ORIGINAL ARTICLE

Comparative Evaluation of Peer Assisted Learning and Teacher Assisted Learning Using Small Group Discussion

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ABSTRACT

Objective: To compare Peer assisted learning (PAL) and teacher assisted learning (TAL) in small group format comprising undergraduate dental students.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: This study was conducted in Islamic International Dental College, Islamabad, from January 2019 to June 2019.

Material and Methods: Four batches of 2nd year BDS comprising of 75 students were randomly divided into two groups. Dental Material topic was selected for an interactive two-hour session, where one group was taught by teacher and other through peer. Session was followed immediately by a short test comprising of multiple-choice questions of single correct answer to assess students' performance. Moreover, a Likert scale-based questionnaire was used to identify the perception of students about these sessions. Comparison of MCQs test scores among the two groups was done using independent sample t test while Mann- Whitney test was applied for the Likert based questionnaire. For data analysis SPSS version 23 was used.

Results: Test results (marks) of TAL had a mean value of 13.72±1.55 and PAL as 12.34±2.3 with a significant p value of 0.01. Analysis of Likert scale-based data revealed that in PAL session competency level, grasping of concepts, student teacher interaction and motivation were significant factors, whereas level of interest and difficulty, time management, student participation and clinical correlation of the concerned topic were.

Conclusion: Teacher assisted learning was found to be better as compared to Peer assisted learning in our set up in terms of test scores and students' perception. Nonetheless, PAL can be utilized as an important supplement in online synchronous teaching especially during current pandemic situation.

Key Words: *Peer Assisted Learning (PAL), Small group discussion (SGD), Students' feedback, Students Scores, Teacher Assisted Learning (TAL).*

Introduction

Peer assisted learning (PAL) has gained significant momentum over recent years as a novel pedagogical learning methodology that is based on exchange of knowledge among individuals who are at similar social grouping and are not professional teachers.[1,2] Peer assisted study sessions is derived from the model of Supplemental Instruction, can be termed as peer-assisted learning that encounters a type of academic sustenance interference widespread in higher education as stated by Dr. Deanne Martin in 1973.[3] This concept of Peer Instruction was then incorporated by Eric Mazur at Harvard University in the 1990s in an attempt to improve his student's conceptual understanding with promising results[4]. Educators from a variety of countries have later used this method in diverse context to engage hundreds of thousands of students in active learning.[5,6] Over the past decade PAL has been a topic of interest for the researchers in the field of medical education which undergoes continuous reforms in teaching learning methodologies according to learning outcome of the students. With the incorporation of PAL in various developed countries as an adjuvant learning strategy, an increase in the participation of students in the learning process was observed along with enhanced critical thinking capability[7]. Majority of these researches used PAL at undergraduate level for skill based learning involving psychomotor skills.[7,8] Commonly adopted teaching methodologies are

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interactive lectures, small group discussions (SGDs), problem based learning (PBL) and practical demonstration in basic medical/dental Sciences.[9] In most of the developing medical universities a hybrid educational system is on its way with increasing attempts to shift from the traditional rote learning to more active student centered conceptual system.[10]

The literature review has shown that discussion with each other enhances cognitive development, motivation and confidence among students and build a deeper understanding of what they are learning.[11,12] This methodology is based on the theories of social constructivism and cognitive congruence where theorists suggest that learning is not a solitary struggle.[5] The general consensus woven is that compared to traditional lecture-based pedagogy, Peer Instruction has led to increased academic self-efficacy as in large-sample studies of PAL reporting lower failure rates even in tough courses.[13] In comparison to the traditional lecture method, PAL is rich with opportunities for feedback from student-to-student, teacher-to-student, and student-to-teacher enriching collaborative learning.[14] Recent local studies in this regard comparing effectiveness of peer assisted and facilitator assisted learning have mainly focused on clinical/practical subjects,[15,16] so to further explore the acceptance and perceived usefulness of PAL in basic dental sciences, we compared it with teacher assisted learning in a small group setting.

Materials and Methods

This comparative cross-sectional study was conducted at Islamic International Dental College, Islamabad from January 2019 to June 2019. Written approval for research study was obtained from Islamic International Medical College of Riphah International University under Reference number: Riphah/IIMC/ERC/19/307. Informed consent of learners was obtained for participation in the study. Non-probability Convenience sampling technique was used for this grouping. Second year students attending regular classes of Dental Materials were included in the study while qualified doctors acting as tutors and dental students of 1st yr, 3rd yr and 4th yr were not included in the study. Each class has four batches (i.e., A, B, C and D comprising of 15-19 students in each) with a total of 75 students. Two of the batches (C &D) were selected for PAL and the other two batches (A & B) assigned for TAL.

A two-hour session of SGD, which was part of their regular timetable was selected for this purpose. Students were informed beforehand about the trial and four of the students (two for each batch) were selected on voluntary basis as peer tutors. One week prior to the activity the topic was taught to these four selected peer tutors. Students in PAL group (C & D) were taught in two different rooms by these peer tutors under the supervision of teacher and for the students of TAL (A & B) SGD was arranged for the same topic in traditional way, in two separate rooms where subject specialists conducted the discussion. Subject selected for this trial was Dental Materials of Basic Dental Sciences. Assistant Professor of the DM chose the topic as well as designed the assessment, comprising of 15 MCQs of one correct option category including C1 (recall) and C2 (comprehension) level questions. In both the groups test was conducted after the discussion along with a Likert Scale based feedback questionnaire[10]. Three subject specialists vetted these MCQs to validate their construct. Students perceptions about peer assisted learning were congregated by using a questionnaire with a Likert scale that was self-constructed based on relevant literature and was validated by three medical educationist . Test Marks (i.e., quantitative data) were analyzed using independent sample t-test. Likert Scale based feedback responses were statistically analyzed using Mann-Whitney U test through SPSS 23.

Results

The class of 2nd year BDS comprised of 75 students and among them 69 (92%) participated in the study. A total of 37 out of 69 (53%) students were part of the Teacher Assisted Learning (TAL) group, while 32 (47%) students were part of PAL group.

Data analysis shown in Table I depicted that test results (obtained marks) of students in teacher assisted learning group had Mean±S.D as 13.72±1.55 while test scores of students in PAL group had Mean±S.D as 12.34±2.34 with the $p<0.05$ which was significant.

Question category-based data analysis shown in Table II depicted that in C1 level questions, TAL group had 20 correct responses out of 37 total responses (56%) as compared to PAL group who had 14 correct responses out of 32 (44%) and it was statistically

Table I: Comparison of Test Marks Between TAL & PAL

Groups	Test Marks (Mean±S.D)	Significance (p value)
TAL (A+B)	13.72±1.55	0.01 = <0.05
PAL (C+D)	12.34±2.34	

significant (p<0.05). Statistical analysis for C2 category showed that 37 participants of TAL attained 21 correct responses (59%) in comparison with PAL, where out of 32 only 13 responses were correct (41%) and it was not significant as p>0.05.

Table II: Comparison of Correct Responses Based on Question Category

Question Category	Group	Mean	Std. Deviation	Significance (p value)
C1	TAL	7.3784	.92350	0.001
	PAL	6.2813	1.63104	
C2	TAL	6.4054	.76229	0.158
	PAL	6.1250	.87067	

Likert-scale based feedback questionnaire showed that there was a significant difference between TAL and PAL in terms of teacher competency (p =0.002) , student teacher interaction (p=0.023), addressing queries (p =0.001) and motivation (p =0.034) while this was not significant (p>0.05) as far as lesson enjoy ability (p =0.054), clinical correlation (p =0.065), time adequacy (p =0.406) and participation (p =0.814) was concerned.

The frequency distributions of both the groups' responses as well as questions have been shown in the Fig.1 and Fig. 2.

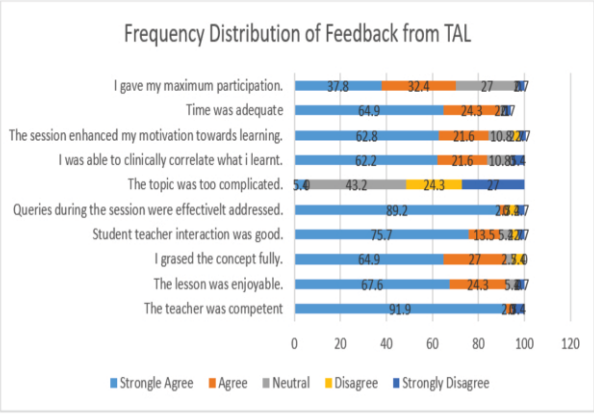

Fig. 1: Frequency Distribution of Feedback from Teacher Assisted Learning Group

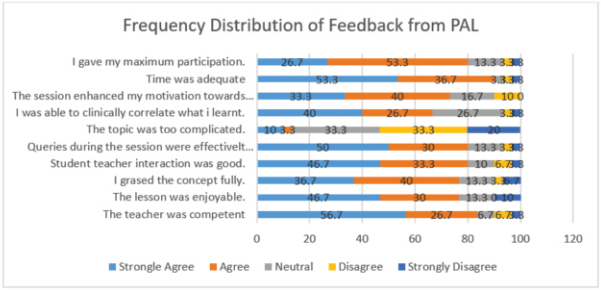

Fig. 2: Frequency Distribution of Feedback from Peer Assisted Learning Group

Discussion

PAL is embraced by medical educationalists for many years in the developed world with growing global acceptance all around[17]. Despite many advantages, we still need to ascertain how to maximize its suitability in our context and cultural background. Present study results show a significant difference in favor of TAL as compared to PAL when comparing overall student assessment scores. These findings may be due to the fact that teaching by experienced faculty or teachers to instruct their students enhance the comprehension and success among students. Our findings are in accordance with a study conducted at Dental Institute of Karachi with final year undergraduate students on the subject of orthodontics. In this study author narrates that comparing overall mean change in test scores of students, significantly better results were revealed by Expert assisted learning as compared to PAL.[19] Similarly, another local study is conducted in Foundation University Islamabad on 1st year medical students comparing PAL in small groups with all students as an adjunct to traditional large group lectures. Scores of PAL sessions were not better than EAL sessions in this study.[15] However student's views regarding these PAL sessions were not included in these studies. Better scores obtained by students of TAL group in our study may be elucidated due to the fact of acquaintance in our students with traditional faculty lead tutorials, where external encouragement act as a guiding factor in provoking critical thinking among students as compared to self-motivation which is integral part of peer tutoring.

Results of present study are in line with a study conducted by Hodgson and Bearman, who narrates that students' performance after teaching from subject specialist was better as compared to peer-

learning.[22] In contrast, during this study MCQS categorization based on C1&C2 level of cognition, C2 category result (depicting lower order thinking) but a step ahead than simple recall (C1) exposed no significant difference in the PAL and TAL test scores. These findings are in favor of a study conducted on dental students in the University of Sharjah which evaluated the role of PAL in team-based learning. A meta-analysis issued by Rees et al revealed that there was no difference in students taught by peers with those taught by faculty.[16] Results obtained from students survey and focus groups suggested that it was a valuable strategy for enhancing students' learning.[18] This encourages to initiate attempts for incorporating PAL as a supplemental teaching strategy. Regarding student's feedback they were more comfortable with the facilitator rather than their peer tutor. So far in most of the international studies PAL has a greater or equal impact on student learning. This could partly be explained by the fact that students experience a college culture which is still quite formal, and teacher centered. Further PAL here is still in its developmental stages and rather new for students.[13] Keeping in mind the racial difference it was observed in an American study that Asian students preferred listener role as compared to white Americans and were less comfortable in class discussions (Eddy et al, 2015) She highlighted that in jumping towards active learning where classrooms are transformed from facilitator centered to student centered we need to focus on students dynamics to understand their experiences and the various barriers to participate equally in classroom discussion.[20] Findings of present research based on Likert scale analysis including competency of teachers, addressing queries, student teacher interaction and motivation level during class are supported by a study conducted at Islamic International Medical College by Afsheen Zafar which accentuates the role of an expert or subject specialist in academic set up. She adopted an innovative approach of PAL in large class format highlighting that teacher's feedback and background collaborative learning still remained the most valued aspect of this format.[21]

We cannot deny the social interactive theory which emphasizes the role of social interaction among students of same age group in educational set up. Hence our study result favors the finding of Menezes et al who also found in his study that interest is expressed in both styles of knowledge acquisition (PAL versus traditional) where 57% students recorded no difference in learning in both styles of learning and 80 % notified no difference in teaching.[8] Nonetheless, there is more research needed to fully measure the potential benefits of PAL in our local set up especially in today's era of blended learning. We need to find ways of utilizing this PAL in synchronous teaching which may help to alleviate faculty load in addition to enriching students learning.

Study limitations

This study could be improved if the sample size, total no. of PAL sessions and more assessment results would be added to generate a valued and effective response.

Future Work

More extensive research and training on the process of PAL for acceptability and better results.

Conclusion

Teacher assisted learning is proved to be more inspiring approach for student learning as compared to Peer assisted learning in our set up based on test scores and students' perception. Nevertheless, PAL can be applied as an imperative support and valuable learning tool in upraising student's performance especially as a supplement in online synchronous mode of teaching in medical and dental institutes

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.