the first year students and 98.7% of the final year students knew the effect of tobacco chewing/smoking in development of oral cancer.

A total of 86.3% of the first year students (61.0% females and 25.3% males) and 97.5% of the final year students (49.7% females and 47.8% males) agreed that regular visit to dentist was necessary. 98.4% of the first year students and 100.0% of the final year students agreed that gutkha chewing/smoking is a bad habit.

Though the mean percentage behaviour scores were significantly higher among the final year students compared to the first year students ($P < 0.01$) certain 'preventive behaviours' did not show the expected improvement.

In present study, among the first year students 45.6% of the students brushed their teeth once daily, 51.1% brushed their teeth twice daily and only 3.3% of the students brushed their teeth thrice or more times daily. Whereas among the final year students 49.0% of the students brushed their teeth once daily, 50.3% brushed their teeth twice daily (in the morning and before going to bed) and only 0.6% of the students brushed their teeth thrice or more times daily (in the morning, before going to bed and after meals/sweet eating). 91.8% of the first year students and 95.5% of the final year students used tooth brush and tooth paste for brushing their teeth. Among which 59.3% of the first year students (40.1% females and 19.2% males) and 64.3% of the final year students (35% females and 29.3% males) used fluoridated tooth paste.

A total of 73.6% of the first year students (51.1% females and 22.5% males) and 96.2% final year students (50.3% females and 47.8% males) changed their tooth brush after fraying of bristles.

Tongue cleaning was regularly performed by 87.4% of the first year students (62.6% females and 24.7% males) and 93.0% of the final year students (47.8% females and 45.2% males). Among the users of other oral hygiene aids, mouthwash was used by 39.6% of the first year students and 40.8% of the final year students, followed by the dental floss which was used by 4.9% of the first year and 12.1% of the final year students.

A total of 28.6% of the first year students and 15.3% of the final year students have never visited a dentist. The percentage of students visiting a dentist for routine check up was more in final year students (43.9%) than in first year students (19.8%) and was least among the first year male students i.e. 3.3%. Number getting treatments performed for common dental problems was 21.4% among the first year and 17.2% among the final year students. 30.2% of first year students and 23.6% of the final year students put off going to a dentist unless they have pain.

The behaviour related to the sweet consumption was better among the first year students, who reported that 38.5% of them do not eat sweet at all compared to the final year students with 16.6% of the students not eating sweet at all. The percentage was highest in the first year females (28.0%). Very few students (14.0% from final year and 7.7% from first year) reported having bad habits like smoking, pan chewing or gutkha chewing and all of them were males. 79.7% of the first year (56.0% females and 23.6% males) students and 93.6% of the final year students (49.0% females and 44.6% males) agreed that they take care of their teeth as much as other parts of body.

The regression analysis for behaviour on knowledge and attitude in all the students showed that the oral health behaviour of the students has a linear relationship with the attitude of the students ($P < 0.001$) depicting the influence of attitude, beliefs in moulding the behaviour, but no significant linear relation with the knowledge ($P > 0.05$) which shows that all the knowledge is not changed into behaviour.

The regression analysis for attitude on knowledge and in all the students showed that the attitude of the students has a statistically significant linear relation with the knowledge ($P < 0.001$) which shows that oral health knowledge is a significant factor in forming a positive attitude towards oral health maintenance.

## Discussion

The results of the present study indicated that the mean percentage score for oral health knowledge, attitude and behaviour were significantly higher in final year students compared to first year students ($P < 0.001$ for knowledge and attitude and $P < 0.01$ for behaviour), agrees with the results of some previous studies by Kawamura *et al.* (2000) (20), Tseveenjav *et al.* (2003) (21) and Rong *et al.* (2006) (22). An important thing to be noted is that, the dental curriculum from first to final year was same for both the colleges in Udaipur city. The curriculum for the first year students in the academic

year 2007–2008, and for the final year students of year 2007–2008 when they were in their first year was same. There were no changes in the curriculum of the first to final year studies in both the colleges. The preventive dentistry course is taught in the third year of dental studies. So the difference in the knowledge, attitude and behaviour scores of first and final year dental students of both the colleges in Udaipur city, appears to reflect the variation in the student's educational level.

Dental health behaviours have been categorized according to 'brushing behaviour', 'complex dental behaviour' and 'sugar behaviour' (Rise and Holund, 1990; 23). The effective tooth-cleaning practices are indicative of positive oral health behaviour whereas frequent consumption of sugary foods represents negative health behaviour (risk behaviour) (24).

Though the mean percentage behaviour scores were significantly higher among the final year students compared to the first year students ($P < 0.01$) certain 'preventive behaviours' like twice daily brushing, fluoridated tooth paste use, reduction in sweet consumption etc. did not show the expected improvement which agrees with the multivariate regression analysis that with the increased level of knowledge there was no significant change in the oral health behaviour.

In the present study, there was no significant difference in brushing behaviour of males and females in both the years in agreement with the study by Tseveenjav B. *et al.* (2002) (21) who found no differences in the tooth-brushing frequency between male and female Mongolian dental students. This finding was different from the findings in a study by Khami *et al.* (2007) (25) and Al-Omari *et al.* (2005) (26), where women reported significantly higher frequencies of tooth brushing ($P < 0.001$), compared with men. A study conducted by Kassak *et al.* (2001) (27) among new undergraduate students in Lebanon showed females brushed their teeth four times as often as males. The percentage of final year students brushing after having meals/sweet was almost nil (0.6%) which shows that even though they have knowledge about the 'preventive behaviours' all the knowledge is not changed into a 'positive preventive behaviour'. There was no significant difference in the tooth brushing behaviour in the first and final year students, which reflects no progress in the 'positive oral health behaviour' with the increased level of knowledge unlike the finding of a study by Barrieshi-Nusair *et al.* (2006) (28), which showed that the percentage of students claiming to brush their teeth twice daily or more often was four times higher amongst clinical students than amongst preclinical students.

From the results, we can say that the knowledge about the role of fluorides in prevention of dental caries has definitely got an impact on the behaviour of the students but all the knowledge was not changed into behaviour. Females showed better behaviour related to use of fluoridated toothpaste than their male colleagues. This result was similar to the findings in another study by Khami *et al.* (2007) (25) among the senior Iranian dental students where women reported significantly higher fluoridated toothpaste use ($P = 0.001$) and compared with men.

Health-related behaviour change would reduce unhealthy behaviours such as sugar in the diet and smoking and increase healthy behaviours such as flossing and dental attendance (Prochaska 1994) (29). Though in all, the tongue cleaning behaviour and the use of mouth wash was better in final year students compared to the first year students; within the groups, tongue cleaning behaviour was best among the first year females (62.6% of females) and also the use of mouth wash was found highest among the first year females i.e. 26.9% which portrays the effect of factors other than knowledge, like, beliefs, values, attitudes, influence of family members and friends on the oral health behaviour. Regardless of better mean per cent behaviour scores for final year students, the low percentage of final year students using dental floss (12.1%), shows that the 'preventive behaviour' of the final year students was not balancing with the level of knowledge. Despite the better percentage of knowledge among the final year students regarding effect of sweet retention on teeth, the behaviour related to the sweet consumption was better among the first year students, who reported that 38.5% of them do not eat sweet at all compared to the final year students with 16.6% of the students not eating sweet at all. The percentage was highest in the first year females (28.0%). This reflects the disparity between knowledge level and behaviour of the students.

Visiting the dentist for routine check up was defined as 'preventive care use'. The final year students showed better preventive care use behaviour than the first year students. The preventive care use behaviour was better in the females in both the years than their male colleagues and was highest among the final year females (22.3%). This could be explained on the basis that females usually care more about their body and appearance. They would thus be more concerned about visiting the dentist.

Many general health factors are of direct relevance to oral health, e.g. smoking, diabetes, alcohol, stress, medication (Horowitz 1990) (30). In present study, very few students (13.37% from final year and 7.69% from first year) reported

having bad habits like smoking, pan chewing or gutkha chewing and all of them were males which shows that the behaviour does not necessarily depend on the knowledge. This finding agrees with the finding of Al-Omari *et al.* (2005) (26), who reported that smoking was much more frequent among males than among females (31% versus 4% with $P < 0.001$) of the dental students in Jordan.

In agreement with the results of Polychronopoulou *et al.* (2002) (31), in general, females presented better knowledge, attitude and behaviour scores compared to the male students. This finding agrees with the results of the study by Al-Omari *et al.* (2005) (26), Ostberg *et al.*(1999) (32) and Fukai *et al.* (1999) (33) who found that female dental students had better oral health attitudes and take better care of their teeth than their male colleagues. All scores progressed significantly in the fourth year of dental studies as seen in another study by Komabayashi *et al.* (2005) (34).

Though the progress in all the scores from first to final year was statistically significant, it was observed that all the 'oral health knowledge' was not changed to 'oral health behaviour' and preventive behaviour among the students has to be improved so that the dental students, as future dental health providers, can set an example for their patients, family and friends by maintaining good oral health in their own mouth and advice the community about good oral health behaviours with conviction.

## Conclusion

Attitudes are not learnt from text books, they are acquired by social interaction, so the responsibility to develop healthy attitudes depends upon parents, teachers, religious leaders and elders in the society. A substantial change in the dental curriculum should be implemented to give dentists, the knowledge, skills and attitudes which will need in future practice for them.

Besides the positive changes revealed in the oral health knowledge, attitude and behaviour, among the students passing through the undergraduate curriculum from first to final year of dental studies, preventive behaviour among the students could still be improved. Regarding these tasks, professional education should provide meaningful learning experience on modern methods. Professional education of dental students should create stable health behaviour which will overcome differences in personal characteristics and will be helpful for the future dental health providers to provide good preventive oral healthcare services to their patients, family and friends.

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