Case Study

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A Multi-Level Approach to Pre-Briefing and Debriefing in a Pediatric Interdisciplinary Simulation

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ABSTRACT

A unique, progressive multidisciplinary simulation was developed for a pediatric end-of life experience. In order to prepare all participants, regardless of discipline, extensive pre-briefing and reflective debriefing was developed. The project included seven evolving pediatric simulations, each one with multiple disciplines participating, over a four-week period. Key components of the pre-briefing stages included learning about the topic of end-of-life, understanding the different inter-professional roles, teamwork, and feeling comfortable with the simulation environment. Reflective debriefing was carried out in small groups immediately after the simulation with objective feedback and affirmation of interdisciplinary teamwork, skills, and communication. A second culminating debriefing also occurred which offered the students the ability to pull their experiences together and reflect and compare their perceptions to those of an actual survivor of the same disease. This project revealed to faculty the importance of using multistaged pre-briefing and debriefing in a progressive multidisciplinary pediatric simulation.

KEYWORDS: Simulation; Pre-briefing; Debriefing; Clinical reasoning; Interdisciplinary simulation.

ABBREVIATIONS: IOM: Institute of Medicine; NICU: Neonatal Intensive Care Unit; INACSL: International Nursing Association for Clinical Simulation and Learning; IPE: Interprofessional education.

INTRODUCTION

A review of the literature revealed limited research related to interprofessional teamwork in pediatric healthcare. In fact, a 2016 study performed by Felix et al[1] claimed to be the first larger study to examine interprofessional teamwork in the pediatric healthcare setting. However, studies on healthcare teams in general indicate teams make fewer mistakes than individuals do.[2] Furthermore, teamwork between interdisciplinary/interprofessional healthcare providers is essential.[3] However, the Institute of Medicine (IOM) stated[4] that a major barrier to improving healthcare safety and reducing costs is ineffective communication and collaboration among healthcare professionals. Healthcare professionals are well trained and educated to function within their own disciplines, but they are generally trained separately from other disciplines. As a whole, the healthcare profession has been slow to train the skills necessary to perform as a member of an interprofessional team.[2] The study performed by Miller, Riley, Davis and Hansen[2] reported when ineffective interprofessional team behaviors are displayed during a critical event, the incidence of an adverse episode occurring may be increased.

The use of simulation in pediatric team training has most frequently been studied in relationship to neonatal resuscitation, pediatric code and critical care situations.[5-7] Deering, Johnson and Colacchio[5] state, "*Team training can be used to both improve teamwork and to practice skills necessary for pediatric caregivers to acquire during their training*". Further-

more, simulation is a prime setting for pediatric team training because it allows the entire team to practice pediatric situations (including emergencies) in a safe environment.[5] Smith and Cole[8] explored interdisciplinary teamwork through simulation in the Neonatal Intensive Care Unit (NICU). The authors suggest that simulation allows the complexities of teamwork to be captured and provides opportunities for healthcare professionals to develop into expert teams working together.

Simulation is a training technique used to help learners practice procedures and skills in a real-life environment. It also enhances clinical competence and improves patient care.[9] Additionally, when simulation is utilized in healthcare training, it is an effective strategy to develop collaborative teamwork.[10] Marshall and Manus, as cited by Morrison and Catanzaro[10] have noted "Simulation exercises can be used for team training using the human factors of communication, decision making, and situational awareness to enhance patient safety". The IOM also supports the use of simulation for training healthcare professionals in the areas of problem solving and crisis management.[4] But, is there a standard way that pediatric simulation is utilized and does research show is it being used interprofessionally?

The International Nursing Association for Clinical Simulation and Learning (INACSL) developed the INACSL Standards of Best Practice: Simulation[SM].[11] Use of the standards in simulation reflects the implementation of evidence-based practices in healthcare education and the commitment to quality and improvement of patient care.[11] Unfortunately, limited literature has been found that shows these standards are being utilized in their entirety.[11] Furthermore, there has also been little evidence in the literature showing that nursing and other health professionals have used simulation exercises together to enhance communication, collaboration and problem solving.[3]

Early research conducted by Rhodes and Curran[12] within a baccalaureate degree program stated the need for the simulation process to consist of three important phases—pre-briefing, scenario and debriefing. Little research has been found that indicates the three phases are emphasized equally in simulation exercises. Additionally, pediatric simulation studies located during the literature search revealed minimal to no emphasis was placed on the pre-briefing stage at all.[6,8,13] Page-Cutrara[14] performed a literature review on pre-briefing and found there were gaps regarding the definition of pre-briefing, the purpose of pre-briefing, and the types of learning techniques used in pre-briefing. Additionally, little research can be found on the effectiveness and impact on learning when pre-briefing and debriefing are used together based on the INACSL Standards of Best Practice: Simulation[SM].[11] Therefore, the objectives and long-term goal of the interdisciplinary pediatric end-of-life simulation that was performed was to incorporate the INACSL Standards of Best Practice: Simulation[SM11] regarding the use of pre-briefing and debriefing in an interdisciplinary pediatric simulation and to set the foundation for future research on the impact this method of pre-briefing together with debriefing has on student's learning in a pediatric interdisciplinary simulation.

BACKGROUND

Pediatric Simulation in Interprofessional Education (IPE): The literature provides very few studies involving pediatric simulation in IPE. One study by Messmer[15] examined how the use of pediatric simulation involving three scenarios enhanced nurse-physician collaboration. Results of her study indicated that with each scenario pediatric nurses and residents communicated more with each other and "appeared to become more collegial toward each other, recognizing the strengths that each group brought to the team." Additionally, as the participants progressed through the three scenarios they began to understand the importance of each team member.

Interdisciplinary/interprofessional education in general has the ability to serve several functions: educating on the roles and responsibilities of professionals in the healthcare team, improving team building skills and communication skills, and encouraging error reduction to improve patient safety.[9] Research has shown[2,3] that simulation is a successful method for students to actively learn these strategies as well as an effective way to develop collaborative skills.[10] However, as stated earlier, healthcare professionals are generally trained and educated to function within their own discipline with little training on the skills necessary to function as a member of an interdisciplinary team.[2] Limited amount of research involving the use of pediatric simulation in interprofessional education (IPE) supports this statement.

Pre-briefing: The INACSL Standards of Best Practice: Simulation[SM16] state the purpose of pre-briefing is to "set the stage for a scenario and assist participants in achieving scenario objectives". Some recommended components of the pre-briefing include simulation environment orientation, roles of participants, time and objectives, and patient information.

Standard 4 of the INACSL Standards of Best Practice: Simulation[SM17] details more extensively what should be included in the pre-briefing phase:

- Orientation to the simulation laboratory and mannequins.

- Review ground rules of the simulation to ensure a safe, non-competitive environment.

- Discussion around students doing their best but recognizing that mistakes may occur.

- Providing back-ground information.

Pediatric simulation has not been as widely studied as simulation in general. Even with the vast amount of research that has been performed on simulation, the phase of pre-briefing is an understudied phenomena.[14] Several studies were located involving pediatric simulation and only one of those studies minimally described pre-briefing. The study performed by Youngblood et al[7] involved multidisciplinary simulation in pediatric critical

care. In this study, the only reference to pre-briefing activities was that the students were given a "description of the scenario and information regarding potential grief reactions as a starting point". No other pre-briefing activities as recommended by INACSL Standards of Best Practice: Simulation[SM17] was provided prior to the start of the scenario.

Husebo, Friberg, Soriede and Rystedt[18] focused on the instructional problems with pre-briefing in nursing education. In their review of the literature, the authors found that pre-briefing was either not described in the simulation studies reviewed or the focus was primarily on the simulation itself. Of the nine studies reviewed, only one study discussed pre-briefing in the context of a short description of who should participate in the simulation, how to work with the mannequins, and ground rules on team performance and communication. In reviewing the remaining studies, which included other disciplines use of pre-briefing, the author's[18] state "*the studies did not focus on pre-briefing per se but on how the facilitator instructs the participants in the ongoing simulation and how they should understand the simulation*".

Page-Cutrara[14] performed a literature review to explore the use of pre-briefing in nursing simulation. All the literature that was examined for this review showed that the phase of pre-briefing was consistently described as the time to explain the process of the simulation, including review of objectives, orientation to the environment and mannequin, and patient situation. This description is in alignment with the INACSL Standards of Best Practice: Simulation[SM17] description of pre-briefing. There were variations in the literature reviewed around the selection of various learning strategies used in the pre-briefing phase. The author concluded these variations appeared to depend on the learning needs of the participants as it related to the specific simulation. Interestingly, the choice of various learning strategies was not clearly linked to simulation outcomes. The under studied areas of pediatric simulation and pre-briefing in pediatric simulation as well as the literature review performed by Page-Cutrara[14] revealed gaps around the definition of pre-briefing, the purpose of pre-briefing, alternate learning techniques used in briefing, and the use of pre-briefing as it relates to learner outcomes.

Debriefing: The INACSL Standards of Best Practice: Simulation[SM16] state the purpose of debriefing is to "move toward assimilation and accommodation to transfer learning to future situations". It is a time of reflective thinking, questioning and exploring emotions on the participant's part. During this phase the facilitator provides feedback on the participant's performance and participants also share feedback with other participants.

Standard 6 of the INACSL Standards of Best Practice: Simulation[SM19] detail more extensively what should be included in the debriefing phase:

- Acknowledging participants' feelings and perspectives.
- Creating transparency in communication and helping partici-

pants achieve key objectives.

- Exploring participants' decisions and actions and linking the simulation experience to authentic patient care.
- Facilitating feedback from standardized patients or peers.
- Encouraging participants to evaluate what they did well, what they need to improve, and offering suggestions on how participants can improve their care in the future.
- Providing feedback.

Arafeh, Hansen, and Nichols[20] stated that debriefing is an integral part of simulation and has been reported to be where most of the learning occurs during simulation. The debriefing makes sense of the simulation and allow the participants to tie everything together.[2] Debriefing allows for self-discovery. It provides an opportunity for participants to express concerns and to discuss how they performed in the simulation. In an interdisciplinary simulation, it allows participants to discuss how they performed as a team revealing any system failures and failures in problem solving.[2]

The value of the student's learning is in the student's ability to engage in reflection that translates into actionable knowledge.[21] Debriefing fosters the development of clinical reasoning and judgment skills through reflective learning processes. "Learning occurs in simulation through contextual task training and repetition, but significant learning occurs when deep insight is made explicit through reflection during debriefing".[21] Throughout the literature, debriefing is identified as the most important part of the simulation.[22,23]

Several research articles on pediatric simulation discussed the activities of debriefing. All of the studies included some aspects of debriefing, but none of the articles included all of the components of debriefing as outlined by Standard 6 of the INACSL Standards of Best Practice: Simulation[SM19]. Three of the pediatric simulation studies[7,8,13] specifically described the debriefing phase as a reflective process. A reflective process is one that allows the participant (individually and as a team) to reflect on the events of the simulation, the emotions that accompanied the simulation and the thought processes that were involved in the simulation. It is this reflective process that the authors state enables the students to enhance their learning and grow from the simulation experience. Only the study by Youngblood et al[7] stated that the study participants were able to obtain feedback from the standardized patients following the simulation. None of the reviewed pediatric simulation studies included as part of the debriefing process, encouraging participants to evaluate what they did well, providing feedback on what they needed to improve on, and offering suggestions on how participants can improve their care in the future.

Similar to pre-briefing, researchers have found that debriefing has not been a well-studied area either.[20] In a systematic review on debriefing in technology enhanced simulation, Cheng et al[24] found that there were inconsistencies in the definition of

what debriefing was as well as inconsistencies in describing the process of debriefing itself. None of the 177 studies reviewed consistently described the characteristics of debriefing or the characteristics of debriefing were poorly described.

Pre-briefing and Debriefing Used Together: As stated earlier, the simulation process consists of at least three phases—pre-briefing, scenario, and debriefing.[14] However, little research in pediatric simulation and simulation in general has been found that indicates the three phases are emphasized equally in simulation exercises.[14] Typical debriefing can be 3 times the length of the actual simulation and is considered where the most learning is occurring.[8] Decker, as cited in Page-Cutrara[14] recommends pre-briefing can also have an effect on learning and should be explored more in depth. Therefore, the purpose of this article is to detail the impact of equally emphasized and multi-level pre-briefing and debriefing sessions on student learning outcomes through incorporating the INACSL Standards of Best Practice: Simulation[SM11] in a pediatric interdisciplinary simulation.

INTERDISCIPLINARY SIMULATION PROCESS

Introduction: Quinnipiac University embarked on a four-week long pediatric inter-professional end-of-life simulation that involved the disciplines of athletic training, nursing, occupational therapy, cardiovascular perfusion, physical therapy, physician assistant, and social work. Seven evolving interdisciplinary pediatric simulations were completed over four weeks following the journey of an adolescent patient from his initial injury on the playing field to his death from an osteosarcoma in hospice. The magnitude of this simulation was commanding because of the size of the project, the coordination of students from multiple disciplines, and the progressive nature of the scenario. Therefore, based on the literature review performed for this project, pre-briefing and debriefing were essential components to the success of the simulation.

Learning Outcomes: Four learning outcomes for the end-of-life simulation experience were developed:

- Respond to the medical and psychosocial needs of a simulated pediatric patient from onset of injury to end-of-life.

- Utilize communication skills appropriate for responding to the needs of the healthcare team, the pediatric patient, and the patient's family.

- Attain knowledge and insight into the stages of dying and providing end-of-life care.

- Collaborate in critical decision making and creative thinking in devising patient-centered healthcare team plans of care.

The learning outcomes formed the basis for the pre-briefing, the simulation, and the debriefing.

Pre-briefing: Recognizing the scale of the simulation and the desire to ensure that each student feel prepared to deal with the

complex nature of this topic and meet the outcomes, pre-briefing was carefully planned to occur at two different stages of the simulation. As a lack of research exists regarding the design and benefits of pre-briefing, this pediatric simulation experience incorporated research by Page-Cutrara,[14] which indicated students are often expected to perform skills in a simulation without any prior experience. Most students have little pediatric end-of-life exposure and a comprehensive pre-briefing was planned to fill this void.

The first pre-briefing was inclusive of all students and faculty from the various disciplines participating in the simulation. Students and faculty were provided with individual folders containing their designated simulation scenario and any supporting materials specific to that scenario. The supporting material included the names of the faculty involved, the students who would make-up the interprofessional team, a carefully selected journal article pertaining to their specific scenario, discipline role descriptions, and learning pearls. The journal articles ranged from case studies of actual adolescents with terminal illnesses and the progression of the disease, to specific concepts, such as end-of-life signs and symptoms or symptom management. The discipline role descriptions offered a brief explanation of each allied health role and how each specific expertise affects healthcare. Learning pearls were short supportive evidence-based statements, submitted by faculty, explaining important aspects of end-of-life care helpful for the novice student. An example of a learning pearl was to "Provide liberal viewing and accommodate family needs to facilitate family presence before, during, and after the moment of death".[25] Each of the folder materials were reviewed generically as a group and then more specifically once students were broken down into teams. A power point presentation with a question and answer period was then given by an expert in hospice and palliative care.

After reviewing the information in the folder, students were asked to break into their individual simulation groups and be introduced to their peers. After introductions, a team building activity was assigned to build comradery. Teams were asked to build the highest tower with spaghetti sticks and marshmallows within 30 minutes. The activity was designed to give students the chance to collaborate prior to working together on the simulation project.

The second stage of the pre-briefing occurred throughout a four-week period on the teams' scheduled simulation day, directly before participation in their scenario.The small group pre-briefing provided the students with the opportunity to ask questions related to the pediatric simulation, clarify the role of each individual student in the simulation, and receive an orientation to the simulation room and equipment. Although many of the students had been in previous simulation experiences, providing as much information as possible beforehand can reduce anxiety, particularly in a complex scenario. Cordeau[26] has stated, *"For novice students, the anxiety is caused by not knowing what to expect during the scenario. Second-time students experience anxiety from the perception of the increasing difficulty of the sce-*

narios". Taking the need to understand what to expect into account, the goal for both pre-briefing sessions was to increase the student's knowledge related to pediatric end-of-life care, interdisciplinary roles and responsibilities, as well as the simulation environment, in order to decrease the student's anxiety as they entered the simulation experience. Students entered the simulation experience after the group verbalized a readiness to participate.

Simulation: As the focus of this article is pre-briefing and debriefing, only a short description of the seven actual simulation stages is discussed to collaborate the four outcomes: Stage 1) the adolescent experienced a fracture to his right femur while playing as a member of a school soccer team, Stage 2) the adolescent is transported to the emergency room for diagnosis, Stage 3) the adolescent and his family learned of a suspicious lesion found during surgery, Stage 4) the adolescent and his family are told about the diagnosis of osteosarcoma and plans were made for treatment, Stage 5) the adolescent was at home with progressive deterioration in his disease, Stage 6) the adolescent was actively dying in Hospice, and Stage 7) the adolescent's teammates were informed of his death. Student participants were observed by multi-disciplinary faculty members at each stage. Faculty unanimously agreed all four outcomes were met in all of the stages except Stage 5. In this scenario, a deterioration in physical function was occurring which the family could not physically handle and had difficulty accepting. Faculty agreed students did not meet the medical or psychosocial needs of the patient as a team (Outcome 1). In-patient hospice services should have been offered to the patient and family. Instead, the team offered hospitalization for IV fluids and additional treatment, such as physical therapy for strength training.

Debriefing: As with the pre-briefing, a two-tiered approach to the debriefing was used for this four week long simulation. Immediately after each of the seven simulation sessions, student groups met with the discipline faculty involved in the simulation for a small group debriefing to discuss the outcomes of the simulation and to reflect on the experience. The small group debriefing experience, led by at least one of the discipline faculty, included the following: 1) the opportunity to express emotions in regards to dealing with a patient and his family who were experiencing end-of-life issues, 2) a review of the student performances during the simulation, 3) the opportunity to identify the students' own areas of strength and weakness, and 4) a discussion of the relationship between the student performances and the simula-

tion outcomes. This discussion of outcomes was of particular importance immediately after the scenario for Stage 5, in which some of the objectives were not met. In this instance, student's reflected on their lack of knowledge on how to communicate with a family and patient during this deterioration phase.

The second tier of debriefing was a final summation of the multiple week interdisciplinary end-of-life simulation. A large group debriefing was held in the form of a Grand Rounds for all participating students and faculty members. This second tier of debriefing allowed the student participants to 1) gather together to combine all weekly experiences together and reflect on the entire end-of-life simulation, and 2) relate to and learn from an actual survivor of the very disease depicted in the simulation.

The large group debriefing began with the lead facilitator presenting a brief introduction of the simulation project followed by each simulation group's presentation and reflection on their week's scenario. A photo slide show of the related weekly simulations ran as the backdrop for each team's presentation and reflection of their story and feelings. The reflections centered on the learning experiences as well as the interprofessional relationships developed. The final presenter was the survivor. The survivor had recovered from the exact childhood osteosarcoma as the adolescent in the simulation, only in the 1950's. The presentation began by explaining how the survivor learned of the project and his intrigue with the simulation. The survivor was present during the student's interdisciplinary presentations and noted surprise as he analyzed and compared their reflection to his lived experience. The survivor commended the participants for their patient centered, supportive care of the patient and his family. Factors such as caregiver preparation, holistic care, and patient support were but a few of the poignant aspects of care which were drastically improved since the survivor's experience as a child.

After the survivor's presentation, students responded to questions from the facilitators asking for student perceptions of the simulation experience. (Table 1)

DISCUSSION

Simulation requires both a thorough pre-briefing and an objective debriefing in order to offer the learner a complete experience. The key components of the INASCL Standards for pre-briefing were enhanced with the addition of the teamwork exercise,

Topic	Student Perception
Value, worth of time, and realism of the simulation.	Unanimous agreement the simulation was invaluable and recommended a repeat performance with additional students.
Teamwork, skills, and communication.	Vast majority indicated an improvement in teamwork, skills, and communication.
Factors of greatest impact.	Actual end-of-life moments with parents, discussion with the teammates after the death, and gratitude for having a team to work with during these events.
Interaction with a survivor of osteosarcoma.	Provided a positive note on which to end the experience.

Table 1: Student perceptions of the simulation experience.

role responsibilities, journal articles, and powerpoint materials, which helped to prepare the students to work as a team and plan care for a patient progressing towards the end-of-life. As end-of-life experiences and interprofessional collaboration with actual patients may be limited in clinical rotations, providing as much knowledge beforehand contributed to meeting scenario objectives and a positive student experience. Equally important were the two post-scenario debriefing sessions. The immediate post-scenario debriefing allowed the participants a more intimate opportunity to reflect on the experience while fresh in their mind, and receive objective feedback and affirmation of their interdisciplinary teamwork, skills, and communication as a small group. This was of particular importance for Stage 5. The reactions of the team in this scene were to revert back to what was comfortable for the students to plan, rather than discuss the inevitable with the family. In spite of what was believed to be a comprehensive first-stage pre-briefing, further education was needed in the pre-briefing related to difficult conversations with families and patients. This content should be a part of future replications of the simulation.

As the simulation consisted of several different scenarios, the larger debriefing session provided the environment for active reflective engagement among all the groups. Student participants sharing information on what went well with the various scenarios and also areas of concern, supports a collaborative learning experience. Feedback from the osteosarcoma survivor on the student participant's performance further validated learning had occurred and added another level of understanding of the disease process. Faculty facilitators also benefited from both of the debriefing sessions by learning of the students' knowledge gap in understanding and discussing with family comfort rather than healing measures at the end of life, an area of difficulty for several of the participating disciplines. Student responses to the questions in Table 1 indicated a very positive experience for the participants and enhanced knowledge of interprofessionalism.

CONCLUSION

Further research is needed to evaluate extensive pre-briefing and debriefing processes on student success in meeting pediatric simulation objectives. Additional content related to communication with family during the progression of end-of-life and replication with a larger student sample, are necessary to support the time and effort involved in achieving positive outcomes from progressive interprofessional simulations. As many institutions may not have an actual survivor of a terminal illness available, a family member who has gone through the experience of losing a child or losing a sibling, could be a potential powerful speaker, either in the pre-briefing or the debriefing. Utilizing a pre- and post-test could also evaluate the extent of knowledge acquisition on end-of-life care, as well as discipline-specific roles and responsibilities. Overall, multi-leveled pre-briefing sessions were key preparation for performance while the multi-leveled debriefing provided immediate feedback, collaborative learning, and time for deeper reflection. Both multi-leveled components held the key to student success in pediatric simulation.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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