ENHANCING ACTIVE LEARNING IN ORTHODONTICS THROUGH TEAM CASE BASED LEARNING – AN INDIAN DENTAL SCHOOL EXPERIENCE

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Abstract: Case-based learning (CBL) is a method that involves students in the investigation of real-world problems. According to this research, active learning in Orthodontics may be achieved through the utilisation of team-based case-based learning. Materials and Methods: After an orientation programme for teachers and students, the final year dentistry students were exposed to a Team Based CBL as a variation to the individual CBL. After the intervention, the average student scores in the solo CBL programme were compared to those in the team-based-case-based learning programme. A comparison of the effects of CBL with Team Based CBL on academic achievement was also done in this research. In addition, students' opinions on Team Based CBL were gathered. Results: A cross-sectional survey was undertaken to evaluate the effectiveness of Team Based CBL and found that students were able to improve their analytical, collaborative and communication abilities as a result. In comparison to the results acquired through individual-centric CBL, the test scores obtained through team-based CBL were much higher. Conclusion: Team-Based CBL sessions in orthodontics were found to promote more active learning, according to our findings. In addition to helping students acquire the necessary Orthodontic information, Team Based CBL sessions would also assist students improve their analytical and communication abilities.

Keywords: case based learning, orthodontics, dentistry, active learning

I. Introduction

Active learning environment is when students are more interactive, with increased participation of students in all aspects of the course in an academic environment that is conducive for an enquiry based learning rather than a passive reception of knowledge. Usually in such an environment, teachers are facilitators. Active learning embodies a student centric and self-directed learning from knowledge acquired and their own experiences¹,². In case-based learning,
students are involved in a hands-on investigation of real-world scenarios. The learning process is sparked by a case study. Using the instances, students are able to learn about events in an environment that encourages active participation. Cases are often produced to provide students a better understanding of a patient's past or present clinical circumstances. Additional information, such as X-rays and study models, are supplied. The Dental School in India, offers the Bachelor of Dental surgery (BDS) program which runs for five years as per the curriculum mandated by the Dental Council of India. The first three years of the curriculum are annual, whereas the final year is broken into two parts: Part I and Part II. Students in India's Final Year Part 1 programme are required to complete Orthodontic training. Content delivery in the bulk of our dental schools consists mostly on lectures and clinical chairside individual case discussions; the assessment techniques even while they probe analytical and reasoning skills, but fail to test communication and team oriented skills. What we are seeing in CBL is the experimentation of a wide range of different educational methodologies, including self-directed and issue based, task and co-operative, and peer helped and collaborative (PAL). But when done individually it fails to give the same result as it does not have peers in the learning process.

Traditional system-based teaching is used to teach the dental curriculum. Educationists are looking at ways to help adults learn more effectively because of the rapid expansion of knowledge. Accordingly, the Department of Orthodontics has modified its individual CBL programme and included TB-CBL sessions to the undergraduate orthodontic curriculum in order to promote active learning among students. This paper aims to compare performance of final year orthodontic students participating in the individual CBL and TB-CBL and so the main objectives were to

- To investigate student perceptions on TB- CBL
- To compare the academic performance of pupils during CBL and TB-CBL.

II. Methodology

The orthodontic clinical rotations were of approximately one month duration and comprised of 100 odd students divided into 5 groups of 20 students each. The content coverage in each rotation involved all major clinical and diagnostic exercises and Removable appliances. The CBL was allotted for the orthodontic case diagnosis exercise. Before the start of each cycle, the cases for CBL sessions were determined. Patients with mild to severe malocclusion were shown in a clinical setting at the patient's table. To make sure everything was crystal clear, each case was debriefed, clinically analysed, and disputed between peers. Every step of the treatment process was reviewed at detail in the departmental meetings that were held on a regular basis. Below is a sample case that was utilised in the exercise.

The study population consisted of 100 regular and 15 irregular students participating in the last year of dentistry undergraduate education in India. Case taking demonstrations were held two weeks prior to the start of CBL sessions as an introduction to CBL. An Orthodontic case study method was presented and students were informed about the importance of active learning in dental education. Case procedures and group dynamics were also addressed, and the necessity of adjusting to TB-CBL was emphasised throughout the session. Students from the normal batch and the irregular batch were split into four groups of five each for the purposes of this rotation. There was a specific set of orthodontic issues that each group was assigned to deal with. To begin CBL, students created case sheets that included background information as well as important facts. A member of the Orthodontics faculty was assigned to each of the five groups to
act as a facilitator during the presentations. Each student was invited to establish their own learning objectives. The facilitator's role was limited to keeping students focused on learning objectives and ensuring that the group remained cohesive. A sessional evaluation at the end of each rotation was used to assess TB-CBL session content. In order to better understand the students' views on TB-CBL, a cross-sectional survey was carried out utilising a questionnaire. Twenty questions were gathered from a focus group discussion to make up the questionnaire [Table 1]. Among the topics discussed were the connections between CBL and TB-CBL and their abilities to learn, analyse, and communicate. It also examined the effectiveness of CBL in improving knowledge of Orthodontic subject matter, test performance, and promoting cooperative learning in the classroom. YES/NO was the pattern of the replies. Participating students were made aware of the questionnaire's objective, and their responses were kept private. The students' TB-CBL average scores were compared to the students' individual CBL average scores in order to measure their academic achievement on the themes covered throughout individual CBL and TB-CBL exercises. We compared the academic performance of the students who had used TB-CBL (Group B) with their immediate senior cohort (Group A) that had only received individual CBL instruction. Both batches of students received the same instruction from the same members of the academic staff. Additionally, the evaluation process was standardised. Mean scores from each year were used to compare the performance of these groups in the Orthodontic diagnosis treatment plan exercise.

Comparing students' marks in the TB-CBL subject and individual CBL sessions was done through the use of a paired t-test. An independent samples t test was used to compare the students' average scores before and after the introduction of TB-CBL sessions. Windows SPSS 20 was used to conduct statistical analysis on the data collected in this study. The Institution's research and ethical committee gave its assent to the investigation. It was then published.

III. Results

Among the 114 students who participated in the survey [chart1], 61 (54%) opined that their group members showed responsibility and respect towards the tutorial process and learning skills. 48(42.5%) felt that their group members were able to process the information from the tutorial at the clinical setting. 43(38.4%) felt their team mates were able to achieve the desired learning requirements after the chair side case based learning. As shown in (chart 2), 52(46%) felt that their teammates participated well in the critical analysis of the case history, clinical examination and diagnosis. 55(48.7%) rated the interaction and collaboration among group members as very good. As shown in [Chart 3], 39(34.8%) opined that group based CBL has helped change their attitude and 38(33.9%) felt that group based CBL has helped change their learning process. [Chart 4] shows that, 27(24.1%) rated their analytical skills in CBL as good and 29(25.9%) rated themselves as good in communication skills post CBL. Students who participated in TB-CBL sessions had considerably higher average marks than those who participated in CBL sessions (P value = 0.0001), according to a comparison of the two methods.

IV. Discussion

Critical thinking, a passion for learning, and the ability to effectively communicate with others are just a few of the abilities dental students need to succeed in their field. Even though it is well accepted that problem-solving abilities are vital in the practise of medicine and dentistry, there is widespread scepticism to implement educational initiatives in this area in the dental setting. In
the Indian context, this is very relevant. Most of the activities that promote student-centered learning have been tested on a trial and error basis. Our kids, for the most part, prefer scheduled learning activities and standardised testing. A pre-existing curriculum framework was disrupted when we introduced TB-CBL into our classrooms.

Students' attitude to learning is impacted by elements such as curriculum, teacher qualities, departmental features, and assessment systems. 6. For greater learning to take place, it must be focused on a real-world issue, according to literary sources. During CBL, the focus of student learning must be shifted away from the facts and toward the use of scientific knowledge to frame questions and to answer them. Students learn to discover and handle information, produce logical replies, and justify their conclusions along the process. The TB-CBL programme also helps students develop their communication and teamwork skills by encouraging them to connect with one another more often. Dental students might benefit from this method by sharpening their analytical and decision-making abilities. It would also help them learn faster. In a peer group, it is clear that these characteristics would encourage active learning. Learners benefit from TB-CBL classes in addition to gaining knowledge of the subject matter at hand. Collaborative learning occurs when people are mutually reliant, share responsibilities, and work together to reach a common objective. Learners are required to communicate with one another since doing so has a beneficial impact on their progress. It is encouraging to see that the participants found the questionnaire to be a useful tool for assessing their attitudes toward cooperative learning. Teaching in TB-CBL is akin to facilitating a conversation between two people. Training for faculty members on how to use instructional methods that encourage higher order thinking should be undertaken. Deviating from one's routine might lead to faculty apprehensions. The faculty, on the other hand, viewed the curricular shift favourably in our investigation.

V. Conclusion

In the TB-CBL technique, students work together to solve issues utilising an analytic approach in a learner-centered way. Traditional case-based learning methods may be replaced with TB-CBL to encourage active learning among dentistry students, according to our study. We will use the information obtained to design tactics that encourage students to take a more self-directed approach to learning that is more inquiry-based, collaborative, and student-centered.

References