

Challenges in Learning Preclinical Prosthodontics: A Survey of Perceptions of Dental Undergraduates and Teaching Faculty at an Indian Dental School

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ABSTRACT

Introduction: Preclinical dental education promotes development of competency and expertise before students work on patients, but this phase is devoid of exposure to real patients leading to challenges in teaching-learning.

Aim: The aim of this study was to explore the challenges faced by students during the process of learning preclinical prosthodontics.

Materials and Methods: Two Focus Group Discussions (FGDs) were conducted with two different groups of students and one FGD was held with prosthodontics faculty. The FGDs explored the student's and faculty perceptions on the topics which were difficult for the students to understand and their suggestions on how these topics can be made easier to understand. The discussions were audio taped with prior consent and transcribed.

Results: The students and the faculty felt that the subject of prosthodontics is vast, difficult to visualize and also difficult to correlate theory with practical aspects. Lack of clinical exposure coupled with use of conventional methods of teaching were identified as reasons for difficulty in understanding the subject. Both students and faculty members suggested that use of simulation, demonstrations, and videos could augment the learning process for the students. Early clinical exposure will help solve many problems encountered during learning and contribute to a better understanding.

Conclusion: The students and faculty expressed a "need" for early clinical exposure to enhance the learner's understanding of the preclinical aspects of the subject. The present study highlights the need for change in instruction methods to enhance the learning experiences in preclinical prosthodontics of dental undergraduate students in India.

Keywords: Dental education, Early clinical exposure, Focus group discussion

INTRODUCTION

Prosthodontics is an extensive subject, with learning beginning right from the time the undergraduate student joins the course till the completion of his/her bachelor's degree. Traditional undergraduate dental education in India engages students in classrooms and laboratory settings during the first two years of their preclinical training, with the clinical subjects being introduced in the third and final year, followed by one year of rotatory internship [1].

One of the objectives of the preclinical prosthodontics curriculum is to introduce students to laboratory and clinical procedures involved in the fabrication of complete dentures in preclinical settings and provide opportunity for deliberate practice [2]. Preclinical prosthodontics is taught in the first and second year of dental education to promote the development of competency and expertise before dealing with patients [2,3]. Students spend majority of their time in the laboratory performing preclinical exercises with no patient contact [2].

In our institution, during our faculty discussions, we had observed that even students, who performed well academically in other specialties, struggled to respond adequately on queries related to preclinical prosthodontic topics. Evaluation of teaching and learning plays a vital role in curriculum development [4]. And our introspection led us to identify that "student and faculty feedback is a valuable source of information for curriculum reform". There was no published literature which identified the probable reasons for identifying the student and faculty perspective on the teaching and learning of preclinical prosthodontics, particularly so in the Indian context.

In this background, we wanted to explore the perspectives of both faculty and students regarding challenges in learning prosthodontics at a preclinical level through qualitative research.

MATERIALS AND METHODS

This was a qualitative study based on phenomenology using FGDs to understand the phenomenon (challenges in learning preclinical prosthodontics).

Two FGDs were conducted with two different groups of students and one FGD was conducted with the faculty members of Department of Prosthodontics at their workplace between June 2015 to August, 2015. The study was approved by the Institutional Review Board of Bharati Vidyapeeth Institute, Sangli, India.

The moderator (KS) and the assistant moderator (BS) had Masters Degree in Prosthodontics while authors (J) and (UW) had Masters Degree in Public Health Dentistry. Author J received training in qualitative research methods, contributed towards development of FGD guide and identified key strategy to be adopted for conducting the discussion thus contributing towards strengthening of qualitative research methods.

The presence of four researchers in the present study, with varying teaching experience and type of expertise, helped in better understanding of the research related issues from varying perspectives, thus helping in increasing the validity of the study. Author KS conducted the FGDs. The study subjects knew the principal investigator. Informed consent was taken from the participants.

Study Design

Theoretical framework: The investigators wanted to probe into the difficulties faced by the students and faculty in learning and teaching preclinical prosthodontics. On identifying the difficulties, suitable remedial measures could be recommended and if feasible tested.

Participant selection: The sample for the FGD was a purposive sample. Students who had completed preclinical prosthodontics examination were eligible to participate in the study. Both of the student FGDs comprised of 10 participants each (five interns, three final years and two third years). The faculty involved in preclinical teaching and the head of the department were requested to participate in the discussion. The faculty FGD had 11 participants. This was conducted in a different institute by the same moderator (KS). The moderator was from the Department of Prosthodontics and the assistant moderator was from the Department of Public Health Dentistry.

Study Instrument and its Development

A FGD guide consisting of a series of six guiding questions with probes, each for the student and faculty FGD discussion was developed by the investigators to initiate and conduct the discussion [Table/Fig-1]. The guide was reviewed by the experts in the field. The first question in the FGD for students probed the opinion of the students regarding the subjects. The second and third question probed the difficulties faced in understanding the subjects and the rest of the questions pertained to the ways of overcoming these difficulties.

The first question in the FGD for faculty probed the difficulties faced by the faculty while teaching the students. The second and third question explored the faculty perception of difficulties faced by the students in understanding the subject. The remaining questions addressed ways of overcoming these difficulties. The FGDs explored the students' and faculty perception on the topics which were difficult for the students to correlate theory with clinical aspects and their suggestions on ways to make topics easier for them [Table/Fig-2].

Data Collection

Student focus group discussion: The moderator adopted a neutral approach and stressed that there was no correct or wrong answers but only opinions and the purpose of the focus group was to understand students' experiences and views. The participants were assured of anonymity that the information collected from them would not be used in anyway against them. An average time planned for the focus groups was 60-90 minutes, which would be modified if required. The first few minutes were spent to break the ice and build rapport, provide orientation to the subjects and to make them feel comfortable. The moderator motivated the participants to share their experiences and put across views freely and ensured the discussion was not dominated by any particular member. Respondent validation was done during the FGD wherein the information collected from the subject was summarized to the subject and checked for accuracy.

Faculty focus group discussion: Data saturation was discussed with the faculty members analysing the comments. The discussions were audio taped. The written and audio taped records were reviewed and transcribed in order to capture all the words and phrases.

Analysis and Findings

The audio taped records were heard twice by the researchers to facilitate accurate interpretation of the recording and to ensure that minor details were not missed. Analyst triangulation was also done with three faculty members who analysed the comments of the FGD so that data could be interpreted in multiple aspects. Inductive content analysis of the data was done. Initially the data was coded; which included generating descriptive codes that summarized the quotes. The codes were then organized as code families. Later, the themes were derived from the code families. The themes and the comments were discussed by the three faculty members and 100% consensus was reached.

Q1. What is your opinion about the subject of prosthodontics from a learners' point of view?
Q2. In the first and second year, you were exposed to the basics in this subject. Did you find any difficulty with any of the topics?
Q3. Can you explain in detail what were the difficulties faced?
Q4. How can we help the students overcome these learning difficulties?
Q5. In case, we were to post you to clinics in first and second year itself, to observe how your seniors are handling the case, will that help in improving your knowledge of the procedural steps?
Q6. How do you think it will help?
[Table/Fig-1]: Student focus group discussion guide.

Q1. As a faculty, you have guided undergraduate dental students in preclinical prosthodontics. What were the challenges you faced in this process?
Q2. What do you think are the challenges faced by students during the preclinical learning phase?
Q3. What are the areas or topics you think students find it difficult to understand?
Q4. What do you think can be done to help the student understand these topics better?
Q5. What is your opinion on exposing the first and second year dental students to clinical settings where they will observe and learn from their seniors who are treating patients?
Q6. Now, if we plan to develop a module which exposes the students to clinics early in their career to enhance their learning experience. According to you, which topic can we consider for developing this module?
[Table/Fig-2]: Faculty focus group discussion guide.

RESULTS

A total of 20 students (12 females and 8 males) and 11 staff members (two females and nine males) participated in the study. The mean age of the students was 22 ± 1.37 years. The mean age of the staff members was 35.5 ± 6.83 years. Among them, three staff members had a teaching experience of more than nine years, three staff members had a teaching experience exceeding four years and remaining five staff members had a teaching experience of up to four years.

The themes that emerged from the FGDs were:

1. 'Preclinical teaching does not facilitate application in real clinical settings' and
2. 'Modification of traditional instruction methods is required to improve learning'.

The subthemes from which the themes emerged were: 'teaching is more theoretical', 'lack of interest during classes', 'lack of exposure to actual clinical situation', 'demonstration of clinical procedures', 'early clinical exposure to preclinical students' and 'modification of syllabus'.

'Preclinical teaching does not facilitate application in real clinical settings'

This theme highlights the need for vertical integration of preclinical subjects. The aim of imparting information to the student is for him/her to understand the logic behind information being imparted and not just to pass tests. Vertical integration helps the student to understand the link between the theoretical aspects and how it has an impact on the management of real time patients. Teaming up the junior students with the senior students will assist in enhancing the learning experience.

Subtheme 1: Teaching is more theoretical: The respondents were asked how well they understood the topics which were taught to them during their second year of BDS course. The study subjects responded that they found it "difficult to grasp the clinical topics that were taught" to them. They were of the opinion that it was "not easy to understand by only listening to the lectures". They were "not able to visualize all the things that were going on". 'Impression techniques, jaw relations, anatomical landmarks, dental ceramics, casting procedures, arrangement of teeth, components

	Codes generated from student quotes	Codes generated from faculty quotes	Students' quotes	Faculty quotes
Theme 1 : Preclinical teaching does not facilitate application in real clinical settings.				
Subtheme 1: Teaching is more theoretical	Difficult to understand clinical topics/ lab procedures with only theoretical explanations.	Difficult to explain clinical, lab procedures without demonstration/ procedures.	"Difficult to grasp clinical topics" "not easy to understand by listening lectures" "not able to analyze all things".	"Difficult to correlate with clinical aspects as they do all ideal things" "students are more confused".
Subtheme 2 : Lack of interest during classes.	Only chalk and talk, Lack of audio-video aids, classes in the noon and Lack of audibility of staff make the classes boring, topics are uninteresting/disinteresting. Vast syllabus.	Lectures cannot be made interesting as the students don't have basic clinical knowledge; thus making it uninteresting/disinteresting.	"Not interesting" "afternoon sessions"	"Giving half knowledge as they are not exposed to patients".
Subtheme 3 : Lack of exposure to actual clinical situations.	Unable to understand the implications properly.	Students are exposed to ideal situations only as they are not exposed to actual clinical procedures.	"Not exposed to clinics". "difficult to imagine".	"Lack of clinical exposure". "Difficult to correlate: they cannot understand what actually happens".
Theme 2: Modification of traditional teaching methods to improve learning.				
Subtheme 1 : Demonstration of procedures.	Lab procedures like casting could be better understood by demonstration. Demonstration of procedures using audio-video aids could improve understanding.	Demonstration of basic procedures could help in imparting better knowledge.	"Demonstration of preclinical procedures". "Videos to supplement teaching". "Interactive session: student presentations and group discussions to be encouraged".	"Video demonstrations".
Subtheme 2: Early clinical exposure to preclinical students.	Anatomical landmarks could be demonstrated in patients, clinical procedures could be demonstrated in patients.	Exposure to clinical procedures could provide students with an opportunity to come across real life situations. It could also help in improving the understanding of concepts which are otherwise to be only imagined.	"Student exposure to clinics. in second half of second year"	"Each and every procedure involved should be shown" "Every practical procedure should be shown with clinical steps".
Subtheme 3 Syllabus modification to include relevant topics.	Too much of practical work (lab work) which could be reduced.	Topics irrelevant for preclinical students could be included in later years as there is lack of time and syllabus is vast.	"Vast subject". "More of practical".	"Vast syllabus". "Reduce syllabus". "Syllabus to be restricted to only complete denture". "Syllabus is more difficult to complete". "Difficult to accommodate revision class".

[Table/Fig-3]: Themes and subthemes that emerged from the focus group discussion.

of removable and fixed partial denture emerged as challenging topics for the students.

Similarly, the faculty members also reported that it is "difficult to correlate with clinical aspects as they teach all ideal things and not what happens in real clinical settings". They also expressed that "students are more confused".

The faculty perceived jaw relation, facebow, occlusion, articulators, dental ceramics and casting defects to pose challenge to students.

Subtheme 2: Lack of interest during classes: Students reported that "the traditional method of chalk and talk lectures was not very interesting". As half of the "lectures were scheduled during the afternoon sessions", the students felt drowsy. At times "audibility of some teachers" was reported as a hindrance.

The faculty expressed that they were "giving half knowledge as students are not exposed to patients".

Subtheme 3: Lack of Exposure to actual clinical situations: Students opined that as they were "not exposed to clinics" they found it "difficult to imagine" what was taught.

The faculty felt that "lack of clinical exposure" was a major impediment in training students. They reported that the students might find it "difficult to correlate as they cannot understand what actually happens".

'Modification of traditional teaching methods to improve learning'

This section emphasized student and faculty opinion on the means to be employed to improve teaching and enhance learning. Traditional instruction methods should change with time and should be supplemented with recent technology.

Subtheme 1: Demonstration of procedures: Respondents felt that "demonstration of preclinical procedures" might help them in understanding the subject better. "Videos to supplement the traditional chalk-and-talk method" might be a critical component in understanding the subject better. "Video sharing and documenting" of interesting cases in the department. They also suggested that "Interactive session: student presentations and group discussions should be encouraged".

The faculty also suggested the use of "video demonstrations" to augment the learning process. One of the respondents also suggested that "a dental chair be kept in the preclinical setting and the procedures can be demonstrated on patients, which was said to be similar to the practices followed by dental schools in the USA".

Subtheme 2: Early Clinical Exposure (ECE) to preclinical students: Students expressed "some exposure to clinics at least in the second half of second year" might help them in correlating theory with clinical aspects very well.

Faculty felt that students require "clinical exposure at preclinical level". They suggested that the "students should be exposed to clinic once in a week" to facilitate student learning. According to the faculty "the entire procedure for a complete denture should be shown to the students".

Subtheme 3: Syllabus modification to include relevant topics: Students perceived prosthodontics to be a "vast subject with more of practical work".

Staff members in the present study opined that the "syllabus is vast", "reduce syllabus" to render the teaching process more effective. The respondents also suggested that the "syllabus for the second years might be restricted only to complete dentures". Faculty members observed that the "second year syllabus was difficult to be complete" within the stipulated time as it was very vast. They also expressed

that it was "difficult to accommodate revision class".

They also observed that the "syllabus in preclinical training was vast" in comparison with the other departments.

DISCUSSION

This study reveals challenges faced by the faculty and the students in teaching and learning of preclinical prosthodontics and includes their recommendations for improvement. The students and faculty have expressed a "felt need" for ECE to enhance the learner's understanding of the preclinical aspects of the subject. The results of our study are similar to those of Haralur SB and Al-Malki AE according to whom students are not trained to cope up with commonly found clinical variations [3]. Henzi D et al., and Manakil J and George R reported that there is a need for more patient interaction and community outreach opportunities to reinforce classroom learning [5,6]. It has also been reported that dental school graduates rank, ECE as an important factor which helps them in preparing for clinical practice [2].

It has been observed that when the students enter the clinical fields they are unable to recall important basic scientific concepts. Approaches have been introduced to find means of instruction to improve teaching and make it more practical [7]. Early exposure to clinical scenario may help to bridge the gap between preclinical and clinical setting and strengthen students' learning.

It has been suggested that the earlier the contact with patients, the easier it is for the students to put in context the information acquired from basic sciences [8]. Early patient contact can be realized by observing and assisting in senior student clinics, participating in community clinics, or by actually performing simple non-invasive procedures, even in the first year of studies [8]. It has been reported that the opportunity to observe and assist senior students in the clinic was a valuable experience for the junior students that helped them to ease their transition from lab to clinic [9]. Gerzina TM et al., reported that students value seeing the "expert" completing the task that they would be expected to complete [10].

Some authors have proposed that providing students with denture patient contact during the first or second year could increase student interest and enthusiasm toward complete denture prosthodontics [11,12]. The College of Dentistry at the University of Illinois at Chicago has introduced an active learning environment for second-year students based on significant clinical exposure with patients [2]. Early clinical exposure has been tried and found better than traditional teaching for medical students [13] but we did not come across any Indian studies related to ECE in dental students. In our study, the recommendation for improving teaching learning of preclinical prosthodontics has been for early clinical exposure.

The results of our study are similar to those of Sukotjo C et al., and Aragon CE and Zibrowski EM where the majority of students felt that they did not gain enough from conventional didactic methods which tend to make skill acquisition difficult [14,15]. Elangovan S et al., suggested that engaging students in case discussions and seminars rather than lectures would aid in development of analytical skills [16]. Clinical seminars and active group discussions are generally preferred by students compared with traditional didactic lectures [9,17]. It is stated that most of the learning occurs outside the classroom, when information has been retrieved, revised, applied and mainly associated with other existing information or experiences [9].

Similar results were found to those of Rosenberg H et al., Lechner SK et al., and Fayaz A et al., where Computer-Aided Learning (CAL) was proven effective [18-20].

According to Goset J and Espinoza P, students considered educational videos (especially the demonstrative type) as a useful tool being complementary to the role of the teacher [21]. Nikzad S et al., Packer ME et al., and Kon H et al., concluded that students perceived clinical videos as not preferable to live demonstrations

but they were good supplementary materials for self-study due to revision convenience and effectiveness for clinical session preparation [22-24]. A study by Bennadi D et al., assessed the learning preferences of dental students and concluded that most students prefer multimodal type of learning [25].

Parolia A et al., have found that their students preferred early morning classes, because students are able to concentrate better at this time of the day [26]. Clinical demonstration after theory class was preferred to enable the students to correlate the procedure to the lecture.

Dentistry has used various types of simulation in preclinical education for some time [27]. Suvinen TI et al., found positive student response to teaching and learning in the simulator over a three-year evaluation period and preferred it over traditional preclinical laboratory instruction [28].

The strength of the study exists in the conduction of a qualitative study using FGDs involving the important stakeholders like students and faculty. Unlike use of closed-ended questionnaires, this modality helps us obtain and explore rich data which can be analysed in depth.

LIMITATION

The results of this study cannot be generalized. FGDs were conducted by the faculty members from the Department of Prosthodontics. There are chances of "acquiescence bias during the FGD. In order to overcome it, the students were put at ease, confidentiality was assured. They were told that there are no right or wrong answers to the queries being put across and each one can share their experience/opinion without fear. The group was reassured that contradictory opinions were welcome too.

Future Implications: The present study paves the way for further research on various issues related to training in preclinical prosthodontics of dental students. A yearly feedback of students and faculty of their perceptions of the curriculum is necessary to improve the system. The present study sheds light on the problems that students face during their undergraduate dental training. It brings to focus the need for changes in dental curriculum that might pave the way for enhanced learning experiences of undergraduate students. It also underscores the need for policy changes in dental education in developing nations like India.

CONCLUSION

The students and the faculty expressed felt need to supplement traditional teaching with early clinical exposure. Early clinical exposure might be a critical step in paving the way for enhanced learning among the undergraduate dental students. We recommend early clinical exposure and active teaching learning methods for teaching learning of preclinical prosthodontics.

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