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DEVELOPMENT AND IMPLEMENTATION OF A PEDIATRIC TELESIMULATION INTERVENTION FOR NURSES IN COMMUNITY EMERGENCY DEPARTMENTS



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Abstract

The need for virtual education for nursing staff has dramatically increased because of social distancing measures after the coronavirus disease pandemic. Emergency departments in particular need to educate staff on caring for patients with coronavirus disease while concurrently continuing to ensure education related to core topic areas such as pediatric assessment and stabilization. Unfortunately, many nurse educators are currently unable to

provide traditional in-person education and training to their nursing staff. Our inter-professional team aimed to address this through the rapid development and implementation of an emergency nursing telesimulation curriculum. This curriculum focused on the nursing assessment and initial stabilization of a child presenting to the emergency department in status epilepticus. This article describes the rapid development and implementation of a pediatric emergency nursing telesimulation. Our objectives in this article are (1) to describe the rapid creation of this curriculum using Kern's framework, (2) to describe the implementation of a fully online simulation-based pediatric emergency training intervention for nurse learners, and (3) to report learners' satisfaction with and feedback on this intervention.

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Introduction

Because of the global coronavirus disease (COVID-19) pandemic, emergency nurse educators needed to rapidly develop and implement novel methods to provide continuing education to front line staff.¹⁻³ This involved either a cessation of existing educational activities or a transition from in-person education to distance learning. To ensure adherence to physical distancing and the safety of themselves and their learners, many educators used free video conferencing platforms such as Zoom. In the emergency department, nurse educators faced a unique challenge in that they needed to ensure ongoing education of core content and competencies while concurrently providing new education on COVID-19-related topics. Unlike operating rooms, outpatient clinics, and other areas of care,

the emergency department could not close down and/or cease to provide care to non-COVID-19 related conditions.

Pediatric emergency care is a specific area that has created significant challenges for nurse educators. COVID-19 restrictions have compounded the baseline challenges that nurse educators face in providing pediatric education in the community ED setting. Community emergency departments typically care for both children and adults, and the vast majority of acutely ill and injured children in the United States (>90%) are seen in these emergency departments, whereas specialty pediatric centers provide care to 10%.⁴ Community emergency departments in particular faced a decreasing volume of overall pediatrics, with a concurrent increase in the proportion of critically ill children, often with delays in presentation. In general, in the US, ED census declined by 42% since the onset of the pandemic; however, patient acuity has increased (because of delays in presentation and/or lack of access to care).⁵ This census decline and acuity shift has triggered educators and pediatric experts to explore alternative models of education to maintain the knowledge and competencies of nursing staff in the community ED setting.

This article describes the rapid development and implementation of a national pediatric emergency nursing telesimulation that was implemented for 3 weeks across 18 ED sites. This curriculum was developed using Kern's model,⁶ engaged an established group of emergency educators involved in the international simulation collaborative group, Improving Pediatric Acute Care Through Simulation (ImPACTS, impactscollaborative.com), and focused on a high priority clinical topic area of pediatric status epilepticus (SE).

Background

The majority of acutely ill pediatric patients do not present to academic medical centers but to community emergency departments in the US, and 69% of those emergency departments see fewer than 15 children per day.⁵ The most recent Joint Policy Statement from the American Academy of Pediatrics states, "All EDs must be continually prepared to receive, accurately assess, and at a minimum stabilize and safely transfer children who are acutely ill or injured."⁷ In situ simulation has shown improvement in adherence to guidelines and best practices for acutely ill children in the emergency department.⁸ Simulation-based training is frequently used for ongoing pediatric training in many emergency departments, but because of limitations of in-person pediatric simulations in the setting of the COVID-19 pandemic, there is an increased need for continued pediatric education via telesimulation.²

Methods

The need for ED nursing staff to maintain pediatric education can be met through a completely remote telesimulation-based curriculum, where participants can engage in simulation from geographically distinct locations. Here, we address the development and execution of this telesimulation.

This telesimulation curriculum was developed by an inter-professional team of content experts including pediatric emergency medicine physicians, pediatric intensive care physicians, pediatric nurses, nurse educators, and respiratory therapists. Following Kern's framework, we conducted a general needs assessment, and a problem was identified that revealed pediatric critical care as an area of focus with the current approach largely relying on in situ simulation and in-person training that could not be conducted because of physical distancing rules. Our targeted needs assessment identified that we should focus on the initial management of a child with SE presenting to the emergency department. Simulating SE allows nurses to consider pediatric-specific physiology, rehearse airway management, and calculate weight-based dosing. Learning objectives were established on the basis of the most recent guidelines from The American Epilepsy Society⁹ and were guided by Kirkpatrick's educational levels of reaction and learning.¹⁰

The objectives of the simulation were for participants to (1) demonstrate 3 critical actions in the first 2 minutes of care for a pediatric patient seizing for more than 5 minutes presenting to the emergency department, (2) list the first- and second-line medications and calculate doses for SE with and without intravenous access, (3) identify when a

TABLE 1
Participant demographics

Participants from 18 sites*	Mean (range)
Years worked as a registered nurse (n = 138)	8 (0-41)
Years worked as a registered nurse in the emergency department (n = 138)	5 (0-30)
Approximate no. of pediatric patients cared for each month (n = 138)	182 (1-2000)
Amount of simulation sessions attended earlier (n = 41)	14 (0-100)

* California, Indiana, Connecticut, New York, Massachusetts, Rhode Island, Maine, Vermont, New Hampshire, and Ontario, Canada.

patient in SE requires transfer to a tertiary care center or admission, and (4) demonstrate family presence and family-centered care in a pediatric patient with a seizure. We selected telesimulation as our educational strategy because of the restrictions for in-person simulations/learning. The team authored a case to meet the goals and objectives, which was conducted using the Zoom videoconferencing platform. Community ED sites were recruited through the ImPACTS collaborative network. Our team recruited 18 community ED sites in the US and Canada (Table 1). Approximately 2 to 10 individual nursing learners were then recruited by the Pediatric Emergency Care Coordinators (PECCs) or Educators at each community emergency department. During the planning phase, our team made the decision to focus on nurse learners at the respective sites owing to concerns of physician availability and engagement. In addition, many sites communicated that physician furloughs were happening, and they simply did not have the staffing to participate in nonclinical activities. This project was reviewed by the Indiana University Institutional Review Board and was deemed exempt as an educational intervention.

The telesimulations were completed at each site over the Zoom videoconferencing platform during a 1-hour time frame using the emerging telesimulation platform American College of Emergency Physicians SimBox. All of the learners participated on a voluntary basis. Many sites had larger teams of 4 to 8 learners during the telesimulation; in this case, to enhance learning opportunity, 2 to 4 nurses took active participant roles, and the remainder took an observer role throughout the scenario. The telesimulation and debrief were facilitated by 2 experienced simulation facilitators, a pediatric emergency nurse, and another pediatric content expert (physician or nurse). Each facilitator was provided training and tips specific to telesimulation.

Every learner was provided with the same prebrief via a YouTube video,¹¹ which detailed what to expect and how to use the video conferencing system and demonstrated the option to call “time out” to clarify information, address technical difficulties, or huddle with their team. The video continued to a simulated emergency medical services report with the telesimulation that followed. The lead facilitator shared their screen that displayed a YouTube video stream of a child seizing overlaid on top of an evolving set of vital signs displayed on a monitor. The vital signs changed over time on the basis of the preprogrammed scenario that was recorded in a “simulation on rails format.” Each of the 18 simulations followed an identical clinical course for the patient. The lead facilitator ensured an appropriate evolution of the case using the preplanned vital signs (this lies in contrast to traditional simulation format with dynamic

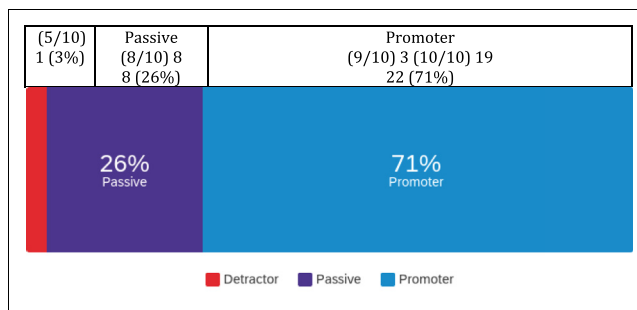


FIGURE
Net promoter score. How likely are you to recommend this session to a colleague 0-10?

changes in response to provider actions). To ensure that no nursing participant worked outside of their scope of practice, a scripted physician role was portrayed by one of the facilitators. This allowed for the nurses to have autonomy while creating a realistic environment. The case ran for a total of 10 minutes, during which, the lead facilitator used a checklist to score the team performance and guide the debriefing. After completion of the case, a reflective debrief was completed by the nursing team and facilitators. The learners and facilitators had the opportunity to provide feedback on the simulation session, which was collected via an online survey (Qualtrics, Provo, UT) using a quick response code link. The survey included a net promoter score (NPS) on the likelihood that a participant would recommend this experience, the validated Modified Simulation Effectiveness Tool (SET-M) to measure the simulation effectiveness,¹² 8 statements using 5-point Likert scales, and demographic questions.

Results

Telesimulations were scheduled across 19 emergency departments, and 18 were conducted (1 was canceled owing to no staff participation). A total of 86 learners participated with experience ranging from new graduates to 41 years of nursing experience and an average of 14 simulations completed previously (Table 1). A total of 7 facilitators were involved in the telesimulations (4 physicians, 3 nurses). Overall, learners reported being likely to recommend this curriculum to others, with the majority reporting a high NPS (Figure). Learners reported a high level of agreement with statements of satisfaction on Likert scales (Table 2). Learners reported a high level of effectiveness as measured by the simulation SET-M (Table 3). In free text, learners reported a safe learning environment in which they felt more

TABLE 2

Agreement with statements related to this session as a whole

Question: this session improved my___:	Strongly agree (total number (%))	Somewhat agree (total number (%))	Do not agree (total number (%))
Teamwork/communication skills in pediatric acute care	22 (70.97)	9 (29.03)	0 (0.00)
Psychomotor skills in pediatric acute care	16 (51.61)	13 (41.94)	2 (6.45)
Knowledge of pediatric acute care	26 (83.87)	5 (16.13)	0 (0.00)
Comfort in pediatric acute care	19 (61.29)	11 (35.48)	1 (3.23)
Telesimulation is effective compared to other distance-learning methods-online case discussion, discussions, lectures, etc...	24 (77.42)	7 (22.58)	0 (0.00)
Telesimulation is effective compared to traditional in-person simulation/debriefing	9 (29.03)	18 (58.06)	4 (12.90)
Having a cofacilitator enhanced my learning during this session	28 (90.32)	3 (9.68)	0 (0.00)
The cofacilitators worked well together	28 (90.32)	3 (9.68)	0 (0.00)

empowered to make clinical decisions and improved comfort and knowledge in acute pediatric care. Facilitators reported that the technology was simple to use, the script was easy to follow, and learners were engaged and actively participated in debriefing. [Supplementary Table](#) reports the performance in the scenario across the 18 simulations, which was used to guide debriefings across sites.

Lessons Learned

Our team demonstrated success in implementing a telesimulation curriculum with nursing staff from a set of community emergency departments throughout the US and Canada. The PECC or Educator at each site was able to observe the expert-facilitated telesimulation at their site. The learners found telesimulation more effective than other distance-learning methods, although not as effective as in-person simulation on the postsimulation evaluation ([Table 2](#)).

The majority of barriers our team experienced occurred during the project recruitment phase. Because of the ramifications from the COVID-19 pandemic, many hospitals had been forced to make financial cuts and were unable to justify additional time and/or payment for educational activities. We mitigated this barrier by designing the educational experience to be completely voluntary instead of a required component of education for staff. During the project period, a large variability in

participation was noted related to COVID-19 census surges. Some emergency departments were experiencing very high clinical volumes, and others were experiencing decreased clinical volumes. Many nurses relayed that they felt burnt out and unable to complete telesimulation in addition to ED nursing responsibilities. Additionally, many nurses were joining from home and did not have access to resources that would typically be available if caring for an ill child in the emergency department. Some learners also had difficulty connecting to Zoom because of poor internet connections or difficulty using Zoom due to nonoptimal devices.

Lessons learned from this implementation include the need to provide better guidance on how to use teleconferencing software. After discussing with the PECCs and facilitators, a more explicit prebrief on how best to use Zoom would be beneficial to provide to future learners. In addition, we suggest encouraging participants to test their audio and video connection before the telesimulation, to use Zoom on a desktop or laptop as opposed to a phone or tablet, and to use a Wi-Fi connection instead of a cellular connection. Providing copies of clinical resources typically available in the emergency department for the learners to use at home would also improve the simulation experience. Many learners joined from home, which made scheduling and attendance more achievable; however, we noticed family and children interacting with them during the sessions.

TABLE 3
Simulation effectiveness tool¹²

SET-M results (N = 31)

	Strongly agree n (%)	Somewhat agree n (%)	Do not agree n (%)
Prebriefing			
Prebriefing increased my confidence.	22 (77)	6 (19)	3 (10)
Prebriefing was beneficial to my learning.	23 (74)	7 (23)	1 (3)
Scenario			
I am better prepared to respond to changes in my patient's condition.	22 (71)	9 (29)	0 (0)
I developed a better understanding of the pathophysiology.	14 (45)	15 (48)	2 (7)
I am more confident of my assessment skills.	18 (58)	12 (39)	1 (3)
I felt empowered to make clinical decisions.	20 (65)	10 (33)	1 (3)
I developed a better understanding of medications.	21 (68)	10 (33)	0 (0)
I had the opportunity to practice my clinical decision-making skills.	18 (58)	13 (42)	0 (0)
I am more confident in my ability to prioritize care and interventions.	20 (65)	10 (33)	1 (3)
I am more confident in communicating with my patient.	18 (58)	11 (35)	2 (7)
I am more confident in my ability to teach patients about their illness and interventions.	21 (68)	9 (29)	1 (3)
I am more confident in my ability to report information to health care team.	21 (68)	10 (33)	0 (0)
I am more confident in providing interventions that foster patient safety.	20 (65)	10 (33)	1 (3)
I am more confident in using evidence-based practice to provide care.	22 (71)	9 (29)	0 (0)
Debriefing			
Debriefing contributed to my learning.	23 (74)	8 (26)	0 (0)
Debriefing allowed me to verbalize my feelings before focusing on the scenario.	20 (65)	10 (33)	1 (3)
Debriefing was valuable in helping me improve my clinical judgment.	25 (81)	6 (19)	0 (0)
Debriefing provided opportunities to self-reflect on my performance during simulation.	24 (77)	6 (19)	1 (3)
Debriefing was a constructive evaluation of the simulation.	24 (77)	6 (19)	1 (3)

FUTURE DIRECTIONS

This education tool was designed for PECCs to lead their own telesimulations without the presence of experts from the ImpACTS team. To assist PECCs in independently

facilitating telesimulations at their own sites, our team will provide resources, scripts, and telesimulation video. This will allow the community emergency departments to have more frequent pediatric simulation experience without having to coordinate with the academic medical centers. In

addition, our team is interested in exploring future telesimulation work with an inter-professional team to include physicians and additional ED support staff. Our team at ImPACTS continues work with the American College of Emergency Physicians SimBox project team to provide more telesimulation options.

Conclusion

Conducting a multicenter pediatric telesimulation for nursing staff in the community ED setting was feasible and well received by nurse learners. Overall, learners positively scored our telesimulation tool on the SET-M objectives and promoted the experience to colleagues on the NPS. Moving forward, our goal is to expand this curriculum and to promote and support other community emergency departments across the US to run these simulations independently.

Author Disclosures

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Supplementary Material

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jen.2021.01.013>.

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Supplementary Table: Telesimulation checklist (n = 18 teams)

Status epilepticus checklist	n (%)
1. Verbalize airway response in first minute	12 (67)
2. Verbalize glucose check in first 3 minutes	8 (44)
3. Verbalize correct dose of lorazepam IV/IO as first line agent at any point in the case	13 (72)
4. Verbalize correct dose of midazolam IM/IN at any point in case	5 (27)
5. Verbalize need for second line agent	13 (72)
6. Allow parent to stay in room	10 (55)

IV, intravenous; IO, intraosseous; IM, intramuscular; IN, intranasal.