
**PROGRAMMATIC ASSESSMENT OF SAME LEVEL PEER-ASSISTED LEARNING AMONG
PHASE I MBBS STUDENTS*****Suchitra Mustur Manohar and Kusumakumari Medooru**

Department of Biochemistry, Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India

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Abstract

Purpose: Peer-Assisted Learning (PAL) is an active, student-centered educational strategy increasingly adopted in medical education. However, evidence from structured programmatic assessment of PAL among Phase I MBBS students remains limited. **Methods:** A prospective interventional study was conducted in department of Biochemistry among Phase I MBBS students. Five PAL sessions were implemented on selected topics, facilitated by peer tutors under faculty supervision. Pre-test and post-test assessments were administered for each session. Structured feedback was collected using a validated questionnaire assessing cognitive, affective, and learning environment domains. Two tailed paired t-test was used to analyze the difference between pre and post-test scores and the feedback scores were expressed graphically using Microsoft Excel. **Results:** Post-test scores showed a statistically significant improvement compared to pre-test scores in four PAL sessions ($p < 0.001$) with a higher percentage of students scoring more than five marks in post-test compared to pre-test (84.89%, 83.33%, 92.05%, 86.92%, 87.17% vs 35.25%, 79.16%, 41.72%, 66.15%, 16.66%). Highest feedback score of five was given for satisfaction in participating in PAL (75%), improved learning (72%), teamwork (52%), achieving personal learning goals (48%), improved communication skills (55%) and additional academic support (47%). A majority of students expressed preference for integrating PAL alongside traditional lectures in all phase I subjects if feasible. **Conclusion:** Peer-Assisted Learning significantly improved immediate learning outcomes and is well accepted by Phase I MBBS students. Programmatic incorporation of PAL as a supplement to traditional lectures can enhance effective active learning and early professional development.

Keywords: Medical education, Peer-assisted learning, Programmatic assessment, Phase I MBBS.

INTRODUCTION

Medical education has progressively shifted from traditional teacher centered approaches toward learner-centered strategies that emphasize active engagement, collaboration, and self-directed learning [1]. Among the teaching learning methods (TLM) lecture-based teaching method remains effective for delivering core knowledge; however it often limits interaction, learner participation, and immediate feedback, particularly in large undergraduate classes [2]. In traditional lecture based TLM, it is challenging to oversee individual student needs due to reasons such as time constraints, language barrier, anxiety or student being a slow learner. Also with availability of smart phones and gadgets, the interaction between students has become very limited resulting in a tendency to lean towards teachers for more guidance rather than learning from each other. Student's interaction among themselves can be encouraged by introducing peer-assisted learning (PAL) where students at similar academic levels facilitate learning for their peers, promoting both teaching and learning simultaneously [3]. Systematic reviews have demonstrated that PAL improves academic performance, communication skills, and learner confidence among medical students which are the foundation for a medical graduate to develop critical thinking and reasoning skills [4,5]. Importantly, enhanced learning may occur when students are at the same academic level due to factors such as an enhanced reliability, a lowering of hierarchical barriers which can promote open discussion. A study on web based near peer teaching found that though it offered flexibility, meaningful interaction between peer learners and teachers was limited [6].

Hence a physical one to one interaction increases the chances of open communication, fostering holistic development of both peer teachers and peer learners. Within the framework of competency based medical education, PAL aligns well with the goals of fostering teamwork, communication, reflective learning, and early professional development [7]. Despite its documented advantages, structured programmatic assessment of PAL among Phase I MBBS students in the Indian context remains limited.

METHODS

Ethical statement: Institutional Ethics Committee approval was obtained (IEC No.1300) and written informed consent was taken from the students after explaining the nature and objectives of the study.

Study Design: A prospective interventional study with programmatic assessment, using convenience sampling was undertaken. Lecture was conducted in traditional classroom model for all the students participating in the study as per the routine teaching schedule. A two hour PAL session was conducted on the same topic covered in the lecture but on a different day in the same week. A total of five PAL sessions were conducted at a frequency of once a week.

Subjects: Phase I MBBS students who consented to participate. Peer-Assisted Learning Session

Preparation phase: A schedule for the PAL sessions with the topics, the specific learning objectives and the information regarding resource materials were made available in advance to the students. Students were oriented to the PAL process

***Corresponding Author: Suchitra Mustur Manohar**

Department of Biochemistry, Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India.

prior to implementation. The assessment material consisting of the pre-test and post-test multiple choice questions (MCQs) were validated by two faculty members before every session.

Conduct: Faculty members supervised sessions to ensure content accuracy. The PAL grouping consisted of student pairing done by simple random allocation taking into consideration the student's requirement and preference.

Structured format of PAL session:

- Pre-test conducted with ten MCQs for ten marks with an allotted time of ten minutes.
- Faculty supervised PAL interaction between peers for ninety minutes using their own study materials.
- Post-test with ten MCQs for ten marks with an allotted time of ten minutes.

Assessment strategy with the assessment quality and design were guided by established frameworks emphasizing validity, reliability, and educational impact [8].

Cognitive Assessment: The pre-test and post-test scores compared within each PAL session.

Feedback Assessment: A structured feedback questionnaire validated by two faculty members, using a five point scale response assessing domains involving understanding of concepts, learning comfort, interaction and participation, motivation, interest and overall satisfaction was provided to students and their responses collected.

Statistics: Pre and post-test scores were compared using two tailed paired t-test. A p-value <0.05 was considered as statistically significant. For the feedback questions, the five point scores and number of students giving each score were entered into Microsoft excel sheet and presented graphically. Data was analyzed using Microsoft Excel software.

RESULTS

An average number of 144 ± 10.17 students participated in the five PAL sessions. Mean post-test scores obtained in all PAL sessions were significantly higher compared to pre test scores (Table 1). A higher percentage of students scoring more than five marks in post-test compared to pre-test was observed in all the five PAL sessions, with significant changes observed in four PAL sessions (Table 2). The individual scores analysed from six to ten marks found a significant increase in the number of students scoring between seven to ten marks in the post-test compared to pre-test (Table 3). The output of the student's feedback is expressed graphically as a bar diagram (Figure 1) depicting percentage of students who gave a score of five for achieving satisfaction in PAL (75%), with improved learning (72%), teamwork participation skills (52%), personal learning goals (48%), communication skills (55%) and academic support gained (47%). Score of four was given for achieving cognitive improvement (66%), effort put in listening to study partner (62%), socialization skills (58%), communication skills (55%), effort put to gain knowledge (47%), effort put in understanding (44%) and improvement in teaching skills (43%). For knowledge at beginning of PAL, score of 3 (59%), 2 (25%) and 1 (9%) were given.

Table 1. Comparison of pre-test and post-test scores in PAL Sessions

PAL session	Number of students (N)	Pre-test score (Marks) Mean \pm SD	Post-test score (Marks) Mean \pm SD	p*
First	139	4.85 \pm 1.77	7.64 \pm 1.81	<0.001
Second	144	6.59 \pm 1.49	7.43 \pm 1.74	<0.001
Third	151	5.27 \pm 1.76	7.96 \pm 1.51	<0.001
Fourth	130	6.02 \pm 1.66	7.5 \pm 1.76	<0.001
Fifth	156	3.76 \pm 1.70	7.64 \pm 1.77	<0.001

*Statistically significant p<0.05

Table 2. Number of students scoring less than, equal to and more than five marks in post-test compared to pre-test in PAL sessions

PAL session	< 5 Marks			5 Marks			> 5Marks		
	Pre test N %	Post test N %	p	Pre test N %	Post test N %	p	Pre test N %	Post test N %	p
First	56 40.29	09 6.47	<0.001*	34 24.46	12 8.63	<0.001*	49 35.25	118 84.89	<0.001*
Second	44 30.55	39 27.08	0.27	17 11.80	16 11.11	0.85	114 79.16	120 83.33	0.31
Third	73 48.34	07 4.63	<0.001*	37 24.50	05 3.31	0.02*	63 41.72	139 92.05	<0.001*
Fourth	38 18.46	06 4.61	<0.001*	18 13.84	11 8.46	0.19	86 66.15	113 86.92	<0.001*
Fifth	106 67.94	06 8.84	<0.001*	24 15.38	14 8.97	0.08	26 16.66	136 87.17	<0.001*

*Statistically significant p<0.05

Table 3. Number of students scoring six to ten marks in pot-test compared to pre-test in PAL sessions

PAL session	6 Marks		7 Marks		8 Marks		9 Marks		10 Marks	
	Pre test N %	Post test N %	Pre test N %	Post test N %	Pre test N %	Post test N %	Pre Test N %	Post test N %	Pre Test N %	Post test N %
First	23 16.55	12 8.63	17 12.23	22 15.83	07 5.04	34* 24.46	02 1.44	28* 20.14	0	22* 15.82
Second	27 18.75	15 10.41	46 31.94	24* 16.66	33 22.91	41 28.47	07 4.86	24* 16.66	01 0.69	16* 11.11
Third	31 20.52	09* 5.96	13 8.60	25* 16.55	13 8.60	43* 28.47	04 2.64	43* 28.47	02 1.32	19* 12.58
Fourth	34 26.15	18* 13.84	23 17.69	27 20.76	24 18.46	29 22.3	05 3.84	19* 14.61	0	20* 15.38
Fifth	14 8.97	23 14.74	11 7.05	25* 16.02	01 0.64	33* 21.15	0	26* 16.66	0	29* 18.58

*Statistically significant p<0.05

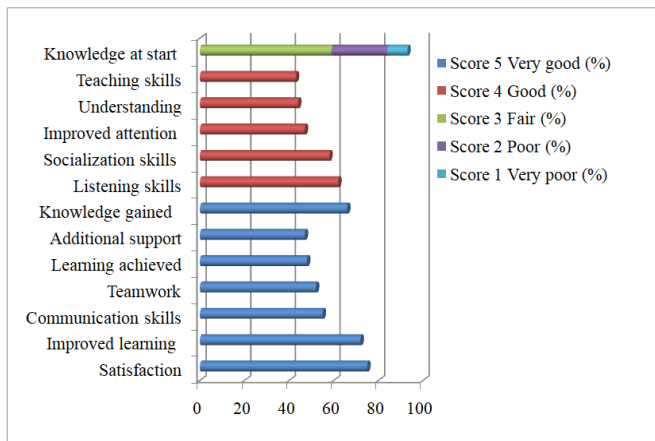


Figure 1. Bar diagram showing Student feedback distribution across domains

DISCUSSION

Programmatic assessment using repeated pre-test and post-test evaluation has been recommended for capturing incremental learning gains and reinforcing formative assessment principles [9]. Pre-test scores in the present study is the assessment of learning of the lecture based TLM. The observed improvement in post-test scores across the PAL sessions indicates enhanced understanding and retention of subject matter, reflecting the effectiveness of PAL. The effectiveness observed in this study may also be influenced by the use of same-level peer tutors, as previous research suggests that minimal hierarchy between learners enhances psychological safety, participation, and conceptual clarity [6]. Hence this study reinforces the evidence of research that suggest that same level PAL enhances academic performance, motivation, communication skills, and learner confidence [6]. Structured student feedback using validated questionnaires is an established method for assessing learner perceptions, engagement, and educational environment in medical education research [10]. Student feedback revealed overwhelmingly positive perceptions of PAL, with majority of students reporting better conceptual clarity. Students felt more comfortable asking questions in peer-led sessions indicating increased engagement and active participation. Students also reported improved confidence due to same peer engagement, which aligns with studies highlighting the role of PAL in developing communication and feedback skills [11]. All students expressed satisfaction regarding sufficient study time provided for the topic. Suggestions given were to continue these PAL sessions weekly once in Biochemistry and also to introduce for other subjects. Positive learner perceptions observed in this study, particularly regarding comfort, approachability, and active participation can be attributed to the social and cognitive congruence inherent in same level peer-led teaching which facilitates deeper learning [4,5, 6]. These affective benefits are particularly important in early medical training, where students may hesitate to actively engage during conventional lectures [2]. Comparison between same-level peer interaction and senior peer interaction trials remain limited. PAL can assist medical graduates to achieve competency and experience in both teaching and assessment, and may help to instil a life-long culture of teaching and learning. PAL has also been found to bring about a measurable improvement in clinical skills, with a long term effect [5]. While traditional lectures remain essential for foundational knowledge delivery, PAL serves as an effective

complementary strategy to address the gaps in curriculum delivery. Programmatic integration of PAL can address diverse learning styles and foster early professional competencies. PAL can strengthen formative assessment, encourage reflective learning and support CBME objectives.

Conclusion

Consistent with prior studies, this study confirms that same level PAL is an effective, acceptable, and learner-friendly instructional strategy for Phase I MBBS students [4,5]. Its structured incorporation alongside traditional lectures may enhance learning outcomes, student engagement, and early professional skill development [9]. The significant improvement in post-test scores and positive feedback support its incorporation as a supplementary instructional method alongside traditional lectures, as in same level PAL, students from similar social groupings may mentor, teach and learn from each other.

Recommendations

- Incorporate same level PAL sessions systematically in MBBS curriculum.
- Identify peer tutors and train them formally.
- Use PAL for revision, difficult concepts, and formative assessment.
- Conduct longitudinal studies to assess long-term impact.
- Maintain a record of peer tutors and encourage them to continue contributing as an alumni also

Conflicts of Interest

No potential conflict of interest relevant to this article is reported.

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Authors' contributions

1. Suchitra Mustur Manohar: Conceptualization, data curation, formal analysis, self-funding, methodology, project administration, visualization, writing- original draft, writing – review & editing.
2. Kusumakumari Medooru: Data curation, formal analysis, methodology, visualization, writing-review & editing.

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