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Handover Education Improves Skill and Confidence

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Abstract:

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Background:

Despite patient care handovers' frequency and vulnerability to errors, medical schools infrequently teach handover skills. Our study evaluated the impact of a medical school handover curriculum on students' performance, as rated by faculty, peers, and self-assessments.

Methods:

Nineteen fourth-year medical students participated in a handover curriculum that included a workshop and three directly observed patient handovers, with faculty feedback. Multivariate repeated measures analysis evaluated faculty, peer, and self-rated performance over time. Students' self-assessed confidence in performing handovers prior to, at the end of, and eight to 12 months after the curriculum was also analysed.

Results:

Faculty, peer, and self-assessments showed students' performance significantly improved after the curriculum, on handover content, clinical judgment, and overall performance ($p < 0.05$). Students rated the curriculum as effective and characterised themselves as more prepared to perform handovers, with these findings persisting for eight to 12 months ($p \leq 0.001$).

Discussion:

A handover curriculum appears to improve medical students' handover performance, as evaluated by the independent ratings of faculty, peers, and students, in addition to students' confidence.

Background:

In order to improve patient safety, the American Council of Graduate Medical Education (ACGME) mandated restricting post-graduate trainee work hours. An unintended consequence was an increase in patient care handovers, defined as the giving and receiving of patient information between health-care providers across shift changes (also referred to as "handoff" or "signout").¹ Transitioning care introduces vulnerability to communication failures, uncertainty in patient care, delay in diagnosis or treatment, near misses, and inefficiencies or work

redundancies.² Recognising that communication failures account for the majority of sentinel events, the World Health Organization issued patient safety mandates requiring standardised approaches to handover education.³

Handover education research has focused on training and assessment of postgraduates.⁴ Despite the importance placed on handover training, studies indicate ineffective handovers still occur⁵ and trainees feel unprepared to perform handovers.⁶ Complicating matters, postgraduate training programmes expect trainees to assume patient care responsibilities upon entry, prior to any postgraduate training handover curriculum. Given that medical school is a trainee's preparation for their postgraduate year one (PGY-1) responsibilities, medical schools should be teaching handover skills. The Association of American Medical Colleges explicitly identifies giving and receiving patient handovers as a core competency for entering residency.⁷ However, only 35 per cent of medical schools in the United States formally provided handover instruction.⁸ Expecting incoming trainees without adequate preparation to be competent in the handover process is unreasonable.

As fourth-year medical students perform the duties of PGY-1 trainees during sub-internship rotations, our paediatric inpatient sub-internship provided an opportunity to institute a formal handover training curriculum. Our curriculum's goal was to improve students' performance of the handover process, as assessed by faculty, peers, and trainees.

Methods:

Participants:

Fourth-year medical students at a North American university-affiliated hospital enrolled in a paediatric sub-internship in 2012. Students were assigned to an inpatient team during the day. Each week, one student rotated on a block of night shifts. At the end of their day or night shift, students transitioned care of their patients to another sub-intern. Each student participated in our handover curriculum, which included a one-hour workshop and faculty observed patient handovers with feedback on three separate occasions over the course of one month. Our Institutional Review Board granted exempt status.

Previous Training, Knowledge, and Confidence Related to Patient Handovers:

Pre- and post-rotation, students completed an assessment eliciting perceptions of knowledge and confidence related to giving and receiving patient handovers. The pre-rotation assessment also included questions about trainees' previous handover process education. We also administered a post-rotation assessment, which included questions evaluating our handover process curriculum's perceived impact, at the end of the rotation and immediately prior to the students' graduation from medical school, eight to 12 months later.

Workshop:

At the start of the rotation, students participated in a one-hour workshop demonstrating the importance and components of the handover process. The workshop examined effects of ACGME work hour requirements on handovers, consequences of poor patient handovers and barriers to communication, and recommendations for handover standardisation and training. Handovers as a shared responsibility was also discussed. Students brainstormed qualities of "good" and "poor" handovers, then viewed video examples of each for further discussion.⁹ Faculty introduced the SIGNOUT mnemonic⁴ as a method to ensure appropriate information is provided during a handover.

Observed handovers:

During the rotation, faculty observed students transferring care of patients to a peer on three occasions: the first, prior to handover instruction, with remaining observations following the handover instruction workshop at 2-week intervals. For each observation, faculty provided structured feedback using our assessment tool. Students receiving the handover (peer) and students initiating the handover (self) completed the same assessment tool immediately after the handover, then the faculty provided verbal and written feedback.

Assessment tool: A panel of local experts developed our assessment tool (Table 1), incorporating items from the SIGNOUT tool⁴ covering content and clinical judgment, supplementing items from peer-reviewed research to incorporate assessment of organisation/efficiency, communication skills, and professionalism.¹⁰ Medical education experts, faculty, post-graduate trainees, and students provided feedback prior to our piloting the tool

using actual patient handovers. The final version included 15 items scored as “not done” (0), “done but needs improvement” (1), or “done well” (2).

Observers: One of two experienced paediatric hospitalists/educators (JNS and JHS) evaluated each handover. Observer training included a series of calibration exercises in which the observers used the observation tool to assess video clips of trainees conducting handovers. Raters discussed discrepancies and explained their scoring. The Cohen Kappa inter-rater agreement indicated high agreement (0.82).

Analysis:

We calculated descriptive statistics for participant demographics, previous related training, and pre- and post-training confidence and performance. We evaluated changes in handover confidence ratings over time using multivariate analyses with repeated measures (F-test). We evaluated differences in performance over time on content, clinical judgment, and overall performance, using multivariate analyses with repeated measures.

Results/Findings:

Nineteen students participated in the handover curriculum as part of their paediatric sub-internship. Only 16 per cent (3/19) of students reported receiving prior handover instruction and none reported receiving prior feedback. When asked to identify the leading root cause of sentinel events, 84 per cent (16/19) of entering students correctly answered “lapses in communication,” with 95 per cent (18/19) answering correctly post-curriculum ($p=0.03$).

Overall, 93 individual patient handovers from 15 students over three observations were included in the interpretation of the performance data, with each individual student performing three to nine patient handovers (mean 6.1, SD 1.7). We excluded from analysis four students who were on a night block during the first week of the rotation who participated in the workshop prior to their first observed handover.

Mean self-assessed confidence scores increased significantly during the sub-internship ($p\leq 0.001$) (see Table 2). Students also characterised themselves as better able to communicate the necessary information in a handover and do so more efficiently. These increases in self-assessed confidence persisted eight to 12 months later, prior to the students entering their PGY-1 year ($p\leq 0.001$).

Handover performance, as evaluated by faculty, self, and peers, improved over the course of the sub-internship (Figure 1). Initial faculty-derived performance scores were 68 per cent (SD 13), but increased to 96 per cent (SD 5) by the final observation ($p < 0.005$).

Students rated the curriculum favorably with an overall mean rating of 4.8, on a 5-point Likert scale on which higher numbers represented more favorable ratings. When asked to rate the individual components of the curriculum, students' mean rating for the didactic workshop was 3.9, rating the attending physician's immediate feedback as 4.8.

Discussion

A recent study of paediatric residency programmes found programmes struggle to incorporate systematic patient care handover instruction, with only one in three reporting curricula with goals, objectives, and assessments.¹¹ Although efforts to prepare trainees prior to their postgraduate care responsibilities attest to students' appreciation of such training, evidence of the impact of these interventions might further promote handover training during medical school.¹² Our study demonstrates that a handover curriculum for medical students seems to be associated with improved clinical skills and confidence. This study adds to the current body of handover research by including pre-instruction data, as we were able to compare pre- and post-intervention performance. We demonstrated handover performance improvement after the intervention, with continued improvement as the students progressed through the curriculum. Our study is also unique in that it demonstrated an increase in student's self-assessed ability not only immediately after the curriculum, but also eight to 12 months later, demonstrating a sustained effect. Our goal is to prepare students to provide handovers as PGY-1 trainees, therefore, the success of this training lies in its ability to sustain long-term impact.

Our findings suggest training patient handovers in the fourth year of medical school is feasible in a clinical setting. We were able to integrate our performance direct observations and feedback into the students' everyday patient care, making the exercise clinically relevant to the learner. As medical education moves to competency evaluation, faculty observation will become increasingly necessary. Students rated the curriculum favorably and felt that the immediate faculty feedback was beneficial.

Our study occurred in a single department at one academic institution and therefore, the results may not be generalisable to students at other medical schools or in other departments. In

addition, only 19 medical students were assessed, reflecting the limited number of students rotating through a sub-internship. The faculty raters were also teaching faculty for the curriculum and not blinded to the observation number of the handovers assessed. Students were assessed while giving patient handovers, but students receiving the information were not assessed. Students were not randomly assigned to intervention and control groups. Although the study did not constitute a randomised design, findings indicate that handover curricula are feasible and can improve performance and confidence in a real-life clinical setting.

Based on our results, we suggest medical schools can teach handover skills during medical students' sub-internships and should incorporate a formal handover curriculum into clinical training. By acquiring these skills prior to graduating, medical students will hopefully be better able to perform patient handovers at the beginning of their PGY-1 year and become more confident in their skills, making the task seem less daunting. Ideally, this will improve patient care by decreasing associated threats to patient safety.

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Table 1: Performance Assessment of the verbal handover, incorporating items from the SIGNOUT tool.⁴ Items scored 2=information conveyed, 1=information partially conveyed, 0=information not conveyed

	Items Pertaining to Content
S	Identification of sick patients and code status
I	Identifying patient information (Patient one liner)
	Pertinent past medical history
G	General hospital course
N	New events of the day/active issues
O	Overall health status (current clinical condition and pertinent physical exam findings)
	Recent lab/studies results (pertinent)
	Meds/allergies (pertinent)
	Items Pertaining to Clinical Judgment
U	Upcoming possibilities with plan and rationale
T	To Do Items for overnight with plan
	Additional items included in the overall score
?	Allows for questions
	Ideal setting for handover
	Organization/Efficiency
	Communication skills

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Table 2: Fourth-year Medical Students' Mean Self-Assessed Confidence Scores Across Time

N=19

	Pre-Survey (Prior to curriculum)	Post Survey (1 month follow- up)	Follow-up Survey (8-12 month follow-up)	p*
I can communicate all the information that is needed in a handoff.	3.2 ± 1.0	4.3 ± 0.5	4.3 ± 0.5	0.001
I can communicate all the information that is needed in a handoff in an efficient manner.	2.6 ± 0.8	4.0 ± 0.6	4.1 ± 0.5	<0.001
I am able to take care of acute issues overnight based on the handoff I receive.	3.0 ± 0.7	4.1 ± 0.6	3.8 ± 0.5	<0.001
I am prepared to perform a handoff as a PGY-1 trainee.	2.3 ± 0.8	4.3 ± 0.5	4.2 ± 0.5	<0.001
How would you rate your overall handoff performance?	1.8 ± 0.7	4.1 ± 0.5	3.9 ± 0.3	<0.001

* Multivariate analysis with repeated measures, F test.

Score are based on a Likert scale from 1-5, with higher numbers representing more confidence.