

Virtual Newborn Nursery Rounds: An Alternative Experience During the COVID-19 Pandemic

Tara E. Avery^{1†} and Ashley L. Shamansky¹

¹Geisinger Commonwealth School of Medicine, Scranton, PA 18509

[†]Doctor of Medicine Program

Correspondence: tavery@som.geisinger.edu or teavery@geisinger.edu

Abstract

Background: The novel coronavirus (COVID-19) has presented educators with new, unique challenges in delivering education that have underscored the need for innovative ways to prepare learners for the clinical setting without being physically present in the clinic. This virtual workshop was developed to simulate newborn nursery rounds for students removed from the clinical setting at the onset of the COVID-19 pandemic.

Methods: Students were each assigned one case to present, with the facilitator guiding the discussion as if on clinical newborn nursery rounds. Student educational outcomes were measured using newborn nursery Entrustable Professional Activities (EPAs) assessment forms on a 5-point Likert scale. Performance on the EPAs was compared between students completing virtual rounds versus those who completed in-person rounds.

Results: Of the 7 measured EPAs, only 2 showed a statistically significant differences (EPA 3, p-value 0.01 and EPA 9, p-value 0.003).

Conclusion: These results demonstrated that virtual newborn nursery rounds can act as a substitution for clinical newborn nursery rounds with statistically significant differences in only 2 of the 7 measured EPAs. Virtual, simulated rounds are an alternative way to introduce medical students to the newborn nursery and review concepts that will help them to succeed in the clinical setting.

Introduction

The novel coronavirus (COVID-19) has presented educators with new, unique challenges in delivering education to medical students. Although lectures during the didactic years of medical school are frequently replaced with podcasts and virtual resources, replacing hands-on clinical experiences poses a significant challenge. Prior research has demonstrated that implementing preclinical pediatric rounds can be successful in delivering educational content and improving students' clinical skills (1). Clinical rotations are a key component of medical education and are often the first time that medical students interact with patients and are involved in decision-making as part of the health care team. Patient contact, a variety of patient presentations, and being part of a clinical team have been identified as core features of clinical learning (2). In the face of uncertainty and new guidelines for social distancing, it has become imperative to find new ways to prepare learners for the clinical setting without being physically present in the clinic.

One of the most valuable skills that students develop during their clinical year is the art of the oral presentation during patient rounds. The oral presentation is crucial as it facilitates

patient care, directs both individual and group learning, and provides an opportunity for students to be evaluated and receive constructive feedback (3). When performed properly, the oral presentation communicates all important aspects of patient care to the rest of the health care team and makes for efficient and effective patient rounds. Developing proficiency in this area is one of the greatest challenges for students, as it requires integration of materials rather than simple rote memorization and regurgitation. Perhaps the most challenging aspect for medical students when giving oral presentations is identifying which data is clinically relevant due to student inexperience (4). The oral presentation can also be a source of anxiety for students. Prior studies have demonstrated that students required to deliver oral presentations had significant anxiety with increased cortisol levels on the day of their presentations compared to before and after giving the presentation (5).

The art of the oral presentation is further complicated by the lack of a standardized framework for both teaching and evaluating students and the influence of each attending physician's subjective preferences on presentation style. Despite this lack of framework, several standards have been identified that are commonly accepted among clerkship directors with the most important elements being a complete and accurate history of the present illness, pertinent physical exam findings, laboratory studies, and a prioritized assessment and plan addressing the problem at hand (3). However, students best learn to give oral presentations through trial and error rather than a standardized framework or specific model, thus underscoring the importance of continued practice (4).

In the clinical setting, most of the time on rounds is spent presenting with less time spent on providing constructive feedback due to time constraints, reducing opportunities for medical student education. E-learning, or online learning, has become a popular feature of medical education as it is durable and reusable, allows for standardized content delivery, and permits asynchronous learning with fewer time constraints (6, 7). Furthermore, implementing technology into medical education can be considered a primer for interprofessional cooperation and future telemedicine encounters (8).

Prior curricula developed at Vanderbilt University School of Medicine demonstrated that implementing preclinical pediatric rounds was successful in delivering educational content and improving students' clinical skills such as eliciting a chief complaint, obtaining the history of present illness (HPI), and reviewing past medical history with patients. Additionally, student-reported comfort levels pertaining to interacting with the pediatric patient population increased (1). Another study demonstrated that pediatric interns who underwent simulation-based training in family-centered rounding demonstrated

statistically significant improvement in their presentation skills and higher performance ratings overall (9).

To prepare medical students removed from the clinical setting at the onset of COVID-19 for future clinical rotations, we developed five newborn nursery cases to be used during virtual rounds to simulate the experience of the newborn nursery. The Council on Medical Student Education in Pediatrics (COMSEP) identified newborn care as a core component of the MS3 General Pediatric Clerkship Curriculum, as noted in the 2019 COMSEP Curriculum Action Toolkit (10). Using these cases, we expect students to gather information from maternal and patient data and practice oral presentations to prepare for real-time rounding in the clinical setting. These cases present the opportunity for students to receive real-time feedback on their performance, and to address common topics covered on newborn nursery rounds, thus providing a foundation in newborn care and knowledge. Our primary goal is to identify if virtual, simulated newborn nursery rounds can act as a substitution for clinical newborn nursery rounds.

Methods

We developed this workshop for third-year medical students, but the materials can be applied broadly to any learner preparing for pediatric clinical rotations or clerkships and are readily adaptable to any institution. We presented these cases in a workshop to 27 students during a virtual curriculum lasting 2 weeks via Zoom Video Communications.

One day prior to the workshop, we sent the students workshop instructions and assigned each student a case with the following materials: maternal delivery summary, infant delivery summary, maternal history and physical, newborn information, as well as maternal medications and additional laboratory values depending on the specific case. We expected students to have a rudimentary understanding of how to properly construct an oral patient presentation which they would deliver during virtual rounding in groups of five. In preparation for their presentations, students were required to fully review all documents and complete a history and physical note for the newborn that they would be presenting. We also provided workshop instructions to the pediatric clinical facilitators, as well as case summaries and a summary of all teaching points.

We conducted the workshop with learning groups composed of one facilitator and five learners, with each learner assigned to one of the five cases. Facilitators for the workshop were newborn nursery physicians that volunteered to guide the discussion. During the workshop, students presented their patient cases sequentially to the group, as if on rounds, with the facilitator guiding the discussion using the provided case summaries and teaching points. We repeated this process for all five cases and spent approximately 2.5 hours completing the simulated rounds, with 30 minutes spent on each individual case.

This study was approved by the Geisinger Institutional Review Board as not-human research. We measured educational objectives and outcomes for the workshop using the GCSOM Clinical Assessment Tool, based on the Entrustable Professional Activities (EPA) assessment form on a 5-point Likert scale with anchors. Following the workshop, facilitators completed an assessment of student performance on each EPA. Each

assessment was returned to the student within one week of the workshop. We then compared student performance on virtual nursery rounds to student performance on clinical nursery rounds from the same year to identify if virtual rounds were an adequate substitution for clinical rounds. In order to do so, we looked at differences in performance on the EPAs between 36 students who completed clinical, in-person newborn nursery rounds and the 27 students who completed virtual newborn nursery rounds.

There were 7 EPAs in total that evaluated a variety of skills pertaining to clinical competencies. These EPAs included gathering a pertinent history, prioritizing differential diagnoses and selecting a working diagnosis, recommending and interpreting common tests, discussing management and treatment plans, delivering an oral presentation, and demonstrating an eagerness to learn as well as professionalism (Table 1). EPA 5, documenting a clinical encounter in appropriate written format, was omitted from the EPA assessment. Although students completed HPIs for their cases, they were graded by other faculty and not the physicians facilitating the workshop and were therefore not included. EPA 8, performing a patient handover, was also not assessed in the virtual setting and was therefore excluded from the evaluation. We conducted statistical analysis of the data using a two-tailed t-test.

Results

In total, we delivered this virtual curriculum to 27 third-year medical students. The students who completed the workshop were students removed from the clinical setting at the onset of the COVID-19 pandemic. These students had a rudimentary understanding of how to develop and write a HPI but had not had any clinical exposure to pediatrics or delivering oral presentations in the newborn nursery. Facilitators for this workshop were volunteer core pediatric faculty and newborn nursery physicians and therefore had pre-existing background knowledge on the topics covered during the simulated newborn nursery rounds.

Facilitators evaluated students following virtual rounds using a newborn nursery EPA assessment form on a 5-point Likert scale with anchors (Table 1). These EPAs aligned with our educational objectives which we developed using Kirkpatrick's pyramid. Our ultimate goal was to evaluate if simulated newborn nursery rounds are an adequate substitution for clinical newborn nursery rounds. To answer this question, we compared the EPA assessments of the third-year medical students completing virtual, simulated newborn nursery rounds to EPA assessments of students on clinical newborn nursery rounds from the same year. We found statistically significant differences in performance on two of the EPAs (Table 2), with improved performance among the in-person group as compared to virtual learners. EPA 3, recommending and interpreting common tests, differed between the two groups (p -value = 0.01) and EPA 9, demonstrating professionalism and teamwork (p -value = 0.003).

Discussion

Virtual, simulated newborn nursery rounds are a novel method of preparing learners for pediatric rotations outside of the clinical setting. Implemented as a substitution for clinical newborn nursery rounds in the wake of the COVID-19

Table 1	
Entrustable Professional Activities (EPAs) Assessed	
EPA Number	Criteria Being Evaluated
1	Can the student gather a pertinent history and physical exam that is complete and accurate?
2	Can the student prioritize a differential diagnosis and select a working diagnosis?
3	Can the student recommend and interpret common tests?
4	Can the student discuss common treatment and management plans?
5	Can the student document a clinical encounter in appropriate written format?
6	Can the student provide an oral presentation of a patient encounter?
7	Does the student show an eagerness to learn, ask clinical questions, and retrieve evidence to advance patient care?
8	Can the student give or receive a patient hand over?
9	Does the student demonstrate professionalism and teamwork?

Table 1. Entrustable Professional Activities (EPAs) assessed. Students were assessed using the above EPAs. Each EPA was graded using a 5-point Likert scale ranging from 1 to 5, with 1 being the lowest score possible and 5 being the highest. EPA 5, documenting a clinical encounter in appropriate written format, and EPA 8, performing a patient handover, were not assessed in the virtual setting and therefore excluded from students' evaluations.

Table 2					
In-Person Newborn Nursery vs. Virtual Curriculum Nursery Performance					
		In-Person	Virtual	t-value	p-value
EPA 1	n	33	19	-0.45	0.65
	M	4.61	4.68		
	SD	3.14	2.85		
EPA 2	n	31	19	1.47	0.15
	M	4.55	4.26		
	SD	3.69	2.77		
EPA 3	n	30	27	2.55	0.01
	M	4.57	4.07		
	SD	3.66	3.98		
EPA 4	n	32	27	1.87	0.07
	M	4.56	4.19		
	SD	3.45	4.69		
EPA 6	n	33	27	0.73	0.47
	M	4.47	4.56		
	SD	2.7	3.56		
EPA 7	n	33	27	1.84	0.07
	M	4.88	4.63		
	SD	1.88	3.51		
EPA 9	n	33	27	3.10	0.003
	M	5	4.63		
	SD	0	3.51		

Table 2. In-person newborn nursery vs. virtual curriculum nursery performance. Of the 7 measured EPAs, only 2 showed a statistically significant difference. EPA 3, interpreting and recommending common tests, and EPA 9, professionalism, were both lower among the virtual rotators versus the clinical rotators.

pandemic, we found that the virtual newborn nursery rounds are successful in preparing student learners. Ultimately, students can gain a better understanding of how patient rounds function, practice and refine their oral presentation skills, and discuss various topics relevant to caring for a newborn as a pediatrician.

Of the 7 measured EPAs, only 2 showed a statistically significant difference. EPA 3, interpreting and recommending common tests, was lower among the virtual group (p-value = 0.01). This could be because the materials provided to students already included documented clinical testing, reducing student recommendations for future laboratory tests. This could also be accounted for by a lack of newborn medicine experience at the time of the virtual rotation. These simulated newborn rounds were the first exposure to the newborn nursery for many students, requiring them to rapidly acquire, assess, and incorporate information prior to presenting whereas students in the clinical newborn nursery group were evaluated toward the end of their rotation (1 full week of newborn nursery), which provided them with more time to receive feedback and hone their skills prior to formal evaluation. The virtual formatting also allowed for

more candid, rapid feedback which may be more representative of student performance.

EPA 9, professionalism, was also lower among the virtual rotators versus the clinical rotators. We hypothesize that this difference may be due to the fact that students were delivering oral presentations from the comfort of their home environment. Additionally, when assessing professionalism in the virtual environment, there are not as many interactions with providers, support staff, and families that can be assessed. Interestingly, the standard deviation for professionalism is the largest among the data set, suggesting a large difference between virtual versus in-person rotators. This raises the question of whether students can have improved professionalism ratings by simply being present in person. Although these cases strive to replicate clinical scenarios, it is difficult to simulate the professional clinical environment in its entirety. Despite these differences, most EPAs showed no statistical difference.

Potential limitations of this activity include reliance on a skilled facilitator with knowledge of the newborn nursery. Facilitators for the workshop were all pediatricians with background knowledge of the subject matter; however, any facilitator with knowledge of the newborn nursery could guide the discussion using the provided materials. Similar to in-person clinical rounds, there may be time constraints. Facilitators should be mindful of the time throughout the workshop to guarantee enough time to cover the teaching points and provide ample constructive feedback to each student. One area for improvement is the newborn physical exam, which could not be approximated with virtual rounds. Students were instructed to view the Loyola University Stritch School of Medicine Newborn Physical Exam Video and provided with newborn physical exam findings that they could present (11). This workshop helps to develop a framework for and discuss pertinent physical exam findings but does not give students the hands-on experience

that they would receive in the actual newborn nursery. A useful adjunct to this workshop would include a session allowing students to simply handle newborn infants and become comfortable examining them with a more in-depth discussion of pertinent physical exam findings.

Conclusion

In summary, simulated rounds are an adequate substitution for clinical rounds with differences in only 2 of the 7 measured EPAs. Although intended for use by third-year medical students, these cases can be applied broadly to any learner preparing for pediatric clinical rotations or clerkships and are adaptable to any institution. These cases can be delivered synchronously on a pediatric rotation, asynchronously as a “primer” prior to starting a newborn nursery rotation, or as clinical makeup time or remediation. Simulated, virtual rounds will never fully replicate the professional working environment of the hospital or working within an integrated health care team, but they are an alternative way to open the door for medical students and provide education on pertinent topics and presentation skills that will help them to succeed in the clinical setting.

Disclosures

The authors have nothing to disclose.

References

1. Apple R, Fleming A, Israel S. Pediatric clinical rounds teaching guide: A preclinical curriculum to improve medical student comfort with pediatric patients. *MedEdPORTAL*. 2012;8(1). doi: 10.15766/mep_2374-8265.9293.
2. Kandiah DA. Perception of educational value in clinical rotations by medical students. *Advances in medical education and practice*. 2017;8:149-162. <https://www.ncbi.nlm.nih.gov/pubmed/28223855>. doi: 10.2147/AMEPS129183.
3. Green E, Green E, Durning S, et al. Expectations for oral case presentations for clinical clerks: Opinions of internal medicine clerkship directors. *J Gen Intern Med*. 2009;24(3):370-373. <https://www.ncbi.nlm.nih.gov/pubmed/19139965>. doi: 10.1007/s11606-008-0900-x.
4. Haber R, Lingard L. Learning oral presentation skills. *J Gen Intern Med*. 2001;16(5):308-314. <https://www.ncbi.nlm.nih.gov/pubmed/11359549>. doi: 10.1046/j.1525-1497.2001.00233.x.
5. Merz CJ, Wolf OT. Examination of cortisol and state anxiety at an academic setting with and without oral presentation. *Stress (Amsterdam, Netherlands)*. 2015;18(1):138-142. <http://www.tandfonline.com/doi/abs/10.3109/10253890.2014.989206>. doi: 10.3109/10253890.2014.989206.
6. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of E-learning in medical education. *Academic Medicine*. 2006;81(3):207-212. <https://www.ncbi.nlm.nih.gov/pubmed/16501260>. doi: 10.1097/00001888-200603000-00002.
7. Heiman HL, Uchida T, Adams C, et al. E-learning and deliberate practice for oral case presentation skills: A randomized trial. *Medical Teacher*. 2012;34(12):e820-e826. <http://www.tandfonline.com/doi/abs/10.3109/0142159X.2012.714879>. doi: 10.3109/0142159X.2012.714879.
8. Ferrel MN, Ryan JJ. The impact of COVID-19 on medical education. *Cureus (Palo Alto, CA)*. 2020;12(3):e7492. <https://www.ncbi.nlm.nih.gov/pubmed/32368424>. doi: 10.7759/cureus.7492.
9. Rao P, Hill E, Palka C, et al. Improving pediatric resident communication during family-centered rounds using a novel simulation-based curriculum. *MedEdPORTAL*. 2018;14(1):10733. https://search.datacite.org/works/10.15766/mep_2374-8265.10733. doi: 10.15766/mep_2374-8265.10733.
10. Narayan AM, Held M, Noelck A, Narayan M, Jamie. 2019 COMSEP CURRICULUM REVISION. COMSEP curriculum revision action team toolkit. 2019 COMSEP curriculum revision.
11. *Normal newborn screening physical exam*. [https://vault.lumc.edu/videos/videojump.cfm?hd=1&ID=4DE8CA15-DAF6-42FC-AA95-40EA218E2942]. Chicago, IL: Loyola University Health System; 2001.