

Assessing the Need For and Developing a Standardized Patient Handover Curriculum for
Undergraduate Medical Education

by

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Abstract

Abridged Title: Teaching Standardized Patient Handoffs to Medical Students

Learning Objectives:

- Recognize the need to begin standardized patient handoff education in medical school
- Develop a standardized patient handoff workshop for medical students entering clerkships
- Evaluate medical student comprehension of standardized handoffs

Short Description: This project aimed to develop an interactive patient handoff curriculum for medical students entering their clinical clerkships to instill good, safe practices at the grassroots level.

Background: Improving patient handoff communication is a national patient safety goal; however, few medical schools have standardized handoff training curricula for their medical students. Studies show that a large number of medical students perform handoffs and observe handoff errors during their clerkships [1,2]. This lack of formalized training has a negative impact on medical student perceptions of handoffs [3]. This project assessed the need for handoff education at our institution and developed a curriculum aimed at medical students.

Implementation: Clerkship directors were interviewed & preclinical medical students were surveyed for a stakeholder analysis. Prior to starting core clerkships, 200 total students participated in four 1-hour workshops consisting of a 20-minute lecture and three 10-minute handoff scenarios. Trained residents performed the scenarios and led group discussions. Pre- and post-course engagement surveys were used to evaluate the workshop.

Evaluation & Outcomes: Clerkship directors desired handoff training before clerkships; however, there was concern that the curriculum would be too advanced. Survey of pre-clinical students showed 71% had heard of standardized patient handoffs, but 94% had no training. 75% believed training should be done prior to core clerkships, and 64% believed handoff simulations were the best method for learning. Students scored 10.7% higher on the post-engagement quiz and 98% of students believed they better understood the elements of a good handoff after the workshop.

Impact & Lessons Learned: Standardized patient handoff curriculum designed for preclinical medical students improved confidence and knowledge about the handoff process. Concerns about creating handoff curriculum for medical students were addressed by focusing on general concepts rather than specific handoff tools and by creating simple handoff evaluation scenarios. Further work will focus on evaluating the impact of this workshop on the handoff experience during clerkships.

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Introduction

Problem Description

The UT Southwestern (UTSW) undergraduate medical education curriculum does not currently include formal education on standardized patient handovers. As medical students play a significant current and future role in patient care, this lack of training leaves medical students ill-prepared for their clinical duties after graduation and can lead to worse clinical outcomes.

Available Knowledge

Clinical Impact of Standardized Patient Handovers

The implementation of standardized handovers has been shown to reduce medical errors, reduce preventable adverse events, and improve communication ¹. In response to the growing concern for patient safety secondary to patient handovers, the Joint Commission has identified handover communication as a National Patient Safety Goal ². Additionally, the Institute of Medicine and Accreditation Council for Graduate Medical Education have recommended that all medical residents receive training on patient handovers and put into place requirements for residency programs to ensure their trainees achieve competency in handovers ³.

Medical Students Exposure to Patient Handovers

Though standardized handover education has become required in graduate medical education, there are currently no defined learning objectives or requirements for U.S. allopathic undergraduate medical education. Studies have shown however, that medical students play an active and passive role in handovers during their third and fourth years. A survey of students at two large US medical schools found that third year students frequently observed verbal

handovers, updated written signouts, and used verbal and written handovers to follow their patients during their internal medicine, pediatrics, and surgery rotations. Nearly all of the students reported witnessing errors in a written handout, and two-thirds witnessed errors in verbal handouts ⁴. Additionally, a focus group of faculty and residents in the I-Pass study found that the majority of sites allowed third and fourth year students to participate in handovers, with variable oversight of the process by faculty or senior residents ⁵. Despite this frequent exposure of medical students to handovers, few medical students report receiving any formal training ⁴. In a survey of ninety-nine internal medicine clerkship directors, only fifteen percent indicated that they have a structured handover curriculum during their medicine clerkships and thirty seven percent have one during their medicine sub-internships. The majority of these programs used small group discussion or lecture to deliver the curriculum. Half of these surveyed clerkship directors felt that their handover training was inadequate ⁶. Because patient handovers have traditionally been an “on-the-job” learning experience, there is still not a clear consensus on whether handover training needs to be addressed at an undergraduate level. A survey sent to all of the medical schools in the UK showed that a majority of the schools that responded did not think that handovers were an important issue for undergraduate education; however, they did agree it is an important educational issue and would like to see more published research on the impact of medical student handover education ⁷.

Impact of Handover Education on Medical Students

Despite the lack of consensus on when handover training should begin, there is evidence showing that handover education can both improve medical students’ clinical clerkship experiences and their readiness for performing handovers after graduation. A survey of third year

medical students at one institution asked the students to describe a care transition that they had witnessed that evoked a strong emotional response. 92% of these emotions were negative, with students most often feeling frustrated, annoyed, or angry with the transitions they witnessed ⁸.

The impact of handover education on handover performance in residency has also been evaluated. A group of PGY-1 trainees at one institution participated in a handover OSCE to evaluate their handover skills. Only 35% of participants had received formal training on handovers in medical school, and only 51% had previously received feedback on their handover performance. Those students who had received feedback or had formal training felt significantly more confident than other PGY-1s in their ability to perform a handover. The students that had prior formal training also performed significantly better in their handover content, clinical judgement, global score, and total score ⁹ than those that had not received training.

Medical Student Handover Curriculum Development

Given the growing evidence behind starting handover education during medical school, many institutions have developed handover teaching interventions for their medical students. At the University of Chicago, Pritzker School of Medicine, fourth year students participated in 90-minute handover training workshops during their transition to internship course. One week following the course, the students participated in a modified OSCE to assess their ability to perform written and verbal handovers. Students showed statistically significant improvement in self-perceived ability to perform handovers after the session; however, only 67% felt well prepared even after the session ¹⁰.

At the University of Colorado Denver School of Medicine, a Handoff Selective was developed for students entering their fourth year. Students participated in a combination of

didactic and practicum teaching on handovers. Post-session surveys showed that the students found the session useful and believed it should be required in the curriculum. The didactic portion of the sessions was less well received than the practicum ¹¹.

Among the articles that discuss handover interventions for medical students, most have shown that single interventions are effective in improving handover skill or self-perceived confidence immediately after the intervention. At The George Washington University School of Medicine, a quasi-randomized study was conducted on third year medical students in which some students participated in a handover workshop during their third year medicine clerkship. These students were tested on their handover skills through participation in both a pre- and post-workshop standardized patient handover simulation. These students, as well as students who did not participate in the intervention, were then tested again during their fourth year. Students who participated in the workshop demonstrated improved handover scores both immediately after participation in the handover workshop and nine months after the intervention compared to their own baseline and to the control group ¹². Though this study was able to demonstrate handover education has a sustained impact on handover performance, there remains sparse literature on the development of a longitudinal handover curriculum with multiple interventions that tries to improve handover confidence and skill for medical students.

Rationale

A longitudinal curriculum with multiple intervention points was decided to be the best approach to teach patient handovers to medical students. As demonstrated by Farnan et al, even after a training workshop for medical students may improve confidence, but not to a level where students feel well prepared. If students are exposed to standardized handovers during their whole

clinical experience, they may feel more prepared to perform these types of handovers during residency. Additionally, teaching standardized handovers early and regularly throughout the clinical medical student experience could help bring about the necessary cultural change needed for widespread implementation of standardized handovers. In order to identify opportunities to integrate a patient handover curriculum at UTSW, a process map of the current undergraduate clinical education curriculum was created (Figure 1). The first exposure to clinical medicine starts immediately in the first year during monthly Academic Colleges sessions. Prior to starting clinical clerkships, all medical students are required to attend a 1-week transition to clerkship orientation. From there, they may begin taking either their core clerkships, elective clerkships, or begin a scholarly activity. Finally, the students participate in selective clerkships during their fourth year in the discipline of their interest and have the option to participate in internship preparation courses.

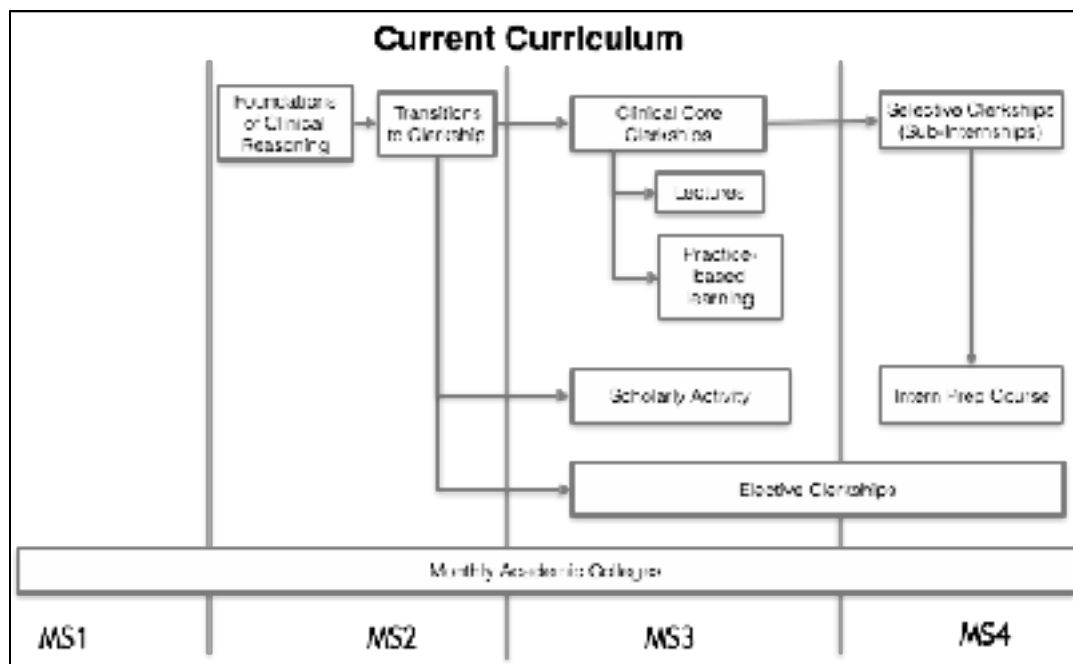


Figure 1. Process map of UTSW medical education clinical experiences

To further understand how to develop a curriculum integrated into the current clinical education experience, a formal stakeholder analysis was conducted through interviews and focus groups of key stakeholders (Table 1). These stakeholders were identified as the medical education administration, core clerkship directors, and preclinical medical students. This analysis highlighted what was important to each stakeholder and the key concerns for each stakeholder. All of the stakeholders agreed on the importance of teaching handovers to medical students; however, there was concern amongst the clerkship directors that it may be too early to teach specific handovers strategies to pre-clinical or core-clerkship students while they are still trying to develop basic clinical skills. There was also a concern amongst administration and students that the curriculum needed to be engaging and include an interactive or practical component.

Stakeholder Analysis			
	What is important to the stakeholder?	How could the stakeholder contribute to the project?	Strategy for engaging the stakeholder?
Administration	<ul style="list-style-type: none"> • Handover education is necessary • Students need to be engaged • Well developed learning objectives 	<ul style="list-style-type: none"> • Allocate resources towards project • Integrate handovers into curriculum goals 	<ul style="list-style-type: none"> • Use student feedback to improve interventions
Clerkship Directors	<ul style="list-style-type: none"> • Handover education is necessary • Needs to be appropriate to learner level • Shouldn't detract from other learning objectives 	<ul style="list-style-type: none"> • Implement handover education into clerkship objectives • Encourage faculty discussion & observation of handovers 	<ul style="list-style-type: none"> • Keep interventions generalizable to multiple clerkships • Teach students how to integrate handovers into their clerkship experience
Students	<ul style="list-style-type: none"> • Engaging curriculum, not just didactics • Taught and reinforced 	<ul style="list-style-type: none"> • Provide feedback on curriculum 	<ul style="list-style-type: none"> • Development of multiple modalities for curriculum

Table 1. Stakeholder Analysis Summary

After the stakeholder analysis was completed, an outline for a handover curriculum at UTSW was developed (Figure 3). In order to create a longitudinal curriculum which built on ongoing clinical experiences, three potential intervention points were identified: the transition to

clerkship orientation, core clinical clerkships, and selective clerkships. These three points were the ideal place to introduce handover curriculum because they were required for every student and they occurred at different levels of clinical experience.

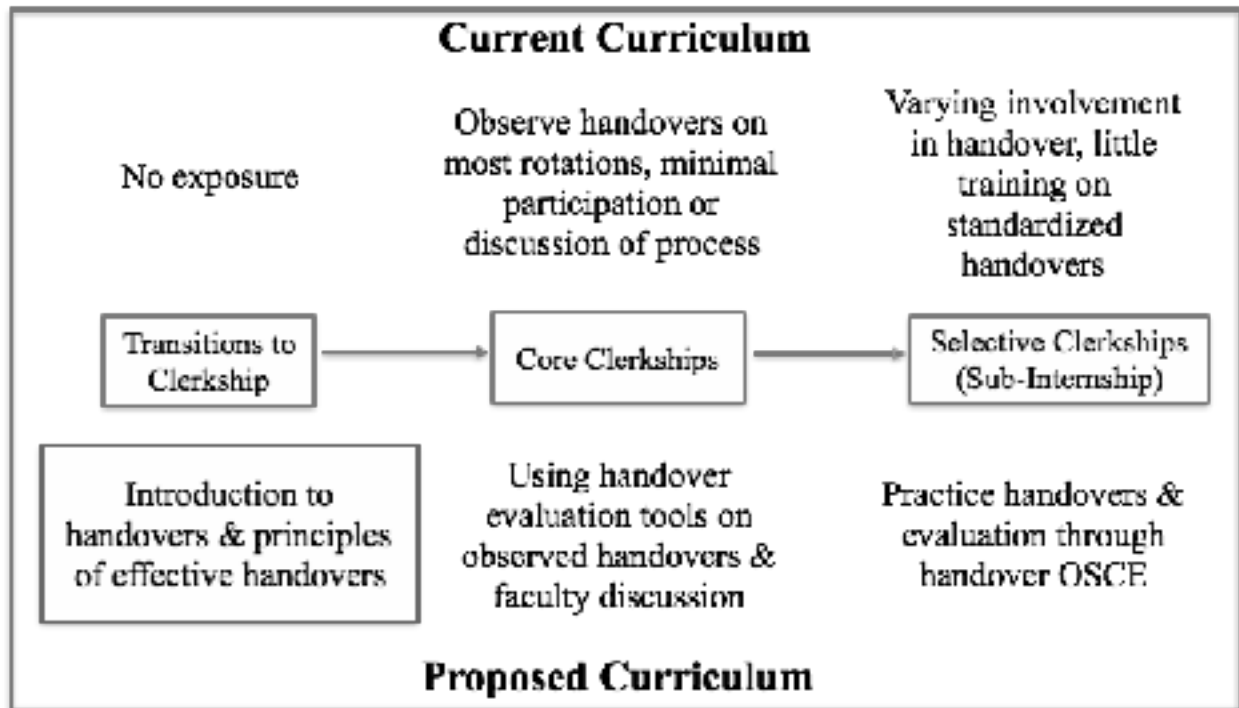


Figure 2. Current handover exposure compared to proposed handover curriculum. The first intervention target is boxed.

Specific Aim

In this project, a longitudinal curriculum has been proposed for teaching patient handovers to medical students at UTSW.

The primary end goal of this study is for 90% of medical students at UTSW to be confident in their ability to identify the critical components of a safe and effective patient handover by graduation. The secondary aim of the study is for 90% of medical students at UTSW to be confident in delivering and receiving patient handover.

The first part of the curriculum was developed and implemented as the first iteration of

the PDSA cycle for this project. This paper looks at the implementation and outcomes of this first PDSA cycle and the implication on further development of the whole curriculum.

Methods

Study Setting

The first intervention of the curriculum, a workshop aimed at preclinical students, was developed to be included during the week-long Transition to Clerkship orientation for students starting clinical clerkships in January 2017. 240 preclinical UTSW medical students participated in the workshop. Students were divided into four groups of 60 to participate in the 1-hour long workshop sessions at different times. Each workshop was delivered by the same facilitators and there were no differences in the content delivered to each group.

Intervention Development

The 1-hour workshop was divided into two sections: a 30-minute didactic and a 30-minute role-playing scenario (Appendix A). The sessions were held in lecture-style classrooms with groups of 60. Each session was facilitated by one faculty member and two residents with previous experience in handover education. The learning objectives for the workshop were defined as shown in Table 2.

Transition to Clerkship Workshop Learning Objectives
<p>After this session, students will be able to...</p> <ol style="list-style-type: none"> 1. Describe the purpose of a structured handover <ol style="list-style-type: none"> a. How does a structured handover differ from regular handover b. What are the effects of poor handovers on patient safety 2. Learning the “anatomy” of effective team communication <ol style="list-style-type: none"> a. Outline the steps including: clear beginning/end, clear understanding of names/roles, structured communication style, avoidance of interruptions/distractions, read back, synthesis b. Practically use SBAR as an example of structured communication style c. Observe & evaluate a handover using standardized tools d. Identify common barriers to good communication and thorough handover delivery 3. Explore role of medical students in the provider team & how they can help in providing effective handover <ol style="list-style-type: none"> a. How to use standardized patient handovers during clerkships b. How to provide feedback to your medical team about their handover process

Table 2. Workshop Learning Objectives

The didactic portion of the workshop began with a description of standardized handovers and literature review of the impact they play in patient care. To mitigate the concern over teaching specific handover strategies too early, the intervention developed for the Transition to Clerkship workshop was geared to teach general knowledge about handovers and handover tools that are important for any handover regardless of the specific mnemonic/tool used. The second portion of the didactic described the essential elements of a good handover, integrating TeamSteps principles relevant to patient handovers ¹³. The final portion of the didactic focused on discussing how medical students could use the information they were learning during their clerkships.

To address the concern over creating an interactive curriculum, role-playing scenarios were added to the workshop. Three role-playing scenarios were developed to highlight effective and ineffective techniques for patient handovers (Appendix B). Each of the scenarios were created to simulate scenarios that medical students could potentially encounter on their core

clerkship rotations. In each scenario, a combination of positive and negative handover elements were incorporated for students to identify and scripts were prepared for the faculty and resident facilitators to reenact. It was decided to use faculty and residents to demonstrate each handover because the pre-clinical medical students still had limited medical knowledge and experience with patient presentations. After each scenario, students used a modified version of the Handoff CEX ¹⁴ to evaluate the quality of the handover, with the facilitators leading a group discussion to identify what the receiver and sender did well or poorly.

Measures and Data Collection

In order to understand the students' baseline knowledge and prior exposure to handovers, an anonymous pre-workshop survey was administered to all the workshop participants (Appendix C). The survey was administered electronically via SurveyMonkey prior to beginning the workshop while students were seated in the lecture hall.

To assess the efficacy of the curriculum as a whole, a set of process, balancing, and outcome measures were proposed for the project (Table 3). Only the specific measures relevant to the preclinical workshop were used to assess its efficacy: performance on questionnaires assessing knowledge, feedback from students on curriculum, and student self-rated understanding of handover elements. To assess handover knowledge before and after the workshop, students were required to take anonymous pre- and post-workshop tests administered electronically immediately before and after the workshop (Appendix C). These questions assessed competency in five different learning objectives for the workshop. The post-workshop test also included a feedback form for students to assess the relevance of the material to their clinical education, rate their confidence in understanding the essential elements of handovers,

and give free-response feedback on improving the workshop (Appendix C).

Type	Measure
Process	<ul style="list-style-type: none">● Performance on questionnaires assessing handover knowledge● Performance on handover OSCE● # of handovers observed & performed on clerkship rotations● Positive & negative interactions with faculty/residents on handovers● Perception of handovers observed on clerkships
Balancing	<ul style="list-style-type: none">● Feedback from students on curriculum design● Feedback from faculty on impact of handover education on student performance and readiness
Outcome	<ul style="list-style-type: none">● Student self-rated understanding of handover elements● Student self-rated readiness to receive & deliver handovers

Table 3. Proposed process, balancing, and outcome measures. Measures used to assess the preclinical workshop are bolded.

Statistical Analysis

Data were merged into a Microsoft Excel spreadsheet for analysis. Descriptive statistics were used to summarize the baseline knowledge data and the workshop feedback questions. Aggregate unpaired t-test was performed to compare the mean scores on the pre and post-workshop tests. Correct response rate for each question in the pre- and post-workshop tests were compared using two-sample tests of proportions. Free text data was analyzed for positive and negative feedback and sorted for frequency of comment on various topics.

Ethical Considerations

The UT Southwestern Institutional Review Board deemed that this project did not meet the definition of human subject research as 45 CFR 46.102, as the project involved Quality Improvement/Quality Assurance activities that were designed solely for internal program evaluation purposes. No major conflicts of interest were identified in the study.

Results

Baseline Handover Knowledge

200 of the 240 (83%) participants in the workshop completed the pre-workshop survey. 142 (71%) students had previously heard of standardized patient handovers, and of those, 11 (5.5%) had previously participated in formal handover training (Figure 3). Of the students who had heard of standardized handovers, 24 (16.9%) had heard of handover tools like SBAR, I-PASS, etc., and 6 (4.2%) had previously used such tools. The majority of students (75%) believed handover training should be conducted during MS3 orientation and simulation exercises (64%) were the best method for learning.

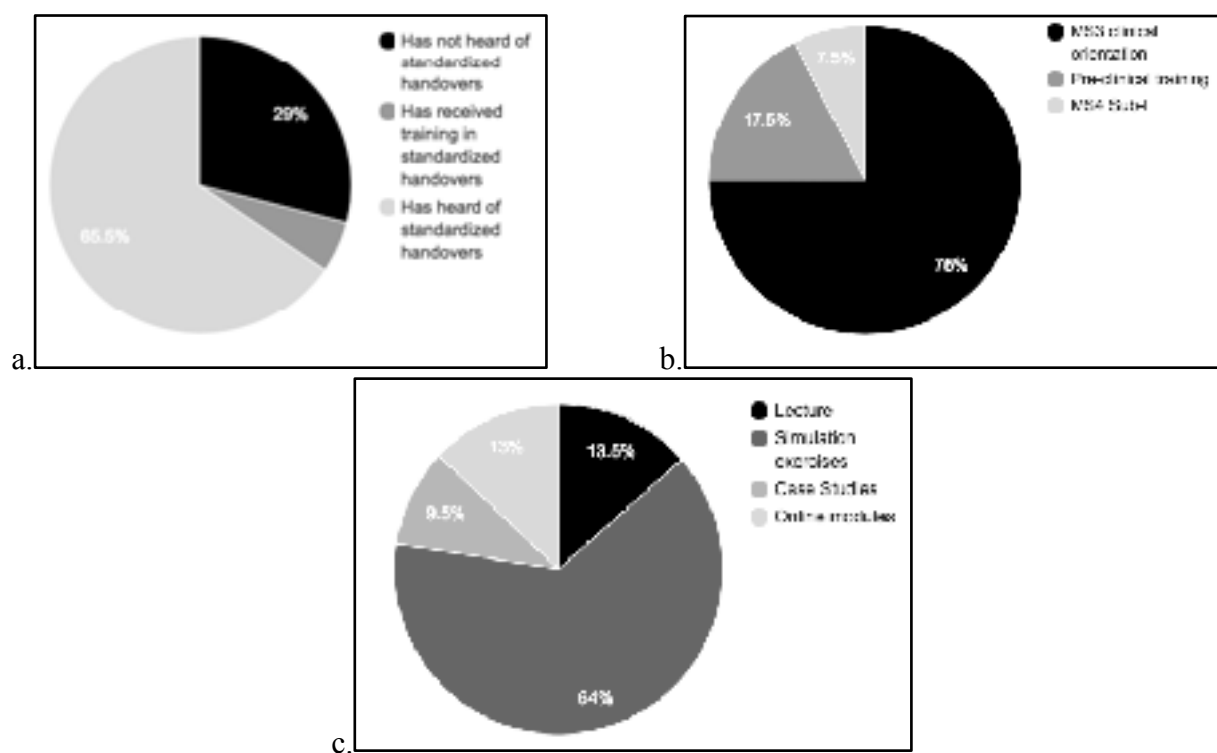


Figure 3. Preclinical Handover Exposure Survey. a) exposure to handovers b) preferred time to learn handovers c) preferred method for learning handovers

Pre- and Post- Test Results

194 of 240 (80.8%) of students completed the pre-test. 162 of 240 (67.5%) students completed the post-test (Table 4). The percent of students who answered the questions correctly for each tested learning objective increased from the pre-test to the post-test. The greatest improvement was in the percentage of students who correctly answered the questions pertaining to the essential elements of standardized handovers and how to use SBAR. The mean average performance on the post-test (97.4%) was significantly higher than the mean performance on the pre-test (75%).

Learning Objectives Tested	Pre-test(n= 194)	Post-test (n=162)
Definition of standardized handover*	94.4%	97.9%
Clinical impact of standardized handover*	91.8%	98.1%
Causes of handover error*	90.7%	99.4%
Essential elements of standardized handover*	82.5%	96.9%
How to use SBAR as a handover tool*	70.6%	98.1%
Mean Performance*	75% \pm 23.8	97.4% \pm 9.23

Table 4. Performance on pre- and post-workshop tests on each learning objective and mean performance. * P<.05

Workshop Evaluations

160 of 240 (66.6%) students completed the end of workshop evaluation survey (Table 5). 97.5% of students were satisfied with the workshop (strongly agreed or agreed), and a large majority believed the content was clear and concise, the length and pace was appropriate, and the workshop would be beneficial for 3rd year clinical rotations. 99 of 160 students (61.88%) of

students strongly agreed that they understood the elements of a good handover, and 58 of 160 (36.25%) agreed with the statement. 28 free-text comments were submitted, of which 13 were negative or constructive comments. The most frequent feedback were that microphones were not loud enough (4), there should have been more case scenarios (3), smaller groups (2), and allowing students to practice receiving and delivering handovers (2).

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Overall, I was satisfied with this workshop	92 (57.50%)	64 (40.00%)	3 (1.88%)	0 (0.00%)	1 (0.63%)	160
The workshop content was clear and concise	99 (61.88%)	57 (35.63%)	2 (1.25%)	0 (0.00%)	2 (1.25%)	160
The workshop length and pace was appropriate	86 (53.75%)	65 (40.63%)	5 (3.13%)	3 (1.88%)	1 (0.63%)	160
The workshop will be helpful for my 3rd year clinical rotations	103 (64.38%)	52 (32.50%)	4 (2.50%)	0 (0.00%)	1 (0.63%)	160
Observing handoff scenarios helped me understand the elements of a good handover	99 (61.88%)	58 (36.25%)	2 (1.25%)	0 (0.00%)	1 (0.63%)	160

Table 5. Post-workshop feedback & confidence in understanding elements of handovers.

Discussion

Summary

This project is the initial step in the implementation of a longitudinal patient handover curriculum at UTSW. The primary aim of the project was to achieve 90% confidence amongst medical students in identifying the essential elements of a handover. 98.13% of students who completed the initial Transition to Clerkship Handover workshop agreed that they understood the elements of a good handover, which represents a good initial step in achieving that aim.

Additionally, students showed a significant improvement in performance on the handover post-test. The largest improvement was in identifying essential elements of handovers and how to use SBAR as a tool, which was expected given that only 15% of students had either heard of or used those tools before. Reyes et al. have shown that handover interventions earlier in the medical school curriculum can have a sustained effect as the students continue to experience handovers in the clinical setting ¹². As the students who participated in this workshop move onto clinical clerkships, they will be able to use this knowledge to implement better handover skills in their clerkships and eventually during residency.

Baseline data showed that a majority of the pre-clinical students had not previously heard of patient handovers, but felt that pre-clinical orientation was the ideal time for teaching and that simulation exercises were the best method for teaching. Post-workshop feedback reiterated that simulation exercises were the preferred method for learning about handovers, a finding consistent with other handover curriculum interventions ¹¹. The majority of students also felt that the information they learned in the workshop would be useful in during their clerkship rotations.

Limitations

Because this intervention was specifically designed to be implemented at the Transition to Clerkship orientation at UTSW, the generalizability of the findings to other institutions are limited. Though the majority of students stated that they understood the essential elements of a handover, the survey was administered immediately after the workshop, so their knowledge and confidence on handovers may not persist if they were resurveyed at a later point. Additionally, because the post-workshop survey was completed before the students had clinical exposure or practice performing handovers, they were not asked to evaluate their confidence in performing a handover. It is difficult to interpret how the knowledge of the elements of a handover translates to confidence to perform a handover or actual clinical skill; however, we are confident that as the full curriculum is implemented we will be able to evaluate students' confidence and handover skill over time.

Interpretation/Future interventions

In order to continually improve this curriculum, the Transition to Clerkship intervention will need to be changed based on the student feedback. Increasing the number of handover scenarios, creating smaller groups, and increasing the number of facilitator will improve the student experience by making the sessions more interactive. Though a few students suggested being able to practice delivering or receiving handovers at the workshop, this may be better suited for later in the curriculum after students have more clinical experience.

In addition to improving the pre-clinical workshop, development of the second portion of the curriculum will allow students to use their knowledge of handovers during their MS3 clerkships. The proposed intervention during the core clerkships is for students to use a handover

evaluation tool to evaluate handovers that they witness during their MS3 rotations and then discuss their evaluations with their faculty. This will allow students to compare the theoretical concepts they have learned in the workshop to practical handovers they witness in the hospital and determine what is done well and what is not. By initiating discussions with faculty on these topics, we hope to further facilitate a culture change at UTSW to fully adopt standardized handovers. After the implementation of a core clerkship curriculum, a curriculum for practicing handovers can be implemented for fourth year students in their specialty specific selective clerkship rotations. Additionally, a handover OSCE may be added to the end of the selective clerkships to test fourth year students similar to the one created by Farnan et al ¹⁰.

Conclusions

This study is significant as the first step in developing a longitudinal curriculum at UTSW for teaching patient handovers to medical students. In response to the positive feedback from students about the first workshop, it has been implemented as a regular portion of the Transition to Clerkship orientation week. As the curriculum is fully implemented, further studies will be needed to show the clinical impact that medical student training has on quality and patient outcomes.

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