

ORIGINAL RESEARCH

Clinical skills day: preparing third year medical students for their rural rotation

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ABSTRACT

Introduction: In order to prepare third year medical students in the Rural Physician Associate Program for a nine-month community-based continuity care experience in rural Minnesota, USA, a clinical skills day that featured human patient simulators and standardized patients was developed. Patients presenting with common urgent and routine primary-care problems were developed and presented using the objective structured clinical examination for teaching. The goals of the day were to: (1) distinguish urgent from non-urgent clinical presentation; (2) use clinical guidelines for making decisions; (3) communicate effectively in stressful situations; and (4) uncover a significant clinical issue with a different presenting complaint.

Methods: Case scenarios were written for a variety of diagnoses in patients with differing ages. Scenarios were both urgent and non-urgent and typical of what might be encountered in primary care. They included: chest pain with bradycardia and pulseless electrical activity; major trauma from an all-terrain vehicle; labor and delivery; acute abdomen (acute appendicitis in a 20 year old and diverticulitis in a 70 year old); anaphylaxis after an influenza vaccination; pediatric upper respiratory infection in which the



mother demanded antibiotics; knee injury in a middle-aged man after a weekend of football; heartburn with an underlying significant depression; and X-ray review. The experience occurred in the Interprofessional Education and Resource Center (IERC), where each room was a fully equipped ambulatory examination room with a computer for accessing data and a video camera for central monitoring. Faculty were recruited from the College of Medicine and received an on-line presentation orienting them to the IERC, the teaching model and the scenario assigned to them with supporting evidence-based guidelines. Students reviewed an on-line audio-visual presentation orienting them to the IERC and outlining the learning expectations for the day. Otherwise, students were not expected to prepare for the day because this was an immersion learning experience. Faculty were present in each room as observers, facilitators and educators. Their roles were active or passive, depending on the case scenario and the presence of a simulator or standardized patient. Each station, except the radiology station, involved a debriefing at the end for final questions, and distribution of educational resources or summary teaching points. Standardized patients also gave the students feedback. Students were randomly assigned to small groups of three to four students and rotated through the stations as a unit.

Results: To date two classes of students ($n = 77$) have participated. Evaluations were completed by both students and faculty and included both qualitative and quantitative data immediately after the event and 9 months later ($n = 59$). Evaluations were overwhelmingly positive with means well above four on a five-point Likert scale. Feedback from both immediate and delayed evaluations were and continue to be used to improve the session for the following year.

Conclusion: Both students and faculty were enthusiastic about this 'hands on' team learning format, which provided students with opportunities to begin to understand the complex skills that they will need before they learn them step-by-step.

Key words: clinical simulations, objective structured clinical examination, patient simulators, undergraduate medical education, USA.

Introduction

The Rural Physician Associate Program (RPAP) of the University of Minnesota Medical School is a 36-year-old program that provides third year medical students with a nine-month community-based, clinical continuity care experience¹⁻³. Students are mentored by a primary preceptor over a period of months.

Historically, the students' 2 day orientation included introductions to the RPAP experience and coursework, communication skills, and resuscitation training. In recent years, student feedback indicated dissatisfaction with resuscitation training during orientation. A review of the literature revealed a paucity of published curricula directed to orienting students to long-term community rotations. However, literature in community-based learning recognized

the challenges for new students with undifferentiated clinical problems and the emotional nature of the patient's world view. A prior sensitization experience was posited to ease students' adaptation to a community setting⁴.

In response, faculty considered the types of clinical skills that might be most useful for students who were starting in apprentice roles. The Interprofessional Education and Resource Center (IERC), a clinic setting designed for teaching and testing health professions students on clinical skills through the use of standardized patients and human patient simulators, presented creative learning opportunities. The orientation was restructured to include a day of clinical skills training in 2005 using the objective structured clinical examination (OSCE) for teaching as opposed to testing⁵. To date two classes of RPAP students have participated in this experience.



Methods: Clinical skills day description

Objectives

The learning objectives of the full-day experience included to:

1. Distinguish urgent from non-urgent clinical presentation.
2. Use clinical guidelines for making decisions.
3. Communicate effectively in stressful situations.
4. Uncover a significant clinical issue with a different presenting complaint.

Orientation

Prior to the day, faculty received an on-line presentation orienting them to the IERC, and the teaching model and the scenario assigned to them. Evidence-based guidelines were provided for context and to share with the students as resources to utilize during their RPAP experiences. A brief face-to-face orientation session was held before the students arrived.

Students reviewed an on-line audio-visual presentation orienting them to the IERC and outlining the learning expectations for the day. Otherwise, students were not expected to prepare for the day because this was an immersion learning experience.

Evaluation

Evaluations were completed at the end of the day by both students and faculty. The final evaluation completed by students at the end of the 9 month RPAP experience also enquired about the value of the clinical skills day. Analyses of these data included simple descriptive statistics (quantitative) and written comments organized into representative themes (qualitative). The University of

Minnesota Institutional Review Board granted exemption from formal review.

Case scenarios

Cases scenarios were written for a variety of diagnoses in patients of differing ages. Less complex primary care problems were given 20 min. Complex problems including acute abdomen, labor and delivery management, and two urgent cases (chest pain and major trauma) were allocated 45 min. All experiences occurred in the IERC which offers 18 fully-equipped ambulatory examination rooms with a computer for accessing data and a video camera for central monitoring. The IERC also oversees the University of Minnesota's health sciences simulations and Standardized Patient Program, which recruited and trained the patients participating in this event.

Faculty recruited from the department of family medicine and community health and the department of emergency medicine supervised the stations. They were present in each room as observers, facilitators and educators. Their roles were more active or passive, depending on the case scenario and the presence of simulated or standardized patient. Each station, except the radiology station, involved a debriefing at the end for final questions, distribution of educational resources or summary teaching points. Standardized patients also gave the students feedback.

Students were randomly assigned to small groups of three to four students that rotated through the stations as a unit. Groups were combined for the longer cases. The students were encouraged to take turns leading the interview among stations. The schedule was monitored centrally with overhead announcements informing students when to begin and when 5 minutes remained. After completing the interview the student performed a directed examination, as appropriate, for the content of the station. The lead student could ask the other students to assist him/her as needed. The faculty member observed and taught at appropriate junctures. Near the end of the time period, the standardized patient and faculty debriefed the students on the salient



issues, provided directed feedback to the students and shared the evidence-based guidelines provided for the station.

Primary care cases (20 min each): *Anaphylaxis* After receiving an influenza vaccination, a middle-aged patient had an anaphylactic response. The objectives of the station were to recognize the symptoms and signs of acute anaphylaxis, to understand the basic treatment, and to educate the patient in the use of appropriate avoidance and protection from anaphylaxis in a situation of a known allergen. *The Diagnosis and Management of Anaphylaxis: an Updated Practice Parameter* guideline was used⁶.

Pediatric upper respiratory infection A young mother presented with her screaming 15 month old baby, requesting antibiotics for an uncomplicated upper respiratory infection. The challenge for the student was dealing with an exhausted and difficult parent. The objectives were to assess presenting symptoms and decide whether the case was urgent or non-urgent. Then the student educated the parent on the child's status and provided appropriate educational resources (ie the difference between bacterial vs viral illness, appropriate antibiotic usage). Further, she/he practiced effective communication in the setting of a crying infant and a demanding parent. The *Institute for Clinical Systems Improvement (ICSI) Health Care Guideline: Viral Upper Respiratory Infection in Adults and Children* was used⁷.

Knee injury A middle-aged man presented with knee pain after a weekend of playing football. The objectives of this station included the ability to gather information about the nature of the injury and to make a decision about whether or not to order an X-ray with the assistance of the Ottawa guidelines, and to inform the patient on basic assessment and plan⁸.

Heartburn and depression A 30-year-old female patient presented with symptoms of heartburn with an underlying significant depression. The objectives of this station were: to recognize the signs and symptoms of depression in a clinical presentation of unrelated complaints; to communicate with the patient about the diagnosis of depression; to recognize

the need for urgent psychological/psychiatric intervention; and to develop a contract with the patient should she become suicidal. The Institute for Clinical Systems Improvement healthcare guideline: *Major Depression in Adults in Primary Care* was utilized⁹. The *Patient Healthcare Questionnaire 9* was discussed as tool for assessing depression¹⁰. The standardized patient played a critical role in providing feedback to the students about which interviewing skills were productive in eliciting her information.

Radiology This station was the only one without role-play by a standardized patient. Instead, a series of different X-rays were presented based on brief case scenarios with the following objectives: to review an X-ray in an organized approach and to find basic abnormalities on X-ray assisted by clinical details.

Complex cases (45 min each): *Acute abdomen* The acute abdomen station included two scenarios involving standardized patients. One was a 24 year old with right lower quadrant abdominal pain and delayed menses. In this scenario students thought through the differential and management of a young woman who might be pregnant, have a sexually transmitted disease or an appendicitis. The second scenario was a 70 year old woman with left lower quadrant abdominal pain. Guidelines about the appropriate imaging for abdominal pain were available¹¹⁻¹³. The learning objectives for the acute abdomen stations were: to obtain presenting complaints and perform a limited physical examination; to develop a differential diagnosis considering the four quadrants; and to understand when surgery might be indicated for the acute abdomen.

Labor and delivery management Two scenarios dealt with issues related to labor and delivery using a patient simulator and a standardized patient. The learning objectives for the station on prolonged labor with a patient simulator included: exposure to a labor curve and fetal monitoring strips; assessment of prolonged labor/failure to progress; identification and management of failure to progress; and performance of uncomplicated vertex vaginal delivery. This station also involved the APGAR scoring of the newborn



and the management of post-partum hemorrhage. The second labor station featured the early presentation of labor with a standardized patient and the following learning objectives: obtain presenting symptoms and pregnancy history and to decide on urgency or non-urgency; to understand how to perform the basic tests required to assess labor and fetal health; and to educate the patient on expectations for labor and delivery.

Urgent stations Both urgent scenarios (chest pain and major trauma) used a patient simulator. The objectives were that students articulate, not answer, four to five questions from the following list: What basic emergency equipment does my facility have? Where is it kept? How does it work? Who knows how to use it? Where can I find quick references for emergency interventions? Who is on our emergency care team? What are the critical care capabilities of this facility? What management and transfer protocols exist at this facility? What are our referral centers and mechanisms of transfer?

The chest pain scenario consisted of an inferior myocardial infarction with bradycardia and pulseless electrical activity (PEA) arrest. Students conducted a basic resuscitation for this rhythm, including airway management, and discussed the elements of effective communication with patient families and medical colleagues/consultants. At the conclusion of this station, students were provided with the *Handbook of Emergency Cardiovascular Care for Healthcare Providers* and familiarized themselves with the resource using a scavenger hunt format¹⁴.

A major trauma scenario involved the victim of an all terrain vehicle accident. Managing this patient with abdominal trauma and shock, students verbalized understanding of major sources of morbidity in major trauma. These included airway/breathing abnormalities, shock and neurotrauma, and how to prioritize trauma care in order to address these concerns. Students conducted a basic secondary survey for trauma and formulated a diagnostic, treatment and disposition plan consistent with the patient's condition and the facility's capabilities.

Results

Seventy-seven students have participated in the clinical skills day. Evaluations were collected from 76 medical students (30 from 2005 and 46 from 2006). One student did not hand in any evaluations. Students completed three evaluations: one for the 45 min stations, one for the 20 min stations, and one administered at the end of the day evaluating the experience as a whole. In 2005, the evaluation for each station type used four general, summary items to assess the students' perceptions of the event, the degree to which it reinforced or improved their skills and knowledge, and their confidence as student practitioners. In 2006, students were asked to evaluate learning objectives more specifically (eg their ability to recognize symptoms of depression or to find abnormalities on an X-ray). Responses to all items used a 5 point Likert scale (strongly disagree to strongly agree). Students were also asked for open-ended written comments at the end of each evaluation form. The final evaluation completed after the 9 month rotation also included three questions about the day. One questions asked about the helpfulness of the experience, using a 5 point Likert response scale. The second question asked how the experience could be improved, and the third listed the four objectives and asked for written comments about how the student applied the learning at the RPAP site. Fifty-nine students completed this evaluation.

Table 1 shows the overall mean for each station. Table 2 presents the day's evaluation immediately after the event. Students rated the stations and overall day positively, with means well above four on the 5 point scale.

Table 3 includes qualitative data from written comments at the end of the experience organized in themes. Quotations representing each topic area for a theme are presented. Overall, student comments were positive. Several students in both classes recommended expansion of this type of simulation throughout the medical school curriculum. In 2005, one deficit noted by students, faculty and staff was the need for greater preparation of both students and faculty



instructors. Not all instructors were able to practice scenarios with the equipment (especially the patient simulators) before the event, and logistics made it difficult for an on-site orientation the day of the event. In 2006, several students complained about the length and intensity of the day. This may have been due to incorporating two scenarios into the longer stations which was done in order to address the 2005 staff and faculty's perceptions that the longer stations needed more content.

On the evaluation 9 months later, the majority (71%) thought the orientation was very helpful (15%) or helpful (56%). A quarter rated the experience as adequate (24%) and 5% did not think the experience was helpful. Table 4 summarizes the written comments 9 months later about how to improve the day and how the learning was applied. A few could not remember the specifics of the day, but had retained a positive impression of it.

Table 5 presents the evaluations by all 2006 faculty performed immediately after the experience. Responses were on a 5 point Likert scale (strongly disagree to strongly agree). Written comments were also encouraged. Formal faculty evaluation was not made in 2005. The experience caused some to reflect on their teaching, the content of the scenarios, and the medical school curriculum in general. For example, one faculty member at an acute care station wrote, 'I felt like I scared the students a bit'. Several others indicated that they left with a strong sense of the need to incorporate more of this kind of content and more active learning strategies into the curriculum.

Discussion

Student feedback about the limited usefulness of resuscitation skills training as orientation to a rural longitudinal clerkship encouraged faculty to develop an active, learner-centered experience with broader and more appropriate objectives. Using the OSCE format for teaching as opposed to testing has been done by others and, as our

evaluations suggest, it was well received by the students¹⁵. Students learned eagerly in a non-competitive and supportive environment. The increased content and the intensity of the urgent care stations may have led to the complaints about the length of the day. In the future, RPAP faculty will continue to use student and faculty feedback to make improvements for the following year. While evaluations immediately after the event are essential, enhanced longitudinal assessment following the students' RPAP community experiences will impact the design and support of the teaching experience.

The RPAP students are immersed in their settings, working with 'experts', physicians who have been in practice for several years¹⁶. They can use intuition where empirical knowledge does not yet exist. 'Learning for mastery' or outcome-focused and competency-based teaching objectives that encourage students to acquire skills at the level of a practicing physician, enables students to put all their skills together¹⁷. Introducing them to this early in a realistic, facilitated experience is the value of the OSCE format⁵.

Conclusions

The clinical skills day experience immersed students into situations that they would be facing in their settings. This provided them with opportunities to begin to understand the complex skills that they would need before they learned them step by step. Building a bridge between skills-laboratory learning and real-life communities of practice using faculty-assisted simulated clinical learning is valuable¹⁸. Evaluations were positive both immediately after the experience and 9 months later. As we ponder how to improve medical education¹⁹, the evaluations for this clinical skills day support the value of learning that is realistic, active and faculty facilitated.



Table 1: Mean for each urgent and non-urgent station for two Rural Physician Associate Program classes, 2005 and 2006

Mean	Rural Physician Associate Program class station							
	Anaphylaxis	URI	Knee	Heartburn	X-ray	Abdominal pain	L&D	Urgent
Overall mean [†]	4.55	4.47	4.47	4.47	4.43	4.70	4.51	4.54

[†]Rated on a 5 point Likert scale (1 student from 2006 did not hand in an evaluation).
L&D, Labor and delivery; URI, upper respiratory infection.

Table 2: Summary evaluations for the entire clinical skills day for two Rural Physician Associate Program classes, 2005 and 2006

Statement	Mean [†]
The event was well-organized.	4.69
I received adequate information to prepare for this event.	4.17
The staff and faculty were very helpful.	4.78
The standardized patients were believable.	4.58
I benefited from working with other students in my groups.	4.59
I enjoyed this event.	4.45
This event improved my confidence about starting my rural clinical experience.	4.14
This event should be repeated in the future.	4.54
Overall mean	4.49

[†]On a 5 point Likert scale ($n = 70$; 7 students from 2006 did not hand in the overall evaluation).

Table 3: Student comments about the clinical skills day two Rural Physician Associate Program classes, 2005 and 2006

Theme	Sample quotes (year)
Format of the day	<ul style="list-style-type: none"> Really enjoyed the day - excellent opportunity to be taught in small groups by faculty. I really enjoyed this setup. (2005 + 2006) The morning went by fast and it was a good refresher on history/physical/management skills. (2005) Way better than lectures. Great way to review before RPAP. (2005 + 2006) Working in teams with little to no pressure and lots of excellent structure and guidance from faculty and patients. (2005 + 2006) Very hands-on. (2005 + 2006) Have one person as a leader every time especially in interview otherwise it gets too hectic with multiple people firing questions at the patient. (2005) Maybe make the day a bit shorter or break it into 2 half days. (2006)
Use of standardized and simulated patients	<ul style="list-style-type: none"> The simulated dummy was very instructive. (2005) The patient simulators are great. This should be a part of all beginning 3rd year student training. (2005) Great acting (2005 + 2006) The patients were believable, all of the situations were realistic, and will most likely happen on RPAP. (2006)
Specific stations	<ul style="list-style-type: none"> The chest pain station was great, a good refresher. (2005) Chest pain was very relevant; OB – I have no prior knowledge so I was kind of lost at this. Abdominal pain was easy/redundant to previous experience I've had. (2005) Overall good though the radiology station should emphasize a systematic approach to x-ray. With every film I wish the presenter would have said "Look at the airway it is normal because..." "Now look at the bones here is an old fracture because (2006)
Skills gained	<ul style="list-style-type: none"> Opportunity to review some common problems. (2005 + 2006) Opportunity to practice interview skills with realistic patients. (2005 + 2006)
Faculty	<ul style="list-style-type: none"> A little more rehearsal by teaching staff. (2005) Faculty teaching during encounters was more helpful because we could correct/redirect the interview (2006)

OB, Obstetrics.



Table 4: Summary of themes of student comments about how learning from the clinical skills day was applied during the Rural Physician Associate Program rotation, and suggestions about improving the day

Objective	Sample quotes
Overall	<ul style="list-style-type: none"> • HELPFUL • The objectives are essential in all areas • I used them every day • Good review and confidence builder • Situations were realistic • NOT SO HELPFUL • I feel like I had already experience most of these, but I still thought it was good. • Can't learn it all in six hours, but get a sense of what to expect.
Objective 1 Urgent vs non-urgent	<ul style="list-style-type: none"> • Used all the time in the ER. • Used to prioritize the problems of my complicated internal medicine patients. • Used when I received phone calls from nurses in the ER in the middle of the night who were trying to decide whether or not to call my preceptor.
Objective 2 Clinical guidelines	<ul style="list-style-type: none"> • Used guidelines all the time. • Once my preceptor knew that I knew how to find guidelines, she started asking me to find the answers to many evidence based medicine questions.
Objective 3 Communication under stress	<ul style="list-style-type: none"> • It helped me practice...I had many patients with depression, loss of one's spouse, sexual orientation and this let me work out some of the bugs and be more aware of what they might be needing. • I dealt with upset and crying patients, dying patients and developed more comfort with time.
Objective 4 Uncover a hidden issue	<ul style="list-style-type: none"> • I found myself asking patients if there was anything else the wanted to discuss...many had other issues that they might not have brought up.
Suggestions for improvement	<ul style="list-style-type: none"> • More time • More cases • Sessions should help us be more succinct with our presentation skills. Doctors don't have time to listen to an entire H&P. • Small group work does not encourage the participation of all students.

ER, Emergency room; H&P, history and physical.

Table 5: 2006 Faculty summary evaluation (n = 15)

Statement	Mean
The event was well organized.	4.80
I received adequate information to prepare for this event.	4.80
The staff and other faculty were very helpful.	5.0
The standardized patients were well trained.	5.0
I was able to meet my station's educational objectives in the time allotted.	4.33
I enjoyed this event.	4.93
I think the students learned a lot in today's event.	4.73
This event should be repeated in the future.	4.93
Overall mean	4.82



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