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STUDENTS' PREFERENCES REGARDING TEACHING METHODOLOGY IN DENTAL EDUCATION – A CROSS-SECTIONAL STUDY

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ABSTRACT

INTRODUCTION. The goal of dental education is to prepare competent ethical professionals with critical thinking, reasoning and analyzing skills along with ability of application of clinical skills and judgement in treating a patient. The present study was designed with the objective to elicit the preferences of dental students regarding the utility of the prevailing teaching and learning methods and teaching aids.

MATERIAL AND METHODS. A cross-sectional study was conducted among undergraduate dental students. Study population consisted of 382 dental students. A self-designed close-ended questionnaire written in English was constructed specifically for the study. The questionnaire was divided into two sections. Information regarding various teaching and learning methods both in theory and practical/clinical classes was obtained from the students. Results were calculated using numbers and percentages only.

RESULTS. The mean age of the students was 20.49 + 2.4 years. Problem based learning (PBL) was rated very useful by 76% (290) and useful by 24% (92) of subjects. Performing clinical/practical procedure individually rather than in group was rated very useful by 31% (118) of subjects. Use of power-point along with the blackboard was rated as the most useful method by 95% (363) of subjects. Majority of subjects (61%, 233) felt that 40 minutes duration of lecture was more useful as compared to 30 minutes.

CONCLUSIONS. Our study concludes that dental students prefer active teaching learning methodologies and combination of audiovisual aids. Hence it is suggested that collaboration of different active teaching methods and aids should be adopted by the teachers in order to enhance the student learning process.

Key words: *dentistry, learning methods, teaching aids, interactive*

INTRODUCTION

Dental education training requires an understanding of a diverse spectrum of healthcare, dental skills and professional attitudes. The goal of undergraduate dental education is to produce a competent and ethical practitioner equipped with the knowledge, clinical skills, interpersonal skills and attitudes. Effective teaching forms an essential part of student learning, in professional fields such as dentistry (1). The various learning and teaching methods should be based on educational needs of the profession so that we produce a competent health care provider.

Students are one of the important stakeholders in the field of education. It is widely accepted that the teaching methods should be reviewed by feedback from students regularly, and necessary modifications in the various teaching methodologies should be incorporated to

make the teaching more interesting and relevant (2, 3). There are different teaching methodologies, which are being used by teachers worldwide to impart education. Lecture is the most common mode of teaching being used by almost all the teachers in various educational institutes, including dental colleges (4). This teaching method is teacher centered and focuses on providing information to the student passively.

Nowadays in rapidly changing field of medical education, small group teaching and interactive methods are being incorporated to increase the interest of the students and enhance process of deep learning like group discussions, tutorials, seminars, case discussions, problem based learning etc. (5, 6). Active teaching methods increase student involvement and facilitate students understanding, critical thinking, reasoning power, analyzing skills as well as decision making skills. With the advancement of technology,

the use of modern and computer assisted techniques in teaching is inevitable. Nowadays, use of power-point presentations (PPT) has been increasingly adopted by many of the colleges. Studies have suggested that there are advantages and disadvantages of different teaching methods and there is lot of debate on the superiority of various teaching aids (7, 8).

There are very few documented studies which have assessed the students' perception of effectiveness of various teaching learning methods in a dental setup in India. The purpose of our study was to determine dental student preferences regarding teaching methodologies and teaching aids. An effort is being made through our study to explore the effective methodologies both in the classroom and clinical teaching in dental colleges so that necessary changes can be brought in the dental education system and also to promote learner-based education.

MATERIAL AND METHODS

Ethical clearance and informed consent. Ethical clearance was taken from the concerned college authorities prior to the start of the study. The students were completely informed about the purpose of the study. Students were assured that participation would be voluntary and any type of information disclosing the identity of the subjects would be kept confidential. They were asked to be truthful and unbiased in answering questions. An informed written consent was taken from all the willing participants.

Study population and sample. The present cross-sectional study was conducted in two dental colleges/institutes of North India. The following formula was used to calculate the required sample size:

$$n = \frac{Z^2 \cdot 1 - (\alpha / 2) \times S^2}{d^2}$$

Where Z is the standard normal score with 95% confidence interval (CI) ($\alpha=0.05$), S is the standard deviation of the variable, and d is maximum acceptable error. After applying the formula, 382 subjects constituted the final sample size after excluding the non-responders. Undergraduate students studying in 1st, 2nd, 3rd and 4th year were enrolled in the study using systematic random sampling methodology.

Research instrument/questionnaire. A self-designed close-ended questionnaire written in English was constructed specifically for the study. The content of the questionnaire was verified by two dental academicians and it was pre-tested for validity and reliability. A pilot study was done by including 25 subjects for pre-testing the questionnaire before the start of the actual study. These 25 subjects were not

included in the final study sample. Reliability of the questionnaire was assessed using Test-Retest and the values of measured Kappa (k) were 0.84 and Weighted Kappa (k) was 0.8. The Questionnaire consisted of questions regarding students' preferences for various teaching methodologies and teaching aids with 4-5 options. A pilot study was conducted to validate the content initially before administering it to the entire study group. Prior to the administration of the questionnaire, the study was explained to the students in detail. The questionnaire was distributed to students during their lecture classes.

The questionnaire comprised of 2 sections. Section I consisted of demographic profile: age, gender and year of study. Section II comprised of a questionnaire based on various teaching and learning methodologies in lecture and clinical/practical classes. Students were asked to tick the option which they considered was the most appropriate. This scoring was based on a 5 point Likert's scale (very useful, useful, average, not useful or irrelevant/poor) or (strongly agree, agree, no opinion, disagree or strongly disagree) according to the type of question. At the end of the questionnaire space was provided where students were asked to give their own suggestions/comments. The students were given 30 minutes to complete the questionnaire. They were not allowed to discuss it amongst themselves during this time.

Statistical analysis. The data was collected and entered in Microsoft excel sheet. Data obtained from responses to the questionnaire was assessed using SPSS statistical package (SPSS, version 21.0, Chicago, IL, USA). Categorical measurements were done using number and percentages.

RESULTS

A total of 382 dental undergraduate students participated in the study. Demographic profile of subjects is depicted in Table 1. The mean age of the students was 20.49 ± 2.4 years. Majority of subjects were females (61%) and more than 50% (210) were from the one dental institute.

The usefulness of various teaching methods is depicted in Table 2. Problem based learning (PBL) was rated very useful by 76% (290) and useful by 24% (92) of subjects. Tutorials were rated very useful by 22% (84) of students and useful by 56% (214) of students. About the usefulness of various teaching methods in practical and clinical postings, subjects opined 'demonstration' as the most useful form of learning practical/clinical skills (88%). This was followed by interactive discussion with the teacher and then performance, which was rated as very useful by 73% (278) of subjects as depicted in Table 3.

Table 1. Demographic profile of study population

Demographic profile		Number	Percentages(%)
Gender	Males	149	39
	Females	233	61
Year of study	1 st Year	95	24.8
	2 nd Year	97	25.3
	3 rd Year	98	25.6
	4 th Year	92	24
College/Institute	First	210	55
	Second	172	45
Type of seat allotment / quota	Indian	340	89
	Non-resident Indian	42	11

Table 2. Rating about the preferred method of teaching by the dental students

Teaching methodologies	Very useful	Useful	Average	Not useful	Poor
Problem based learning lecture	290 (76%)	92 (24%)	-	-	-
Didactic/one way lecture	-	-	183 (48%)	187 (49%)	12 (3%)
Interactive lecture	213 (56%)	169 (44%)	-	-	-
Tutorials	84 (22%)	214 (56%)	84 (22%)	-	-
Seminar	5 (1 %)	148 (39%)	195 (51%)	34 (9%)	-

*Problem based learning – a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.

*Didactic/one way lecture – a structured and teacher-focused method centered on teachers delivering lessons to students.

*Interactive lecture – classes in which the instructor incorporates an activity (engagement triggers) and breaks the lecture at least once per class to have students participate in an activity that lets them work directly with the material.

*Tutorials – a class in which a tutor gives intensive instruction in some subject to an individual student or a small group of students.

*Seminars – a seminar is a group meeting led by an expert that focuses on a specific topic or discipline.

Table 3. Rating about the preferred method of teaching by the students in clinics/practical

Teaching methodologies	Very useful	Useful	Average	Not useful	Poor
Demonstration followed by practical	336 (88 %)	46 (12 %)	-	-	-
Discussion with teacher in practical/clinics and performing practical	278 (73%)	104 (27%)	-	-	-
Practical performance in a group	57 (15 %)	194 (51 %)	131 (34%)	-	-
Practical performance individually	118 (31 %)	149 (39%)	115 (30%)	-	-

Use of power-point along with the blackboard was rated as the most useful method by 95% (363) of subjects (Figure 1). However, blackboard alone was reported as very useful by only 15% (57) of subjects. More than 60% of subjects found both listening to lecture along with taking notes (68%) and later getting accessibility of notes (61%) as most useful (Table 4).

Majority of subjects (61%, 233) felt that 40 minutes duration of lecture was more useful as compared to 30 minutes or 1 hour duration lecture as depicted in Table 5. Regarding the response of students of desirable

quality of a teacher, the popular choices included motivating and inspiring quality (94%), followed by being knowledgeable (80%) and enthusiastic (66%) about teaching (Table 6).

DISCUSSION

The present study was conducted with the objective to elicit the preferences of dental students regarding the utility of the prevailing teaching and learning methods. The teaching methodologies and aids mentioned in the

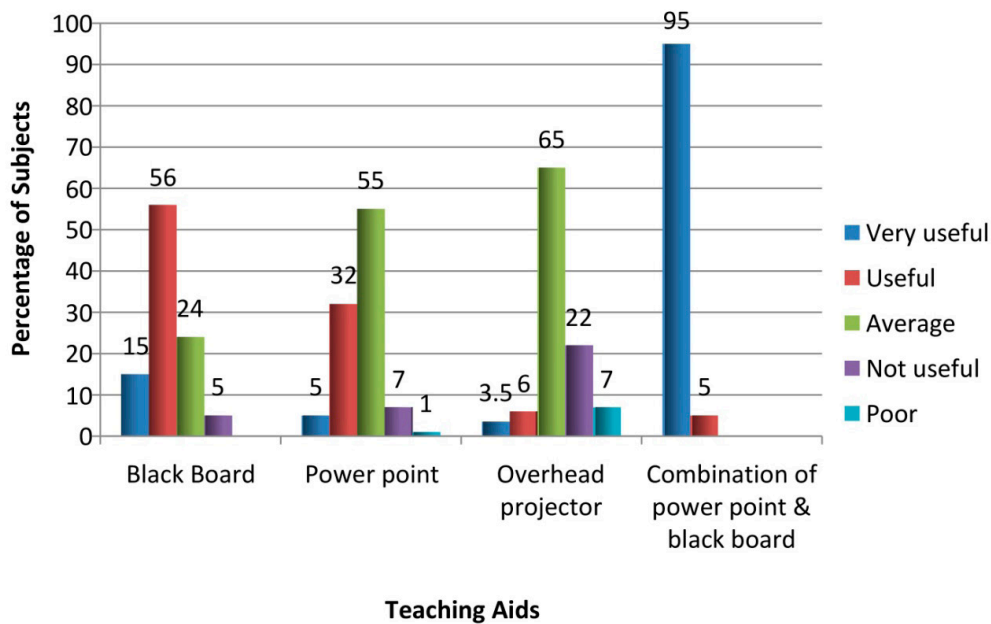


Figure 1. Students' perception regarding usefulness of various teaching aids

Table 4. Preferences regarding teaching method for understanding by subjects

Teaching method	Very useful	Useful	Average	Not useful	Poor
Listening to lecture	19 (5%)	206 (54%)	149 (39%)	8 (2%)	-
Listening to lecture and taking notes	260 (68%)	118 (31%)	4 (1%)	-	-
Listening to lecture and later accessibility of notes	233 (61%)	114 (30%)	35 (9%)	-	-
Getting brief of notes before lecture	103 (27%)	233 (61%)	46 (12%)	-	-

Table 5. Preference regarding duration of lecture by the dental students

Lecture duration	Most useful	Useful	Average	Not useful	Poor
1 hour	45 (12%)	76 (20%)	91 (24%)	148 (39%)	22 (5%)
30 minutes	64 (17%)	57 (15%)	76 (20%)	64 (17%)	121 (31%)
40 minutes	103 (27%)	233 (61%)	19 (5%)	27 (7%)	-

Table 6. Qualities of a good teacher

Quality	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Knowledgeable	305 (80%)	77 (20%)	-	-	-
Friendly	187 (49%)	195 (51%)	-	-	-
Communication skills	233 (61%)	149 (39%)	-	-	-
Enthusiastic	252 (66%)	106 (28%)	19 (5%)	-	5 (1%)
Motivates & inspires	359 (94%)	23 (6%)	-	-	-

study were already being used to teach students in most of their theory and practical classes in the two dental institutes. The students were actively participating in their classes using all the given methods. By making use of the best teaching methodology, a teacher can make the students understand, learn and reproduce

well; thus, improving the academic performance of the students (9). The student feedback is very important in providing information to the teacher regarding the effectiveness of various teaching methods. This information can be useful for the teacher to bring

about modifications in their teaching strategies so as to improve the quality of education (10, 11).

In our study, a vast majority of subjects were more satisfied with interactive form of teaching like problem based lectures, interactive lectures, small group teachings etc. Results similar to our study have also been reported in previous studies (10-13). The reason could be that interactive teaching methods involve bilateral communication, which plays a very important role in enhancing student's interest during the lectures. Since active learning methods were highly rated in our study, so it is suggested that collaboration of different active teaching methods should be adopted to ensure in depth knowledge and improved performance by students (14).

It was found in our study that majority of subjects opted for demonstration followed by interactive discussion with the teacher as most useful. This could be explained by the fact that the student can observe the teacher performing a procedure in a clinical setting or during a practical demonstration. Role of teacher in integration of knowledge with clinical learning has also been reported in an earlier study (15). In the present study, majority of subjects also valued performing the practical or clinical skill individually as compared to doing it in a group. This could be attributed to the fact dentistry being a practical course requires hand on approach in learning.

Among the prevailing combination of teaching aids employed, majority of the students opted for power point and black board as their preferred teaching aid which is in congruence with previous studies (16, 17). Advantage of power-point as a teaching aid is that it involves various pictures, graphs, 3D diagrams, animations and hence helps in understanding the concept better. Power points can also cover the topic in shorter time, whereas in blackboard teaching there is better student teacher interaction (18). The results of our study revealed that a vast number of subjects rated listening to the lecture along with taking notes as most useful method for understanding and retaining the lecture. It has been suggested that taking down notes during a lecture helps the student to remain focused and also it facilitates recall of information (19).

One of the problems faced during the class lectures is the lapse of concentration of students during the topic, which really hinders the understanding and learning process. In the present study, majority of students suggested that lecture duration of 40 minutes was ideal time for a lecture which is also in agreement with some other study (20). Studies have shown that attention span of adult learning is 18-20 minutes, after which there is lapse of concentration (21). Hence there is need to modify the teaching strategy during the delivery of lecture to hold the attention of students.

In our study the most effective teaching ability rated by the dental students was motivating and inspiring quality of the teacher. It is accepted that encouragement and support provided by a facilitator can make a lot of difference in transferring information to the students (22).

The present study had some limitations also. Firstly, the present study restricted to a limited sample size since it was conducted only in two dental institutes because of limited time, budget limitation and hectic schedule of the investigators. Secondly, the study did not take into account the cultural and learning background of the students as it can have influence on their learning potential. Therefore the results of the study should be generalized with caution and need to be confirmed in studies involving larger sample for more specificity and validation in future studies.

CONCLUSIONS

Our study concludes that dental students prefer active teaching learning methodologies. They also appreciate lectures delivered using combination of audiovisual aids. Hence it is suggested that collaboration of different active teaching methods and aids should be adopted by the teachers in order to promote active participation of students, developing reasoning and critical thinking skills and enhance the student learning process. It is also suggested that we should modify our teaching based on suggestions of students in order to enhance the learning process and quality of education.

Impact of COVID-19 on dental education. Social distancing and restrictions imposed as a result of COVID-19 have made e-learning much more important than ever before. This also holds true in case of postgraduate dental education and residency programs. It is believed that online education can be used as a suitable alternative in the future after COVID-19 pandemic. However, there are inherent problems in virtual courses especially with regard to dental education. As dental education is completely dependent on practical training; virtual training cannot transfer skills to the level of face to face training. This problem can be solved only to some extent with advance portable tools that students can use at home.

Another issue that can challenge e-learning is the lack of motivation among students. It is suggested by researchers that new tools should be used in various aspects of dental education and the education system should be updated to adapt to different conditions. Another important aspect of pandemic-induced change is the need for implementation of strict infection practices by dental schools so that students can follow similar practices in their future career.

Moreover, this pandemic has indirectly created stress and psychological effects on students and professors. These may have effect of students' concentration, which will affect both their academic achievement and treatment of patients. Counseling and psychological support is vital under these circumstances.

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