

Assessing the psychometric properties of a questionnaire evaluating the residents' perception of peer assisted learning in emergency medicine residency program

Peer assisted learning in residency program

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Abstract

Purpose – This study aims to measure the perception of the residents regarding peer assisted learning in emergency medicine residency program as well as assessing the psychometric properties of the questionnaire used as the research tool.

Design/methodology/approach – A descriptive cross-sectional study was conducted at King Abdullah Medical City, Saudi Arabia, Makkah on a Convenience sample of Emergency Medicine residents who completed peer assisted learning sessions. Data were collected through a questionnaire evaluating the residents' perception of Peer Assisted Learning. Descriptive statistics were used and statistical significance was set at $p < 0.05$. The Peer Assisted Learning (PAL) satisfaction questionnaire was tested for construct validity and reliability. Exploratory Factor Analysis (EFA) was conducted. The reliability of the used questionnaire was assessed using Cronbach's coefficient alpha.

Findings – The study showed that the PAL questionnaire yielded four factors. The four factors are labeled as the following: Factor 1: Cognitive congruence, Factor 2: Social congruence; Factor 3: Teaching skills in Peer Assisted Learning (PAL) session; and Factor 4: Professional development. These results indicated that questionnaire has a good structure validity. In addition, the study showed high internal consistency of the questionnaire. Cronbach's alpha coefficient value for the total scale was 0.88. The perception of residents was assessed and results revealed residents' satisfaction regarding Peer Assisted Learning.

Originality/value – Up to the authors' knowledge, this is the first study which assessed the psychometric properties of a questionnaire measuring the residents' perceptions regarding Peer Assisted Learning. The study contributed to improving information regarding the psychometric properties and usefulness of PAL questionnaire.

Keywords Satisfaction, Peer assisted learning, Validity, Reliability, Exploratory factor analysis and residency
Paper type Research paper



Introduction

Dynamic teaching methods, known as interactive teaching, are the key components of stimulating learning in which students assume a critical position towards the taught materials (Senthamarai, 2018). Interactive teaching is a method of encouraging students' self-learning and development by including them in discussions with their peers (Türkben, 2019). Students' active participation, communication and collaboration in classes are necessary for effective learning (Akbar *et al.*, 2022; Burgess, Dornan, Clarke, Menezes, & Mellis, 2016).

Peer Assisted Learning (PAL) has been utilized widely in many professional healthcare courses (Soriano-Moreno *et al.*, 2020). Peer Assisted Learning is one of the student-centered approaches and a total shift from the teacher-centered to active and self-directed learning (Hunt, Jones, & Carney, 2020). As defined by Abdel Ra'ouf Abed, Gomma, and Nasser (2021), Peers are members of the same social group as the students are not considered professional educators since they lack the expertise, authority, and teaching abilities that qualified teachers have (Abed *et al.*, 2021). According to Soriano-Moreno *et al.* (2020), Peer Assisted Learning is one of the supportive strategies that consists mainly of students helping their peers to learn (Soriano-Moreno *et al.*, 2020). Peer Assisted Learning is a mutual learning process as well in which the students discuss their information, thoughts, and experiences in a way that benefits both sides, which can be done in a formal or casual context (Latjatih, Roslan, Jahn Kassim, & Adam, 2022). In other words, Peer Assisted Learning is an educational style that focuses on developing talented and dedicated students (Amer *et al.*, 2020).

When students actively participate in content instruction, they examine and reorganize the knowledge, resulting in better understanding and memorization of the topic (Hunt *et al.*, 2020). Many other advantages of Peer Assisted Learning include reduced subjective suffering and improved course satisfaction and engagement due to the formation of a reciprocal social support system (Mills, Dalleywater, & Tischler, 2014). Several studies have identified multiple benefits of Peer Assisted Learning, including increased student confidence and motivation, learning by resolving ambiguities, and a gradually progressive effect on students' reflective practice and skills, enhancing their learning, as well as integrating theory into practice (Amer *et al.*, 2020; Hunt *et al.*, 2020).

Peer Assisted Learning instills in participants a stronger sense of responsibility for teaching as well as a stronger sense of partnership between students and universities (Yang *et al.*, 2022). There is, however, minimal evidence on how satisfied students are with peer teaching versus teaching by a faculty member. In addition, up to authors' knowledge there no valid questionnaire to evaluate the residents' perception regarding Peer Assisted Learning. Therefore, the aim of the study was to measure the perception of the residents regarding peer assisted learning in emergency medicine residency program as well as assessing the psychometric properties of the questionnaire used as the research tool.

Methodology

Objectives of the study

- (1) Measure the psychometric properties of an instrument evaluating the residents' perception regarding Peer Assisted Learning
- (2) Assess the perception of all emergency medicine residents in King Abdullah Medical City of Peer Assisted Learning

Study design. This was a cross-sectional descriptive study conducted at King Abdullah Medical City, Makkah region, Saudi Arabia.

Study sample. The sample size was calculated by using the following formula:

$$\text{Sample size} = \frac{Z_{1-\frac{\alpha}{2}}^2 P(1-p)}{d^2}$$

$Z_{1-\alpha/2}$ = is the standard normal variate (at 5% type I error ($p < 0.05$) it is 1.96 and at 1% type I error ($p < 0.01$) it is 2.58). As in the majority of studies p values are considered significant below 0.05 therefore 1.96 is used in formula.

p = Expected proportion in population based on the previous studies (Jauregui, Bright, Strote, & Shandro, 2018).

d = Absolute error or precision.

Sample size = $1.96 \times 0.15 (1-0.15)/0.0047 = 100$ students. By assuming 30% attrition rate that will be added, The sample size should be 130 participants. These participants were recruited by convenient sampling technique.

Study population. The study included the Emergency Medicine residents in Makkah region at King Abdullah Medical City, both males and females.

In the Emergency Medicine Residency program, Makkah region, Peer Assisted Learning is being used in many ways. At the junior level, it is implemented as Peer teacher training (PTT) program and peer tutoring, while in the senior level it is implemented as a formative Objective Structured Clinical Examination (OSCE). Moreover, PTT is being conducted for junior residents once or twice monthly while peer tutoring is conducted once every three months. On the other hand, formative OSCE for senior residents is being conducted once a year before the final exams of the residency year.

This study evaluated the perception of all residents from all levels from Residency year 1 (R1) to Residency year 4 (R4) as well as recently graduated residents where R1 and R2 are junior residents, and R3 and R4 are senior residents in Emergency Medicine Program, Makkah region with Peer Assisted Learning. The number of residents in each level is as follows: R1 ($n = 36$), R2 ($n = 33$), R3 ($n = 27$), R4 ($n = 17$) and recently graduated ($n = 17$).

All the study samples attended Peer Assisted Learning sessions, and all responded and completed the questionnaire (100%).

The research had approval from the Ethics Committee of Fakeeh College for Medical Sciences (FCMS). After obtaining approval from the Institutional Review Board (IRB), the researcher took the approval from Emergency Medicine Program director in Makkah region.

Data collection

The PAL satisfaction questionnaire was adapted from Usman & Jamil (2019) that assessed the perceptions of the undergraduate medical students about PAL (Usman & Jamil, 2019). This questionnaire was tested for construct validity and reliability. Exploratory Factor Analysis (EFA) was conducted. The reliability of the used questionnaire was assessed by tests for internal consistency, using Cronbach's coefficient alpha. The questionnaire comprises 18 items that are categorized into four factors: Factor 1: Cognitive congruence, Factor 2: Social congruence, Factor 3: Teaching skills in Peer Assisted Learning (PAL) Session, and Factor 4: Professional development.

This questionnaire was composed of four parts. First part is an introduction and consent form for participation agreement of the residents. Second part is demographical characteristics of residents that include gender, age, and year of residency. Third part contained 12 items for assessing residents' satisfaction regarding Peer Assisted Learning as they acted as tutees (Learners) and the fourth part contained 6 items for assessing residents' satisfaction regarding Peer Assisted Learning where the residents acted as tutors (instructors). The proportion was calculated by dividing the number of participants answered specific choice from Likert scale to the total number of participants, then multiplied by 100 to create a proportion of this choice for each item in the scale. The numbers and percentages of scores were used to present the PAL perception.

The questionnaire is in English version since the participants are all professional and can write, understand, read and speak English language.

The questionnaire was constructed using a five-point Likert response scale that ranged from strongly disagree (1) to strongly agree (5). The total PAL perception was calculated by adding the answers for each participant, then calculating the Mean and standard deviation.

The researcher sent the prepared self-explanatory online Google survey to the residents. The residents filled up the online survey after the agreement of participation in the study and the researcher collected the online data. Privacy and confidentiality were ensured during completion of the questionnaire.

Data analysis

Data was entered by the researcher into the statistical software package SPSS version 26. Data were presented as both mean and standard deviation of each item. Descriptive statistics such as frequency and percentage were completed to describe participants' demographic characteristics. Independent *t*-test was used to examine the difference between two means of continuous variables. ANOVA test was utilized to examine the difference between more than two means of continuous variables. Statistically significant was considered at *p*-value <0.05. EFA was performed to assess the construct validity. The reliability of the scale was evaluated using Cronbach's coefficient alpha.

Ethical considerations

The following ethical considerations were respected during the study:

- (1) The official approval was obtained from the (IRB) at FCMS.
- (2) The official approval from the director of Emergency Medicine Residency Program in Makkah region was obtained through E-mail.
- (3) All the participants agreed voluntarily to be part of this study knowing that they had the right to withdraw at any time.
- (4) No influence was practiced on the study participants to force them to participate in the research.
- (5) Participants of the study were informed about the aims of the study and were kept updated with any changes in the research.
- (6) All the personal data were kept confidential, in addition the data were collected anonymously.

Results

The result is divided into 3 sections

- (1) *First section:* Analysis of demographic data
- (2) *Second section:* Descriptive statistics
- (3) *Third section:* The Psychometric properties of the PAL questionnaire through EFA and Reliability Analysis.

First section: demographic data. Table 1 showed that less than half of studied students (42.3%) aged 25-27 years. More than half of the participants (60.0%) were male. Slightly more than one quarter of participants (27.7%) were at first year of residency. More than half of participants (63.1%) acted as learner and instructor in Peer Assisted Learning sessions.

Variables	N	%	Peer assisted learning in residency program
<i>Age in years</i>			
- 25-27	55	42.3	
- >27-≤30	48	36.9	
- <30	27	20.8	
<i>Gender</i>			
- Male	78	60.0	
- Female	52	40.0	
<i>Residency years</i>			
- 1st year	36	27.7	
- 2nd year	33	25.4	
- 3rd year	27	20.8	
- 4th year	17	13.1	
- Graduated	17	13.1	
<i>Role in PAL sessions</i>			
- Peer tutee (learner)	41	31.5	
- Peer tutor (instructor)	7	5.4	
- Both	82	63.1	

Source(s): Table by authors

Table 1.
Demographic characteristics of the studied participants

Second section: descriptive statistics. Table 2 shows the perception of the residents related to their roles as “learner” in Peer Assisted Learning. 83.0% of the participants revealed that they felt comfortable to share ideas and they were satisfied with the teacher role of peers. Furthermore, 82.3% revealed that they were satisfied with Peer Assisted Learning as an effective method of learning. Moreover, the residents emphasized that the sessions were interesting and they felt relaxed to ask questions (81.5% and 80.8%, respectively).

Table 3 shows the perception of the residents related to their roles as “instructor” in PAL sessions. 81.5% agreed that Peer Assisted Learning enhanced their communication skills followed by 80.8% agreeing that Peer Assisted Learning helped them in personal and professional development. In addition, 76.9% agreed that Peer Assisted Learning enhanced teaching skills. Whereas 69.2% stated that Peer Assisted Learning decreased their anxiety to present in front of others.

Statements	Disagree		Not sure		Agree	
	N	%	N	%	N	%
1. The sessions were interesting	10	7.6	14	10.8	106	81.5
2. I feel relaxed to ask questions	9	6.9	16	12.3	105	80.8
3. My peer manner matches my level of understanding	6	4.6	21	16.2	103	79.3
4. The sessions were interactive	14	10.8	14	10.8	102	78.4
5. The sessions were relevant to real experience	10	7.7	17	13.1	103	79.3
6. I'm satisfied with the contents covered in PAL	8	6.1	23	17.7	99	76.2
7. I was comfortable to share my ideas	5	3.8	17	13.1	108	83
8. I feel easy to communicate with peer when compared to regular instructor/consultant	9	6.9	23	17.7	98	75.3
9. I found PAL similar or more informative than classical lectures	13	10	34	26.2	83	63.8
10. I found the teacher role of peers was effective	4	3.1	18	13.8	108	83
11. Peer tutors understand problems and challenges faced us	7	5.4	24	18.5	99	76.2
12. In general, I found it an effective method of learning	9	6.9	14	10.8	107	82.3

Source(s): Table by authors

Table 2.
Perception of the residents as tutees (learners) in PAL sessions

There were statistically significant differences of residents' perceptions of Peer Assisted Learning in relation to their age. There was statistically significant differences of residents' perceptions of Peer Assisted Learning between students who aged less than 30 years (25–27, and $>27 \leq 30$) and those aged more than 30 years ($p = 0.001$). Furthermore, there were statistically significant differences of residents' perceptions of Peer Assisted Learning in relation to their roles in Peer Assisted Learning sessions. It also showed that there were statistically significant differences of residents' perceptions of Peer Assisted Learning between residents who were learners in PAL sessions and those who were learners and instructors in Peer Assisted Learning sessions ($p = 0.001$). In other words, residents who acted as learners and instructors in Peer Assisted Learning sessions were more satisfied with Peer Assisted Learning than those who acted as learners only in Peer Assisted Learning sessions.

However, the data revealed that there were no statistically significant differences of the perceptions of residents regarding Peer Assisted Learning in relation to their gender ($p = 0.28$). Moreover, there was no statistically significant differences of residents' perceptions of Peer Assisted Learning in relation to their study year ($p = 0.07$).

Third section: the psychometric properties of the PAL satisfaction questionnaire through EFA and reliability analysis.

1. Exploratory factor analysis

The correlation matrix showed statistically significant, moderate correlations among the observed variables that were used in the analysis. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity was 0.82 and Bartlett's test of sphericity was statistically significant ($p < 0.000$) as shown in Table 4.

The Principal Components Analysis (PCA) with varimax rotation was conducted to identify and interpret the number of factors. The results showed that the 18 items of the questionnaire yielded 4 factors (as shown in Table 5) with an eigenvalue >1.00 . The 4 factors that resulted from the factor analysis accounted for 61.11% of the total variance. These results indicated that questionnaire has a good structure validity. The four factors are labeled as the following: Factor 1: Cognitive congruence, Factor 2: Social congruence; Factor 3: Teaching skills in Peer Assisted Learning Session; and Factor 4: Professional development.

Table 3. Perception of the residents as tutors (instructors) in PAL session

Statements	Disagree		Not sure		Agree	
	N	%	N	%	N	%
1. PAL decreased my anxiety to present in front of others	3	2.3	37	28.5	90	69.2
2. PAL improved my clinical knowledge	12	9.2	23	17.7	95	73.1
3. PAL enhanced my communication skills	5	3.8	19	14.6	106	81.5
4. PAL enhanced my teaching skills	5	3.8	25	19.2	100	76.9
5. PAL helped in my personal and professional development	3	2.3	22	16.9	105	80.8
6. PAL helped me to review and reflect on my previous clinical experience	4	3.1	30	23.1	96	73.8

Source(s): Table by authors

Table 4. Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of PAL questionnaire

Kaiser-Meyer-Olkin measure of sampling adequacy		0.829
Bartlett's test of sphericity	Approx. Chi-Square	1014.795
	df	153
	Sig	0.000

Source(s): Table by authors

Rotated component matrix Items	1	2	3	4	Factor labeling
12- In general, I found it an effective method of learning	0.727				F1: Cognitive congruence
7- I was comfortable to share my ideas	0.720				
10- I found the teacher role of peers was effective	0.709				
11- Peer tutors understand problems and challenges faced us	0.686				
8- I feel easy to communicate with peer when compared to regular instructor/consultant	0.628				
9- I found PAL similar or more informative than classical lectures	0.496				
5- The sessions were relevant to real experience		0.806			F2: Social congruence
3- My peer manner matches my level of understanding		0.741			
6- I'm satisfied with the contents covered in PAL		0.739			
2- I feel relaxed to ask questions		0.661			
4- The sessions were interactive		0.638			
1- The sessions were interesting		0.469			
16- PAL enhanced my teaching skills			0.837		F3: Teaching skills in PAL Session
15- PAL enhanced my communication skills			0.797		
13- PAL decreased my anxiety to present in front of others			0.651		
17- PAL helped in my personal and professional development				0.520	F4: Professional development
18- PAL helped me to review and reflect on my previous clinical experience				0.769	
PAL improved my clinical knowledge				0.595	

Note(s): Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Source(s): Table by authors

Table 5.
Factor structure of PAL satisfaction questionnaire, using PCA

2. Reliability Analysis

The overall Cronbach's alpha for the total PAL items was 0.882. This result indicates adequate internal consistency (reliability). Alpha levels did not increase with deletion of any item.

Discussion

This study aimed to measure the perception of the residents regarding peer assisted learning in emergency medicine residency program as well as assessing the psychometric properties of the questionnaire used as the research tool.

To test the construct validity of the PAL satisfaction questionnaire, both EFA and reliability analysis were conducted. The EFA was conducted by using PCA with varimax rotation. The data showed that PAL questionnaire is categorized into four factors. These factors were: cognitive congruence, social congruence, teaching skills and professional development.

In the current study 82.3% of the residents found Peer Assisted Learning to be an effective method of learning and that result is consistent with the results of a study done by [Nunnink, Thompson, Alsaba, and Brazil \(2021\)](#) which assessed the satisfaction of medical students regarding Peer Assisted Learning in simulation-based medical education at Bond University and University of Queensland (UQ). The previous study revealed that 92% of medical

students stated that they were satisfied with PAL sessions and that they would recommend the Peer Assisted Learning sessions to their peers. In addition, this finding is consistent with findings of another study conducted by [Jauregui et al. \(2018\)](#) at University of Washington School of Medicine, Department of Emergency Medicine, Seattle which found that 88% of the Fourth-year medical students were satisfied with PAL sessions and learning with their peers.

The previous study also revealed that 74% of the participants found the peer-guided sessions to be more interactive than previously experienced faculty facilitated sessions and that finding is congruent with the findings of the current study as 75.3% of residents stated that it is easy to communicate with peers when compared to a regular instructor/consultant and 63% of the residents found Peer Assisted Learning sessions similar or more informative than classical sessions by instructors.

The current study is consistent with another study conducted by [Veerabhadrapppa et al. \(2021\)](#), on undergraduate year 3 students at the Faculty of Dentistry, SEGi University, Malaysia. As 70% of the dental students revealed that they were satisfied with Peer Assisted Learning as an independent teaching methodology and 80% of them agreed that they have benefited from Peer Assisted Learning session and find it useful. The previous findings are consistent with the findings of the current study as 82.3% of residents perceived Peer Assisted Learning as an effective method of learning.

In addition, 75% of dental students in the same study stated that they have understood what has been taught by the tutor and that is consistent with the current study as 79.3% of the residents stated that their peer tutor manners match their level of understanding. Furthermore, 60% of dental students were able to clarify their doubts with the peer tutor. The previous finding is consistent with the current study as 80.8% of residents felt relaxed to ask questions.

In the current study 69.2% of the residents revealed that Peer Assisted Learning decreased their anxiety to present in front of others and 75.3% revealed that they felt easy to communicate with peers when compared to a regular instructor. The previous findings are consistent with another study conducted at Ball State University by [Weidner and Popp \(2007\)](#) for identifying students' perceptions of Peer Assisted Learning, where 70.4% of the participants revealed that they were less anxious in the presence of peer tutors than in front of an instructor. In addition, 51.8% of the participant stated that being taught by peer tutors increases their interaction and collaboration with other students more than being taught by an instructor.

The current study findings were somewhat similar to a study done by [Latjatih et al. \(2022\)](#), who studied medical students' perception as well as their satisfaction on Peer Assisted Learning in formative Objective Structured Clinical Examination (OSCE) and stated that majority of the participants were satisfied and positively perceived Peer Assisted Learning as useful strategy.

The current study is consistent with [Usman and Jamil, \(2019\)](#) who studied perceptions of undergraduate medical students about Peer Assisted Learning at Peshawar Medical College which reported that students felt easy to communicate with peers as compared to facilitator as this statement had the highest response.

Another study by [Burgess, Dorman et al. \(2016\)](#) about peer tutoring in a medical school, revealed that the learning environment fostered by the tutors promoted supportive interactions between the tutors and tutees that encouraged confidence for both groups of students ([Burgess, Dorman et al., 2016](#)).

In the current study, it was observed that majority of residents agreed that Peer Assisted Learning helped in personal and professional development and enhanced their teaching skills. This is consistent with results of [Tayem et al. \(2015\)](#), who studied medical students' perceptions regarding peer assessment in a Problem-based Learning (PBL) Curriculum and concluded that communication skills, collaborative skills and students' analytical skills were improved by peer assessment ([Tayem et al., 2015](#)).

On the other hand, the current study findings were inconsistent with a study conducted by [Sevenhuysen, Thorpe, Molloy, Keating, and Haines \(2017\)](#), which revealed that both educators and students prefer traditional clinical education to a Peer Assisted Learning model ([Sevenhuysen et al., 2017](#)).

Limitation of the study: the authors used only quantitative measures. Thus, further studies using qualitative measure is recommended. Number of students included is from only one residency programs with limited sample size, findings cannot be generalized to entire residency program population as data were generated from a single residency program, no control group used to exclude some bias.

Conclusion

The study established good reliability and construct validity of PAL questionnaire after measuring the different types of construct validity evidences through EFA and reliability analysis. From the residents' perspective, the residents were satisfied with Peer Assisted Learning as an effective method of learning thus more sessions could be considered in the future. They recognized the importance of Peer Assisted Learning in enhancing their communication skills and for their personal and professional development.

References

- Abed, R. A. R., Gomma, N. H., & Nasser, A. A. (2021). Using of peer assisted learning to conduct pre-training situational analysis for nurse intern. *Journal of Ecophysiology and Occupational Health*, 21(2), 83–89.
- Akbar, A., Ayub, M. N., Atif, M., Jawad, H., Mumtaz, H., & Iftikhar, T. (2022). Peer assisted learning; the perspective of peer tutors. *Annals of PIMS-Shaheed Zulfiqar Ali Bhutto Medical University*, 18(3), 201–211.
- Amer, M. G., Althaqafi, R. M., Assiri, S. A., Alsufyani, A., Alrubaei, F. S., & Mohamed, N. M. (2020). Peer-assisted learning: Undergraduate medical students' perception and satisfaction. *Millenium-Journal of Education, Technologies, and Health*, 16, 11–22.
- Burgess, A., Dornan, T., Clarke, A. J., Menezes, A., & Mellis, C. (2016). Peer tutoring in a medical school: Perceptions of tutors and tutees. *BMC Medical Education*, 16, 1–7.
- Hunt, T., Jones, T. A., & Carney, P. A. (2020). Peer-assisted learning in dental students' patient case evaluations: An assessment of reciprocal learning. *Journal of Dental Education*, 84(3), 343–349.
- Jauregui, J., Bright, S., Strote, J., & Shandro, J. (2018). A novel approach to medical student peer-assisted learning through case-based simulations. *Western Journal of Emergency Medicine*, 19(1), 193.
- Latjatih, N. H. F., Roslan, N. S., Jahn Kassim, P. S., & Adam, S. K. (2022). Medical students' perception and satisfaction on peer-assisted learning in formative OSCE and its effectiveness in improving clinical competencies. *Journal of Applied Research in Higher Education*, 14(1), 171–179.
- Mills, J. K., Dalleywater, W. J., & Tischler, V. (2014). An assessment of student satisfaction with peer teaching of clinical communication skills. *BMC Medical Education*, 14, 1–5.
- Nunnink, L., Thompson, A., Alsaba, N., & Brazil, V. (2021). Peer-assisted learning in simulation-based medical education: A mixed-methods exploratory study. *BMJ Simulation and Technology Enhanced Learning*, 7(5), 366.
- Senthamarai, S. (2018). Conceptual framework for study 3 the present study is based on the conceptual framework of the reflective teaching model for reading comprehension (RTMRC) involving four main steps: Planning, acting, reflecting, and evaluating. In this reflective model RT. *Journal of Applied and Advanced Research*, 3(S1), 36.

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- Sevenhuysen, S., Thorpe, J., Molloy, E., Keating, J., & Haines, T. (2017). Peer-assisted learning in education of allied health professional students in the clinical setting: A systematic review. *Journal of Allied Health, 46*(1), 26–35.
- Soriano-Moreno, A. N., Delgado-Raygada, J. E., Peralta, C. I., Serrano-Díaz, E. S., Canaza-Apaza, J. M., & Toro-Huamanchumo, C. J. (2020). Perception of medical students about courses based on peer-assisted learning in five Peruvian universities. *BMC Research Notes, 13*(1), 1–6.
- Tayem, Y. I., James, H., Al-Khaja, K. A., Razzak, R. L., Potu, B. K., & Sequeira, R. P. (2015). Medical students' perceptions of peer assessment in a problem-based learning curriculum. *Sultan Qaboos University Medical Journal, 15*(3), e376.
- Türkben, T. (2019). The effects of interactive teaching strategies on speaking skills of students learning Turkish as a second language. *Journal of Language and Linguistic Studies, 15*(3), 1011–1031.
- Usman, R., & Jamil, B. (2019). Perceptions of undergraduate medical students about peer assisted learning. *The Professional Medical Journal, 26*(08), 1283–1288.
- Veerabhadrapa, S. K., Ramalu, D. S., Jin, E. Y. S., Lyn, F. S., Valautham, D., Ramamurthy, P. H., . . . , & Yadav, S. (2021). Effectiveness of online peer assisted learning as a teaching methodology for dental undergraduate students. *Educacion Medica, 22*(6), 320–324.
- Weidner, T. G., & Popp, J. K. (2007). Peer-assisted learning and orthopaedic evaluation psychomotor skills. *Journal of Athletic Training, 42*(1), 113–119.
- Yang, M. M., Golden, B. P., Cameron, K. A., Gard, L., Bierman, J. A., Evans, D. B., & Henschen, B. L. (2022). Learning through teaching: Peer teaching and mentoring experiences among third-year medical students. *Teaching and Learning in Medicine, 34*(4), 360–367.

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