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Does Participation in Peer Assisted Learning Programs as a Tutor Lead to an Increase in Teaching Skills Domains? A Quasi-Experimental Study

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ABSTRACT

Objective: To evaluate the effectiveness of a training program for tutors in peer-assisted learning using objective structured teaching evaluation scores.

Study Design: Quasi-experimental study.

Place and Duration of Study: Combined Military Hospital Lahore Medical College and Institute of Dentistry, Lahore Pakistan, from Jul 2022 to Oct 2022.

Methodology: Peer-assisted learning was introduced for fourth-year MBBS students rotated in the Ear, Nose, and Throat Department. Twenty-two students, demonstrating strong academic performance and a willingness to teach, were chosen as peer-assisted learning tutors. A series of workshops was conducted to equip these tutors with effective peer-assisted teaching and learning strategies. To gauge the influence of the training on the tutors' teaching abilities, data were collected using 12 stationed Objective Structured Teaching Evaluation scores, both pre-and post-workshop series.

Results: Of the 22 students, 16(72.73%) were females, while 6(27.27%) were males. Their ages ranged from 21 - 24 years, with a mean age of 22.45±0.73 years. The study revealed a significant improvement in total Objective Structured Teaching Evaluation raw scores for Peer-assisted learning tutors. The Pre-Objective Structured Teaching Evaluation median score was 35(IQR: 9), exhibiting a substantial increase to 61(IQR: 5.75) Post-Objective Structured Teaching Evaluation, with a statistically significant change (p<0.001).

Conclusion: The research results indicate that training Peer-Assisted Learning Tutors in teaching and learning principles significantly enhanced their teaching skills.

Keywords: Medical Education, Objective Structured Teaching Evaluation, Peer-Assisted Learning, Pakistan, Teaching and Learning.

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INTRODUCTION

Effective teaching skills play a vital role in the field of medical education. These skills facilitate the transfer of complex medical knowledge and improve clinical competence and critical thinking abilities among future healthcare professionals.[1] Additionally, skilled educators serve as mentors and role models for students, promoting lifelong learning and instilling important values such as patient-centered care, professionalism, ethics, collaboration, and adaptability. Ultimately, through effective teaching in medical education, we can ensure high-quality healthcare by nurturing competent individuals equipped with the necessary competencies and values to provide the best patient care.[2] The need for formal guidance on teaching skills for medical graduates is a noteworthy concern within medical education. This gap has implications for both medical educators and the quality of healthcare. A recent article by Marjo in Germany[3] highlighted the significance of preparing medical professionals for effective teaching roles. Effective teaching within the medical domain is instrumental in disseminating medical knowledge and shaping the future healthcare workforce.

One key aspect of effective teaching in medicine is peer-assisted learning (PAL).[4] Peer-assisted learning is a widely used approach in medical education that involves a collaborative educational approach where students within the same program support each other's learning. PAL involves individuals within the same social cohort who actively contribute to each other's academic progress, even though they do not have formal teaching roles.[5]

PAL has gained recognition as an impactful educational strategy with potential benefits for tutors and tutees. Involvement in PAL schemes as medical undergraduates is a platform for preparing junior

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doctors to become the next generation of leaders in medical education.[6] Experience gained as an undergraduate PAL tutor can be carried forward into the foundation years following graduation. PAL is said to provide leadership, coaching, and learning skills training, enhance confidence and intrinsic motivation, and may also promote an interest in academic careers. However, there is still a need to comprehensively examine the effectiveness of PAL in improving teaching skills among PAL tutors.[7] A local study by Khan *et al*.,[8] demonstrates the effectiveness of peer-assisted learning and Sonia *et al*. concluded that Implementing a peer mentorship program for junior residents is crucial to promoting academic progress, social assimilation, emotional well-being, and personal growth.[9,10] However, it failed to thoroughly investigate its influence on the teaching competencies of individuals undertaking tutoring roles in Pakistan. This research aims to bridge this knowledge gap by conducting a meticulous investigation into the effects of PAL participation on the teaching skill domains of medical professionals, contributing valuable insights to enhance medical education in our country.

This study aims to assess the impact of peer-assisted learning programs on the development of teaching skills among PAL tutors. Specifically, Objective Structured Teaching Evaluations (OSTE) were utilized as a means of measurement. The study determined whether participation in PAL programs positively influences the teaching skills domains of PAL tutors.

METHODOLOGY

The quasi-experimental study was carried out from July to October 2022. The study was granted Ethical approval by Combined Military Hospital (CMH) Lahore Medical College and Institute of Dentistry (713/ERC/CMH/LMC). The WHO sample size calculator calculated the sample size.

$$n = \frac{\sigma^2 \left(Z\left(1 - \frac{\alpha}{2}\right) + Z(1 - \beta) \right)^2}{(\mu o - \mu 1)^2}$$

The power of the test was set at 1-β=80%, and the significance level was α=5%, μ_0 was 44.12, while μ_1 was 51.65, with a standard deviation (σ) of 18.79.[9] Although the calculated sample size was n=49, only 22 participants were included in the study due to the inclusion criteria, which specified high achievers who consented to participate.

Inclusion Criteria: Students with high academic scores, students who volunteered to be PAL tutors, who submitted the consent forms, who attended the PAL tutoring workshop sessions, and who took the pre- and post-workshop OSTE, were included.

Exclusion criteria: Students with low academic scores, students who have missed PAL tutoring workshops, and pre-post-workshop OSTEs, were excluded.

Non-probability convenience sampling was employed in this study, wherein fourth-year medical students were recruited and subsequently categorized according to their academic performance in the 2nd module exam of ENT. Specifically, the top 26 students, characterized by high academic scores, were invited to participate as Peer Assisted Learning tutors.[10,11] The invitation to two students was pending. In total, 24 students volunteered to partake in the study. The selection process meticulously adhered to predefined inclusion and exclusion criteria. Notably, two participants were ineligible due to their absence from the PAL tutoring workshops and were excluded from the study (Figure).

Figure: Study Participant and Data Collection Flow Diagram

OSTE consisting of 12 stations with a maximum score of 15 was conducted to assess the teaching skills of the selected PAL tutors. This evaluation focused on domains such as learning abilities, formative feedback, adult learning-attribution, adult learning-self-directed learning, supervisory skills, teaching methods,

motivation, group dynamics, types of learning, educational theories, and conflict management.

PAL tutors underwent a comprehensive physical and online blended training program conducted over Zoom over 01 month. Three medical education professionals led six workshops designed to enhance their teaching skills. Two workshops were conducted during additional ENT lectures, and the rest of the 04 workshops were conducted on Zoom after college hours. Topics of workshops were "Time management", "Psychology behind teaching and learning" (Motivation, self-efficacy, mindset, goal orientation, and attribution), "Curriculum" (definition, components, frameworks for development, concept of integrated curriculum, and SPICES model). Applying Educational Theory in Practice (Educational Theories, Adult Learning, Learning Cycle, Educational Environment, Motivation, Learning Styles, And Information Processing), Collaborative Learning (Peer Assisted Learning Tutoring, Mentoring, And Assessment), Group Dynamics, Conflict Management, Teaching Principles, Supervisory Skills, Assessment, and Feedback. After completing the workshops, a post-workshop OSTE was conducted to evaluate the PAL tutors' teaching skills across different domains.

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 26.00. The mean with standard deviation (Mean±SD) was computed for qualitative variables, while categorical variables were analyzed for frequency and percentage distributions. Median and interquartile ranges were calculated, and the Wilcoxon signed-rank test was utilized for intra-group comparisons. The significance level of $p \leq 0.05$ was used to determine statistical significance.

RESULTS

Twenty-two students from the 4th year MBBS program were chosen to serve as PAL tutors. The majority of the students were females being 16(72.70%) while males were 6(27.27%). The mean age of the participants was 22.45±0.73, ranging from 21 - 24 years.

Before the workshops, the OSTE was conducted to gather pre-assessment scores and marks across 12 stations. However, station number 2, which focused on "Adult Learning Attribution," was excluded from the analysis because the students could not attempt it before and after the intervention. Table summarizes the training workshops' impact on PAL tutors' teaching skills for pre- and post-OSTE assessments across various stations.

Table: Median (IQR) Scores and Statistical Significance for Pre-OSTE and Post-OSTE Assessments (n=22)

Stations	Pre-OSTE	Post -OSTE	*p*-value*
Feedback	4(3)	8(2)	<0.001*
Adult leaning- self-directed learning	7(2)	8(2)	0.351
Classification of teaching methods	3(1)	1(3)	0.058
Supervisory skills	2.5(3.25)	1(1)	0.126
Criteria for selecting teaching methods	3(1.25)	2(3)	0.457
Motivation	2(2.25)	5.5(4)	<0.001*
Group dynamics	0(0)	9(2)	<0.001*
Types of learning	2(2.25)	2(6)	0.009*
0Educational theories	0(2)	0(4)	0.019*
Conflict management-phases	0(2)	1.5(3)	0.134
Conflict management-steps	3(2)	7.50(2.5)	<0.001*
Overall Total Score	35(9)	61(5.75)	<0.001*

**For the significance, Wilcoxon signed ranked test was used*

The pre-OSTE median score was 35(IQR: 9), exhibiting a substantial increase to 61(IQR: 5.75) post-OSTE, with a statistically significant change (p<0.001). Significant improvements were observed in several stations, such as "Feedback" scores increased from a median of 4(IQR: 3) to 8(IQR: 2) with a p-value < 0.001. "Group Dynamics"showed a significant growth from a median of 0 (IQR: 0) to 9 (IQR: 2), also significant at p<0.001. "Motivation" levels increased considerably from a median of 2(IQR: 2.25) to 5.5(IQR: 4), with a p-value <0.001. Moreover, improvements were noted in other stations: "Types of Learning" increased from a median of 2(IQR: 2.25) to 2(IQR: 6), p=0.009; "Educational Theories" increased from a median of 0(IQR: 2) to 0(IQR: 4), p=0.019; and "Conflict Management – Steps" improved from a median of 3(IQR: 2) to 7.5(IQR: 2.5), with a p-value <0.001.

Other stations, such as "Adult Learning - Self-Directed Learning," "Classification Of Teaching Methods," "Supervisory Skills," "Criteria For Selecting Teaching Methods," and "Conflict Management - Phases," did not show statistically significant changes.

These results indicate that the intervention significantly improved the teaching skills of PAL tutors in several critical areas.

DISCUSSION

This study examined the impact of teaching training workshops on the teaching skills of peer-assisted learning tutors, as measured through pre- and

post-OSTE scores. The findings indicated that such participation led to improvement across various domains, as demonstrated by significant increases in pre- and post-OSTE scores.

The analysis of the average scores before and after participating in OSTE revealed significant improvements in domains such as providing formative feedback, group dynamics, and motivation. This is consistent with previous research that suggests peer-assisted learning can be as effective as teacher-led learning and that students often enjoy sessions with peer tutors.[12] Furthermore, the study from the United States by Amber *et al*., in 2020 found that peer tutors improved their comfort with teaching after completing the training.[13]

The analysis of the average scores before and after participating in OSTE showed significant improvements in areas such as conflict management, understanding of educational theories, and steps of conflict management. This aligns with previous studies emphasizing that peer-assisted learning programs can effectively impart knowledge to students and potentially result in higher academic achievements compared to traditional faculty-led teaching methods.[7,14] The results of this study align with previous research that emphasizes the importance of tutor training and professional development in enhancing teaching skills for peer-assisted learning. Several studies have highlighted the positive effects of training on tutors' pedagogical knowledge, instructional strategies, and communication skills.[15] These findings suggest that investing in tutor training programs can lead to improved teaching abilities and, consequently, enhance the overall learning experience for students.

The significant improvement in OSTE scores observed in this study can be attributed to the workshops and interventions provided to the PAL tutors. The workshops focused on teaching and learning principles, including effective communication, active learning strategies, and assessment techniques. These interventions aimed to equip tutors with the necessary skills and knowledge to facilitate peer-assisted learning effectively. Moreover, another study conducted by Rees *et al*.,[16] pointed out that observation of peer teaching had a significant role in developing teaching skills. PAL offers inherent opportunities to improve teaching skills. According to Guraya *et al*.,[17] Peer tutors, by teaching their peers, gain experience effectively presenting information, identifying areas of misunderstanding, and adjusting teaching strategies to meet different learning styles. This process could also enhance their leadership and communication skills. However, Guraya *et al*.,[17] provide direct evidence or more detailed information about how teaching skills are developed explicitly through PAL. Additional research would be required to investigate this aspect further.

The results of this study are consistent with the findings of a study by Cate *et al*., which demonstrated that tutor training programs significantly improved tutors' teaching skills and student satisfaction.[18] The authors emphasized the importance of providing tutors with structured training focusing on pedagogical principles and effective teaching strategies.

In conclusion, this study demonstrates that the training provided to PAL tutors significantly improved their teaching skills for peer-assisted learning. The findings highlight the importance of investing in tutor training programs to enhance the quality of education and promote effective learning environments.

The findings emphasize the significance of investing in tutor training programs to improve the quality of education and foster effective learning environments. By equipping tutors with effective teaching strategies and pedagogical knowledge, institutions can ensure the delivery of high-quality education and improve student outcomes. Furthermore, this study suggests that tutor training programs prioritize the development of conflict management skills, formative feedback techniques, and understanding of group dynamics. These areas facilitate practical peer-assisted learning sessions and promote a positive learning atmosphere.

A recent study[19] involved two groups of students, one receiving PAL and the other receiving expert instruction. It is worth noting that before implementing the PAL program, our study included a formal evaluation of tutors' teaching skills through structured teaching evaluations and comprehensive training for tutors. This practice has yet to be found in previous studies on this topic.

The results of this study add to the growing body of evidence supporting the benefits of tutor training and professional development. Institutions should consider implementing comprehensive and structured training programs for tutors, focusing on subject matter expertise, pedagogical principles, and

instructional strategies. By doing so, they can empower tutors to effectively engage and support their peers, ultimately enhancing the overall learning experience.

In conclusion, this study's findings underscore the importance of tutor training workshops in improving the teaching skills of peer-assisted learning tutors. Institutions can foster effective learning environments and promote student success by investing in tutor training programs that address key areas such as conflict management, formative feedback, and group dynamics. Continued research in this field will further enhance our understanding of the best practices for tutor training and its impact on educational outcomes.

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LIMITATION OF STUDY

The study's limitations arise from its exclusive concentration on 4th-year students within a single medical college, specifically within the discipline of ENT. Consequently, the study's findings may only readily apply to a narrow range of medical student populations, institutions, or other medical disciplines. Moreover, only students with high achieving scores were selected.

CONCLUSION

This research emphasizes the critical role of structured training in PAL. Despite limitations such as a small sample size and focus on a specific student population, PAL programs have demonstrated their ability to improve teaching skills, create conducive learning environments, and ultimately result in improved teaching skills. It is recommended that schools provide this type of training while promoting further research into optimizing its effectiveness in academic scores.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AAK & KH: Conception, study design, drafting the manuscript, approval of the final version to be published.

AA & MK: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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