

Original Article

Evaluation of Peer Assisted Learning on the Outcome of Undergraduate Medical Exams at the University of Jos

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Abstract

Background: Peer-assisted learning (PAL) is the development of knowledge and skill through active help and support among matched companions. This study was carried out to evaluate the effectiveness of PAL on the outcome of undergraduate medical exams among the final year medical students at the University of Jos.

Methodology: This was a retrospective cohort study on final year medical students. Multivariable logistic regression was used to determine the association between PAL participation, sociodemographic characteristics, and the outcome in their 2nd, 3rd, 4th & 5th undergraduate exams, with a confidence interval of 95% and a level of significance at p value <0.05.

Results: A total of 120 students participated, with 72 (60%) males (M) and 48 (40%) females (F). Marital status: 102 (85%) were single and 18 (15%) married. Mean Age (SD) of participants: 29 (4.2) years. Good outcome in the final year exam was associated with gender, age, and marital status: F:M Odds Ratio (OR) = 3.9 (95% CI: 1.1–15, p=0.036); students <30 years: >30 years OR=7.2 (95% CI: 2.4–22.2, p<0.001); married:singles (OR=0.2, 95% CI: 0.1–0.4, p<0.001). The pass rate of students who participated in PAL varied from 59.0–84.5%, similar to the non-PAL students: 59.3–86.1%. There were no statistically significant associations between PAL participation and exam outcome across all examinations. There was a steady rise in the participation and pass rate over the years for those who engaged in PAL.

Conclusion: This study found no difference in exam pass rate among students who participated in PAL and those who did not. However, students who had a good exam outcome in the final year were either young, female, or unmarried. Also, PAL participation steadily increased over the years of the undergraduate training.

Keywords: Peer assisted learning, Undergraduate, Medical exams.

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Quick Response Code:



Introduction

Peer-assisted learning (PAL), defined as the development of knowledge and skill through active help and support among status equals or matched companions [1] has been adopted by medical educationalists for many years in the United States and has been described to positively correlate with exam performance. [2–6] The benefits of this learning process include developing powerful role models, peer tutor cognitive gains, reciprocity of learning, and lowering of subjective distress. [2–6]

Over the years, questions have been raised about the effectiveness of the traditional didactic teaching method, which is a passive form of teaching, involving professional teachers delivering large subject content over a long stretch of hours. [1,7,8] This approach is increasingly viewed as inadequate, particularly in the context of modern challenges such as larger student populations, the expansion of curricula, and students' reduced engagement during lectures, compounded by the distractions of social media. [1,7,8] Several studies have therefore compared traditional learning with different teaching methods including inquiry-based teaching, problem solving based teaching, test-enhanced teaching, with varying results favoring non-traditional methods. [1,7,8]

It is suggested that learning strategies adopted for traditional teaching of theoretical parts of the medical curriculum are in stark contrast to active learning, which is designed to stimulate student learning through performing tasks that engage them with knowledge acquisition and understanding of the subject matter. [1,5,6] Several high-level studies have shown that combining PAL with conventional learning methods positively impacts medical graduates' results, with a few contrasting results recorded. [2,4,9] As medicine is a mentorship discipline, PAL becomes relevant to enhance this expectation within the different cadres of a cohort.

Although the effectiveness of PAL has been researched in some parts of the world, there is a paucity of data in the literature within the field of medical education in Nigeria and in Jos. Notwithstanding, this method of learning, though informal, is clearly present in our schools. It is, however, unknown if PAL has any significant benefit to the students. Findings from this research may inform the inclusion of PAL into our curriculum if found to be beneficial. In this study, we aimed to evaluate the effect of PAL participation on the outcome of undergraduate medical exams among the final year medical students at the College of Health Sciences, University of Jos.

Materials and Methods

This was a retrospective comparative cohort study carried out among the Final year medical students of the College of Health Sciences, University of Jos., from April 2023 to June 2023 using a total population sampling technique. Ethical clearance was obtained from the Health Research and Ethical Committee of the Jos University Teaching Hospital (JUTH) (XXXX/DCS/IREC/127/XXXI/623). Students' participation was voluntary, and there were no rewards or consequences for lack of participation.

Setting and Participants

The College of Health Sciences (COHS), University of Jos is located at Jos, Nigeria. The college trains medical students as well as students of allied health sciences. The COHS is affiliated to and within same premises with the Jos University Teaching Hospital. Hence, the medical students do their clinical rotations daily in the hospital after their didactic lectures at the college. Also, most of the lecturers in the College of Health sciences work in JUTH as hospital consultants. Medical students undergo a six-year program writing a total of four professional (Bachelor of Medicine, Bachelor of Surgery- MBBS) exams that each allow them to proceed to the next class. The 2nd MBBS exam is for Anatomy, Physiology and Biochemistry. The 3rd MBBS exams are for Pathology and Pharmacology. The 4th MBBS exam majors on Pediatrics, Obstetrics & Gynecology and Community Health, while the 5th MBBS (final year class) is for Medicine and Surgery. The 4th and 5th MBBS are clinical exams while the 2nd and 3rd MBBS exams are

non-clinical. Didactic teaching comprises a considerable part of the educational experience of these students. However, they also have clinical sessions, where they are divided into smaller groups of about 10 and are tutored under a consultant-led team. For some of the courses like pathology, pharmacology and the basic medical sciences, the students are similarly divided for the practical sessions. Although informal and not part of the school curriculum, PAL is being practiced among these students as seen in other climes like the United Kingdom[10] and they deploy this method in preparation for all the professional exams. At the time of this study, the Final Year Class had 131 medical students, and this study evaluated the outcome of each of these exams for those who participated in PAL and for those who did not. No incentive was used to motivate participation.

Inclusion and Exclusion Criteria

All consenting students of the Final Medicine and Surgery Class at the College of Health Sciences, University of Jos were included in the study.

Peer Assisted Learning (PAL)

Peer Assisted Learning in this setting was informal and not part of the college curriculum. Participation was characterized by students engaged in peer group discussions with activities such as group study, case presentations, review of past questions, and practice of clinical examinations (where applicable) at comfortable venues in their hostels, facilitated either by their peers or students in higher classes. The students among themselves structured a schedule of topics, cases and areas of interest and allocated them to particular days and time for which the groups were guided. Each session was tailored towards addressing one or two of these topics, depending on the scope of the exam being prepared for. Every session lasted an average of 120 minutes. Students were said to participate in PAL when they met at least “*once every week*” in a six-week duration leading up to the examination, and a “Good” outcome was defined as those who had a “*Pass at first sitting*” in each examination.

Data Collection and Instruments

Data was collected using self-administered semi-structured questionnaires. This questionnaire contained sociodemographic characteristics like *age, sex, marital status, address* as well as the PAL participation and outcome for the 2nd, 3rd, 4th and 5th MBBS exams. Students were said to participate in PAL when they met at least “*once every week*” in a six-week duration leading up to the examination. “Good” outcome was defined as those who had a “*Pass at first sitting*” in each examination while poor outcome were students who did not pass at first sitting.

Data Analysis

The entered data was cleaned using Microsoft Excel and subsequently analyzed using the IBM Statistical Package for Social Sciences SPSS (SPSS Inc. Armonk, NY: IBM Corp) Version 22 statistical software. Descriptive data was summarized in frequencies and percentages. Odds Ratio and Pearson’s Chi-Square test were used to compare the relationship and significance of binary variables. Multivariable logistic regression was utilized to assess the relationship of sociodemographic variables of interest with the outcome variable. Statistical significance was set at $p < 0.05$. Sociodemographic data was compared solely with the final professional exam (5th MBBS examination) as these were the characteristics of participants at the time of the study.

Results:

A total of 120 students out of a class of 131 participated in the study, giving a response rate of 91.6%

Table 1. Sociodemographic characteristics of the study population.

Variable	Frequency (n=120)	Percentage (%)
Sex		
Male	72	60.0
Female	48	40.0
Age Groups		
< 30 years	80	66.7
30 years & above	40	33.3
Mean Age (SD): 29 (4.2) years		
Marital Status		
Single	102	85.0
Married	18	15.0
Address		
Hostel	15	12.5
Off-Campus	105	87.5

Majority of respondents were <30 years, single and residing Off-Campus accounting for 80(66.7%), 102(85%) and 105(87.5%) of the study population respectively. There were more males 72(60%) than females 48(40%) in this study population.

Table 2. Multivariable Logistic Analysis Showing PAL Participation Across Sociodemographic Characteristics for the Final Professional Examinations

Variable	5 TH MBBS							
	PAL Participation				Examination Outcome			
	PAL Yes n=84 (%)	PAL No n=36 (%)	OR (95% CI)	p	Good n=102 (%)	Poor n=18 (%)	OR (95% CI)	P
Sex								
Female	38 (79.2)	10 (20.8)	2.2 (0.9–5)	0.074	45 (93.8)	3 (6.2)	3.9 (1.1–15)	0.036
Male	46 (63.9)	26 (36.1)			57 (79.2)	15 (20.8)		
Age Group								
< 30 years	60 (75.0)	20 (25.0)	2.0 (0.9-4.5)	0.091	75 (93.8)	5 (6.2)	7.2 (2.4-22.2)	<0.001
≥ 30 years	24 (60.0)	16 (40.0)			27 (67.5)	13 (32.5)		
Marital Status								
Married	15 (83.3)	3 (16.7)	2.4 (0.6-8.8)	0.181	10 (55.6)	8 (44.4)	0.2 (0.1-0.4)	<0.001

Single	69 (67.6)	33 (32.4)			92 (90.2)	10 (9.8)			
Residence									
Off-Campus	75 (71.4)	30 (28.6)	1.7 (0.5-5.1)	0.378	91 (86.7)	14 (13.3)	2.4 (0.7-8.5)	0.238	
Hostel	9 (60.0)	6 (40.0)			11 (73.3)	4 (26.7)			

PAL: Peer Assisted Learning. OR: Odds Ratio. CI: Confidence Interval (95%).

Females had higher odds of having a good outcome in the final professional examinations, when compared with their male counterparts, OR = 3.9, 95% CI = 1.1 - 15, p = 0.036. There was a significant association between age group and exam outcome with participants younger than 30 years having better odds of a good outcome. OR = 7.2, 95% CI= 2.4-22.2, p:<0.001. Married participants had a significantly lower chance of having a good outcome. OR: 0.2. 95% CI: 0.1-0.4, p<0.001.

However, there was no statistical significance between those who participated in PAL and those who did not for each of the sociodemographic variables.

Table 3. Relationship Between PAL Participation and Exam Outcome

PAL Participation	2 ND MBBS					3 RD MBBS				
	Outcome		Total (%)	OR (95% CI)	p	Outcome		Total (%)	OR (95% CI)	P
Good	Poor	Good				Poor				
-										
Yes (%)	28 (65.1)	15 (34.9)	43 (35.8)	0.90 (0.41–1.97)	0.788	23 (59.0)	16 (41.0)	39 (32.5)	0.99 (0.45–2.15)	0.976
No (%)	52 (67.5)	25 (32.5)	77 (64.2)			48 (59.3)	33 (40.7)	81 (67.5)		
Total (%)	80 (66.7)	40 (33.3)				71 (59.2)	49 (40.8)			

PAL Participation	4 TH MBBS					5 TH MBBS				
	Outcome		Total (%)	OR (95% CI)	p	Outcome		Total (%)	OR (95% CI)	P
Good	Poor	Good				Poor				
Yes (%)	43 (82.7)	9 (17.3)	52 (43.3)	2.13 (0.88–5.17)	0.089	71 (84.5)	13 (15.5)	84 (70.0)	0.88 (0.29–2.68)	0.823
No (%)	47 (69.1)	21 (30.9)	68 (56.7)			31 (86.1)	5 (13.9)	36 (30.0)		
Total (%)	90 (75)	30 (25)				102 (85.0)	18 (15.0)			

PAL: Peer Assisted Learning. OR: Odds Ratio. CI: Confidence Interval (95%).

There were no statistically significant associations between PAL participation and exam outcome for all examinations.

The 3rd MBBS and 5th MBBS recorded the lowest and highest PAL participation rates, with participation rates of 32.5% and 70.0%, respectively. The pass rate of students who participated in PAL varied in the different examinations, ranging from 59.0-84.5%, as well those who did not participate in PAL, which recorded varying rates from 59.3-86.1%.

The outcome in the clinical exams (4th and 5th MBBS) for those who participated in PAL was 82.7% and 84.5% respectively. This was higher compared to the non-clinical exams (2nd and 3rd MBBS) where the percentages were 65.1% and 59.0% respectively for the students who participated in PAL. However, these findings were not statistically significant.

There was also a gradual improvement in the outcome of the exams for those who participated in PAL. For each category of PAL-participation, the students who had a good outcome always outnumbered those who did not.

Discussion

In this retrospective cohort study, the effectiveness of PAL on the outcome of medical examination was assessed among final year medical students at the College of Health Sciences University of Jos. We found that there was no difference in the examination outcome between students who participated in PAL and those who did not. However, we observed that the exam outcome was better in female, younger-aged students, and those who were unmarried. There was a steady increase in the number of students participating in PAL over the years in training.

The results from this study have shown no statistically significant difference in the outcome of exams between those students who participated in PAL and those who did not. This finding corroborates studies done in Europe,[11] Oceania,[12] and the middle east[13] which indicated no difference between peer tutored and non-peer tutored groups. Shah et al. [14] however, demonstrated a statistically significant improvement in the academic performance of PAL-trained final-year MBBS students compared to those who had the traditional expert assisted learning. A possible explanation for the outcome in our study may be that the 5th MBBS class is a super-selected cohort as it comprises only students who have been “sifted” through medical school, overcoming the challenges of repeating preceding classes and/or withdrawal from the school. Thus, familiarity with the academic environment and clinical procedures over time may have resulted in similar outcomes for both groups. This is to say, the comparison between the PAL and non-PAL group on the outcome of the 2nd, 3rd and 4th MBBS exams is not robust as the students who repeated or were withdrawn were not part of this cohort in final year. Hence, it is difficult to state the effect of PAL participation on the outcome of these exams.

In this study, medical students were more likely to have a good outcome in the final professional examination if they were younger than 30 years, single, or female. The gender variation in academic performance may be due to differences in study habits. Some authors have reported females being more appreciative of PAL activities[15,16] and having a better medical exam performance than their male counterparts.[17,18] This was because the females had better clinical reasoning and the ability to consciously deliberate inference(ratiocination)than the male medical students.[18]Moreover, Zhang et al discovered superior diagnostic competencies among females, yet they did not observe a significant gender difference in terms of theoretical knowledge or manipulative skills.[7]In addition, this study found those who were unmarried had a better outcome in the final year exams than those who were married. Marital status seems to have an impact on academic activities in medical school and has been reported to be a contributing factor to the burden on Nigerian female students.[19] The findings from a study conducted on the academic performance of Nigerian medical undergraduates showed that married females who were of an older age had more repeat examinations compared to single females and males. This was because of the additional burden marriage, pregnancy and child bearing placed on the female students, affecting their academic performance, particularly in the African setting. [19]

Interestingly, there was a gradual increase in PAL participation over the successive exams with the highest recorded in the final MBBS exams. Participation did not only increase steadily but there was also an improvement in exam outcome over the years for those who participated in PAL. This may be because of increasing familiarity amongst this student cohort as they discovered their strengths and most suited study methods over time. Furthermore, the students may have found the PAL setting to be a more relaxed atmosphere in which they developed confidence towards sitting for the exam and became better at making decisions.[13,20]Shah et al. also found that PAL students liked the mode of learning and wanted it to be implemented in the college.[14]In addition, a study has shown that PAL mode of learning alleviates stress, and as such students tend to favor the learning style.[21]Moreover, Animola et al.[22] confirmed the positive effect peer tutoring has in improving academic performance and enhancing the retention ability of students. Hence, further studies could help elucidate why this trend is so among these undergraduate medical students.

A recent systematic review and meta-analysis on peer assisted learning in medical education showed that PAL had more impact amongst clinical medical students than preclinical students and when it was used to teach practical skills than theory,[23]yet our study did not show any statistically significant difference between the outcome of PAL in the clinical and non-clinical classes.

Strengths

To the best of our knowledge, this is the first study on PAL and its effect on the outcome of medical students' examinations in Nigeria. A total population sampling technique was conducted for the final year students, which eliminated any subject drop out and non-response bias. Furthermore, the impact of PAL through the different stages of medical training was determined.

Limitations

This is a retrospective study and as such, students were not randomized to receive PAL or not prior to their examinations. Again, this was a "super-selected" cohort as all the participants had passed their previous exams. This was likely to have affected the outcome of the study.

Conclusion

We conducted a study to determine the participation and effectiveness of PAL on the outcome of exams among the final year medical students at the College of Health Sciences University of Jos. We found that there was no difference in exam pass rate among students who participated in PAL compared to those who did not. However, students who had a good exam outcome in the final year were either of a young age, females or unmarried. Also, PAL participation steadily increased over the years of the undergraduate training.

Recommendation

Further, studies could randomize the students to strengthen the weight of scientific evidence. In this study, participation in PAL could not be demonstrated to improve the likelihood of passing the undergraduate clinical medical students' exams at first sitting. However, there are benefits for students who participate in PAL particularly in preparation for the clinical undergraduate medical exams.

References

1. Topping KJ. The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *High Educ.* 1996;32(3):321-345.
2. Knight JK, Wood WB. Teaching more by lecturing less. *Cell Biol Educ.* 2005;4(4):298-310.
3. Lujan HL, DiCarlo SE. Too much teaching, not enough learning: what is the solution? *Adv Physiol Educ.* 2006;30(1):17-22.
4. Wareing M, Green H, Burden B, Burns S, Beckwith MAR, Mhlanga F, et al. "Coaching and Peer-Assisted Learning" (C-PAL) - The mental health nursing student experience: A qualitative evaluation. *J Psychiatr Ment Health Nurs.* 2018;25(8):486-495.
5. Biggs J. Enhancing Teaching through Constructive Alignment. *High Educ.* 1996;32(3) 347-364.
6. Taheri M, Amini M, Delavari S, Bazrafkan L, Mazidimoradi J. Effect of Peer Assisted Learning (PAL) education on knowledge, attitude and behavior related to prevention and control of diabetes. *BMC Res Notes.* 2019;12(1):227.
7. Zhang Y, Maconochie M. A meta-analysis of peer-assisted learning on examination performance in clinical knowledge and skills education. *BMC Med Educ.* 2022;22(1):147.
8. Balta N, Michinov N, Balyimez S, Ayaz MF. A meta-analysis of the effect of Peer Instruction on learning gain: Identification of informational and cultural moderators. *Int J Educ Res.* 2017;86:66-77.
9. Gandhi A, Primalani N, Raza S, Marlais M. A model for peer-assisted learning in paediatrics. *Clinical Teacher.* 2013;10(5):291-295.
10. Morris T, Collins S, Hart J. Informal peer-assisted learning amongst medical students: A qualitative perspective. *Clin Teach.* 2024;21(4): e13721
11. Büscher R, Weber D, Büscher A, Hölscher M, Pohlhuis S, Groes B, et al. Evaluation of the peer teaching program at the University children's hospital Essen - A single center experience. *GMS Z Med Ausbild.* 2013;30(2):Doc 25.
12. Thomas E. Clinical skills education: outcomes of relationships between junior medical students, senior peers, and simulated patients. *Journal of Physical Therapy Education.* 2009;23(1):82.
13. Kassab SE, Abu-Hijleh MF, Al-Shboul Q, Hamdy H. Student-led tutorials in problem-based learning: Educational outcomes and students' perceptions. *Med Teach.* 2005;27(6):521-526.
14. Shah I, Mahboob U, Shah S. Effectiveness Of Horizontal Peer-Assisted Learning In Physical Examination Performance. *J Ayub Med Coll Abbottabad.* 2017;29(4):559-565.
15. Knobe M, Holschen M, Mooij SC, Sellei RM, Münker R, Antony P, et al. Knowledge transfer of spinal manipulation skills by student-teachers: a randomised controlled trial. *Eur Spine J.* 2012 May;21(5):992-8
16. Tai J, Canny B, Molloy E, Haines T. Gender matters: Students' perceptions of peer learning in clinical education. *Focus Health Prof Educ Multi-Prof J.* 2017 Apr 28;18(1):3.
17. Sethi I, Mastrogiacomo C, Baldelli P, Wackett A, Abdel-Misih S. Gender-Based Differences in Medical Student Self-Ratings of Clinical Performance. *J Surg Res.* 2024 Oct;302:286-92.
18. Hege I, Hiedl M, Huth KC, Kiesewetter J. Differences in clinical reasoning between female and male medical students. *Diagnosis.* 2023 May 15;10(2):100-4.
19. Egwuatu VE, Umeora OUI. A comparative study of marital status on the academic performance of the female medical undergraduate in a Nigerian university. *Niger Postgrad Med J.* 2007 Sep;14(3):175-9.
20. Kolb DA. Experiential learning: Experience as the source of learning and development, . *J Organ Behav.* 1984;8(4):256.

21. Chaudhuri A, Ray B, Koner S. To Study the Effect of Peer Assisted Learning on Academic Performance and Perceived Stress Scores Among First MBBS Students in a College of West Bengal. *Int J Res.* 2018; 5(11):240-248.
22. Animola OV, Bello TO. Comparative Effectiveness of Mastery and Peer-to-Peer Learning Strategies in Improving Junior Secondary Students' Learning Outcomes in Basic Science. *Asian J. Adv. Res. Rep.* 2019 Mar. 13;3(4):1-12.
23. Brierley C, Ellis L, Reid ER. Peer-assisted learning in medical education: A systematic review and meta-analysis. *Med Educ.* 2022 Apr;56(4):365–73