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ORIGINAL RESEARCH

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Peer review for handoff education in a transition to residency course: A prospective cohort study

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Abstract

Background and Aims: Association of American Medical Colleges (AAMC) and Accreditation Council for Graduate Medical Education (ACGME) mandate training in handoff delivery for students and residents. Communication errors, including errors during handoffs of patient care, account for over 2/3 of sentinel events. This study aims to assess the effectiveness of peer-assisted learning (PAL) in handoff education within a longitudinal framework.

Methods: This study involved the analysis of fourth-year medical students ($n = 67$) enrolled in a transition to residency program designed to reinforce skills essential for success in internal medicine residencies. We modified the I-PASS handoff rubric for a single-encounter evaluation. Before attending the transitions of care workshop, students submitted one written handoff report. During high-fidelity simulation sessions, peers evaluated the written document as well as verbal handoffs, while faculty evaluated a recorded verbal version. The primary outcome measured was improvement in handoff quality and accuracy over time and secondary outcomes compared peer- and self-evaluations to faculty assessments.

Results: Overall, students demonstrated a statistically significant improvement in handoff quality and accuracy across all scoring criteria after completing the peer evaluation process. Peer evaluations did not demonstrate statistically significant differences in scores for quality or accuracy questions as compared to faculty.

Conclusion: Peer evaluators effectively assessed handoff reports using the modified I-PASS checklist yielding outcomes similar to faculty while providing feedback. These findings provide exciting evidence that should prompt training programs to consider incorporating standardized peer review into handoff education for medical students and, potentially, residents. The detailed evaluation of individual handoff events fosters feedback skills essential for ongoing professional growth and clinical excellence.

KEYWORDS

clinical education, curriculum development/evaluation, evaluation/assessment of clinical performance, instructional materials/methods, testing/assessment

1 | INTRODUCTION

Ensuring patient safety necessitates that medical students and resident physicians become adept at providing handoffs that are relevant, accurate, and organized. The handoff process often involves transferring patient care to colleagues who may not be as familiar with the patients, which increases the potential for errors.[1,2] Following the 1984 Libby Zion case, the Accreditation Council for Graduate Medical Education (ACGME) introduced an 80-hour workweek limit to address provider fatigue and reduce patient harm. This resulted in an increased number of potential handoffs.[2,3] To promote effective communication in high reliability organizations (HRO), both the ACGME and Association of American Medical Colleges (AAMC) mandate training of residents and students, respectively, in transitions of care.[4] Despite these measures, communication errors, including errors during handoffs of patient care, continue to account for over 2/3 of sentinel events.[5,6]

In response to these educational mandates, various studies have detailed formal curricula and investigated clinical and workflow outcomes such as time required to complete handoff, resulting medical errors or preventable adverse events, and overall quality of handoff.[1,4,5,7–9] Mnemonics were created to foster effective and standardized handoffs. Iterations of the SIGNOUT and IPASSTHEBATON have resulted in the widely adopted I-PASS mnemonic.[5] Implementation of this I-PASS curriculum, as studied by Starmer et al., demonstrated a 23% reduction in medical errors and a 30% decrease in preventable adverse events, establishing a causal link between the I-PASS handoff bundle and improved patient safety without significantly increasing the time spent contacting patients and family, editing the handoff document, or writing printed handoff reports within a 24 h period.[5,8]

Focusing specifically on fourth-year medical student education, Burns et al. studied verbal communication with the I-PASS mnemonic during a transition to residency (TTR) program and demonstrated an increase in self-perceived preparedness to deliver high-quality and thorough signout.[7] Attempts to quantify long-term outcomes of including I-PASS handoff education during TTR programs on intern performance have been hampered by low response rates, preventing these studies from achieving statistical power.[7] Furthermore, these programs have primarily been faculty-led educational experiences.[3–5,10]

The use of peer-assisted learning (PAL) broadly in medical student education offers notable advantages, such as reduced physician time commitments, cost savings, fewer scheduling constraints, and increased comfort among peers in giving and receiving constructive feedback.[11–14] In other areas of medical education including clinical simulations, PAL has shown equivalent improvements in knowledge and understanding as compared to faculty-led teaching.[12,13] Notably, Joyce et al. utilized PAL with

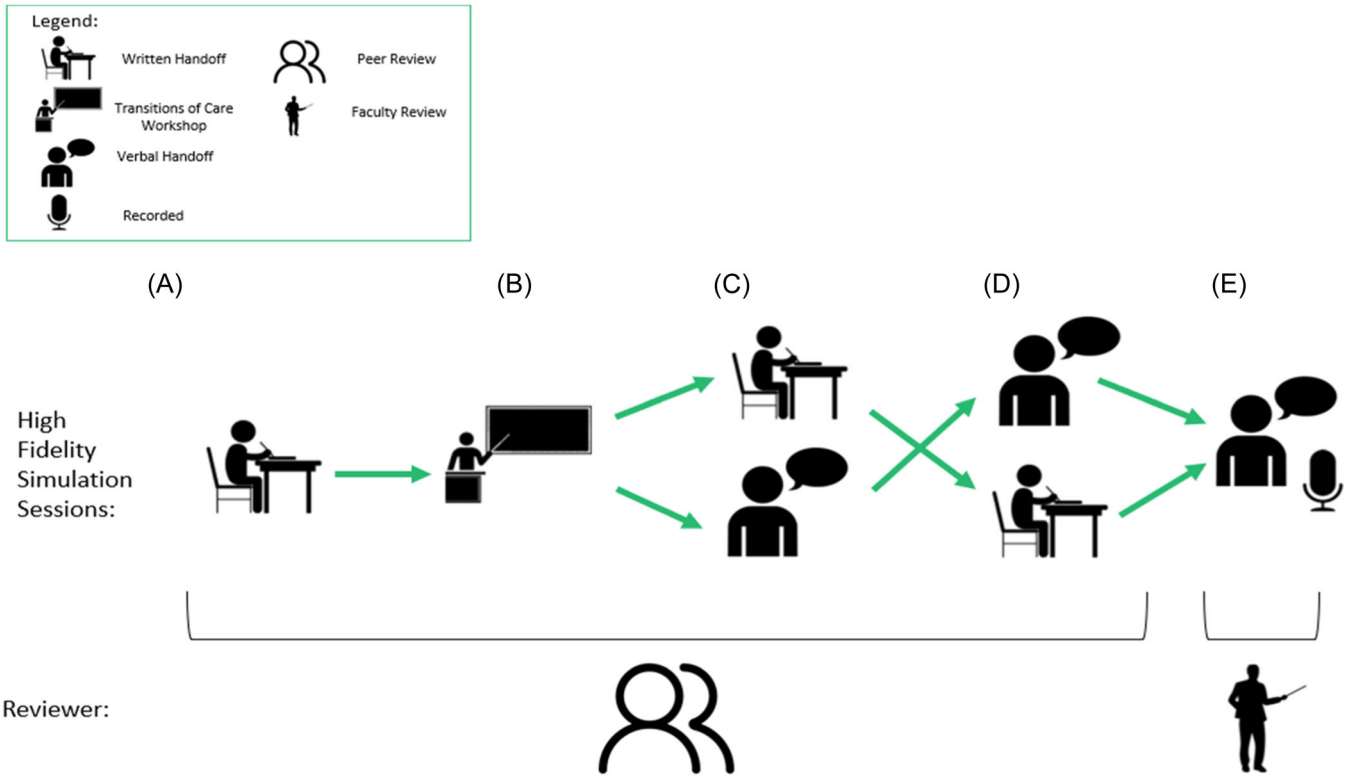

FIGURE 1 Study design depicting (A) students performing high-fidelity handoff simulation in written format before undergoing TTR workshop (B). Students then gave both written and verbal handoffs (C, D); finally, students recorded verbal handoffs (E). Evaluations were completed by peers (A–D), faculty (E), and self (B). TTR, transition to residency.

TABLE 1 Each question is asked on the I-PASS handout for faculty, peer, and self-evaluation.

Question	Answer choices	Preworkshop mean score	Postwork-shop mean score	Unpaired 2-sample *t*-test	Cohen's *D*
Please indicate whether each element of the I-PASS mnemonic is present: Illness severity Identification as stable, "watcher," or unstable; must occur at the beginning of each patient handoff	• Yes (1) • No (0)	0.34	0.96	$p < 0.001$	1.68
Please indicate whether each element of the I-PASS mnemonic is present: Patient summary Might include a summary statement, events leading up to admission, hospital course, ongoing assessment, plan	• Yes • No	0.94	1.00	$p = 0.06$	0.34
Please indicate whether each element of the I-PASS mnemonic is present: Action list A to-do list (must be separated from patient summary)	• Yes • No	0.76	0.98	$p < 0.001$	0.66
Please indicate whether each element of the I-PASS mnemonic is present: Situation awareness/ contingency planning Know what's going on; plan for what might happen	• Yes • No	0.57	0.98	$p < 0.001$	1.08
Please indicate whether each element of the I-PASS mnemonic is present: Synthesis by receiver Giver prompted the receiver to summarize what was heard during verbal handoff	• Yes • No	0.19	0.98	$p < 0.001$	2.59
Quality of handoff information transferred: Plan included Patient summary includes clearly specified plan for the remainder of the admission	• Strongly agree (5) • Agree (4) • Undecided (3) • Disagree (2) • Strongly disagree (1)	3.81	4.72	$p < 0.001$	1.10
Quality of handoff information transferred: Format To-do items with clear if/then format when appropriate	• Strongly agree • Agree • Undecided • Disagree • Strongly disagree	3.25	4.77	$p < 0.001$	1.54
Quality of handoff information transferred: Relevant The to-do list clearly specifies or is restricted to items that should be accomplished on the next shift	• Strongly agree • Agree • Undecided • Disagree • Strongly disagree	3.59	4.74	$p < 0.001$	1.25
Quality of handoff information transferred: Plan quality High-quality contingency plans documented with a clear if/then format	• Strongly agree • Agree • Undecided • Disagree • Strongly disagree	3.07	4.65	$p < 0.001$	1.58
Quality of handoff information transferred: Miscommunications Miscommunications or transfer of erroneous information occurred	• Strongly agree • Agree • Undecided • DisagreeStrongly disagree	1.96	1.95	$p = 0.97$	−0.01
Quality of handoff information transferred: Omissions Omissions of important information occurred	• Strongly agree • Agree • Undecided • Disagree • Strongly disagree	2.46	1.88	$p = 0.01$	−0.45

(Continues)

TABLE 1 (Continued)

Question	Answer choices	Preworkshop mean score	Postwork-shop mean score	Unpaired 2-sample *t*-test	Cohen's *D*
Quality of handoff information transferred: Tangential Tangential or unrelated information was provided	• Strongly agree • Agree • Undecided • Disagree • Strongly disagree	1.88	1.81	$p = 0.71$	−0.07
Accuracy of illness severity assessment	• Unable to evaluate (0) • Poor (1) • Fair (2) • Good (3) • Very good (4) • Excellent (5)	3.62	4.77	$p < 0.001$	1.26
Quality of patient summary	• Unable to evaluate • Poor • Fair • Good • Very good • Excellent	0.52	4.72	$p < 0.001$	1.23
What term BEST describes your impression of the length of the written handoff document?	• Very abbreviated length (1) • Abbreviated length (2) • Appropriate length (3) • Excessive length (2) • Very excessive length (1)	0.53	2.79	$p < 0.001$	0.66

Note: Based on the I-PASS handoff rubric, then modified for a single-event evaluation, each handoff was scored for five proportionate (binary), seven I-PASS questions, 10 Likert scale questions about quality and accuracy of handoff, and three free-response criteria. Additionally, the options available for answer choices, mean preworkshop score, and mean post-TTR workshop score, as well as analysis of these peer reviews using a two-sample unpaired *t*-test (α value of 0.05) of the peer evaluations. The effect size was then found using Cohen's *D* value.

Abbreviation: TTR, transition to residency.

direct observation and feedback by a single peer in a cohort of 30 fourth-year students, before they entered pediatric residency.[1] Although this study evaluated the handoff quality based on the inclusion of a primary problem, acuity, and plan, it did not evaluate the quality of peer feedback, did not distinguish between medical students entering non-pediatric specialties, and failed to achieve statistical power.[1]

We hypothesized that applying PAL to TTR handoff education can enhance handoff knowledge, provide equivalent feedback, and strengthen feedback skills crucial for continued growth during residency. Our study aimed to evaluate the use of PAL in handoff education during an internal medicine TTR program for fourth-year medical students in a longitudinal format over the 2-week course. The primary outcome was an improvement in handoff quality and accuracy. Secondary outcomes were (1) a comparison of peer evaluations to faculty- and self-evaluations, including analysis of individual components for discrepancies between reviewer types, and (2) peers individually modifying their scores for each evaluation.

2 | MATERIALS AND METHODS

2.1 | Settings and participants

This study was conducted in 2022 at a medical school affiliated with an academic Level 1 trauma center in central New Jersey. A total of 67 students were enrolled in a mandatory 2-week internal medicine TTR course. These sessions were designed to bridge students to their upcoming responsibilities as residents.

2.2 | Program description

We employed a longitudinal evaluation pattern that emphasized deliberate practice for handoffs (Figure 1). Initially, a prospective cohort of students wrote a handoff based on a written history and physical (H&P) to establish a baseline assessment. This submission was evaluated by peers using an I-PASS rubric. Following this, students participated in a workshop featuring a resident-led didactic

session and small group discussions focused on effective handoffs. Subsequently, students composed a second written handoff which was evaluated both by the original author and a peer evaluator.

During the 2-week course, students engaged in three high-fidelity simulations, delivering verbal handoff after each simulation. For the first two simulations, each student was paired with a peer who used the I-PASS rubric described below to evaluate the handoff and provide feedback. After the final simulation, each student recorded a verbal handoff, which was subsequently evaluated by a faculty or resident facilitator using the I-PASS rubric. Facilitator evaluations, blinded to prior peer-review feedback, served as the reference standard.

2.3 | Program evaluation—Modification of I-PASS handoff rubric

The I-PASS handoff rubric, originally designed for global assessment of a set of resident handoffs, was modified for single-encounter evaluation.[5] Each handoff was scored using five binary I-PASS component questions and 10 questions assessing the quality and accuracy of the handoff on a 5-point Likert scale (Table 1). This handoff rubric was used for peer, faculty, and self-evaluations. The primary outcome of the study was improvement in handoff quality and accuracy over time. Secondary outcomes included (1) differences in peer evaluations with respect to faculty- and self-evaluations and (2) peers individually modifying their scores for each evaluation.

2.4 | Statistical analysis

A descriptive overview of the data, along with an estimate of effect size, was generated by graphing the combined peer and faculty reviews from all time points using Matlab and think-cell. Additionally, for formal effect size calculation, Cohen's *D* value mean scores were calculated for each handoff question comparing before and after TTR workshop peer evaluations where evaluations from the third and fourth-time points were classified together as postworkshop. These Cohen's *D* values were calculated in Microsoft Excel© with all functions available in base software.

To account for progress over the course of the workshop, statistical analysis was completed separately in Matlab for appropriate data handling, such as analyzing peer evaluations, specifically from SIM3 to the facilitator evaluations (post-work). Similarly, peer- and self-evaluations for the same handoff were substratified.

Given all statistical analyses were reliability measures, all outcomes were prespecified. I-PASS component questions were analyzed using a two-tailed Fischer-exact test for two proportions (binary scale) with an *a priori* 5% significance level using the

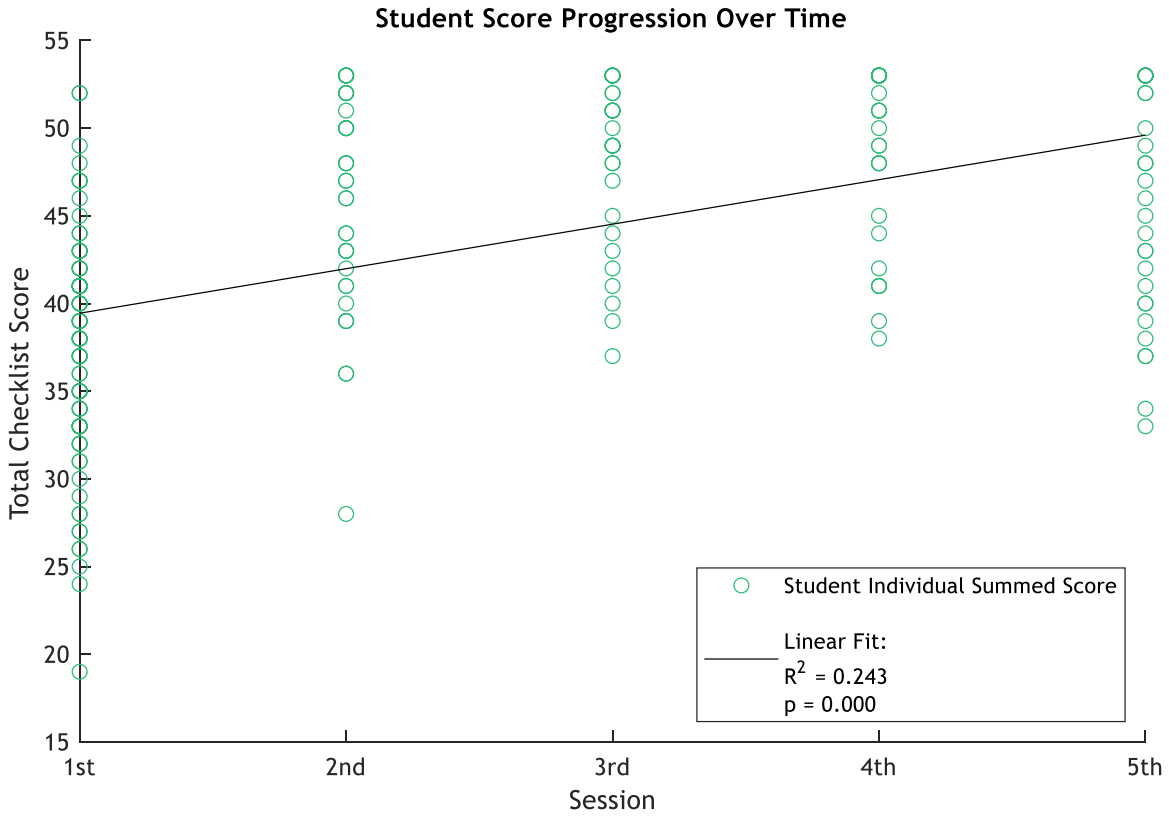

FIGURE 2 Student total scores were calculated by summing all values from the rubric (including both proportionate and I-PASS questions). These total scores were then analyzed using linear regression, providing statistically significant results ($p < 0.05$) that student scores positively correlated with time.

Fishertest() function.[2] I-PASS quality questions were analyzed using a chi-squared analysis of independence (5-point Likert scale) with an a priori 5% significance level using the crosstab() function.[2] Individual peer reviewer analysis for individual statistical variation for each review was completed with a modified Fleiss-kappa value for inter-rater reliability.[15]

All the above analyses were completed using Matlab© (2021a, The MathWorks Inc.) with all functions available in the base software.[16]

3 | RESULTS

Students ($n = 67$) achieved a statistically significant improvement in handoff quality and accuracy for the summed score overall 15 criteria as well as each individual criteria after completing the TTR program with this longitudinal evaluation process ($p < 0.001$) (Figure 2). The mean increase was 8.0682 out of a possible 55 points.

Overall, students performed well in their handoffs as evaluated by both peers and faculty across all SIM workshops (Figure 3). Specifically, peer evaluations ($n = 67$) did not show significant differences in scores for either I-PASS or quality-accuracy questions as compared to facilitator evaluations for any scoring criteria when comparing verbal handoffs given after SIM3 and post-work (Figure 4). The largest observed difference was for the question assessing whether students provided a to-do list for the recipient, though this difference was not statistically significant.

Self-evaluations ($n = 15$), as compared to peers for the same written handoff, showed no significant differences in the quality and accuracy of questions except for questions regarding contingency planning and illness severity, where self-evaluators were statistically more lenient than their peers (Figure 5).

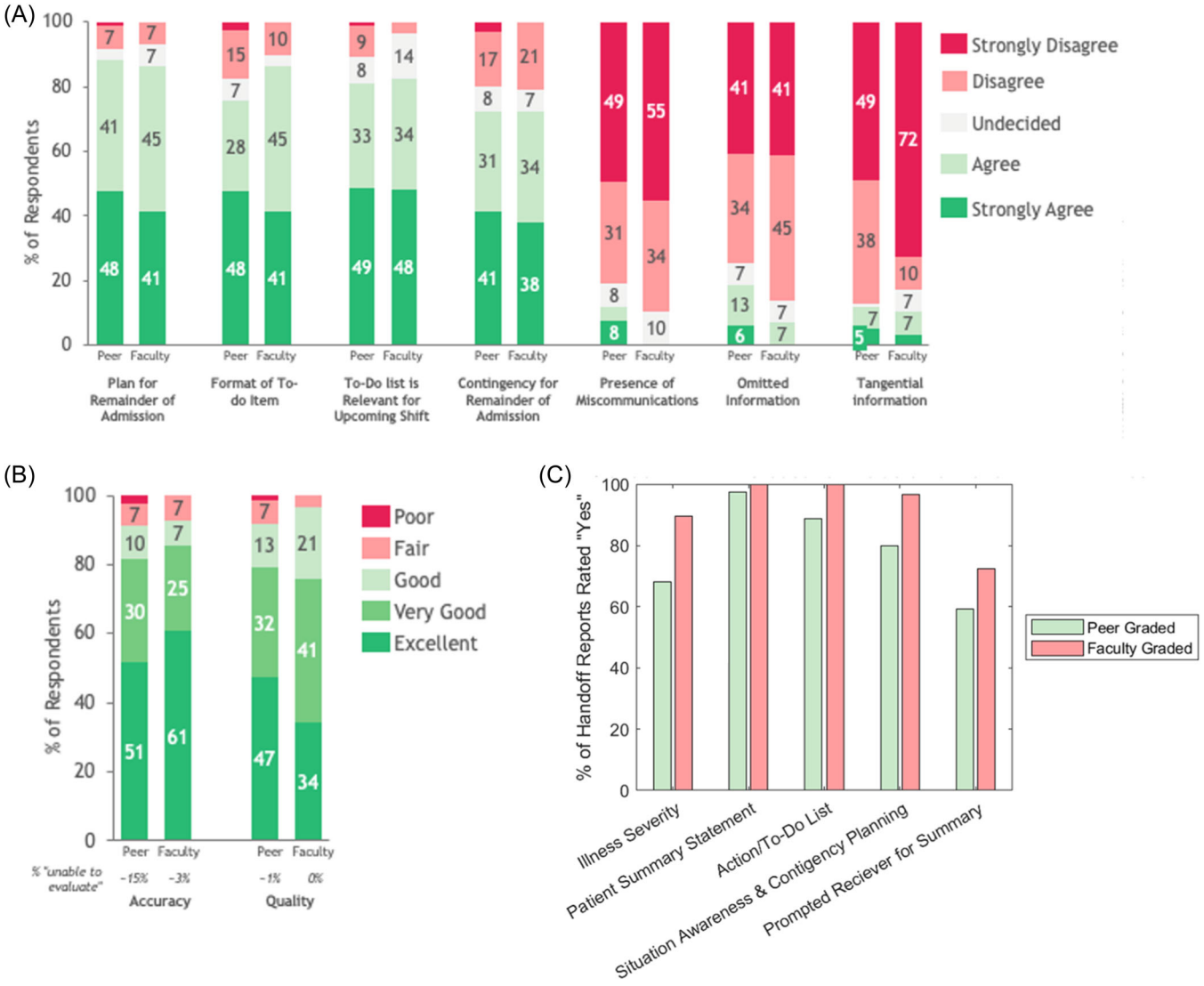

FIGURE 3 Summarized individual scores (across all time points) reviewed by both peers and faculty for I-PASS individual outcomes (A) and overall accuracy and quality (B) to give a broader perspective of the data set before in-depth statistical review. (C) Summarized individual scores reviewed by both peers and faculty for proportionate questions to give a broader perspective of the data set before in-depth statistical review.

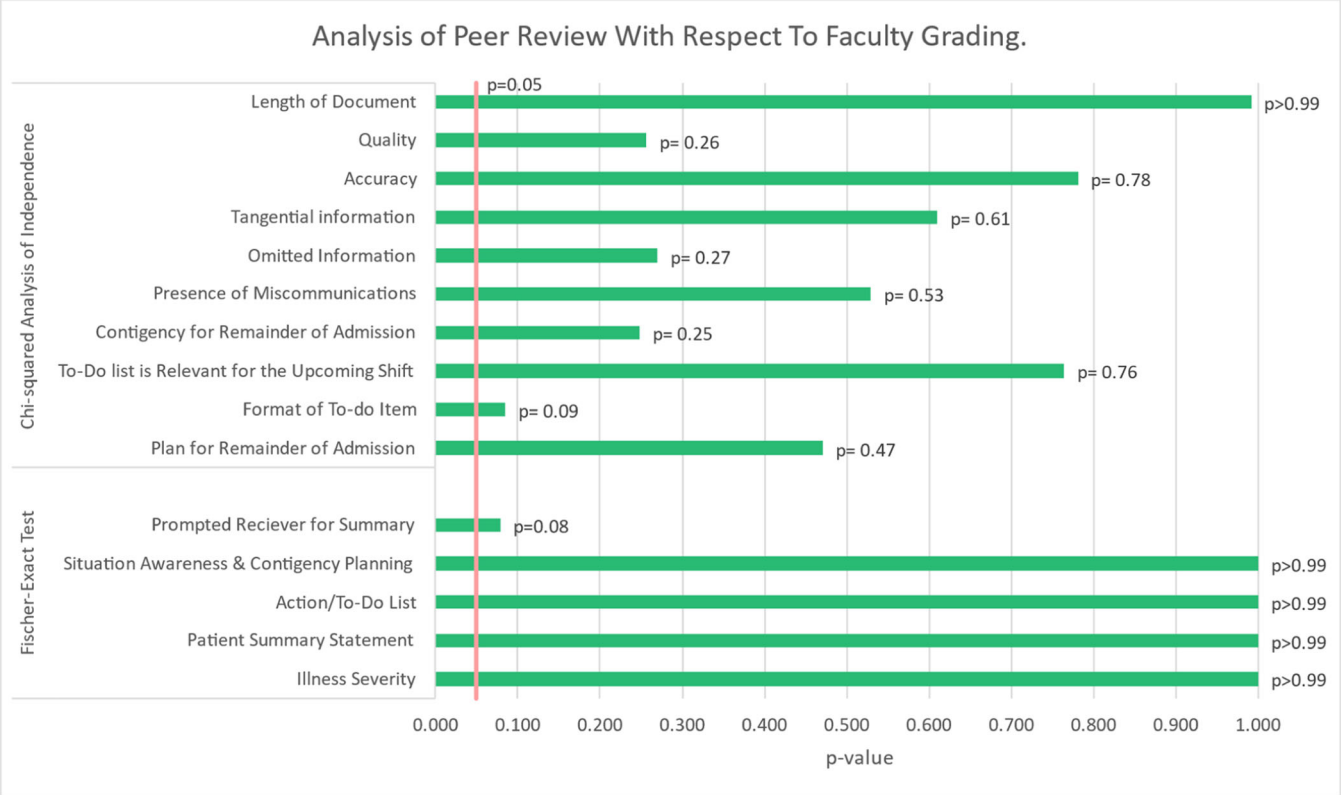

FIGURE 4 Student scoring by peers with respect to faculty was analyzed across all grading criteria using both chi-squared and Fischer-exact analysis. The *p* values from these analyses for each question can be seen with a cutoff of $p = 0.05$ given as a vertical bar. These results indicate that no statistically significant difference could be found between the peer reviews.

Each peer reviewer was individually analyzed to assess whether they were giving identical grades to all evaluations or individually modifying their responses. For most questions, each peer reviewer was individually changing their evaluation (Figure 6). However, for tangential information and presence of miscommunication, reviewers had a higher probability of providing the same evaluations across different students.

4 | DISCUSSION

To address the rising need for standardized education on handoff communication resulting from the evolution toward shift schedules, the I-PASS handoff technique has been integrated into both the residency and medical school curricula.[4,5,8] Our study aimed to leverage the advantages of PAL and peer review to teach handoffs using a modified I-PASS rubric. This longitudinal practice format integrating PAL effectively improved students' handoff quality and accuracy across all categories over the 2-week TTR course.

Improvements were observed over each individual peer review session with both written and verbal feedback formats. The differences between peer and faculty evaluations were negligible, indicating that peers provided feedback comparable to that of faculty. This similarity in feedback, particularly in the last verbal peer evaluation compared to the facilitator evaluation, suggests that PAL could be a practical solution when faculty resources are limited. However, self-evaluators were more lenient as compared to peer reviewers in contingency planning and illness severity. While our students were given a minimum primer on how to utilize the rubric, additional efforts to establish a shared understanding of adequate contingency plans may further increase interrater reliability. Previous studies noted large discrepancies between self-evaluation and faculty review in both preclinical and clinical performance.[17,18] The limited scope of handoff activities in our study may have limited subjective variations.

Regarding the additional secondary outcome, we found that peers were taking the time to individualize their feedback for each submission. In instances where peer reviewers were more likely to provide similar feedback, further studies are needed to determine whether students were performing equivalently to their peers or if reviewers were less discerning in these criteria.

A recent study in BMC Medical Education found that peer review for team-based learning in second-year medical students was inadequate due to a lack of engagement in the feedback process, leading to mistrust.[19] In contrast, our study showed that peers invested time and effort in modifying their feedback for each student. This engagement could be attributed to the growing familiarity with handoffs, increased comfort with the rubric, or the

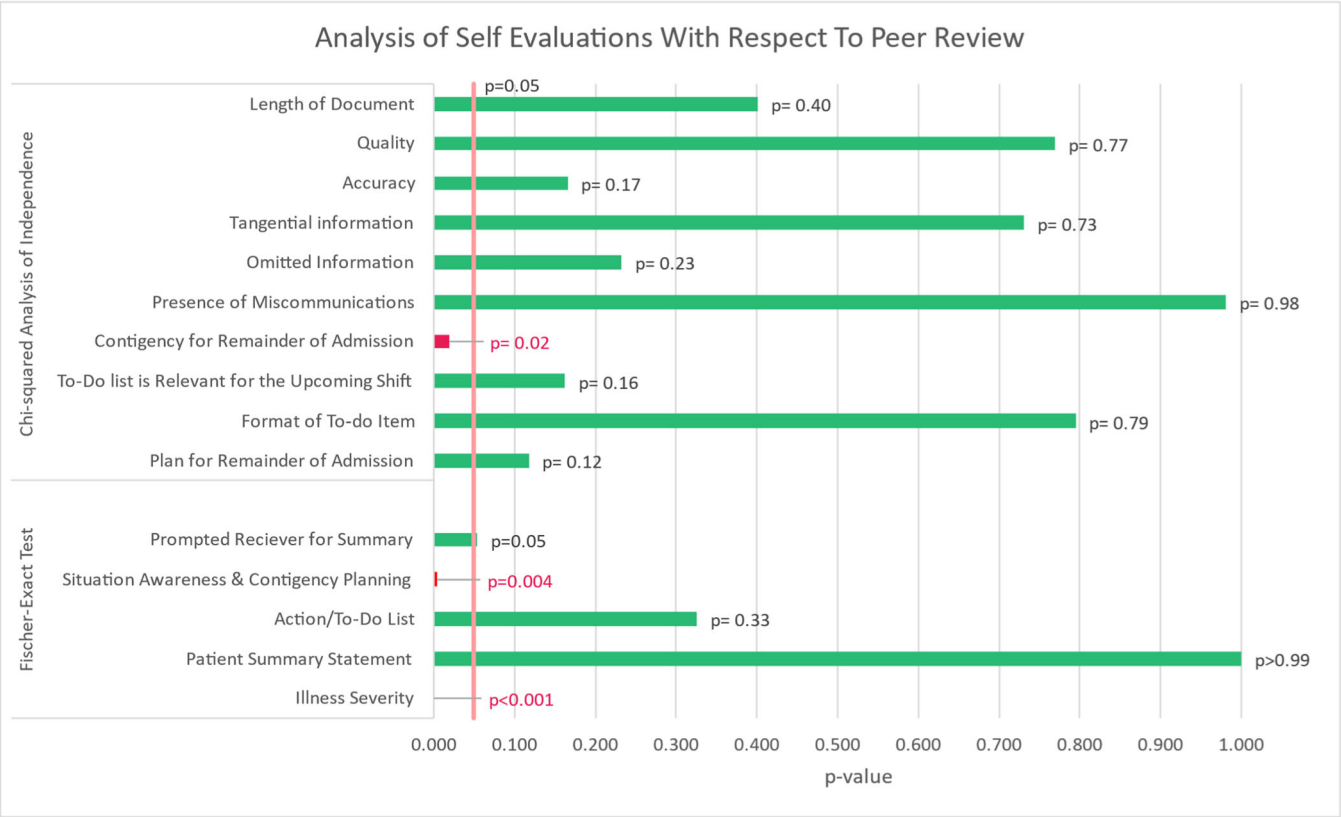

FIGURE 5 Student scoring through self-evaluation with respect to peer was analyzed across all grading criteria using both chi-squared and Fischer-exact analysis. Self-evaluation scores differed significantly from faculty review for quality of contingency planning in both binary evaluation as well as on a 5-point scale. Additionally, scoring differed regarding the inclusion of illness severity on a yes/no scale.

limited scope of the activity. These results suggest that fourth-year medical students in TTR programs are appropriately engaged in the feedback process, likely due to the importance and imminence of using this skill.

Training programs should consider incorporating a standardized peer review into handoff education for medical students and, perhaps, residents. Our study is the largest study to date on PAL for handoff education and contributes to the broader discussion and shift toward PAL in medical education. The I-PASS rubric can be effectively used at both medical student and resident levels. We recommend the inclusion of our modified I-PASS rubric for both peer and self-review in both fourth-year medical student and intern year boot camps.

Detailed evaluation of individual handoff encounters may help develop the necessary feedback skills for continued growth and excellence as clinicians, although this was not directly studied here. Studies have shown that PAL can improve individuals' ability to critically analyze themselves, a skill that allows residents to use learning strategies with individualized educational objectives.[12] PAL, which enhances comfort with delivering feedback, can provide continuous feedback for interns with limited faculty involvement.[12,14] Communication skills developed through PAL also benefit patients. The integration of a "teacher-learner duality" into handoff education has far-reaching implications throughout residency.[14] Thus, we also recommend the inclusion of detailed feedback in boot camp sessions comparing self-evaluations to faculty reviews.

PAL aligns with constructivist social learning theories suggesting that students develop greater psychological insight into the learning challenges being experienced by their cohort.[12] Increased comfort with providing and receiving constructive feedback can create a self-perpetuating loop of continuous growth throughout residency training and beyond. Following the Starmer et al. study that correlated handoffs to patient safety findings, it would be of interest to follow the impact PAL in fourth-year TTR programs on intern year performance as compared to traditional faculty-led teaching.[8]

Regarding the limitations of this study, this was a single institution study and involved mostly internal medicine-bound students, which may limit the generalizability of our results. Second, we had comparatively few self-graded results, as only a few students were able to submit both peer and self-reviews during the workshop activity due to variations between facilitators. While we found few differences between self and peer scores, larger studies of self and peer grading may provide more robust results. Third, the comparison between our peer and faculty ratings was based on verbal handoffs, where the peer evaluation format modality was live and in-person, while the faculty evaluation format was done via recorded reviews.

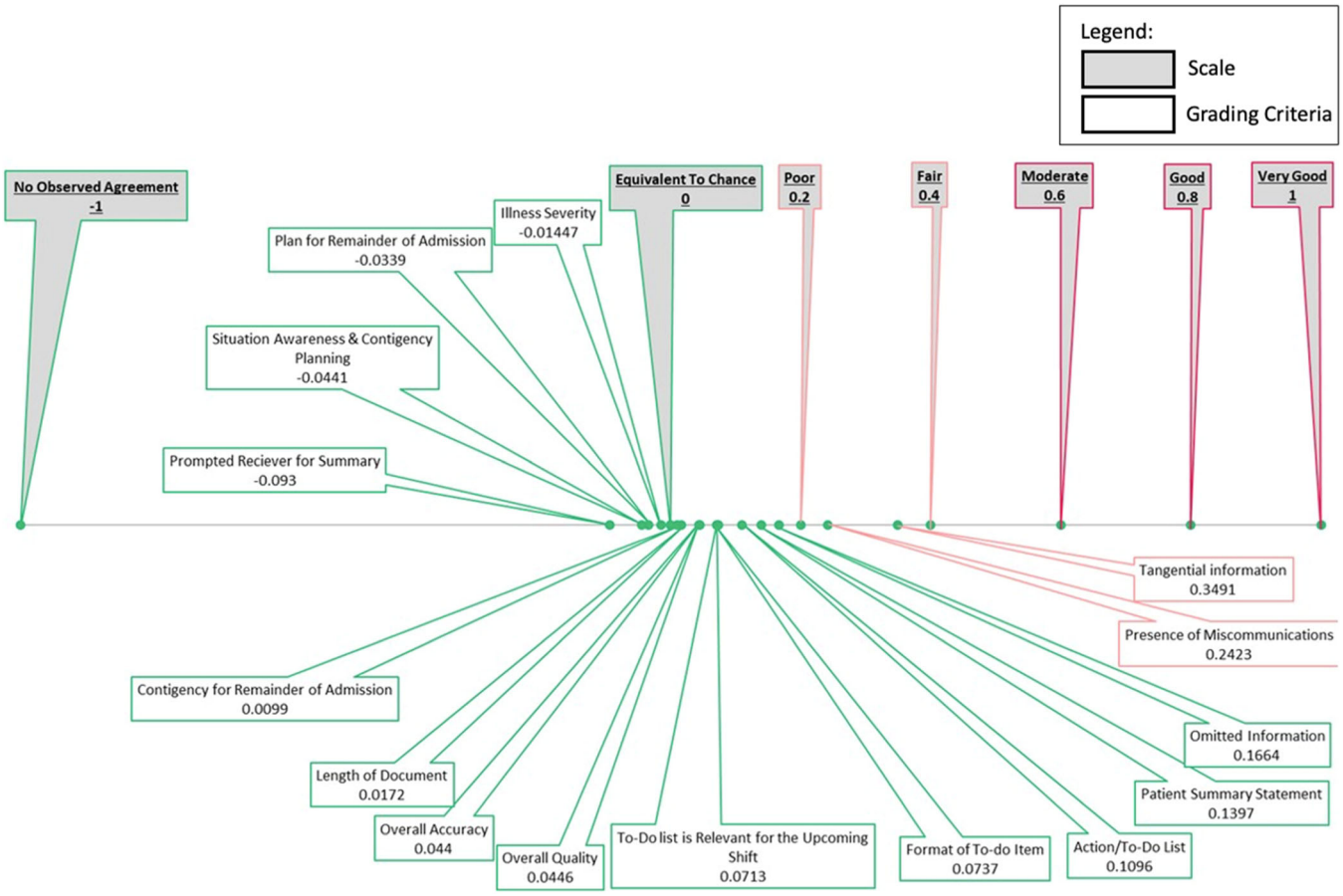

FIGURE 6 Individual analysis of each peer reviewer using a modified Fleiss-kappa value indicated that each reviewer was changing their responses at each time point. Values closer to the right in the above graph indicate that the student was more likely to give the same grade to multiple different handoffs. Subset analysis indicated that peer review had a moderate possibility of repetitive grading by an individual reviewer for tangential information and the presence of miscommunication (categorized under the quality of handoff).

A more accurate comparison might involve peers and faculty evaluating the same recording. Finally, a follow-up study with a control group undergoing the same handoff education without PAL would help to assess the difference in outcomes.

5 | CONCLUSION

Integrating PAL into a longitudinal practice effectively improved medical students' handoff quality and accuracy across all categories over the 2-week TTR course. PAL enhances student learning and further research is needed to explore its application in other aspects of boot camp training and to determine its clinical implications throughout residency.

AUTHOR CONTRIBUTIONS

Rajiv Trehan: Formal analysis; writing—original draft. **Catherine Chen**: Conceptualization; writing—review and editing; supervision; data curation. **Raman Bhalla**: Conceptualization; writing—review and editing; supervision; data curation. All authors have read and approved the final version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

ETHICS STATEMENT

This study was IRB-approved, protocol number Pro2021001058. Informed consent was waived for minimal risk protocol.

TRANSPARENCY STATEMENT

The lead author, Raman Bhalla, affirms that this manuscript is an honest, accurate, and transparent account of the study being

reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned (and if relevant, registered) have been explained.

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REFERENCES

1. Joyce AH. Team-based simulation for medical student handoff education. *MedEdPORTAL [Internet]*. 2016;12:10486. https://www.mededportal.org/doi/abs/10.15766/mep_2374-8265.10486
2. Krajewski A, Filippa D, Staff I, Singh R, Kirton OC. Implementation of an intern boot camp curriculum to address clinical competencies under the new accreditation council for graduate medical education supervision requirements and duty hour restrictions. *JAMA Surg*. 2013;148:727-732.
3. Krishnan S, Kumar N, Diaz E, Thornton I, Ghoddoussi F, Ellis TA. Anesthesiology handoff simulation case: a handoff from intensive care unit to operating room for anesthesiology learners. *MedEdPORTAL*. 2020;16:10887.
4. O'Toole JK, Starmer AJ, Calaman S, et al. I-PASS mentored implementation handoff curriculum: implementation guide and resources. *MedEdPORTAL: AAMC J Teaching Learning Resources*. 2018;14:10736.
5. Starmer AJ, Spector ND, Srivastava R, et al. I-PASS, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129:201-204.
6. The Joint Commission. Sentinel Event Alert 58: inadequate hand-off communication [Internet]. 2017. Accessed December 24, 2021. https://www.jointcommission.org/resources/patient-safety-topics/sentinel-event/sentinel-event-alert-newsletters/sentinel-event-alert-58-inadequate-hand-off-communication/
7. Burns R, Adler M, Mangold K, Trainor J. A brief boot camp for 4th-year medical students entering into pediatric and family medicine residencies. *Cureus [Internet]*. 2016;8(2):e488.
8. Starmer AJ, Spector ND, Srivastava R, et al. Changes in medical errors after implementation of a handoff program. *N Engl J Med*. 2014;371:1803-1812.
9. Davis R, Davis J, Berg K, et al. Patient handoff education: are medical schools catching up? *Am J Med Qual*. 2018;33:140-146.
10. Reyes JA, Greenberg L, Amdur R, Gehring J, Lesky LG. Effect of handoff skills training for students during the medicine clerkship: a quasi-randomized study. *Adv Health Sci Education*. 2016;21:163-173.
11. Hill A, Yu NC, Wilson PP, Hawken DP, Singh SJ, Lemanu AG. Medical students-as-teachers: a systematic review of peer-assisted teaching during medical school. *Adv Med Educ Pract*. 2011;2:157.
12. Guraya SY, Abdalla ME. Determining the effectiveness of peer-assisted learning in medical education: a systematic review and meta-analysis. *J Taibah University Med Sci*. 2020;15:177-184.
13. House J, Choe C, Wourman H, Berg K, Fischer J, Santen S. Efficient and effective use of peer teaching for medical student simulation. *West J Emerg Med*. 2017;18:137-141.
14. Dandavino M, Snell L, Wiseman J. Why medical students should learn how to teach. *Med Teach*. 2009;29:558-565.
15. Zapf A, Castell S, Morawietz L, Karch A. Measuring inter-rater reliability for nominal data: which coefficients and confidence intervals are appropriate? *BMC Med Res Methodol*. 2016;16:93.
16. MATLAB 2021a [Internet]. 3 Apple Hill Drive Natick, MA 01760: The MathWorks Inc.; December 25, 2022. https://www.mathworks.com/help/matlab/ref/rand.ht
17. Tousignant M, DesMarchais JE. Accuracy of student self-assessment ability compared to their own performance in a problem-based learning medical program: a correlation study. *Adv Health Sci Education*. 2002;7:19-27.
18. Woolliscroft JO, TenHaken J, Smith J, Calhoun JG. Medical students' clinical self-assessments: comparisons with external measures of performance and the students; self-assessments of overall performance and effort. *Academic Medicine: J Associa Am Med Colleges*. 1993;68:285-294.
19. Burgess A, Roberts C, Lane AS, et al. Peer review in team-based learning: influencing feedback literacy. *BMC Med Educ*. 2021;21:426.

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