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RESEARCH ARTICLE

Student as a Clinical Teacher: Evaluation of Peer Teaching Experience in Clinical Education

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ABSTRACT:

Background: peer teaching is considered one of the best methods of active learning strategies. The study aims to evaluate the perception of their peer-teaching experience, assessing their satisfaction with the quality and efficacy of the process.

Methods: A cross-sectional study was performed using anonymous self-administered online questionnaires. The study aimed at medical students in Riyadh, Saudi Arabia, who have been enrolled in the peer teaching process at least once.

Results: of the 188 medical students who completed the study questionnaire, 77.1% were male. About half of them (48%) reported participating in at least one or more peer teaching sessions discussing medical contexts. More than half (55.3%) had indicated that they preferred a peer student to learn from an informal educational session. About two-thirds (75%) of the students thought they would possibly conduct future peer-assisted clinical teaching sessions if needed. The top three benefits of peer teaching from the student's point of view were; 1. peer-assisted clinical education enhances clinical skills and knowledge retention, 2. Has a positive impact on the performance of clinical exams; 3. helped to apply clinical skills during regular curricular clinical courses.

Conclusions: the study confirmed that peer education is an effective learning method in the clinical phase. Medical colleges should provide the appropriate environment that encourages senior students to teach their peers. Junior students and students of one batch should teach each other and try to be active teachers and learners alike.

Keywords: Peer Teaching, Peer Tutoring, Student as a Teacher, Teaching strategies, Saudi Arabia.

Introduction:

The phrase "peer teaching" or "peer tutoring" has been described in the literature in many forms. It could simply mean sharing knowledge with another person at any given time. The more explained definition could be "people from similar social groupings who are not professional teachers helping each other to learn and learn by teaching." In addition, the location and time of peer-teaching lessons could be more flexible than a typically structured experience from a faculty member to a student. It is considered pre-arranged by both participants and the type of material itself. Historically, peer teaching has always been implicated throughout the earlier ages, from ancient Greeks to modern times, in current education¹. Medical students should encounter peer teaching as a learning tool because it is considered one of the best methods of active learning strategies. After all, students are the future physicians who will interact with patients².

The peer teaching process is considered one of the valuable ways to teach in modern medical education; for example, it creates a favorable environment to discuss new or even consolidate current information about diseases/cases from senior students, as well as improves organizational skills in objective structured clinical examinations (OSCEs) settings⁷⁻⁸. Furthermore, feedback as a mentor to students helps to strengthen weak points in communication skills³, as well as reinforce the material being taught in the curriculum by professors/faculty members⁴. Several 93 students scored the same as other students who received formal teaching from faculty members, indicating the efficacy of academic learning from peer teaching⁵. Anxiety was less common among students during peer teaching sessions due to less fear of failure⁶.

Today, many undergraduate medical students have a lower situational awareness of clinical scenarios. Studies have shown that students exposed to Objective Structured Clinical Examinations (OSCEs) have much higher clinical reasoning skills to deal with clinical scenarios⁹. OSCE is considered a comprehensive tool to assess basic clinical skills from history taking to physical examination, in a professional manner and under the supervision of a physician¹⁰. Long-term OSCE training programs for medical students are among the most effective ways to increase student confidence, knowledge, and practice¹¹. Peer teaching for clinical examination curriculums shows improvement in the outcome of medical practice education¹². Many students are satisfied with the peer teaching process method because flexibility is one of the essential factors¹³.

In real OSCEs, peer teaching increases overall student scores and performance¹⁴.

In this study, our objective was to evaluate medical students' perception of their peer-teaching experience, assessing their satisfaction with the quality and efficacy of the process. Furthermore, we investigated some of the extra benefits of having a senior medical student as a teacher and whether students prefer having a cooperative and expert matter faculty member or a specialist peer student as an instructor of an informal, complementary clinical session.

Methodology**Study design and setting:**

This observational cross-sectional study was conducted between August and November 2019 in Riyadh, Saudi Arabia.

Subjects of the study: The study population The study targeted medical students who have been enrolled in the peer teaching process at least once. The sample size was 172, with a 95% confidence level and a 5% error margin.

Tools of the study: The questionnaire consisted of two main parts; the first part included questions about the demographic data, including gender, university, level of education, and academic GPAs—one more question about the attendance of peer-assisted learning clinical sessions by students last month. The second part consisted of 11 questions; the five-point Likert Scale was used to explore the student's perceptions and attitudes toward peer teaching of clinical education. Data was collected through anonymous self-administered online questionnaires distributed via short message service (SMS) and social media. The data collection period was two months, and reminders were sent to students every ten days.

Data Analysis

The nine indicators of the attitude toward peer teaching that is measured with an agreement Likert scale were reliably measured, with Cronbach's $\alpha = 0.88$; however, an exploratory factor analysis of these nine indicators showed that these nine indicators comprised one factor, as evidenced by sufficient Unico (Unidimensional Congruence Score) of 0.95, and ECV (explained common variance) of 0.883 and MIREAL (mean of item residual absolute loading test of the residual element) of 0.231; however, these tests were in agreement with scree Cassilith plot tests and parallel analysis tests which showed a dimension that explained variance equal to a total of 60% by

the factor solution. A total sum score was created from these nine indicators comprising a score between 9-45, with a higher score denoting a more fabulous attitude and agreement with peer teaching.

Results

One hundred and eighty-eight (188) medical students enrolled in the study through an online survey. The data analysis of their sociodemographic and academic characteristics is shown in Table 1. The results showed that most of the medical students were male students (77.1%), and the remainder of the medical students were females. However, the study level of the students was distributed as follows: 23.4% were juniors; most (63.3%) were sophomores, and the remainder (13.3%) were medical students and interns. Most of these students

(59.6%) came from the Imam Mohamed Bin Saud University Medical School, but most (40.4%) came from other medical schools based in other Saudi universities. The analysis findings of the GPA of medical students showed that 31.9% had a GPA level below or equal to 4 out of 5, and the remainder, 68.1%, had a GPA above 4 out of 5 points in general.

Students were asked to indicate with (No / Yes) if they had previously attended a peer teaching session with a peer medical student within the last month from the survey time, and most of the medical students (52.2%) indicated that they had not attended any peer teaching session within the previous month. However, most (47.9%) reported participating in at least one or more peer teaching sessions discussing medical contexts.

Table-1: Medical students, demographic and academic characteristics. N=188

Parameters	Frequency (%)
Sex	
Female	43 (22.9)
Male	145 (77.1)
Study Level	
Junior: 1st & 2nd years	44 (23.4)
Sophomore: 3rd & 4th years	119 (63.3)
Senior: 5th and higher years	25 (13.3)
University	
Imam Mohd B Saud Univ	112 (59.6)
Other colleges	76 (40.4)
Academic GPA level	
<=4 out of 5	60 (31.9)
> 4 out of 5	128 (68.1)
In the last month, have you ever attended peer-assisted learning clinical sessions?	
I don't remember	8 (4.3)
No	90 (47.9)
Yes	90 (47.9)
In an informal, complementary clinical session, I prefer to be instructed by	
A faculty member who is an expert	84 (44.7)
Peer student	104 (55.3)
If you were asked to run a peer teaching session, how possible is it to accept the offer?	
No/ Unsure	47 (25)
Yes- Possible	141 (75)

Most medical students (55.3%) indicated that they prefer to learn from a peer student to learn from an informal educational session. Asked to indicate teachers' learning preferences in an informal education session, most medical students (44.7%) stated that they preferred an academic faculty member who is an expert. Of most of the students, 75% thought they would possibly conduct future peer-assisted clinical teaching sessions if required,

but 25% of them were uncertain or believed they would not run such clinical teaching sessions.

To assess the attitudes of the medical student toward peer teaching, their opinions on peer teaching were measured with nine indicators using a Likert agreement scale (1= strongly disagree to 5= strongly agree). Table 2 shows the indicator's descriptive analysis (means and standard deviations, as well as the mean ranks). In simple

terms, the results showed that the medical student's top agreement was given to that "peer-assisted clinical teaching enhances retention of clinical skills /knowledge because it is active learning rather than reading material,(4)" which had received a collective mean agreement by the medical students equal to 4.3 out of 5, suggesting an overall high agreement (between agree and strongly agree) by the medical students on the usefulness of peer-assisted clinical teaching for retaining clinical skills and or knowledge. The second top agreement given by the medical students was given to "peer-assisted teaching, and learning sessions impact positively the performance in clinical exams,(4)", which had received an overall mean collective agreement by the students equal to 4.23 out of 5, which denotes high agreement in general.

The third top attitude toward peer-assisted clinical teaching was "The peer-assisted clinical OSCE sessions helped me to apply the clinical skills from professors during regular curricular clinical and course lectures," which had received a collective mean agreement by the medical students equal to 4.2 out of 5, indicating an overall high agreement by those medical students that peer-assisted teaching complements the professor's assisted clinical sessions.

The fourth indicator of the agreement of medical students on peer-assisted teaching was the

convenience of peer teaching compared to formal educational sessions (4), which was given an overall mean agreement by the students equal to 4.12 out of 5. However, the lowest agreement provided by the medical students was assigned to the ability to save the medical students time (mean =3.75 out of 5), indicating that the medical students were generally undecided on the usefulness of peer teaching for convenience peer teaching. The second from the bottom rating/agreement was assigned to the "earned confidence in exams due to peer-assisted teaching, "which had an overall mean collective agreement equal to 3.94 out of 5, which denotes that the medical students had near agreement on the earned confidence during exams associated with peer teaching.

The third of the bottom agreement was to establish a connection with senior students, mean =4.02 out of 5, and the next from the bottom agreement was given to filling knowledge gaps, mean agreement = 4.02 out of 5. Maximizing and maintaining clinical skills with peer-assisted teaching had received collective mean teaching equal to 4.11 out of 5, which indicates that these medical students had generally agreed (strongly agreed) that peer-assisted teaching helps maintain maximum learning skills via peer learning.

Table-2: Descriptive analysis of the medical student's indicators of attitude toward peer teaching. N= 188.

	Mean	SD	Mean -Rank
I believe that attending peer teaching and learning clinical sessions positively impact my performance in clinical exams.	4.23	0.88	2
I believe that peer-assisted clinical sessions improve retention of clinical skills as it is an active learning process rather than just reading the materials.	4.3	0.72	1
I believe that attending the peer-assisted clinical session will save me time.	3.75	1.04	9
I believe that peer-assisted clinical sessions helped fill my knowledge gaps through my peer evaluations.	4.02	0.92	6
I believe that attending the peer teaching clinical session helped me to be much more confident in the exam.	3.94	0.99	8
I believe that participating in peer training as a clinical instructor will maximize my clinical skills and maintain the retention of my clinical knowledge.	4.11	0.94	5
I believe that peer-teaching OSCE sessions helped me apply the clinical skills I learned from my professors during regular curricular clinical sessions.	4.2	0.83	3
Peer teaching clinical sessions made me establish good connections with my senior students so that I can learn from the different aspects of the future course material.	4.02	0.86	7
I believe peer-teaching clinical sessions have a more comfortable environment than regular curricular clinical meetings.	4.12	0.84	4

Bivariate analyses of the attitude of the medical student toward peer learning are described in table-3.

The student's overall attitude score towards peer-assisted teaching was measured with 36.68 points out of 45 maximum points, SD=5.78 points; this total attitude score (preference of the total peer

learning score) when expressed as a percentage of a hundred is equivalent to $36.68/45 \times 100 = 80.6\%$ of positive attitude points toward peer teaching out of a hundred percent, which indicates a high preference of those medical students toward peer-assisted learning in general.

Table-3: Bivariate analysis of the mean attitude score toward peer teaching. N=188

	n(%)	Mean attitude (SD) attitude toward peer teaching	Test statistic	p-value
Sex				
Female	43 (22.9)	35.15 (5.68)	t(186)=2.05	0.042
Male	145 (77.1)	37.15 (5.74)		
Study Level				
Junior: 1st & 2nd years	44 (23.4)	34.66 (5.78)	f(2,185)=4.88	0.009
Sophomore: 3rd & 4th years	119 (63.3)	37.64 (5.38)		
Senior: 5th and higher years	25 (13.3)	35.72 (6.66)		
University				
Imam Mohd B Saud Univ	112 (59.6)	37.42 (5.86)	t(186)=2.14	0.034
Other colleges	76 (40.4)	35.61 (5.50)		
Academic GPA level				
<=4 out of 5	60 (31.9)	35.20 (5.27)	t(186)=2.50	0.015
> 4 out of 5	128 (68.1)	37.38 (5.41)		
In an informal, complementary clinical session, I prefer to be instructed by				
No	98 (52.1)	35.29 (6.25)	t(150.35)=2.10	0.041
Yes	90 (47.9)	38.21 (4.78)		
In an informal, complementary clinical session, I prefer to be instructed by				
A faculty member who is an expert	84 (44.7)	35.70 (6.57)	t(150.35)=2.10	0.041
Peer student	104 (55.3)	37.50 (4.92)		
If you were asked to run a peer teaching session, how possible is it to accept the offer?				
No/Unsure	47 (25)	34.49 (5.52)	t(186)=3.10	0.002
Yes	141 (75)	37.42 (5.68)		

To better understand what may help explain why medical students prefer more or less peer-assisted clinical teaching, the student's attitude score toward peer-assisted teaching was compared for statistically significant mean differences between the medical students' categorical sociodemographic and academic characteristics levels of medical students.

The results of the analysis (Table 3) showed that male students had a significantly higher preference for peer-assisted teaching (M=37.15, SD=5.74) than females on average (M=35.15, SD=5.68), p=0.042 according to an independent samples t-test. However, a one-way ANOVA test suggested that medical student's attitudes toward peer teaching differed significantly between their university study levels, f(2,185)=4.88, p=0.009, and a Hochberg's adjusted post hoc pairwise comparison between students within different study levels in their mean attitude score toward peer-teaching showed that the junior students had significantly lower mean preference for peer-

assisted teaching (M=34.66, SD=5.78) than their sophomore peers (M=37.64, SD=5.38) on average, p=0.010 and that the sophomore and senior students did not differ significantly on their mean attitudes toward peer teaching. Similarly, senior and junior students may not necessarily vary considerably in their mean attitude (i.e., preference) toward peer learning.

Furthermore, another independent sample t-test showed that medical students from Al-Imam University had a significantly higher preference for peer-assisted learning (M=37.42, SD=5.83) than medical students from other universities (M35.61, SD=5.50), p=0.034. Furthermore, according to the independent samples t-test, medical students with a GPA > 4 out of 5 had a significantly higher preference for peer-assisted learning (M= 37.38, SD=5.41) than medical students with a GPA <=4 out of 5 points (M=35.20, SD=5.41), p=0.015. Furthermore, students who advised they preferred peer student instructors in informal teaching sessions measured a significantly higher mean attitude

toward peer teaching than those who chose faculty expert members in a relaxed, complimentary educational session, $p=0.041$ according to an independent sample t-test. The analysis findings also showed that students willing to become a peer teacher in the future measured significantly higher attitudes towards peer teaching than students who believed they were unwilling or uncertain about their willingness to become a future peer-assisted teacher, $p=0.002$, according to an independent samples t-test.

To determine our findings from the attitude of the bivariate analysis of the medical student toward peer-assisted learning, the sociodemographic and academic factors were regressed against their mean attitude overall score toward peer-assisted teaching (Table 4). The multivariate analysis findings revealed that the sex, university, and academic university level of medical students did not correlate significantly with their mean attitude score toward peer-assisted learning. The analysis

model showed that medical students with a GPA >4 out of 5 could have measured a slightly higher preference for peer-assisted teaching than those with a GPA of 4 or less on average. Furthermore, the difference in attitudes was not statistically significant; however, $p=0.086$. However, multivariate linear regression analysis showed that students who had recently attended a peer-assisted learning session might have a significantly higher preference for peer teaching than those who had not participated in a recent session, $p=0.003$. Furthermore, the analysis model suggested that medical students who liked peer teachers for informal, complementary clinical sessions measured slightly higher mean attitudes toward peer teaching than those who favored a faculty member, $p=0.084$. However, on average, medical students who were willing to peer teach had a more significant attitude toward peer teaching than those who were unwilling to peer-teach other medical students in the future, $p=0.002$.

Table-4: Multivariate linear regression explaining the medical student's attitudes (agreement) toward peer teaching. N=188.

	Beta coefficient	95% C. I Beta coefficient		t-value	p-value
		Lower	Upper		
(Constant)	26.320	21.647	30.993	11.114	<0.001
Gender = Male	1.169	-0.770	3.108	1.190	0.236
University=Other universities	-0.745	-2.448	0.959	-0.862	0.390
Students' level of education	0.518	-0.813	1.849	0.768	0.443
GPA Score > 4 out of 5	1.497	-0.212	3.205	1.729	0.086
Previous attendance of peer teaching session= Yes	2.397	0.813	3.981	2.986	0.003
Preference for a peer teacher during informal sessions = Yes	1.370	-0.185	2.926	1.738	0.084
Willingness to future self-rating score.	1.478	0.550	2.406	3.142	0.002

As a secondary analysis, the students attended a recent peer-assisted medical session. They used multivariate binary logistic regression analysis to analyze why there was more or less attendance at such peer-assisted clinical learning. The results of the data analysis (Table 5) suggested that the analysis model was statistically significant overall, indicating that at least one or more of the student characteristics had a statistically significant association with their attendance last month at a peer-assisted teaching session. Simply put, the analysis model suggested that the student's sex and

the university did not correlate significantly with their recent attendance at a peer-assisted teaching session.

However, the student's study levels had converged substantially on their attendance behavior; the senior students were found to be significant, $p = 0.036$, less predicted (71.5% times less expected $=100 \times (1-0.285)$) than the junior students to have had a recent clinical peer-assisted teaching session on average, considering the other predictors in the analysis model as equal (Figure A).

Table-5: Multivariate binary logistic regression explaining medical students' attendance in the past month at a peer teaching session. N=188.

	Multivariate adjusted Odds Ratio (O.R)	95% C.I.for O.R		p-value
		Lower	Upper	
Gender= Female	1.137	0.509	2.541	0.753
University = Other Universities	0.882	0.440	1.769	0.723
Level of education= Junior-reference	-	-	-	0.045
Level of education= Sophomore	1.075	0.474	2.440	0.863
Level of education= Senior	0.285	0.088	0.924	0.036
GPA score>4 out of 5	0.564	0.282	1.126	0.105
Preference for peer teaching = Yes	1.371	0.729	2.579	0.328
Willingness to future self-rating score.	1.427	0.967	2.107	0.074
Attitude toward peer teaching score	1.087	1.021	1.157	0.009
Constant	0.014			0.001

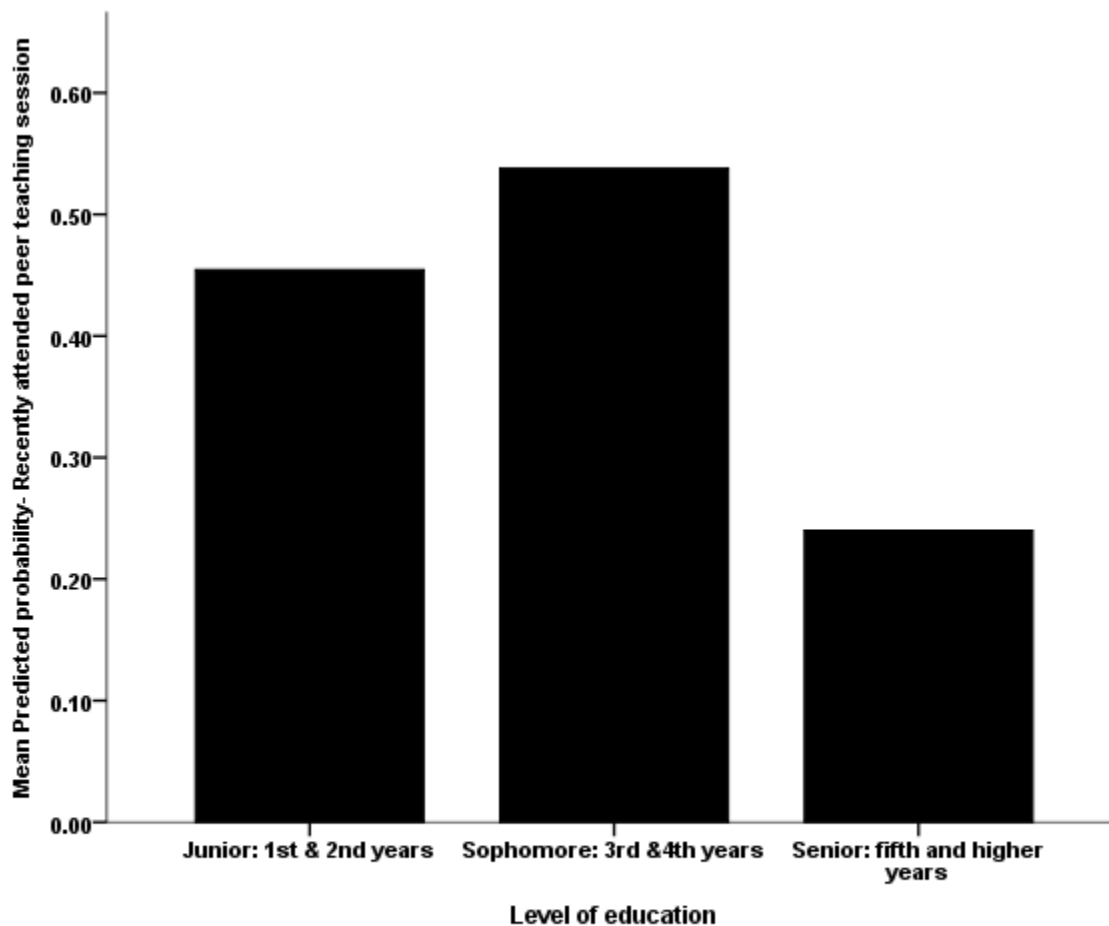


Figure-A: The association between the medical students study level and their model adjusted probability of having attended an recent peer-assisted clinical teaching session.

However, the student's GPA score and preference for peer teachers did not converge significantly on the student's attendance at a recent peer-assisted

learning session. However, it was found that students who were willing to become peer-student teachers in the future were slightly more (1.43 times

higher) predicted to have attended a recent peer-assisted learning session, $p=0.074$; however, the association was not statistically significant. However, the student's attitude score towards peer teaching had correlated significantly with their recent attendance of a peer-assisted learning session within the last months, $p=0.009$, as the student's attitude score (preference for peer learning) tended to rise by one unit their predicted odds of having had a recent peer-assisted learning session increase by 1.087 times higher (or increases by 8.7% times higher) on average, well considering the other predictor independent variables in the analysis model as accounted for (Table-5).

Discussion

According to the study results, most students prefer to deal with peer students to obtain their medical knowledge compared to faculty members, which may vary due to the informal environment's flexibility and ease of communication. Peer teaching enforces teaching skills among medical students and creates a flexible session environment, giving students positive and helpful feedback to enrich their medical knowledge and retention through discussions with peers¹⁵. Moreover, peer teaching in the objective structured clinical exam (OSCE) is considered an effective method to improve the physical examination, diagnosis, and documentation of complex clinical tasks¹⁶.

In our study, most students stated that peer-assisted teaching improves retention of clinical skills and knowledge; this finding can be attributed to the fact that the student teachers focus on making things easier to remember by providing students with mnemonics and tricks to memorize and recall what they have learned. Furthermore, the students agreed that peer-assisted teaching impacted their exam performance, consistent with other research studies¹², such as Taylor and Quick¹⁷.

Furthermore, Tolsgaard found that trained student teachers can be as good as professors in teaching clinical skills¹⁸.

However, many students doubt the ability of peer teaching to save their time; we can link this with the possibility that student teachers have fewer years of experience in managing class time; furthermore, this might be affected by the fact that the peer teaching class is done after the long day of curricular lectures.

Our study results demonstrated that students with lower GPAs had a lower preference for peer-assisted teaching; this finding is contrary to our results, as students with lower GPAs would benefit more from the extra session and, therefore, would have a higher preference.

Our sample who attended a peer-teaching session during medical school had higher self-rating scores for participating in a peer-teaching session again ($p=0.074$). Still, their sociodemographic factors such as academic year, college name, and academic performance did not change. Furthermore, in another study, seniors who participated in a peer-teaching session preferred a future teaching session ($p=0.210$). In addition, they also reported that their skills improved ($p=0.03$)¹⁹. However, the feedback performance to the tutor is a motivating factor for better peer teaching sessions later on and for the tutor to acknowledge any weak points in his medical knowledge²⁰.

In another study, they found evidence that peer teachers improve their academic scores; however, this is due to a selection bias as better-performing students self-select for the peer teaching program. However, the PAL program clearly shows beneficial effects. The peer teachers improve their competencies in the CanMEDS roles of medical expert, collaborator, scholar, and professional. This finding was determined through varied, quantitative, and qualitative approaches based on the literature, student self-assessment, and faculty supervisors. In the first part of their study, they compared the academic scores of peer teachers and their fellow students before and after the PAL project. The former outperformed the latter on the clinical line of the third year, the final Bachelor's scores (before PAL), the clinical sequence of the fifth year, the internship portfolio, and the final Master's scores (after PAL). Their analyses revealed that this performance was not due to their participation in PAL per se but reflected a selection bias: The better-performing students were the students who applied for the peer teaching program. The finding was corroborated by comparing peer teachers to a group of equally well-performing fellow students, eliminating the differences between peer-teaching students and nonpeer-teaching students²¹. Many studies have shown the benefits of social unity as a significant player in peer-assisted learning. While the survey results from those studies reinforce the value of near-peer interactions in contributing to a positive learning environment, they did not observe the quantitative improvement in examination performance published in the two previous studies that did not use an RCT methodology. Previous peer teaching studies have found that students can effectively teach specific topics and cases. Still, few studies indicate that students are equipped to teach a wide range of topics that encompass licensing and board examinations. The results may reflect a trade-off of greater social congruence with the near-peers limited experience, training, and time in

implementing an educational resource for Step exams²².

Conclusion

The study confirmed that peer education is an effective learning method in the clinical phase. The authors of this paper believe that students with previous experience with this type of self-learning have a greater motivation to take the role of teacher and encourage other students to take the peer-teaching expertise because of its great benefits. Therefore, we recommend that medical colleges provide the appropriate environment that encourages senior students to teach their peers, junior students, and students of one batch should teach each other and try to be active teachers and learners alike.

Declarations

Ethical consideration and consent to participate:

The institute review board of Imam Mohammad Ibn Saud Islamic University (IMSIU) approved the study (project number 75-2019; approval date, 17 Nov. 2019). The article was written based on the ethical principles of the Declaration of Helsinki. The introduction to the electronic questionnaire also included a clear explanation of the idea and purpose. Written informed consent was obtained from the study participants after confirming that participation is voluntary and that the data will be treated confidentially and only for research purposes.

Availability of data and materials: The datasets analyzed during the current study are available from the corresponding author on a reasonable request. Due to data protection restrictions and participant confidentiality, we do not make participant data publicly available.

Competing interests: The authors declare that there is no conflict of interest concerning the publication of this article.

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Authors' contributions: KAB, MAA, and KEA substantially contributed to the study design, analysis, and interpretation of data, drafted the first version, and critically reviewed the final version of the manuscript. KAB and KEA contributed significantly to the study design and interpretation of the data and critically revised the manuscript. NAA substantially contributed to the study design and critically reviewed the manuscript. All authors have critically reviewed, read, and approved the final manuscript.

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References

1. Topping, KJ. The effectiveness of peer tutoring in higher education: A typology and review of the literature, higher education. SpringerLink. <https://link.springer.com/article/10.1007/BF00138870>. Accessed August 19, 2022.
2. Dandavino M, Snell L, Wiseman J. Why medical students should learn to teach. *Medical teacher*. 2007;29(6):558-565. doi:10.1080/01421590701477449
3. Erlich, D.R., Shaughnessy, A.F. Student-teacher education program (STEP) by step: transforming medical students into competent, confident teachers. *Med Teach*. 2014;36(4):322-332. doi:10.3109/0142159X.2014.887835
4. Lockspeiser, T.M., O'Sullivan, P., Teherani, A., Muller, J. Understanding the experience of being taught by peers: the value of social and cognitive congruence. *Adv Health Science Educ Theory Pract*. 2008;13(3):361-372. doi:10.1007/s10459-006-9049-8
5. Haist SA, Wilson JF, Brigham NL, Fosson SE, Blue AV. Comparing fourth-year medical students with faculty teaching physical examination skills to first-year students. *Acad Med*. 1998;73(2):198-200. doi:10.1097/00001888-199802000-00020
6. A student-led course in clinical reasoning in the core curriculum. <https://www.ijme.net/archive/1/a-student-led-course-in-clinical-reasoning/>. Accessed August 19, 2022.
7. Nelson AJ, Nelson SV, Linn AM, Raw LE, Kildea HB, Tonkin AL. Tomorrow's educators ... today? Implementing Near-Peer Teaching for medical students. *Med Teach*. 2013;35(2):156-159. doi:10.3109/0142159X.2012.737961
8. Rashid MS, Sobowale O, Gore D. A near-peer teaching program designed, developed, and delivered exclusively by recent medical graduates for final-year medical students sitting the final objective structured clinical examination (OSCE). *BMC Med Educ*. 2011;11:11. Published on 17 Mar 2011 doi:10.1186/1472-6920-11-11
9. Fischer MA, Kennedy KM, Durning S, et al. Situational awareness within objective structured clinical examination stations in undergraduate medical training - a literature search. *BMC Med Educ*. 2017;17(1):262. Published on 21 Dec 21. doi:10.1186/s12909-017-1105-y
10. Brazeau, C., Boyd, L., Crosson, J. Changing an existing OSCE to a teaching tool: the making of a teaching OSCE. *Acad Med*. 2002;77(9):932. doi:10.1097/00001888-200209000-00036
11. Fulford, L., Gunn, V., Davies, G., Evans, C., Raza, T., Vassallo, M. Near-peer integrated teaching for medical students in the final year. *Perspect Med Educ*. 2016;5(2):129-132. doi:10.1007/s40037-016-0255-7
12. Blank, WA, Blankenfeld, H, Vogelmann, R, Linde, K, Schneider, A. Can near-peer medical students effectively teach a new curriculum on physical examination? *BMC Med Educ*. 2013;13:165. Published on Dec 11, 2013 doi:10.1186/1472-6920-13-165
13. Schwill S, Fahrbach-Veeser J, Moeltner A, et al. Peers as OSCE assessors for junior medical students: a review of routine use: a mixed methods study. *BMC Med Educ*. 2020;20(1):17. Published on Jan. 16. doi:10.1186/s12909-019-1898-y
14. Cole JD, Ruble MJ, Donnelly J, Groves B. Peer-assisted learning: Clinical Skills Training for Pharmacy Students. *Am J Pharm Educ*. 2018;82(6):6511. doi:10.5688/ajpe6511
15. Young, I., Montgomery, K., Kearns, P., Hayward, S., Mellanby, E. The benefits of a peer-assisted mock OSCE. *Clin Teach*. 2014;11(3):214-218. doi:10.1111/tct.12112
16. Basehore PM, Pomerantz SC, Gentile M. Reliability and benefits of medical student peers in rating complex clinical skills. *Med Teach*. 2014;36(5):409-414. doi:10.3109/0142159X.2014.889287
17. Taylor D, Quick S. Students' perceptions of a near-peer Objective Structured Clinical Examination (OSCE) in medical imaging. *Radiography (Lond)*. 2020;26(1):42-48. doi:10.1016/j.radi.2019.06.009
18. Tolsgaard MG, Gustafsson A, Rasmussen MB, Høiby P, Müller CG, Ringsted C. Student teachers can be as good as associate professors in teaching clinical skills. *Med Teach*. 2007;29(6):553-557. doi:10.1080/01421590701682550
19. Liew SC, Sow CF, Sidhu J, Nadarajah VD. The near-peer tutoring programme: embracing the 'doctors-to-teach' philosophy--a comparison of the effects of participation between the senior and junior near-peer tutors. *Med Educ Online*. 2015;20:27959. Published 2015 Sep 8. doi:10.3402/meo.v20.27959
20. Weyrich P, Schrauth M, Kraus B, et al. Undergraduate technical skills training guided by student tutors--analysis of tutors' attitudes, tutees' acceptance and learning progress in an

- innovative teaching model. *BMC Med Educ.* 2008;8:18. Published 2008 Apr 9. doi:10.1186/1472-6920-8-18
21. Avonts M, Michels NR, Bombeke K, et al. Does peer teaching improve academic results and competencies during medical school? A mixed methods study. *BMC Med Educ.* 2022;22(1):431. Published 2022 Jun 4. doi:10.1186/s12909-022-03507-3
22. Dadafarin S, Petersen KH. Randomized Trial of a Year-Long USMLE Step 1 Preparation Near-Peer Teaching Program. *Med Sci Educ.* 2021;31(3):1065-1071. Published on 2021 March 24, 2019. doi:10.1007/s40670-021-01275-1