



## ORIGINAL ARTICLE

## Investigating the peer assisted teaching on students' perception of the clinical learning environment in operating room

## التحقق من التدريس بمساعدة الأقران حول إدراك الطلاب لبيئة التعلم السريرية في غرفة العمليات

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**Background:** The clinical learning environment is very important in the medical and other related disciplines such as operating room technicians. Since working in the operating rooms requires a lot of abilities and skills, the perception of the clinical learning environment may be a suitable indicator to evaluate the effectiveness of the implemented training. Some believe that the use of peer training programs can improve skills as well as the students' perception of the clinical learning environment. This study was conducted to investigate the peer assisted teaching on students' perception of clinical learning environment in operating rooms.

**Method:** A semi-experimental study with two group was conducted on 42 operating room students of Mashhad University of Medical Sciences. Students were randomly allocated to intervention and control groups. During the internship period, the control group was trained only under the supervision of the training instructor but the intervention group benefited from peer training in addition. At the end of the internship, both groups were asked to complete Iranian Measure of Operating Theatre Educational Climate (IMOTEC) questionnaire. Then the data were analyzed by SPSS software using independent t-tests and two-way ANNOVA.

**Results:** The results of the two-way ANNOVA test showed that the mean score of the clinical learning environment questionnaire among two groups were significantly different, showing the impact of peer assisted learning program on students' perception of clinical learning environment ( $p \leq 0.05$ ).

**Conclusion:** Considering the benefits of peer assisted learning on students' perception of clinical learning environment, it can be integrated to operating room education program.

**Keywords:** Operating Room Technicians, Teaching Methods, Learning Environment, Peer Assisted Learning, Students

**الخلفية:** تعد بيئة التعلم السريري مهمة جداً في التخصصات الطبية وغيرها من التخصصات ذات الصلة مثل فنيي غرف العمليات. وبما أن العمل في غرف العمليات يتطلب الكثير من القدرات والمهارات، فإن إدراك بيئة التعلم السريري قد يكون مؤشراً مناسباً لتقييم فعالية التدريب المطبق. يعتقد البعض أن استخدام برامج تدريب الأقران يمكن أن يحسن المهارات وكذلك إدراك الطلاب لبيئة التعلم السريرية. أجريت هذه الدراسة لمعرفة تأثير التدريس بمساعدة الأقران على إدراك الطلاب لبيئة التعلم السريري في غرف العمليات.

**الطريقة:** تم إجراء دراسة شبه تجريبية مع مجموعتين على 42 طالباً من طلاب غرفة العمليات بجامعة مشهد للعلوم الطبية. تم توزيع الطلاب بشكل عشوائي على مجموعتين فقط تحت إشراف مدرب التدريب ولكن مجموعة التدخل استفادت من تدريب الأقران بالإضافة إلى ذلك. وفي نهاية فترة التدريب، طُلب من كلا المجموعتين إكمال استبيان القياس الإيراني للمناخ التعليمي لمسرح العمليات (IMOTEC). ثم تم تحليل البيانات بواسطة برنامج SPSS باستخدام اختبارات t المستقلة وتحليل التباين ثنائي الاتجاه.

**النتائج:** أظهرت نتائج اختبار التباين الثنائي (ANNOVA) أن متوسط درجات استبيان بيئة التعلم السريري بين المجموعتين كان مختلفاً بشكل كبير، مما يدل على تأثير برنامج التعلم بمساعدة الأقران على إدراك الطلاب لبيئة التعلم السريري ( $P > 0.05$ ).

**الاستنتاج:** بالنظر إلى فوائد التعلم بمساعدة الأقران على إدراك الطلاب لبيئة التعلم السريرية، يمكن دمجها في برنامج التعليم في غرفة العمليات. الكلمات المفتاحية: فنيو غرفة العمليات، طرق التدريس، بيئة التعلم، التعلم بمساعدة الأقران، الطلاب

## تأثير آموزش مبتنی بر همتایان بر ادراك دانشجویان از محیط یادگیری بالینی در دانشجویان کارشناسی اتاق عمل دانشگاه علوم پزشکی مشهد

## آپریننگ روم میں کلینیکل سیکھنے کے ماحول کے بارے میں طلباء کے تاثرات پر ہم مرتبہ معاون تدریس کی چھان بین

**زمینه و هدف:** محیط یادگیری بالینی در آموزش دانشجویان علوم پزشکی بسیار حائز اهمیت است. پژوهش حاضر با هدف تعیین تاثیر آموزش مبتنی بر همتایان بر ادراك دانشجویان از محیط یادگیری بالینی اتاق عمل در دانشجویان کارشناسی رشته اتاق عمل دانشگاه علوم پزشکی مشهد در سال تحصیلی ۱۴۰۲ اجرا شده است.

**روش:** مطالعه‌ی حاضر از نوع نیمه تجربی با دو گروه مداخله و شاهد بر روی ۴۲ نفر از دانشجویان کارشناسی (نیمسال سوم و پنجم) اتاق عمل دانشگاه علوم پزشکی مشهد صورت گرفت. گروه مداخله در طول دوره کارآموزی علاوه بر آموزش مرسوم از آموزش همتایان که دانشجویان نیمسال هفتم بودند نیز بهره‌مند شدند و گروه شاهد فقط زیر نظر مربی کارآموزی آموزش دیدند. در پایان دوره کارآموزی، از هر دو گروه خواسته شد تا پرسشنامه ادراك از محیط یادگیری بالینی را تکمیل کنند. اطلاعات توسط نرم‌افزار spss26 با آزمون-های تی مستقل و آنالیز واریانس دوطرفه مورد تجزیه و تحلیل قرار گرفت و سطح معناداری  $p < 0.05$  در نظر گرفته شد.

**یافته‌ها:** نتایج آزمون تی مستقل نشان داد، میانگین نمره پرسشنامه ادراك از محیط یادگیری بالینی در دو گروه مداخله و شاهد با یکدیگر تفاوت معناداری دارند. نتیجه تحلیل آزمون واریانس دوطرفه بیانگر تاثیر برنامه آموزش همتایان بر ادراك دانشجویان از محیط یادگیری بالینی می‌باشد.

**نتیجه‌گیری:** به کارگیری برنامه آموزشی همتا می‌تواند موجب ارتقا دانش و مهارت دانشجویان رشته اتاق عمل بدون صرف هزینه اضافی شود. کاربرد این روش هم برای دانشجویان و هم برای همتایان مفید است و می‌توان از این رویکرد به عنوان یک نظام مشارکتی و اثربخش در جهت حمایت و رشد توانمندی دانشجویان اتاق عمل استفاده کرد.

**واژه های کلیدی:** دانشجویان، یادگیری با کمک همتا، محیط یادگیری، تکنیسین اتاق عمل، روشهای تدریس

**پس منظر:** طبی اور دیگر متعلقه شعبوں جیسے آپریننگ روم ٹیکنیشنز میں طبی سیکھنے کا ماحول بہت اہم ہے۔ چونکہ آپریننگ رومز میں کام کرنے کے لیے بہت زیادہ صلاحیتوں اور مہارتوں کی ضرورت ہوتی ہے، اس لیے کلینیکل سیکھنے کے ماحول کا ادراك عمل میں لائی گئی تربیت کی تاثیر کو جانچنے کے لیے ایک مناسب اشارہ ہو سکتا ہے۔ کچھ کا خیال ہے کہ ہم مرتبہ تربیتی پروگراموں کا استعمال مہارتوں کے ساتھ ساتھ طبی سیکھنے کے ماحول کے بارے میں طالب علموں کے تاثر کو بہتر بنا سکتا ہے۔ یہ مطالعہ آپریننگ کمروں میں کلینیکل سیکھنے کے ماحول کے بارے میں طلباء کے تاثرات کے بارے میں ہم مرتبہ معاون تدریس کی تحقیقات کے لیے کیا گیا تھا۔

**طریقہ:** دو گروپوں کے ساتھ ایک نیم تجرباتی مطالعہ مشہد یونیورسٹی آف میڈیکل سائنسز کے ۴۲ آپریننگ روم طلباء پر کیا گیا۔ طلباء کو تصادفی طور پر مداخلت اور کنٹرول گروپوں میں مختص کیا گیا تھا۔ انٹرن شپ کی مدت کے دوران، کنٹرول گروپ کو صرف ٹریننگ انسٹرکٹر کی نگرانی میں تربیت دی گئی تھی لیکن مداخلت کرنے والے گروپ کو اس کے علاوہ ہم مرتبہ کی تربیت سے بھی فائدہ ہوا۔ انٹرن شپ کے اختتام پر، دونوں گروپوں سے کہا گیا کہ وہ آپریننگ تھیٹر لیجوکیشنل کلائمیٹ (IMOTEC) کے ایرانی پیمائش کو مکمل کریں۔ پھر ڈیٹا کا تجزیہ SPSS سافٹ ویئر کے ذریعے آزاد ٹی ٹیسٹ اور دو طرفہ ANNOVA کے ذریعے کیا گیا۔

**نتائج:** دو طرفہ ANNOVA ٹیسٹ کے نتائج نے ظاہر کیا کہ دو گروپوں کے درمیان کلینیکل لرننگ ماحول کے سوالنامے کا اوسط اسکور نمایاں طور پر مختلف تھا، جو کلینیکل لرننگ ماحول کے بارے میں طلباء کے تاثرات پر ہم مرتبہ معاون سیکھنے کے پروگرام کے اثرات کو ظاہر کرتا ہے ( $p \leq 0.05$ )۔

**نتیجہ:** کلینیکل سیکھنے کے ماحول کے بارے میں طلباء کے تاثرات پر ہم مرتبہ معاون سیکھنے کے فوائد کو مدنظر رکھتے ہوئے، اسے آپریننگ روم لیجوکیشن پروگرام میں ضم کیا جا سکتا ہے۔

**مطلوبہ الفاظ:** آپریننگ روم ٹیکنیشنز، طریقہ تدریس، سیکھنے کا ماحول، ہم مرتبہ کی مدد سے سیکھنے، طلباء

## INTRODUCTION

Learning in the clinical field is complex and may be influenced by many factors including the learning environment (1). The necessity for an improved clinical learning environment for students has been emphasized by many studies (2). An important part of the education time for health related disciplines, such as nursing, operating room technicians, and so on, is dedicated to training in the clinical learning environment, and it is essential to focus on their learning needs to provide them with opportunities for excellency and confidence in delivering clinical care (3).

One of the clinical learning environments for many medical sciences students is the operating theatre, which is usually complex and technically settings where patients are exposed to various risks (4). It's the responsibility of the professionals working in operating room to ensure the safety of the patients (5). The technical nature of operating rooms and some aspects of nursing care in this environment, present various challenges for both professionals and students working in such environments. This includes the need to be familiar with many technical details, while also requiring effective communication between operating room staff, instructors, and students. This highlights the importance of focusing on the quality of clinical education in such settings (6). Given the aforementioned points, it seems necessary to conduct further studies on the perception of students about the clinical learning environment.

Applying a peer assisted training program may be a practical way to improve the perception of students about clinical learning environment and reducing students' stress in such educational environments. Additionally, this educational approach can enhance students' professional capabilities and create supportive and nurturing relationships between a more experienced person and a learner. This method of learning also has other benefits, including gaining insights, improving communications, and recognizing the learning challenges of peers, ultimately leading to more effective learning experiences (7). Learning from peers is a situation where individuals from the same social groups as the students, who are not professional educators, help students learn from this teaching, themselves (8). In recent years, there's been more attention on mentoring concept among students, using it as a way to prevent anxiety, confusion, promote active learning, and create a positive environment for learning. It also fosters responsibility, boosts confidence, and develops interactions among students (9). Peer assisted learning in nursing education is very important; in this approach, students benefit simultaneously as both teachers and learners. This method encourages active learning and makes students take more responsibility for their own learning. It enhances social relationships among students, increases their confidence, and promotes greater accountability for their future responsibilities. Additionally, it extends the psychological and personal aspects and addresses the educational needs of students, serving as a suitable model for students' roles (10). This study was conducted to investigate a peer assisted teaching program on operating room technician students' perception of clinical

learning environment in operating theatres at Mashhad University of Medical Sciences (Iran).

## METHODS

This was a semi-experimental study conducted on two groups, intervention and control. The study environment included the operating theatres of educational hospitals affiliated with Mashhad University of Medical Sciences (Imam Reza and Hasheminejad hospitals of Mashhad city) in Iran. The population of this research comprised undergraduate operating room technician students at Mashhad University of Medical Sciences in 2022-2023 academic year. The students were invited to participate in the study and if they agreed, they would sign a written consent. The trainee students who were at 2<sup>nd</sup> or 3<sup>rd</sup> year of their education, grouped into internship groups (Each consisting five members) as junior or mentees. The students in 4<sup>th</sup> year of their education participated as senior peers or mentors for junior groups. Then, the internship groups were randomly assigned to the intervention or control groups.

The data collection tool was a questionnaire consisting of two sections: demographic questions and a questionnaire assessing the perception of the clinical learning environment known as Iranian Measure of Operating Theatre Educational Climate (IMOTEC). The validity and reliability of this questionnaire were approved, previously (11).

This questionnaire included five dimensions: Coaching, support and backing, workload, learning opportunities, and interaction with operating theatre staff. Each of these dimensions contained questions that the student had to answer by choosing one of the options provided for each question.

Briefing sessions for senior students, who would take on the mentor role in the intervention group, were held before the internships of junior students began. The criteria to select senior peer students were based on their performance in previous internships, GPA, and the opinions of the department head and other faculty of operating room department of nursing school. Then, checklists based on the internship plan and job descriptions for junior students were prepared and provided to the senior peers as a roadmap to support and guide junior students on their learning opportunities and tasks. On average, each internship group of five was supervised by three senior peers. The training of intervention group lasted two weeks; during this training process, the intervention group students benefited from both traditional teaching by the faculty instructors and the guidance and supervision of their senior peers. On the last day of the internship, the research tool was administered to the junior students. They were asked to fill out the questionnaire carefully. After gathering the data, analysis was conducted using SPSS software, version 20. The normality of the data was assessed using the Kolmogorov-Smirnov test, and based on the results, appropriate tests were employed. The significance level in this study was considered as  $p \leq 0.05$ .

## RESULTS

Out of 42 junior participants in this study, 13 (31%) were male and 29 (69%) as female. The mean age of participants

was as  $21.31 \pm 1.63$ . Among the mentee students, there were 19 (45.2%) as 2<sup>nd</sup> year and 24 (54.8%) as 3<sup>rd</sup> year and all of mentor students were at 4<sup>th</sup> year of their education. Other results of the study are shown in tables 1 to 3.

As shown in table 3, the independent variables (group and IMOTEC dimensions), along with their interaction effect (group \* dimensions), have a significant impact on the dependent variable, the perception of clinical learning environment which is the total score of IMOTEC questionnaire.

## DISCUSSION

This study aimed to investigate the impact of peer assisted training on students' perception of the operating theatre learning environment. The results of this study showed that there was a significant difference between the mean scores of the IMOTEC questionnaire between the control ( $129.59 \pm 8.71$ ) and intervention ( $106.90 \pm 10.95$ ) groups. This finding means that peer assisted teaching improved students' perception of the operating theatre in clinical learning environment.

Findings from a study conducted by Kizori et al. (2019),

revealed a significant difference in academic achievement between students who learned their clinical courses through active teaching methods (peer-based) and those who were taught using traditional (explanatory) methods. Active teaching methods were found to enhance academic progress in clinical courses. Furthermore, peer-based teaching, as a complementary approach to traditional teaching, improved student learning (12). The results of the present study align with these findings, emphasized the significance of peer involvement in the clinical learning process and adaptation to the clinical learning environment.

Furthermore, a study conducted by Nasiriani et al. (2020) investigated the impact of a combined peer-mentor and clinical supervision program on the status and stressors of nursing education at Yazd School of Nursing and Midwifery. The study findings showed that the mean score for peer-mentor evaluation was 56.42, indicating that peer mentors generally agreed with the peer-mentor and clinical supervision program. This combined program was effective in mitigating clinical stressors to a significant extent (13)."

Hemmati Maslakpak et al. (2013) also found in their study that the use of peer group programs reduced clinical

Table 1. Descriptive statistics of IMOTEC questionnaire score in groups

IMOTEC questionnaire total score	Group	Min.	Max.	Mean (SD)
	Case	117	149	129.59 (8.71)
	Control	83	123	106.9 (10.95)

Table 2. Descriptive statistics of IMOTEC questionnaire dimensions score

IMOTEC questionnaire Dimensions	Group	Min.	Max.	Mean (SD)
Mentoring	Case	60	70	66.59 (3.08)
	Control	39	67	56.70 (8.95)
Support and backing	Case	11	15	12.90 (1.34)
	Control	3	13	9.35 (2.75)
Work load	Case	6	15	11.59 (2.40)
	Control	6	15	10.95 (3.01)
Learning opportunities	Case	16	25	19.81 (2.77)
	Control	9	19	14.20 (2.76)
Interaction with operating theatre staff	Case	14	25	18.68 (2.66)
	Control	8	21	15.70 (3.70)

Table 3. Results of two-way ANOVA

Variable	Source	Sum of square	Mean of square	DF	F	P-value
Score of each IMOTEC dimension	Group	655.743	655.74	1	11.63	0.001
	Dimension	7939.81	18984.80	4	236.80	0.000
	Group*Dimension	879.49	219.87	4	3.90	0.005

stressors for students, and was an effective complementary teaching method for improving clinical education (7). Additionally, the results of Mashalchi et al. (2021) study, which aimed to investigate the impact of mentoring on self-esteem, anxiety, and clinical skills of emergency medical students at Dezful University of Medical Sciences, showed that the use of the mentoring approach led to improved clinical skills, reduced anxiety, and increased self-esteem among students (14)."

However, in Brannagan et al. (2013) study which evaluated the level of clinical self-efficacy among nursing students after implementing a peer based teaching, the results showed that despite students' positive attitudes towards learning through this method, no significant statistical correlation was found between the acquisition of cognitive domain knowledge and clinical self-efficacy in the intervention and control groups (15).

Sharifi et al. (2019) by a systematic review, concluded that the mentoring method in clinical education is effective in improving students' learning, retention, skill acquisition, and clinical competence (16). The findings of the present study are also somewhat consistent with the results of their study. Additionally, the results of a study by Nouhi et al. (2015), which aimed to investigate the impact of implementing mentorship on the educational satisfaction of nursing students at Imam Reza Hospital in Birjand, showed that the implementation of the Mentorship program had a significant impact on the satisfaction of nursing student trainees (17).

## CONCLUSION

The performance of medical professions like medicine, nursing, midwifery, and surgical technologists are related to clinical learning opportunities that can be provided for students by their educators. The perception of students about the clinical learning environment can be an indicator of the quality of such settings, and the efforts done by the educators implement any innovation toward improving the quality of clinical education. Findings of this study showed that applying a peer assisted teaching program in combination with traditional method is an effective and practical way to improve students' perception of clinical learning environment and opportunities which may result in their better performance on clinical situations.

Moreover, the use of this teaching methods is beneficial for senior students as peers, too. They practice one of their future duties as an educator for their novice colleagues in their professional fields. Peer assisted learning is a student-centered pedagogical approach that empowers students to take an active role in their learning process. By fostering a collaborative learning environment, this approach can significantly enhance the skills and knowledge of operating

room technician students. Given the shortage of expert faculty in this field, peer mentorship programs offer a promising solution to address the challenges faced in clinical education. By pairing more experienced students with their peers, these programs can provide opportunities for skill development, mentorship, and peer feedback. To ensure the success of a peer mentorship program, it is essential to carefully select and train peer mentors. Ideal peer mentors should possess strong clinical skills, effective communication abilities, and a commitment to teaching. Additionally, the program should include a structured framework for mentoring activities, regular evaluations, and ongoing support for both mentors and mentees. While peer mentorship programs offer numerous benefits, it is important to acknowledge potential challenges such as the need for ongoing training and support for peer mentors, as well as the importance of addressing any power dynamics that may arise within mentor-mentee relationships.

Considering that the majority of existing studies on peer teaching have focused on nursing and medical students, there is a compelling need for further investigations into the efficacy of peer teaching programs within the context of operating room technician education. Future studies should adopt a multifaceted approach, incorporating the perspectives of students, peer mentors, and instructors to comprehensively assess the impact of peer teaching on students' clinical competence, confidence, and overall satisfaction with the learning experience. By comparing the outcomes of peer teaching programs with traditional instructional methods, researchers can gain valuable insights into the unique benefits and challenges associated with this pedagogical approach.

**Ethical considerations:** Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. The ethics committee of Mashhad University of Medical Sciences approved this research, ethics code: IR.MUMS.MEDICAL.REC.1402.016

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