

ORIGINAL ARTICLE

COMPARISON OF ACADEMIC PERFORMANCE IN PEER ASSISTED AND EXPERT-ASSISTED LEARNING THROUGH TEST SCORES

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Background: Peer Assisted Learning is being increasingly used in medical education as it is a well-established approach in learning. The objective of this study was to compare the effectiveness of Peer Assisted Learning with Expert-Assisted Learning in terms of assessment scores in first year MBBS students during their cardiovascular module. **Methods:** A cross-over study was carried out on 139 first year medical students at Foundation University Islamabad after ethical approval. The entire class constituted the sampling frame. Students were given an introductory lecture on Peer Assisted Learning methodology at the beginning of study. Three Peer Assisted Learning sessions were conducted in small groups with all students as an adjunct to traditional large group lectures, and in the fourth session all students went through pre-informed assessment comprising of short answer questions and multiple choice questions. In the next three weeks, same students went through conventional Expert-Assisted Learning sessions, followed by same type of assessment with different topics of the same module. The scores were compared. Mann-Whitney U test was used as a test of significance. **Results:** Test scores, represented as median (IQR), of the Peer-Assisted Learning and Expert-Assisted Learning sessions were 6.50 (5.00–7.50) and 7.00 (6.00–7.50) respectively ($p=0.46$). Pass percentages in these sessions were 82.9% ($n=102$) and 87.5% ($n=105$) respectively, with odds ratio of 0.69 and 95% confidence interval of 0.34 to 1.42. **Conclusion:** Academic performance of Peer-Assisted Learning sessions in terms of test scores was not better than Expert-Assisted Learning sessions.

Keywords: Peer-assisted learning, Expert-Assisted Learning, academic performance, test scores

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INTRODUCTION

Teaching someone is an effective way of learning. This is the fundamental principle on which the concept of peer tutoring is based, in which students normally within the same class or cohort and at a comparable level of academic development, learn with and from one another.¹

The model from which Peer Assisted Learning (PAL) and a range of similar other schemes are derived was the North American scheme termed Supplemental Instruction which was developed and introduced in medical education by Dr. Deanna Martin in 1973 at the University of Missouri, Kansas City.²

With traditional model of classroom teaching being increasingly considered obsolete, the need to introduce innovative and effective learning strategies like PAL in the medical curriculum is acutely felt.

The benefits of peer learning are theorized to include cognitive congruence between the tutor and learners leading to increased understanding of course material³, enhanced motivation, confidence and sense of responsibility⁴⁻⁶, improved group dynamics and development of teamwork and communication skills.⁷ Peer assisted learning is an efficient and effective way of preparing medical students for their future role as life-long self-motivated learners, educators and team leaders.⁸

At the same time, student tutors are obviously less knowledgeable about the subject matter than staff

tutors and would, therefore, be less able to help other students.⁹ Despite this shortcoming, which manifested in lesser score as compared to the expert led learning sessions in written assessments in several studies,⁹ the subjective benefit of the learners with strengthening of the soft skills makes it a widely accepted educational strategy.¹⁰

Furthermore, while initial studies reported that PAL was inferior to faculty assisted learning where academic scores were compared, more recent studies suggest that in some situations learning outcomes achieved may be comparable.⁵

A number of comparative studies have indicated that peer led tutorial groups are as effective as faculty led tutorial groups for both same level and near level peers.^{9,11,12} The main limitations of PAL include reservations about quality of knowledge imparted and methodology.^{7,13-15} In some cases, there were issues related to group dynamics and resources (infrastructure, faculty staff) required to arrange and supervise PAL programs.¹⁴

Reports about PAL inclusion in the curriculum of medical schools in developed and developing countries have been published widely.¹⁶⁻¹⁸ Despite the widespread recognition of its value to students, there have been limited attempts to integrate it into medical education institutes in Pakistan. Only a few references are available in Pakistani context.^{8,19-22}

Keeping in view the widely accepted effectiveness of PAL methodology, it was introduced as a part of our departmental teaching strategies. It was also deemed important to assess its impact upon students' understanding of the subject and academic performance and hence, this study was conducted to compare the learning outcomes of peer teaching with that of expert lead tutorials in terms of academic scores.

METHODOLOGY

This cross-over study was conducted at department of physiology of Foundation University Islamabad, in the students of 1st Year MBBS employing small group interactive sessions. Ethical approval for the study was obtained from Ethical Review Board of Foundation University Islamabad. The entire 1st year MBBS class of 139 students constituted the sampling frame, comprising of 89 (64%) females and 50 (36%) males, and mean age of 19±2 years, and assessment results of the whole class were used for data analysis. Duration of study was seven weeks of cardiovascular module teaching, which ran from 2nd April till 18th May 2018.

The PAL model chosen was *same level or same class* peer assisted learning, with *equal status* of participants.¹ In this model, all participants acted as both learners and teachers at the same time. The learners were given an introductory lecture on PAL regarding its structure, aims, benefits, guidance on selecting roles within the group and on methods for running the sessions. An emphasis was placed on cooperation, team work, active problem solving and making session plans. Participants attended the PAL session in 5 small groups of 25–30 students each. The sessions were supervised by a facilitator from the faculty, and he/she divided the participants into smaller sub-groups of 5–6 students each. The subgroups were given topics from the ongoing module on physiology of cardiovascular system and they prepared oral presentations to be delivered interactively to the rest of the group. The allocated time for this activity was one hour. After going through three PAL sessions, students went through assessment for the knowledge gain in the fourth week. A 30-minutes written test comprising of short answer questions (SAQs) and multiple choice questions (MCQs) was given to assess the assimilated knowledge of the group regarding a pre-announced topic.

During the next three weeks, Expert-Assisted Learning (EAL) sessions in the form of conventional tutorials were arranged for the same class while the same module was still running. Students were required to come prepared with pre-announced topics in the EAL sessions. Each EAL session, in groups of 25–30 (same students), was conducted by a faculty member. Session started with opening of topic and discussion concerning students' questions, clarification of any conceptual difficulty etc. At the end of three EAL sessions, these

students underwent written assessment and received a mark on a 10-point scale ranging from 1 to 10; 5 being the pass score. Both PAL and EAL assessments comprised of SAQs and MCQs, prepared and checked by same faculty member who was not aware of the applied learning methodology. The difficulty level of questions remained the same in both assessments to ensure uniformity.

Quantitative data was analyzed on SPSS-24. Levene's test indicated that the variances were equal across the two groups (i.e., $p=0.50$). The Shapiro-Wilk normality test was carried out, and p -value being <0.01 , normalcy of data distribution was rejected and non-parametric Mann-Whitney U test was applied to assess the difference in the performance in the written tests in both the PAL and EAL sessions by calculating and comparing medians and the interquartile range. The frequency and percentages of pass/fail in PAL and EAL assessments were compared and odds ratio calculated by selecting risk in cross tabs in descriptive statistics, and $p \leq 0.05$ was considered the cut-off point for statistical significance.

RESULTS

A total of 139 students participated in the study. Out of these, 19 (13.6%) did not appear in EAL assessment, and 16 (11.5%) didn't appear in PAL assessment.

The difference between the test scores of PAL and EAL groups was found to be insignificant ($p=0.46$). These results are summarized in Table-1.

The comparison of the frequency and percentage of pass/fail results along with odds ratio is given in Table-2.

Table-1: Comparison of the test scores of the EAL and PAL groups

Group	Median (IQR)	p
PAL	6.50 (5.00–7.50)	0.46
EAL	7.00 (6.00–7.50)	

Table-2: Comparison of students who passed and failed in the EAL and PAL assessments

Group	Status		p	Odds ratio (95% CI)
	Pass	Fail		
PAL	102 (82.9%)	21 (17.1%)	0.34	0.69 (0.34–1.42)
EAL	105 (87.5%)	15 (12.5%)		

DISCUSSION

The median scores of EAL sessions assessment were better than PAL sessions, but did not reach statistical significance ($p=0.46$). The interquartile range (range of the middle 50% of the data) for PAL sessions indicated that 50% students scored between 5 and 7.5, while 50% of students in EAL groups scored between 6 and 7.5. Despite insignificant median value, the IQ range of the students' scores reflects better performance in EAL groups compared to PAL groups. The pass frequency

and percentage was also better in the EAL group. Furthermore, the odds ratio indicated lesser odds for passing in the PAL group, with 95% confidence interval indicating insignificant association. Hence, performance of students in PAL groups was not found to be better than the students in EAL groups.

Better performance shown by students in EAL groups in our study may be explained by the familiarity of our students with the traditional faculty lead tutorials. In traditional set-up, external exhortation plays a more vigorous part in encouraging students to study and explore, rather than self-motivation, which is required by newer method of peer tutoring. Another explanation for our results may be the format of small group-interactive sessions like PAL and EAL, in which tutors facilitate their students' learning by asking stimulating questions and encouraging critical thinking. It is reasonable to expect that faculty being more knowledgeable would be better able to guide their students and this would result in better understanding and better exam performance. This factor lead to more favourable results in faculty-taught groups in our study.

This explanation is verified by a number of earlier studies, which indicate that students score better in traditional faculty lead teaching, with lesser score in written assessments in PAL sessions. A study published by Schmidt *et al* stated that students guided by a staff tutor achieved better results and they were also rated as more knowledgeable by the students.⁹ In this study, conducted on 1,800 students of health sciences courses at the University of Limburg, the Netherlands, the authors compared the effects of staff tutoring versus peer tutoring on student learning in the context of a problem-based curriculum. The academic performance was marked on a 1 to 10 scale, with the difference between two groups small but statistically significant (6.79 vs 6.64; $p < 0.002$).

Supporting this view is a study published in 2012 by Hodgson and Bearman, in which PAL was introduced to second year students in an undergraduate course and a questionnaire and focus group were used to evaluate the student experience of the PAL program. Learning from a university lecturer improved students' understanding as compared to peer-learning in 81% of students. All students stated they would prefer to learn the subject from a lecturer than their peers.¹³

There are published accounts of both teaching-learning strategies being of equal value. In 2013, Iram Manzoor published a study conducted in 4th year MBBS students of Fatima Memorial Hospital, College of Medicine and Dentistry, Lahore, which compared the effectiveness of PAL and EAL in terms of academic scores.¹⁹ The author concluded that PAL was of equivalent efficacy as EAL in terms of students' scores.

A meta-analysis published in 2016 by Rees *et al* concluded that students taught by peers do not have

significant difference in knowledge or skills outcomes as compared to those taught by faculty. In this study, the pooled effect favoured peer-teaching in both the knowledge and skills domain, but did not reach significance. At the same time, the authors advocated that in view of the reported acceptability to the peers they teach, the educational benefit to the peer tutors, and the necessity for undergraduate students to develop competency in their teaching, confidence and communication skills, peer teaching should be continued at least as an adjunct to lecture-based teaching, while adopting mechanisms to ensure its quality.¹⁰

Test scores of PAL groups were not better than EAL groups in our study. However, PAL is an established student-centred learning strategy and it may play a useful role in undergraduate medical education as an adjunct to faculty-taught classroom lectures and tutorials, which will ensure the active participation of learners while retaining expert teaching. Continuation of PAL sessions will not only help improve generic skills of our students but also train our future physicians to carry out their role as community teachers.

CONCLUSION

In our study, assessment scores achieved by students in PAL sessions were not better than the scores in EAL sessions. Further studies with regular PAL sessions in multiple modules throughout the year making students better accustomed to PAL strategy may be likely to yield a more definitive comparison.

LIMITATIONS OF STUDY

In order to compare the efficacy of both learning strategies, ideally, the study should have been conducted in two matched groups without adjuvant faculty delivered lectures. However, keeping in view the ethical and administrative obligations, it was not deemed practical to wholly shift the learning responsibility to our students while using an entirely new learning method. Furthermore, a focus group analysis would have helped discern the students' perception towards this method.

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