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From Needs Assessment to Near-Peer Orientation: Addressing Learner Gaps in Clinical Skills Before Clerkships

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Abstract

Background: National guidelines task pre-clerkship clinical skills curricula with teaching standardized history-taking, physical examination, clinical reasoning, communication, and procedural skills, yet gaps may exist between pre-clerkship curriculum, and the expectations students face during clinical years. This study aimed to better identify those gaps and whether a targeted intervention can help address them.

Methods: Third-year medical students were surveyed multiple times throughout their core clerkships to identify topics they felt should have been taught during pre-clerkship clinical skills courses and their interest in developing or teaching content for future students. Findings informed a targeted intervention: near-peer-led, optional, 1-hour sessions offered during the incoming third-year clinical skills orientation by the same cohort of now-rising fourth-year instructors. Pre- and post-session surveys assessed procedural preparedness, inpatient equipment

comfort, procedural kit familiarity, understanding of clinical responsibilities, team readiness, electronic medical record (EMR) navigation, and procedural anxiety.

Results: Learner-reported gaps were grouped into five key domains, including equipment, procedures, rounding & communication, EMR navigation, and professional role. Statistically significant improvement was recorded across procedural preparedness, inpatient equipment comfort, procedural kit familiarity, understanding of clinical responsibilities, team readiness, EMR navigation, and procedural anxiety following the third-year clinical skills orientation ($p<0.007$).

Conclusions: Students perceived high value in near-peer-developed and taught in-person sessions. Key gaps in the pre-clerkship clinical skills curriculum were identified. The findings from this study reflect early learner-level outcomes within Kirkpatrick's framework, underscoring the need for future evaluation of behavioral and clinical outcomes.

Keywords: Near-peer teaching; Clinical skills; Undergraduate medical education; Clerkship transition; Curriculum development; Learner preparedness; Needs assessment

Background

Medical schools across the United States have undergone significant curricular shifts in recent years. A national review of AAMC Curriculum Inventory data found notable changes in instructional methods from 2010 to 2020, including a decrease in lecture-based teaching, an increase in collaborative instructional methods, and the transition of USMLE Step 1 to pass/fail

scoring.[1] These changes have heightened the importance of ensuring students are adequately prepared for the clinical environment. Research has shown that students typically perform worse on clerkships that occur early in their training compared with those that occur later, prompting institutions to develop transition-to-clerkship courses to improve readiness.[2] National data show that nearly all U.S. medical schools use multiple hospitals of varying ownership types for required clerkships, with only 3 of 123 schools relying on a single university owned hospital.[3] At large, academic medical centers, this complexity may be particularly pronounced given the number and diversity of affiliated training sites.

Clerkship directors have identified a wide range of competencies that students need before entering clerkships, including communication, professionalism, history-taking, and physical examination skills.[4] This is outlined and guided by institutional and national guidelines to ensure all medical students meet certain criteria,[5] yet 30-50% of clerkship directors felt students were inadequately prepared across multiple competency domains, suggesting persistent gaps in pre-clerkship training.[4] Identifying learner-perceived gaps may help inform targeted educational interventions.[6] Student perceptions can be interpreted in the context of institutional curricula and national guidelines, which may reflect ambiguity in expectations, particularly in pre-clerkship procedural skills training.[4,6]

The AAMC's Core Entrustable Professional Activities (EPAs) for Entering Residency define 13 activities that all graduating medical students should be able to perform without direct supervision on day one of residency. A separate effort developed five EPAs specifically for entry into clerkship (information gathering, information integration for a differential diagnosis and

plan, health care team communication, information sharing with patients, and resource identification).[7,8] Pre-clerkship procedural training is guided by the AAMC's recommended clinical skills competencies. [5] However, accreditation standards for medical education have historically been based on required subject matter and student experiences rather than on observable educational outcomes, a gap identified at the residency-entry level that may similarly apply to the pre-clerkship to clerkship transition and contribute to variability in expectations across institutions.[7]

A descriptive analysis of 30 U.S. transition from pre-clerkship to clerkship courses found that most were brief with 83% lasting one day to one week and commonly covered procedural skills and clinical orientation, but few had explicit goals or student evaluation.[9] One transition-to-clerkship course at Virginia Commonwealth University demonstrated that students who received the intervention had significantly higher summative clerkship performance evaluations (Cohen's d = 0.23-0.62), particularly in early clerkships.[2]

The benefits of near-peer teaching are well-supported in the literature. Peer-assisted learning has emerged as an effective instructional strategy across health professions education, improving teamwork, leadership, self-confidence, and content mastery among both tutors and tutees.[10] Beyond benefitting learners, peer teaching strengthens student-teachers' own subject knowledge, pedagogical skills, communication, and professional identity.[11] Several practical models have demonstrated that structured peer-led activities can enhance engagement and reduce faculty resource burdens with minimal oversight when robust training and review processes are in place.[12-14]

The objective of this study is to evaluate the clinical skills content developed by fourth-year medical students as an indicator of potential pre-clerkship training gaps, and to assess its reception and impact on rising third-year medical students in terms of preparedness, confidence, and anxiety. This work is situated within a large, urban medical school with an integrated systems-based curriculum, a compressed pre-clerkship phase, and continuous clinical skills courses throughout the pre-clerkship phase, a context that may reflect broader national trends and inform curricular development at similar institutions.

Methods

Activity Design and Development

The activity was designed and developed through collaboration with the clinical skills course director and a third-year medical student, along with input from other third-year medical students who had completed clerkships (Figure 1).

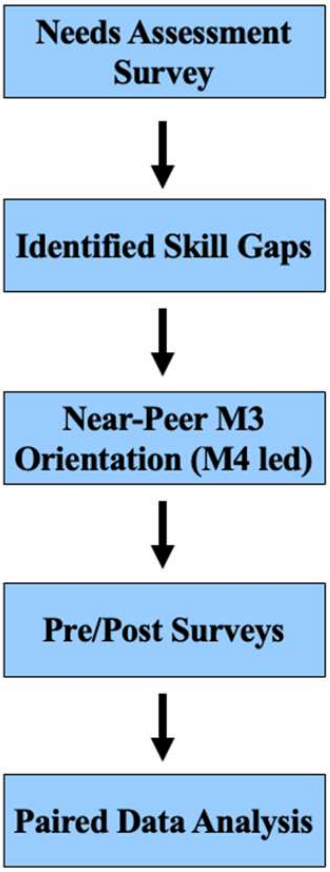


Figure 1. Study design and implementation flowchart. The intervention followed a sequential process from needs assessment to paired data analysis, informing a near-peer, clerkship-specific clinical skills orientation for incoming third-year medical students.

The clinical skills sessions for third-year medical students were developed beginning with a needs assessment survey that was administered four times throughout the year to third-year medical students. This elective and open-ended survey was developed for this study and can be found in the supplemental files titled “Needs Assessment Survey”. The survey asked students to identify the key gaps in their knowledge and determine willingness to serve as near-peer instructors during their fourth-year. The needs assessment results were thematically analyzed and plotted based on the number of times each category was mentioned (Figure 2).

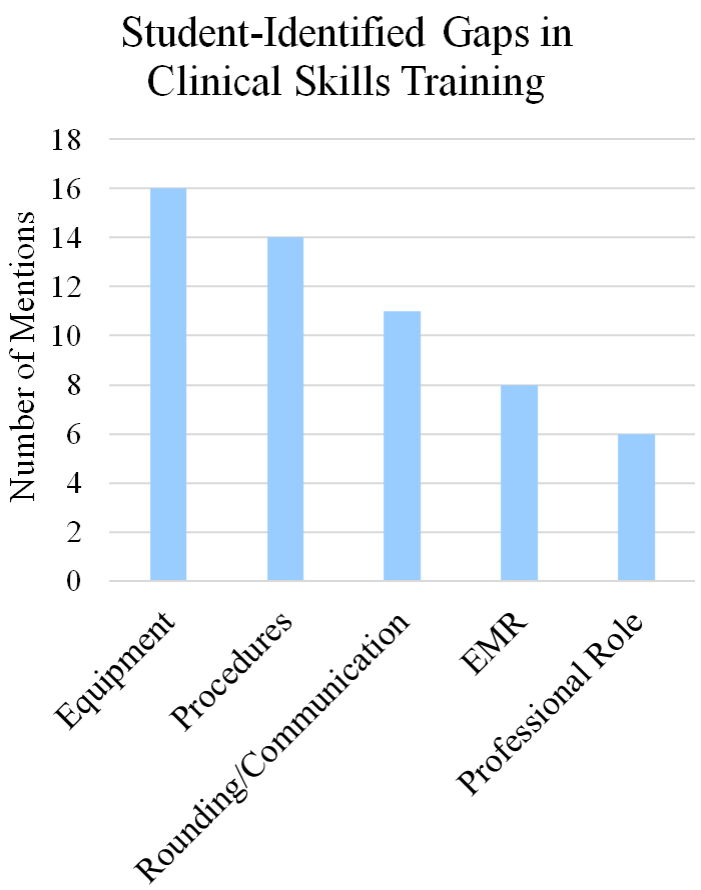


Figure 2. Student-identified gaps in pre-clerkship clinical skills training. Thematic analysis of open-ended needs assessment responses from third-year medical students revealed five key domains: equipment, procedures, rounding and communication, EMR navigation, and professional role. Values represent the number of mentions per domain.

These results informed session development, though fourth-year instructors retained flexibility to prioritize high yield content. Survey responses were grouped into themes of equipment, procedures, rounding & communication, EMR navigation, and professional roles.

Sessions were created based on clinical core clerkships offered to students during their third year. In-person sessions were unanimously preferred by survey responders over simply creating asynchronous materials. This allowed for hands-on use of materials, immediate feedback, and opportunity for mentorship. Utilizing the responses from the needs survey, a list of hands-on-skills and necessary equipment was compiled as a session was developed for each core clerkship.

Curricular Context and Learner Preparation

The activity occurred at the beginning of third-year medical student orientation, prior to the target learner population of third-year medical students beginning their clinical clerkships. The required faculty involved the clinical skills course director, and 12 fourth-year medical students serving as near-peer teachers. Learner prerequisite knowledge included having passed years 1 and 2 of medical school, along with USMLE Step 1. Near-peer teachers were required to have completed and passed the rotation for the session they were going to teach. The sessions were held in classrooms at the school of medicine.

This project was submitted to the author's institutional review board (IRB) for a Human Participant Research (HPR) determination. The IRB determined that this project does not meet the regulatory definition of human participant research and is not subject to IRB oversight; therefore, IRB review was not required.

Implementation

The survey data was used to create a targeted educational intervention as a student-led, near-peer style, optional 1-hour educational sessions offered during the incoming third-year clinical skills

orientation by rising fourth-year instructors. Six clerkship-specific sessions were held in separate rooms (Surgery, OB/GYN, Family Medicine, Internal Medicine, Neurology, Pediatrics). The needs assessment data from the survey informed session development, though fourth-year instructors retained flexibility to prioritize high yield content. Incoming third-year students signed up for the session corresponding to the clerkship they would have first (e.g. if their first rotation was surgery, they attended the surgery session) using a Google Form. Participants were not required to sign up to attend.

The fourth-year medical student teachers were allowed to decide what was considered "high yield" for their session. Sessions began with a near-peer created PowerPoint which included clerkship expectations, common clinical scenarios, and images of common equipment/materials that they might see in the hospital. Sessions then had a hands-on skills portion, which included equipment if it was available. Third-year medical students then broke up into small groups to rotate through hands-on stations. Opportunities for questions were ample throughout each session.

Assessment and Evaluation

The effectiveness of this activity was evaluated via Qualtrics pre- and post-surveys that assessed seven domains via a 5-point Likert scale: procedural preparedness, inpatient equipment comfort, procedural kit familiarity, understanding of clinical responsibilities, team readiness, EMR navigation, and procedural anxiety. The surveys were developed for this study and can be found in the supplemental files titled "Pre- and Post- Session Surveys". Paired pre/post comparisons of Likert–scale outcomes were analyzed using Wilcoxon signed-rank tests with Bonferroni

correction. Descriptive statistics (medians, IQRs, and change scores) were calculated, and open-ended responses from the needs assessment and post-test surveys were analyzed using thematic analysis, with responses grouped into key domains.

Results

Needs assessment data were derived from open-ended responses and represent preliminary thematic groupings. Learner-reported gaps from 26 completed surveys were grouped into five key domains, including equipment, procedures, rounding & communication, EMR navigation, and professional role (Figure 2). Reported knowledge gaps such as IV poles, pumps, drains, and oxygen systems fell into the category of equipment. Procedures included wound care, sterile technique, suturing, foleys, and NG tubes. Reported gaps in rounding and communication included oral presentations, lab interpretations, and multi-problem patient presentations. The EMR navigation category included chart review, order interpretation, and efficiency. The professional role category included gaps such as OR etiquette, hospital workflow, and clerkship expectations. All who offered to assist preferred in person teaching over creating asynchronous material.

199 sign-ups from incoming third-year medical students were recorded for the clinical skills orientation. A Qualtrics pre- and post-survey was used to assess seven domains via a 5-point Likert scale: procedural preparedness, inpatient equipment comfort, procedural kit familiarity, understanding of clinical responsibilities, team readiness, EMR navigation, and procedural anxiety. The pre-test survey was administered before the session began and 123 submissions

were collected. Immediately following the orientation, the post-survey was administered and 69 responses were recorded.

A total of 53 participants completed both the pre- and post-test surveys and were included in paired analyses. A Wilcoxon signed-rank test for paired ordinal data with Bonferroni correction was performed for the seven Likert-scale questions and there were significant improvements across all domains ($p<0.007$) (Table 1).

Table 1. Pre- and post-orientation Likert-scale responses for seven clinical skills domains (n = 53 matched pairs)

Question	Pre-Survey Median (IQR)[a]	Post- Survey Median (IQR)[a]	Change (Post – Pre) Median (IQR)[a]	P-value*
1. I feel prepared to perform basic hospital-based procedures expected of a third-year medical student.	2 (2 – 3)	3 (3 – 4)	+1 (0 – 2)	*<0.0001*
2. I feel comfortable handling common inpatient equipment (e.g. IV poles, pumps, monitors).	2 (2 – 2)	3 (2 – 3)	+1 (0 – 1)	*<0.0001*
3. I feel confident navigating procedural kits (e.g. Foley, sterile gowning, dressing supplies).	2 (1 – 2)	3 (2 – 4)	+1 (0 – 1)	*<0.0001*

4. I understand what tasks interns/residents may reasonably ask me to perform on clerkships.	2 (2 – 3)	4 (4 – 4)	+1 (1 – 2)	*<0.0001*
5. I feel prepared to function as an active member of the inpatient team.	3 (2 – 3)	4 (3 – 4)	+1 (0 – 1)	*<0.0001*
6. I understand how to efficiently navigate EMRs for pre rounding and presenting.	3 (2 – 3)	3 (3 – 4)	0 (0 – 1)	*0.0004*
7. I feel anxious about my ability to perform hands-on skills during clerkships	4 (4 – 5)	4 (3 – 4)	-1 (-1 – 0)	*<0.0001*

Abbreviation: N/A.

a. Rated on a 5-point Likert Scale (1=strongly disagree/not confident, 5 = strongly agree/very confident), with the exception of item 7, which assessed anxiety (1 = not anxious, 5 = very anxious). P-values reported for the Wilcoxon signed-rank test with Bonferroni correction.

Most measures increased by one point on a five-point Likert scale, with the largest gain in understanding clinical expectations. EMR skills showed minimal change, while anxiety decreased (Figure 3).

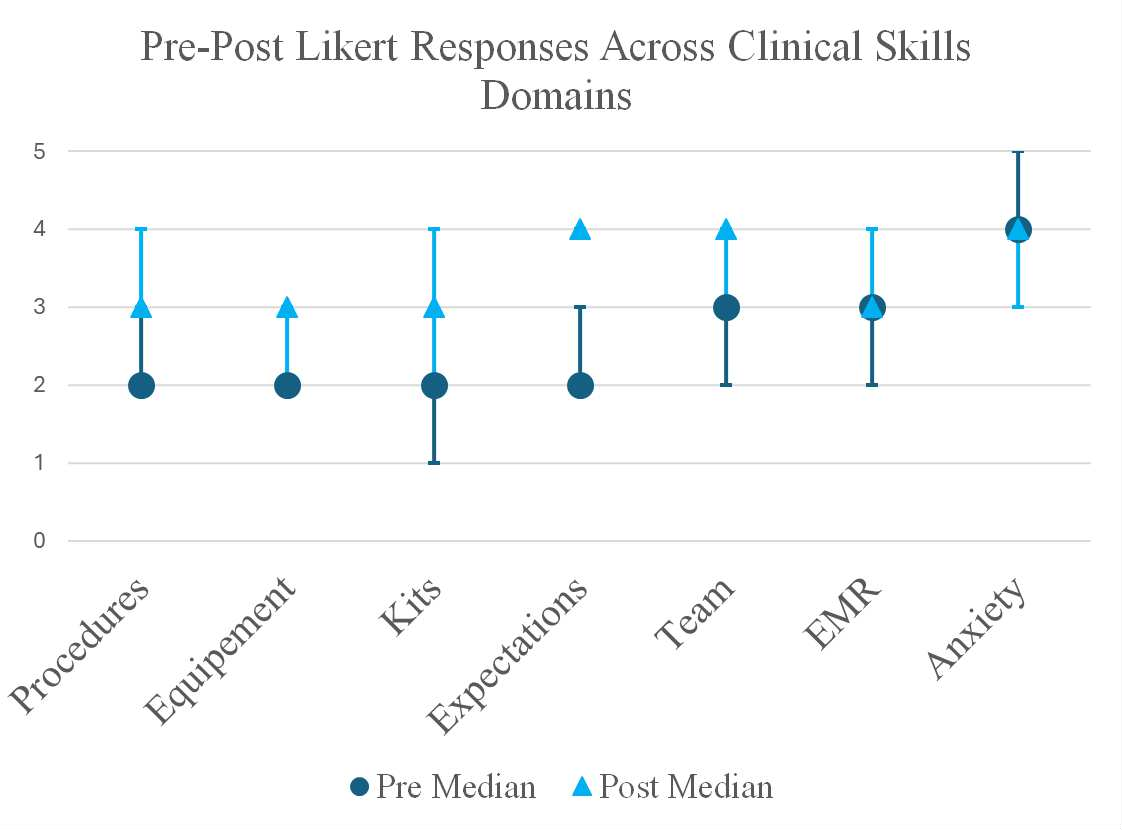


Figure 3. Median Likert-scale responses pre- and post-orientation across seven clinical skills domains. Error bars represent interquartile ranges. All comparisons reached statistical significance (Wilcoxon signed-rank tests with Bonferroni correction, $p < 0.007$).

Open-ended post-test qualitative responses revealed two major themes. The first was that students consistently requested increased hands-on practice, particularly for physical exam and procedural skills, including blood pressure measurements, reflexes, HEENT exam, foleys, and sterile technique. The second major theme that students emphasized was the importance of near-peer guidance and clear expectations for clerkships, including presentations, rounding, and workflow. In addition, many students noted limited opportunities for skill practice, reinforcing the need for more hands-on training.

Discussion

The student-led, near-peer clinical skills orientation was associated with significant improvements in the self-reported preparedness and confidence of the third-year medical students, along with reduced anxiety related to clinical skills. Students specifically perceived high value because the sessions were near-peer-developed and in-person. Key gaps in the pre-clerkship clinical skills curriculum were also identified. Although procedural skills were anticipated to be the primary gap, learners also emphasized broader competencies including EMR navigation and clinical communication. Given the limited specificity of national guidelines for pre-clerkship training, learner-driven needs assessment may help inform pre-clerkship clinical skills curricula, clerkship orientations, and other targeted curricular development.

The study's outcomes align with Kirkpatrick Level 1 (participation) and level 2a (attitudes), which represent the most commonly measured tiers of educational evaluation.[15,16] The findings from this study reflect early learner-level outcomes, underscoring the need for future evaluation of behavioral and clinical outcomes.

Several limitations were identified. Time was a key constraint: each session was allotted one hour, though many sessions went over this allotment. Students commented on wanting more time for each session, with an estimated 2 hours being appropriate to cover the material. Ideally, 1 hour would be dedicated to sharing the clinical expectations, patient presentation format, and clinical images in an interactive lecture format. The following hour would be the hands-on portion of the session, allowing every participant to utilize equipment and practice clinical skills.

Additionally, a limitation of this activity included lack of clear written objectives for the teaching students to follow. Though verbal instructions were given on how each session was to be run, one skills session focused solely on verbal information and did not get to a hands-on portion for students to practice. Students expressed frustration with the lack of hands-on skills for that session. Adding clear objectives would eliminate the lack of standardization between the groups and would ensure equal time for didactic and hands-on portions.

Furthermore, many students did not fill out the post-survey QR codes, as groups forgot to remind students. To ensure larger data sets and understanding student perspectives, it would be beneficial to print the QR codes and place them on the doors at the exits of session rooms.

For future sessions, expansion of clerkships could be considered. Sessions included General Surgery, Internal Medicine, Family Medicine, OB/GYN, Pediatrics, and Neurology. Future areas for expansion could include Psychiatry, Emergency Medicine, Critical Care, and others. Further work at institutions that rotate students across multiple different hospital systems could include investigating how clerkship expectations vary by site or various clinical settings such as community vs academic, urban vs rural, and for-profit vs not-for-profit spaces assessing differences in clinical expectations for students across hospital systems could inform more tailored orientation content.

Conclusions

A near-peer, learner-driven clinical skills orientation was feasible to implement and was associated with significant improvements in third-year medical students' self-reported

preparedness, confidence, and reduced anxiety entering clerkships. By using a structured needs assessment to identify learner-perceived gaps, this model offers other institutions a low-cost, replicable framework for closing the preclinical-to-clerkship transition gap through near-peer education.

List of abbreviations

AAMC – Association of American Medical Colleges; EMR – Electronic medical record; HEENT – Head, eyes, ears, nose, and throat; HPR – Human Participation Research; IQR – Interquartile Range; IRB – Institutional Review Board; IV – Intravenous; NG (tube) – Nasogastric (tube); OB/GYN – Obstetrics and Gynecology; USMLE- United States Medical Licensing Examination

Declarations

Ethics approval and consent to participate

This project was submitted to Wayne State University's institutional review board (IRB) for a Human Participant Research (HPR) determination. The IRB determined that IRB review was not required, and the need for consent to participate was waived. All experiments were performed in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

Funding

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Authors' contributions

RM, AS, and DD were involved in the conceptualization, implementation, and data collection for the study. RM and AS drafted the manuscript. DD was involved in critical revisions of the manuscript. All authors read and approved the final manuscript.

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Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- NeedsAssessmentSurvey.pdf
- PreandPostSessionSurveys.pdf