The Use of Simulation to Improve Resident Communication and Personal Experience at End-of-Life Care

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Abstract

Pediatric residents report they are not sufficiently trained to communicate with families at a child's death. We performed a study to prove feasibility and assess whether simulation improves their communication and experience. Residents were assigned to intervention using simulation or control group. Communication was assessed by standardized patients and audiotapes of simulated encounters when they delivered bad news. Residents' perceptions of their communication were polled. The majority reported they never witnessed end-of-life discussions. All residents perceived themselves to be more capable at pronouncing the death of a child, and informing a family of a death after participating in either the interventional simulation or a bereavement retreat. Despite training within a pediatric intensive care unit, pediatric residents have little exposure to end-of-life discussions. Pediatric end-of-life simulation increases exposure of residents to end-of-life care and improves residents' perceptions of their communication.

Keywords

- ▶ simulation
- ▶ end-of-life care
- ▶ communication

Introduction

Pediatric residents report that the deaths of their patients are the most difficult and distressing experiences of their training.¹ In general, they feel ill-equipped and insufficiently trained to discuss limitation of life-sustaining therapy and the withdrawal of care, pronounce patients dead, and communicate with families following the death of a child.¹ The majority of pediatric deaths that a resident will face in training will occur in the intensive care setting (including both the pediatric and neonatal intensive care units), and of these events, residents have described sudden deaths to be the most unsettling.²

Physicians at all levels of training consistently report that giving bad news is stressful and they feel unprepared.³ In one

study, 90% of pediatric residents perceived the delivery of bad news to be a very important skill. However, only 27% of them felt comfortable in doing so.⁴ Equally important, the families of critically ill patients have frequently cited poor communication with intensive care physicians as a source of dissatisfaction related to the end-of-life (EOL) care of their loved ones.⁵ Though death is a rare occurrence in pediatrics, as emphasized in reports by both the American Academy of Pediatrics and the Institute of Medicine,^{6,7} there is a clear need to supplement the educational curriculum of pediatric residents in this area. Very few formal programs to discuss communication around EOL care have been reported in the literature. In a review of educational programs on the delivery of bad news which included residency programs from all specialties, only 7 of 26 programs included pediatric

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patients.⁸ Although there are few published examples of EOL care simulation in residency curricula, the simulation of EOL care in nursing curricula has been successful to increase knowledge acquisition, communication skills, student satisfaction, and students' engagement in learning.⁹

Simulation-based resuscitations, as a part of pediatric residency training, have been shown to correlate with improvement in several clinical settings. From a clinical outcomes standpoint, simulation training of pediatric residents has been correlated with improved survival rates in pediatric cardiopulmonary arrest.¹⁰ TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) training, a simulation-based approach to teamwork building, has been shown to improve teamwork during neonatal resuscitations.¹¹ Simulations are routinely performed as a part of the educational curriculum of most pediatric residency programs. There are very few reports on the use of high-fidelity simulation to teach communication in EOL care.^{12,13}

Since clinical and team-building skills can be gained by the simulation of sudden, emergency events, we hypothesized that the communication skills, particularly the empathy of pediatric residents at EOL, as well as their personal experiences caring for dying children, may be improved by the simulation of unsuccessful resuscitations with an actor present as a parent.

Methods

Setting

This study was conducted in a single-center, 23-bed medical-surgical pediatric intensive care unit (PICU) at a university-affiliated medical center. The pediatric residency program consists of 60 residents who rotate a total of 21 to 24 weeks in intensive care units (time divided between neonatal and pediatric units). The majority of critical care rotations are completed during the second and third years of residency. In addition, during their first and second years, the residents rotate for 6 weeks at an affiliated cancer hospital, during which time, residents care for many children and families facing EOL care. The simulations were performed in collaboration with the department's simulation program.

Participants

The study was a prospective, quasi-experimental design. Over a 2-year period, all second year residents (20 residents per year) were invited to participate in the study. Approval for the study was granted by the institutional review board of Weill Cornell Medical College. The residents who consented to participation were nonrandomly assigned to control or intervention groups by the research coordinator of the Division of Pediatric Critical Care Medicine, an individual who is not involved in the residency program. The individuals responsible for assessing the outcome measures, as well as those analyzing the data, were blinded to the groups. The control group received an informational package of resources focused on how to communicate with children and families at the EOL.^{14–18} These articles addressed many of the key points of the simulation.

Intervention

The residents in the intervention group were divided into groups of two and participated in the simulation of an unsuccessful resuscitation featuring a high-fidelity mannequin as the patient and trained actors in the roles of a standardized parent and nurse. The residents knew that they were participating in training for EOL care but they were not aware that the simulation included the death of the simulated patient. The learning objectives for this case were developed to reflect communication skills outlined in a death and bereavement curriculum. Specifically, the primary learning objective was “to demonstrate both empathy and strong interpersonal skills in communicating with a parent of a child at the EOL by (1) recognizing the importance in acknowledgement and confirmation of mother's feelings and (2) demonstrating nonverbal skills such as appropriate pauses, no simultaneous speech, no interruptions.” A trained faculty facilitator conducted these simulations using an action-based checklist to assist in providing feedback to participants during the debriefing. In the simulation which involved the near-drowning of a 6-month-old infant, one resident assumed the care of the infant following a prolonged arrest and discussed the neurologic implications of the arrest with the parent. Following a second arrest, the second resident informed the parent that her child had died. A structured debriefing led by the faculty facilitator and standardized parent followed the simulation and focused on communication skills, including the expression of empathy and connecting through interpersonal interaction. The details of the simulation, including the length, those present, prompts and responses by the actor, and debriefing points, are described in **►Supplementary Material** (available in the online version of this article).

Before its implementation in the study, a pilot of the simulation was completed with two third-year, volunteer pediatric residents. At that time, given the concern that the residents may not know how to “call a code” and therefore shift the emphasis of the simulation from communication to focus on the medical management, a “stop” was introduced. After 5 minutes of the resuscitation, a critical care attending “called in” to ask the progress of the case and instructed the residents to stop the resuscitation.

Outcome Measures

Self-Perceived Assessment of Competency

Within 1 month of their enrollment and prior to group assignment, the residents were anonymously polled to assess their prior experiences in caring for children at the EOL and their perceived communication skills. The residents were allowed 3 months to complete a preintervention survey. The postintervention survey was completed at the end of the study (during the last month of each resident's second year of residency).

Communication Skills of Residents

Approximately 6 weeks after the completion of all simulations, the residents participated in a day-long bereavement seminar (as a part of their regular educational curriculum) known as the Kravitt Retreat.^{19,20} This seminar is presented

annually to all second-year pediatric residents. During the seminar, each resident was involved in a simulated encounter with “parents” during which they had to deliver bad news. The actors involved in each scenario, along with faculty facilitators, completed standardized checklists assessing the residents’ communication skills. Both the actors and faculty members were blinded to the residents’ participation in the study. Additionally, audiotapes of each encounter were analyzed to measure the residents’ empathy skills on a quantitative scale, the Empathic Communication Coding System (ECCS).²¹ The ECCS is a two-step, validated coding process. First, empathic opportunities are identified from the patient’s communication; second, the doctor’s response to the empathic opportunity is coded (from level 0 representing “denial of standardized patient perspective” to level 6 representing “shared feeling or experience”). The timeline for each academic year of the study design is outlined in ►Fig. 1.

Statistical Analysis

Categorical variables are presented as *n* (%) and continuous variables as medians with interquartile ranges. The scores of the checklists were obtained by assigning numerical values (0 for strongly disagree, 1 for disagree, 2 for agree, and 3 for strongly agree) to the Likert scale completed by the observers and calculating the average score. The scores of each empathic opportunity were averaged for each resident. The pre- and postintervention survey results were compared using the Wilcoxon signed-rank test, and the intervention and control groups were compared using the Mann-Whitney test. All *p*-values are two-sided with statistical significance evaluated at the 0.05 α level. Statistical analysis was performed using GraphPad Prism version 6.00 for Windows (GraphPad Software, San Diego, California, United States).

Results

Study Participants

Of the 40 eligible pediatric residents, 31 agreed to participate in the study. Sixteen residents were originally assigned to be in the intervention group. However, during the second year of

the study, four residents were unable to schedule the simulation due to conflicts with clinical responsibilities and were therefore allocated to the control group. They did not go through the simulation and received the packet of educational materials 1 month before the bereavement retreat. The final number of residents in the intervention group was 12, as compared with 19 residents in the control group.

Exposure of Residents to Communication Surrounding EOL Care

The overall survey response rate for both groups, both pre- and postintervention, was 81%. Because the residents completed the surveys both before and after the intervention, there were 62 questionnaires possible, of which 50 were completed. Within the intervention group, 10/12 residents (83%) completed the preintervention survey and 9/12 (75%) completed the postintervention survey. Within the control group, 17/19 (89%) completed the preintervention survey and 14/19 (74%) completed the postintervention survey. On average, the residents in both groups were present for one to two pediatric deaths during their first 2 years of residency (see ►Table 1). The baseline exposure to EOL discussions, either as the principal communicator or as an observer, did not differ between the groups. The exposure to EOL discussions for the subjects in the intervention group did not differ before or after the simulation. The control group was exposed to a significantly greater number of pediatric deaths during the course of the study. Of note, the majority of residents in both groups had rarely been present when a child died and had never been present to observe a Do-Not-Resuscitate (DNR) discussion or the communication with a family when a child died.

Residents’ Perceived Capabilities

Within the intervention group, based on pre- and postintervention surveys, we found a significant increase in the residents’ perception of their ability to inform a family of a child’s death (Likert scores increased from 1.4 to 2.5 with $p = 0.02$) and pronounce the death of a child (Likert scores increased from 1.6 to 2.4 with $p = 0.02$). There was no increase in their perceived ability to discuss a DNR (Likert scores increased from 1.8 to 2.3 with $p = 0.31$). The residents’ perception of their abilities to discuss DNR (Likert scores increased from 1.9 to 2.3 with $p = 0.59$) or pronounce death (Likert scores increased from 1.4 to 1.9 with $p = 0.31$) did not change in the control group. The control group’s perceived ability to inform a family of a child’s death did significantly increase (Likert scores increased from 1.1 to 2.3 with $p = 0.002$). However, when the intervention and control groups were compared for each question asked pre- and postintervention, the differences were not statistically significant (p -values range from 0.23 to 0.76). All results are summarized in ►Fig. 2.

Measures of Resident Communication

Of the residents enrolled in the study, measures of communication were collected in 21 participants. In both measures of the residents’ communication, the checklist and ECCS

Fig. 1 Study design.

Table 1 Exposure of residents to EOL care and communication

Question	Intervention group		Control group	
	Preintervention (n = 10)	Postintervention (n = 9)	Preintervention (n = 17)	Postintervention (n = 14)
(1) How many times in your residency have you been present when a pediatric patient has died?	0.75 (1.5)	1.5 (0)	1.5 (1.5)	2.75 (2.5)
(2) How many times in your residency to date have you been present at the team's discussion of a DNR order with the family of an ill child (you were present at the discussion but not the one delivering the news)?	1.5 (1.1)	1.5 (0)	0 (1.5)	0.75 (1.5)
(3) How many times in your residency have you discussed the placement of a DNR order with the family of an ill child?	0 (0)	0 (0)	0 (1.5)	0 (0)
(4) How many times in your residency to date have you been involved in the team's discussion to tell a parent that his/her child has died (you were present at the discussion but not the one delivering the news)?	0 (1.1)	1.5 (1.5)	0 (0)	0 (1.5)
(5) How many times in your residency have you had to tell a parent that his/her child has died?	0 (0)	0 (0)	0 (0)	0 (0)
(6) How many times in your residency to date have you had to pronounce a patient dead?	0 (0)	0 (0)	0 (0)	0 (0)

Abbreviation: DNR, Do-Not-Resuscitate.

Note: IQR reported in parentheses. All *p*-values both between intervention and control groups as well as between pre- and postintervention were insignificant except comparison of control group pre- and postintervention for question 1 (*p* = 0.03).

scores, no differences were found between the intervention group and the control group. The overall median score for the checklist for the intervention group was 36.2 as compared with 39.1 for the control group (*p* = 0.66). The median ECCS score for the intervention group was 4.0 as compared with 4.1 for the control group (*p* = 0.59).

Discussion

This study confirms that the exposure of pediatric trainees to EOL care and the discussions surrounding it within the PICU is insufficient. Pediatric residents recognize this lack of training. An educational intervention, in the form of a single simulation of a pediatric arrest with the focus on communication (such as that given to the intervention group), or a bereavement retreat (such as that experienced by both the intervention group and control group), improves residents' perceptions of their abilities to communicate. Additionally, although no differences were seen in the communication skills of residents exposed to the simulation as compared with the controls, this is the first study to date that applies a validated scale of communication to test the effect of simulation in a pediatric, clinical environment.

Pediatric deaths are a rare occurrence in hospitals (~1–2% of admissions) and may impose significant emotional burdens on the care team.²² Our data confirm that despite significant time training in a PICU, pediatric residents rarely are exposed to children dying. Furthermore, our residents had even less exposure to the communication that surrounds the child's EOL care. This challenges the idea that these

communication skills can be learned experientially through the "apprenticeship" model. This correlates with similar experiences of residents in other U. S. pediatric training programs.²³ EOL discussions can be considered a "high-risk, low-volume" experience. It could be argued that if pediatric death is rare, and mostly encountered in critical care, it is not a necessary element of all residents' education. However, though the intensivist is at the frontline in many instances, there are specialty services that have often cared for these children for extended periods of time (i.e., oncologists). More importantly, it is the role of the general pediatrician, as the leader within the "medical home" of the patient, to serve as a resource to families who have endured the death of a child.

Simulation can be used to address low levels and unpredictability of the exposure of residents to EOL communication. This study demonstrates the feasibility and acceptability of simulation, as well as suggests possible benefits in the use of simulation in this area of resident education.

Controversy exists in the literature regarding the ethics of allowing the "patient" to die in a simulation. Leighton, a nursing educator, recognized the lack of training in EOL communication and described the use of simulation from an ethical standpoint.²⁴ Advantages include: (1) providing experiences that are infrequent in clinical scenarios; (2) allowing learners to experience death in a "safe environment"; and (3) giving learners the opportunity to self-reflect on their views of mortality. Leighton also highlighted the disadvantages. A death in the simulation might cause the learners to be distracted from the planned learning objectives or, worse, suffer psychological harm as a result of the

The bars indicate median scores with confidence intervals noted by error bars.

Fig. 2 Residents' perceptions of their abilities to communicate with families at EOL (all p-values listed represent the differences pre- and postintervention).

simulation. Surveyed learners, however, have not reported any negative effects, but instead relay the benefits of such simulations.²⁵

Similarly, the ability of a standardized patient, or parent in this case, to provide feedback is variable. Bokken and colleagues performed a systematic review of the literature and reported that there appear to be no clear standards for the effective training of standardized patients to give feedback.²⁶ In this study, the standardized parent was an actor who had been trained within the medical school in giving feedback. In addition, she was provided with a structured feedback guideline for the debriefing.

Our survey results showed an increased perception of abilities following the simulation and bereavement retreat which correlates with previous studies. Recent work has shown that EOL care education has been associated with a greater self-perception of abilities and higher competency levels in providing clinical management, emotional support to patients and families, and participation in decision-making processes.²⁷ The perceived abilities of the residents to discuss

DNR in the intervention group did not increase significantly. This result was expected, given the simulation and bereavement retreat did not involve this area of EOL communication. Different scenarios should be developed to enhance resident education in this area, such as the DNR discussion that one might have with the family of a child with refractory leukemia who is admitted with septic shock.

The communication skills of the residents did not improve, either subjectively by a checklist from observers or objectively by a validated score of empathetic communication. One explanation for this finding is the lack of a baseline assessment of communication as a part of the study design. In other words, the communication skills of the residents may not have been normally distributed among the residents entering the study. Additionally, this study mostly focuses on the empathy of residents because it is one aspect of communication essential in EOL care that has a validated scoring tool. Furthermore, repeated simulations with educational debriefings focusing on EOL communication may be needed to affect the measureable communication skills. It is unlikely that one

teaching session would meaningfully change an individual's ability to communicate empathy, especially detecting differences between high-level skills. The use of the validated measure of empathetic communication lends feasibility to an objective assessment of communication that could be used in future larger studies. This study demonstrates a need for multisite or larger longitudinal studies to examine the role of simulation in EOL care and communication. Additionally, more work should be done to understand why residents are not involved in the conversations in the PICU with families regarding EOL decisions.

Limitations

There were some limitations present in this study. The sample size limited the power of the study. As mentioned earlier, the study was limited by the residents' clinical time commitments and, therefore, did not include a baseline assessment of communication skills which would have allowed the ability to measure the change in communication skills over time. The allocation to groups was also flawed as a result of scheduling difficulty which resulted in an uneven balance in the groups. This may have resulted in increased type II errors. Measures of communication were not available for all of the participating residents due to scheduling constraints of the Kravitt Retreat (residents were postcall, on vacation, etc.). The study design did not allow the differentiation of the educational effect of the simulation from the effect of the bereavement retreat itself. The simulation was limited to one institution in the Northeast which may limit applicability at other centers. Additionally, there is no formal curriculum provided to the residents by a pediatric palliative care service in our hospital and, therefore, our center may not be representative of other pediatric training environments. Ideally, it would be beneficial to report the demographics of the residents involved. However, given the small sample size, the demographics of the residents could not be collected at the risk that they would be identified. As with any survey administration, those who did not respond to the survey may have differing perceptions, which may have biased the results. Lastly, the study used a nonvalidated checklist of communication skills. However, these results were balanced by the use of the validated ECCS. More measurements of empathy, or other quantifiable areas of communication, should be collected to provide higher levels of evidence.

Conclusion

The clinical exposure of pediatric residents to EOL care and the surrounding discussions is poor. Educational interventions, such as a single simulation of a pediatric arrest or a bereavement retreat, may not improve residents' measurable communication skills but do improve residents' perceptions of their ability to communicate. As deaths are uncommon in pediatrics, these simulated interventions could be considered as a requisite part of pediatric residency training. Larger longitudinal studies may help to explain the current limited exposure and provide a greater insight into the role of simulation in this educational arena.

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