

Filling the void: Peer-assisted learning's effects & acceptability in basic medical subjects using randomized control study in Islamabad

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Abstract

Objective: To assess the effectiveness and acceptability of peer-assisted learning in basic science subjects among undergraduate medical students exposed to an integrated curriculum.

Method: The randomised control study was conducted at Fazaia Medical College, Air University, Islamabad, Pakistan, from January to August 2023, and comprised second year medical students. One-third of the participants were included in the intervention group, while the rest were placed in the control group. A total five groups were formed, with four tutees led by one tutor in each group. For five weeks, a two-hour weekly session was carried out as part of the intervention by the tutors in gastrointestinal tract and Nutrition module (GIT&Nut module). The post module exam scores of the two groups were compared to assess the effectiveness of peer-assisted learning. Post-intervention feedback questionnaire was distributed to the intervention group to assess its acceptability in basic sciences. Data was analysed using SPSS 23.

Results: Of the 102 students 97(95%) students had mean age 20±1 years, 67(70%) were females. Mean score in the target module of intervention group was higher (58.9±25.4) than controls (45.6±29.9), but the result was not significant (p=0.14). Feedback indicated that more than two-third 58(75%) of the participants recognised peer-assisted learning as effective and easy strategy (p<0.001).

Conclusions: Peer-assisted learning was found to be an effective learning strategy by majority of the students despite showing no significant improvement in the scores of the interventional group.

Key Words: Peer groups, Adult learning, Academic performance, Active learning, Curriculum.

(JPMA 76: 341; 2026) DOI: <https://doi.org/10.47391/JPMA.21715>

Introduction

Peer-assisted learning (PAL) can be defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions. It involves people from similar social groupings who are not professional teachers, helping each other to learn and learning themselves by so doing.¹ This distinctive learning strategy is an intellectual way of encompassing bilateral, reciprocal learning experiences which are mutually beneficial to all participants by promoting the active engagement and involvement of learners.²

In the past, numerous ideas and theories have been proposed that indicate the effectiveness and usefulness of PAL compared to traditional teaching strategies. Cognitive and social congruence were two such key

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Submission complete: 11-10-2024 **First Revision received:** 21-02-2025

Acceptance: 12-11-2025 **Last Revision received:** 11-11-2025

concepts identified that have a fundamental role in the success of PAL.³

Cognitive congruence is explained as similar knowledge base between students and their student tutors.⁴ This similarity ultimately helps the student tutors to explain difficult topics in an easy informal language, and in a method that is easy to grasp by students.⁴ Social congruence on the other hand particularises the fact that the tutors and tutees share similar social roles which in due course is signified by high approachability and enjoyment.⁵

There is presently a large body of literature supporting the efficacy of PAL in the clinical training of medical students. PAL strategies have been effectively used in the teaching of physical examination, resuscitation and surgical skills.⁶ Indeed, some studies even shown that trained student teachers could provide a quality of clinical training comparable to that of experts⁶

To our knowledge, there is scant literature available on the efficacy of PAL in teaching basic science subjects to undergraduate medical students. One study in India on nursing students highlighted general acceptability of PAL and such other methods, and suggested that such

interventions may lead to improve student performance.⁷ A study in Pakistan compared lecture-based learning to PAL, and concluded that in terms of academic achievements, PAL was equally effective as lectures. Therefore, PAL can be incorporated as a supplement to lectures in medical school curricula.⁸

In Pakistan, the gap in knowledge about the effectiveness of PAL as a learning tool is very wide because there are very few medical schools that have incorporated PAL in their teaching learning programme or have researched its efficacy in enhancing the knowledge gained by students. The current study was planned to fill this gap in literature by evaluating the effectiveness of PAL in basic sciences to improve academic performance of low achievers, and to assess PAL acceptability among undergraduate medical students exposed to an integrated curriculum.

Subjects and Methods

The randomised control study was conducted at Fazaia Medical College, Air University, Islamabad, Pakistan, from January to August 2023, and comprised second year medical students. After approval from the institutional ethics review board, the sample size was calculated using the World Health Organisation (WHO) calculator on the basis of two-sided test (Annexure), with alpha value 10% and power of test 80%, with the proportion of two populations being 60% and 40% the total sample size calculated was 77.⁹ Using stratified sampling technique, all second year medical students were included. Students who had to sit for first professional supplementary exam were excluded. Written informed consent was taken from all the participants.

Mean results of all 6 modules in first year integrated curriculum was calculated for each student. On the basis of this result, the students were divided into two strata; 10 high achievers ($\geq 80\%$) and 87 low achievers ($\leq 79\%$). This stratification was done because the study was designed to assess the academic performance only, and the idea was to add at least one high achiever in each group who would provide learning assistance to the low achievers. Tutors and tutees for PAL were selected randomly by lottery method from high and low achiever groups, respectively.

Total 77/97 students (5/10 high achiever, 72/87 low achiever) were included. One-third of the sample size comprised the intervention group, while the remaining two-third formed the control group. The intervention group comprised of randomly selected tutors from the high achiever group. Each tutor led a group of tutees in the intervention group. There were five small intervention groups altogether. Tutees were assigned to intervention

and control groups through simple randomisation using computer-generated random numbers (Figure-1). Students in control groups were strictly advised to study on their own without taking assistance from their class fellows.

A pre-intervention training session on PAL was organised for the tutors where the researchers explained the whole process and addressed their queries. This was done to ensure the homogeneity and standardisation in the implementation of the intervention.

Subsequently, a two-hour session per week was carried out as part of the intervention by the tutors under the supervision of the researchers. Module of Gastrointestinal and Nutrition was pre-scheduled, and the intervention lasted five weeks, meaning five PAL sessions regarding topics covered in the respective week.

Moreover, to assess the acceptability of PAL in basic science subjects, the tutees in the intervention group were asked to fill a post-intervention feedback questionnaire in English at the end of the last PAL session. The predesigned questionnaire was self-administered and had eight questions that were to be answered as 'Yes', 'No' or 'Do not know'. Every 'Yes' was scored 1 point, and the other two options were scored 0. The questionnaire was pretested on 5 students, and data was not included in the final results. On pretesting, Cronbach's alpha was found to be 0.79 which indicated good internal validity. The total score ranged 0-8 for each individual, and mean score ≥ 4 (50% of the total) was set as the cut-off for high acceptability of PAL by the students.

The variables of interest, other than the demographic variables, was the result of the GIT and Nutrition module test of each participant.

Data was analysed using SPSS 23. Data was expressed as frequencies and percentages, or mean \pm standard deviation, as appropriate. The mean scores of Gastrointestinal tract and Nutrition module test of tutees in intervention and control groups were compared using independent sample t-test. To assess the statistical significance of acceptability of PAL, one sample t-test was applied on scores of relevant questions. Alpha was pre-set at 5%.

Results

Of the 102 students, 97(95%) with mean age 20 ± 1 years were enrolled (Figure 1). Of them, 67(70%) were females and hostilities, and 9(10%) came from the Cambridge educational system.

Mean score in nutritional module of intervention group

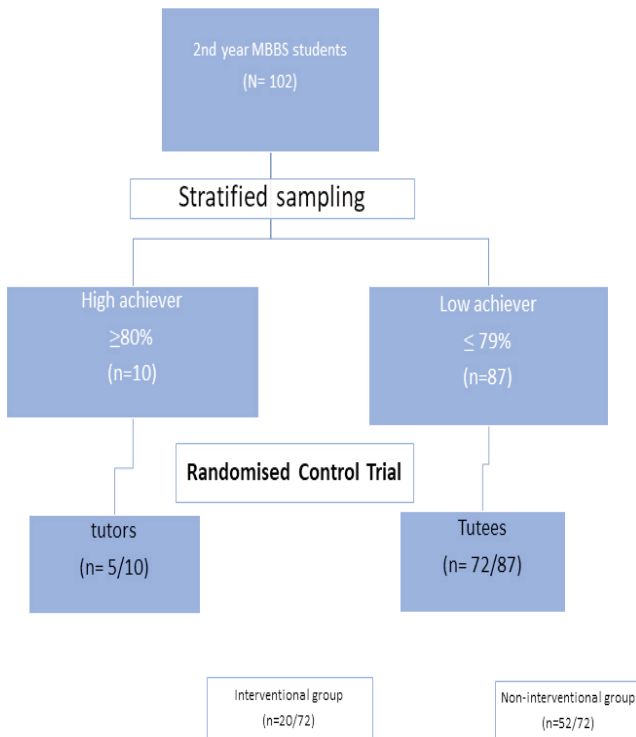


Figure-1: Selection process of the participants.

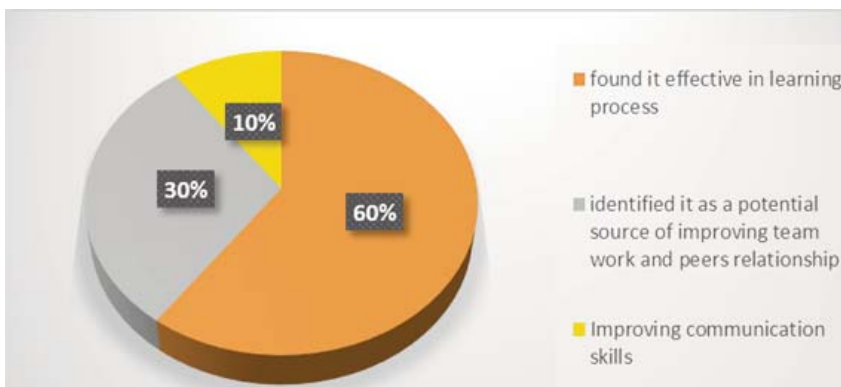


Figure-2: Positive Aspects of peer-assisted learning (PAL).

Table-1: PAL acceptability among the participants.

Questions	Reply		
	Yes n (%)	No n (%)	Don't Know n (%)
Do you think PAL can be an effective learning strategy?	58 (75)	00 (0)	20 (25)
Is it easy to communicate with peers as compared to experts ?	54 (70)	4 (5)	19 (25)
Do you think PAL should be a regular part of your integrated curriculum?	46 (60)	15 (20)	15 (20)
Do you think PAL helped in better retention as compared to expert learning strategies?	54 (70)	7 (10)	15 (20)
Do you think PAL helped you improve your communication skills?	69 (90)	7 (10)	0 (0)
Do you think it is manageable for you to spare time for PAL?	39 (50)	19 (25)	19 (25)
Do you think PAL is more effective than studying alone?	31 (40)	31 (40)	15 (20)
Do you think PAL can motivate you towards active learning?	65 (85)	7 (10)	4 (5)

PAL: Peer-assisted learning.

Table-2: Challenges in the path of PAL adoption..

Challenges faced	Frequency (n)	Percentage (%)
None	42	55.0
No time allocation for PAL in time table	15	20.0
Limited knowledge of tutor on subject	20	25.0

PAL: Peer-assisted learning..

was higher 58.9±25.4 than controls 45.6±29.9 but the difference was not statistically significant (p=0.14).

The assessment of the perception of the mentees regarding PAL suggested more than two-third 58(75%) recognised it as an effective and easy learning strategy. Majority 46 (60%) of the students wanted it to be a regular part of the curriculum.

The mean score of acceptability questions 4.8±2.6 (p <0.001, 95% confidence interval [CI]: 3.96-5.64).

While answering an open-ended questions was about the positive aspects of PAL, 47(60%) students found it effective in learning process, while 23(30%) identified it as a potential source of improving team work and peer relationship (Figure 2). Almost half of the participants 42(55%) mentioned no associated challenges of PAL, while 15(20%) and 20(25%) identified two challenges, respectively; no time allocation for PAL in the timetable, and limited knowledge of tutors on the subject (Table 2).

When asked about suggestions to improve PAL in the future, 39(50%) were in favour of implementing it with proper scheduling, while 20(25%) said the whole class should be involved, while an equal number of participants 20(25%) gave no suggestion.

Discussion

In the current study, the academic scores of students who underwent a nutritional module intervention were higher than those in the control group, but the difference was not statistically significant. The result showed that there was no significant improvement in scores achieved through PAL intervention. The findings are consistent with a study conducted in Lahore, Pakistan, which compared PAL with an expert-assisted learning strategy.¹⁰ Modified student-centred teaching and interactive strategies were already being employed in the curriculum, which might be the cause for non-significant results in the present study, as they provide plentiful opportunities for teamwork, interaction and motivation among undergraduates. Also, learning outcomes might be unintentionally limited among the peers due to their alike knowledge and backgrounds.¹¹

Several researches have reported no difference in results between teacher-led and PAL educational approaches.¹⁰ ¹² Also, numerous studies have indicated PAL's positive effect on academic scores.^{6,13,14}

Contrary to the current findings, a study in South Korea exhibited significantly better academic score (0.029) among the PAL group than the control group.¹⁴ It is believed that PAL amplifies students' enthusiasm, while enhancing their engagement and captivation. Students gained a deeper understanding, fostered more positive attitudes, and honed skills, such as communication and self-study abilities.¹⁴ Variation in the results could possibly be due to differences in effective communication and teaching abilities of the subject experts.

However, majority (90%) of the tutees and tutors improved their teaching and communication skills, and also gained better retention (70%) and understanding of the course content through PAL strategy in the current study. These findings are similar to a study conducted in Iran.¹⁵

Majority (75%) of the current students found PAL as an effective learning strategy, and were in favours of its integration into the medical curriculum. However, time constraint in schedule and limited knowledge of the tutors were identified by a few as challenges in the adoption of PAL. A study in a medical school in England tried out near-peer tutoring method which gained better responses, as juniors were tutored by their seniors, who had expertise in course contents, and the juniors found it very effective, especially because the session format was kept quite interactive.⁶

In the United States, PAL has been incorporated within

the medical field since long. The courses employing PAL have been found to be associated with reduced subjective distress among the students, increased examination scores, and enhanced satisfaction.¹⁶ Integration of PAL has also been explored into the local educational system of various developing countries.¹⁰ This highlights the significance of integrating PAL-related activities into medical education institutions in Pakistan. However, informal practices of peer teaching, mentoring, and guidance exist in various forms, primarily driven by students themselves. For successful implementation of PAL activities, appropriate training support and administrative oversight are mandatory.

The current study has limitations, including the demand for extra PAL time alongside rigorous academic commitments, and implementation during just one module. More studies with vigorous training of tutees and extended time periods are required to validate the current findings.

Conclusion

PAL was found to be an effective learning strategy, with the intervention group gaining higher mean score than the controls, although the difference was not statistically significant. Majority of the participants reported PAL as an effective strategy to improve learning and communication skills, and for better retention and understanding of the course content. Most of the students were in favour of its integration into the medical curriculum. However, no time allocation for PAL in the timetable and limited peer knowledge on the subject were identified as the main concern of some of the participants.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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AUTHOR'S CONTRIBUTION:

AB: Concept, data interpretation, analysis and final approval.

IN: Drafting, data collection, conduction and analysis.

AA: Data acquisition and interpretation.

BA & AT: Conduction and data collection.