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Original Article

Science of Dental Materials as Subject's Perception, Understanding, And Learning by BDS Students

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ABSTRACT

A better understanding of the Science of Dental materials as a subject depends upon theoretical knowledge and its clinical application. The multitude of teaching methodologies in the dental curriculum has been incorporated to determine learning outcomes. **Objective:** This study aimed to found the perception of BDS second-year students toward the subject of dental materials and evaluate the difficulty in learning and acquisition of concepts in this preclinical year. **Methods:** This cross sectional study was conducted among 130 students of BDS second year registered with University of Health Sciences, Lahore. Pre-designed questionnaire was used as research tool to determine the students' perceptions towards teaching methodologies and understanding of dental Materials. **Results:** Only 53.7% of the students reported DM as an interesting subject. Satisfaction with content was 90% and delivery and pace of the lectures were reported at 79.3%. Majority of the student (86.8%) reported lecture materials easy to understand. The most useful method for learning and understanding this subject is group discussion 76.15%, followed by PowerPoint presentation 73.85%. The favored mode of assessment was MCQs (80%) followed by practical lab 66.93%. To improve learning 82.3% of the students recommended group discussion and integrated teaching method (77.6%). **Conclusions:** The majority of students found Dental material a difficult subject. A better understanding of this subject needs improvement in already applied teaching methodologies with an integrated teaching mode

INTRODUCTION

The current trend in dental education depends upon effective learning with suitable assessment tools. Science of Dental materials taught as a pre-clinical subject in the BDS curriculum builds the foundation for upcoming practical learning [1,2]. This subject needs cognitive knowledge of dental materials used in dentistry along with their clinical applications [3]. The didactic lecture with no clinical sessions is ineffective in retaining the knowledge, interpretation and analytical ability of the dental student's in their early years, ultimately making this subject boring and dry [4]. This pre-clinical year in dental education requires a lot of suggestions to have a positive influence on learning outcomes. There should be a definitive mechanism to access and increase the ability of students to apply cognitive knowledge to clinical application. So need for time is to improve the clinical application of student skills rather than increasing syllabus content [5]. Feedback and assessment are the insurance and guarantee for the quality of medical and dental educations [6]. To determine effective learning and teaching strategies, lot of research has been going on, but actual need of time is to work on student's preferences strategies [7]. Giving and receiving feedback can effectively determine loophole in any educational system. One of the common practices is to use circulation of structured questionnaires among students to determine weakness

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and strengths of their teaching system [8]. Curriculum for dental material should incorporate student perception and understanding of their difficulty to absorb the concepts [9]. There should be a definite problem-solving mechanism to provide sufficient time for students to interact and integrate into learning different aspects of the subject. Timely executed feedback could enhance an effective teaching environment [10]. Assessment methods should ensure the achievement of learning competency with good clinical implications, innovative approaches, and critical thinking in our future dental practitioners [11]. Multiple teaching tools like interactive lectures, small and large group discussions, pre-clinical laboratory sessions, and blended learning have been adopted by various institutes to promote the effectiveness of teaching. Assessment methods like MCQs, SEQs, SAQs, OSCE, OSPE, and Viva's voice are the common assessment tools practiced in Pakistan [12]. Everybody has its own capacity of learning. To comprehends new information utilization of different theories like visual to auditory, kinesthetic to tactile should be opted [13]. To ensure equalize attention for different students, facilitators should have the ability to be aware of need of students and then modify teaching as per learner capacity [14,15]. This study aimed to find second-year BDS students' perception of the science of dental material as a subject and problems associated with learning and understanding concepts during their preclinical years.

METHODS

This Cross sectional study was conducted in colleges affiliated with University of Health Sciences, Lahore (UHS). The BDS second year students of regular batch were included in the study. Repeaters, detainees and debarred students from the university exam were excluded. WHO calculator was used for sample size calculation and the standard formula applied was; n= (Z) 2 P (1-P) / (d) 2. The estimated sample size was 150. Data was collected by predesigned structured questionnaire [16], which determined students' perception, effective learning methods, and understanding of subject concepts. The questionnaire was distributed among 150 participants. Of these, 130 students responded to the online survey form. The overall response rate was, therefore, 86.66%. Prior data collection electronic informed consents were taken from students and use of the information for the said objective was ensured. Data was entered and analyzed in SPSS version 25.0. Percentages were used to analyze the data. Percentages and frequencies were calculated and reported.

RESULT

Out of 130 participants, males were 32 (24.61%) and females were 98(75. 38%).Majority of the study sample was based on females, Figure 1.

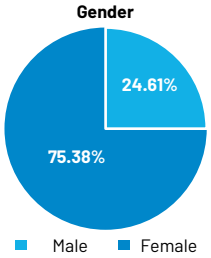

Figure 1: Gender wise data distribution

Group discussion were reported the most useful methods (76.15%) for learning and understanding dental material followed by PowerPoint presentations 73.85%, integrated teaching 64.6%. Black board teaching 67.7% and Seminars, quizzes and Presentation 76% were reported negatively by majority by students. MCQs were reported positively by majority of students (80%).Whereas SEQs, OSCE, VIVA, and Practical exam helpful in improving knowledge and application of skills were reported 46.15%, 53.1%, 33.1% and 66.93% respectively. Majority of students want to have integrated teaching method 101(77.6%). Introduction of case based learning was supported by 97(74.6%). Introduction of group discussions was supported by 107(82.3%)students.

		Yes	No	I don't know
Students' Perception about Dental Materials as a Subject	Are you interested in DM	74 (53.7%)	49 (38.3%)	7 (5.4%)
	Does combining DM instruction with clinical topics aid in conceptual understanding?	98(75.3%)	26 (20%)	6 (4.6%)
	Is DM more difficult than other dental clinical subjects?	96(73.8%)	29(22.3%)	5(3.8%)
Teaching Methodology: Content and Quality.	Are you happy with the lectures' subject matter?	117(90%)	11(8.4%)	2(1.5%)
	Do you think key themes were sufficiently emphasized in the lectures and practical classes?	112(86%)	16(12.5%)	2(1.5%)
	Are you satisfied with the explanations given during lectures and practical classes?	110(84.4%)	17(12.8%)	3(2.8%)
		Yes	**No**	**May be**
	Are you satisfied with the delivery and pace of the lectures?	103(79.3%)	19(14.5%)	8(6.2%)
		Yes	**No**	**I don't know**
	Are you encouraged to ask questions and give answers during the classes?	113(86.9%)	13(9.8%)	4(3.3%)
	Are the numbers of classes taken in DM adequate?	113(86.9%)	15(11.3%)	2(1.8%)
	Is duration of each of the class adequate?	123(94.7%)	5(3.6%)	2(1.7%)
Teaching Tools	Are the displayed lecture material easy to follow and satisfactory?	113(86.8%)	15(11.9%)	2(1.3%)

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	Are the images, flow charts and graphics used during the lectures are relevant to the topic?	109(83.7%)	17(13.2%)	4(3.1%)

Table 1: Perception of students about Dental Materials (DM)

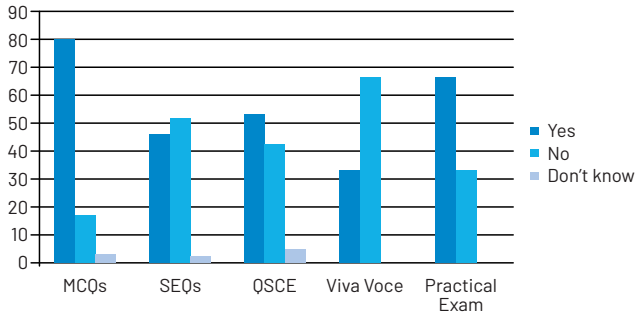

Figure 2: Methods useful for learning and understanding Dental Materials

Recommendations	Yes	No	May be
should we Introduce integrated teaching method	101(77.6%)	15(11.5%)	14(10.7%)
should we Introduce Case based learning	97(74.6%)	13(10%)	20(15.3%)
Introduce group discussions	107(82.3%)	16(12.3%)	7(5.3%)

Table 2: Recommendations to improve learning in Dental Materials as a subject

DISCUSSION

The current study found that 53.7% of participants considered the science of dental materials as an interesting subject. In another study, only 48.85% of the participants were found to consider dental materials as an interesting subject [17]. Whereas a study conducted at Islamabad Medical and Dental College reported that 71.4% of the students found this subject interesting [18]. For a better understanding of clinical applications in dentistry, the majority of the students 75.3% desired the integrated teaching of the subject. The participants were found with a high motivation of learning with integrated teaching of this subject. Integrated teaching enhances students' perception and understanding of dental materials subject better than the traditional methods [19,20]. Regarding the teaching and classroom environment, the students were satisfied with the lecture delivery (79%) and they were encouraged by the teacher to ask questions to clarify the difficult concepts. The results of our study are similar to that of Mussaret et al. who reported student's satisfaction to lectures and tutorials given by the faculty [21]. In another study majority of the participants showed satisfaction with competency of teachers [22]. Most of the respondents (83.7%) were satisfied with the images and charts shown by the teacher to enhance their learning abilities. Our results are similar to the of Suran and Kumar, they reported that the inclusion of innovative tools during didactic teaching improved the cognitive skills of the students (64%). Incorporating flowcharts and relevant pictures may facilitate the students to become life-long learners [23]. To achieves the learning outcomes, a good student-teacher relationship is mandatory [24]. The current study showed that 86.9% of students were satisfied with the appreciation and encouragement to ask the question and they received answers to their questions. Another study conducted in different dental colleges in Karachi concluded that 60.8% of the participants received proper attention from their teachers [25]. The current study revealed that 80% of the participant reported MCQs as the preferred mode of assessment followed by practical exams and OSCE, whereas VIVA (33.1%) was considered the least desirable tool. These results are in accordance with another study conducted in Islam Dental College, Sialkot which reported MCQs as a favorite and most preferred method whereas only 15% students favored viva voce for assessment [12]. BDS students affiliated with UHS were satisfied with the current educational strategies but they recommended integrated teaching 77.6%, case-based learning 74.6%, and group discussion 82.3%. As per our study, 2nd year BDS students of Foundation University College of Dentistry (FUCD) also strongly advocated and appreciated integrated teaching, case-based and group based learning methods [17]. To receive adequate knowledge of dental materials and better responses from the students, every didactic lecture should be associated with and accompanied by a clinical application session. The preclinical lab should provide an opportunity for learning the manipulation and handling of various materials used in clinical practice and should also provide the gateway to address the queries of students regarding storage and usage of the materials [25]. Out of 130 participants, males were 32 (24.61%) and females were 98(75. 38%). Majority of the study sample was based on females, Figure 1.

CONCLUSIONS

The students of second-year BDS were less interested in learning Dental Materials; they found difficulty in understanding the concepts due to conventional teaching with inadequate clinical exposure. Group discussion joined with integrated teaching methodologies should be the best option that can enhance the interest of students and learning outcomes.

Conflicts of Interest

The authors declare no conflict of interest.

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