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Ethical Reasoning Debriefing in Disaster Simulations

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ABSTRACT

Background: With disasters occurring often, nurses must understand and ethically implement disaster management and patient care coordination. Yet these topics are often not discussed in nursing education curricula. Simulations are a potential solution to this ethical educational deficit, allowing students to act as professional nurses in a realistic scenario with minimal threat of harm to themselves or others.

Aim: This study investigates the effect of a high fidelity, multiple-casualty disaster simulation followed by a structured faculty-led debriefing session on perceived ethical reasoning confidence on senior Bachelor of Science in Nursing (BSN) students. Additionally, the effect of the intervention on students' perceived importance of ethical reasoning and perceptions of such skills was explored.

Methods: Students were provided with preparatory materials on the START (Simple Triage and Rapid Treatment) System and The Madison Collaborative's Ethical Reasoning in Action Eight Key Questions (8KQ) frameworks one week before the simulation exercise. In total, 90 students worked in pairs during the 15-minute disaster simulation. Participants' ethical reasoning attitudes were measured before and after the exercise, employing the Survey of Ethical Reasoning (SER) to indicate the importance of each of the 8KQ in students' ethical reasoning process using a five-point Likert scale. The SER was administered electronically using Qualtrics and statistical analysis was completed using SPSS. The 8KQ was also used in the debriefing led by faculty.

Results: Comparative assessment of pre and post-results demonstrate significant growth in students' ethical reasoning confidence scores ($t(89) = -6.609$, $p < 0.001$).

Conclusions: Simulations are shown to be effective educational approaches in developing ethical reasoning confidence and promoting the development of students' ethical preparedness.

Introduction

Within the past 15 years, a large number of mass casualty disasters have occurred, both domestically and abroad. The 9/11 terrorist attacks (2001); Indonesia (2004) and Japan (2011) tsunamis; Hurricane Katrina (2005); Haitian earthquakes (2010); the Orlando *Pulse Nightclub* mass shooting (2016); and the Las Vegas massacre (2017), which is the deadliest mass shooting in modern history (Rocha & Wagner, 2017), illustrate the various forms of natural disaster and complex humanitarian emergencies that ensue in our world today. There is a mass shooting incident almost every day in the United States (Gun Violence Archive, 2017), and on average at least one disaster per week that requires international assistance on the global level (Veenema, 2012). In 2017, there were 137 federally declared major disasters and emergencies in the United States alone (Federal Emergency Management Agency [FEMA], 2018). While it is difficult to predict when or where disaster will strike, history shows these events are inevitable.

Though nurses' roles are pivotal to population health, the profession is largely ill-prepared in the specific skills required for disaster care and preparation (Veenema et al., 2016). Research shows that disaster training is scarce in nursing education. For example, one survey of 1351 nursing students found that only 64.7% reported their schools talked about disasters; this contradicts the majority consensus (95.6%) that disaster preparedness education should be included in nursing curricula (Schmidt et al., 2011). Moreover, this may be cause for nurses reporting they lack competence in managing disasters (Baack & Alfred, 2013), and is additionally significant when considering nurses' training and attitudes have been found to affect their ability to perform well in actual disaster situations (Jiang et al., 2015).

Disaster simulations are a potential solution to this educational deficit. They serve as advantageous learning tools while allowing students to act as professional nurses in a realistic scenario with minimal

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threat of harm to themselves and others. Nursing education research supports that simulation exercises are powerful learning experiences for nursing students and often lead to improved clinical competency, critical thinking, and reports of self-efficacy (Bremner, Aduddell, & Amason, 2008; Kimhi et al., 2016; Smith & Roehrs, 2009). A crucial component of any simulation exercise is the debriefing process following the activity; this provides a structured reflection for participants to analyze and self-correct their behavior, decisions, and thought processes to promote cognitive accommodation and assimilation of their learning experience into future professional practice (Dreifuerst, 2009; Forneris et al., 2015; Lavoie, Pepin, & Boyer, 2013). However, limited research has been done to measure the exact outcome of such simulations on ethical reasoning in nursing students. This study utilizes the Survey of Ethical Reasoning (SER), created in collaboration with James Madison University (JMU)'s Center for Assessment and Research Studies, to assess nursing students' perceived ethical reasoning confidence and their perceived importance of ethical reasoning and skills following the debriefing process (Smith, Bashkov, & Fulcher, 2014).

Background – literature review

Overview of disaster training in nursing, needs and framework

There is disagreement on the definition of the term “disaster” (International Council of Nurses [ICN], 2009). The World Health Organization (WHO, 2008) defines disaster as “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the effected community or society to cope using its own resources.” Disasters overwhelm and disrupt the infrastructure of communities. Moreover, community response and infrastructure vary widely, which adds to the complexity of both disaster management itself and training for disaster management (Whittaker, McLennan, & Handmer, 2015). Whether natural or man-made, these events can challenge community resources, resulting in a severe toll on the individuals affected and those striving to respond (ICN, 2009). Thus, capacity building is critical to meet the aim of saving lives and reducing suffering after disasters (ICN, 2009). An assessment of the international community conducted by the WHO indicated that the greatest needs after these events are human resources. Specifically, the lack of trained personnel results in immense challenges during response, transition and recovery, creating a significant gap in disaster management (ICN, 2009; WHO, 2009).

Nurses are poised to help meet human resource needs following disasters. The WHO and ICN indicate that nurses have an important role in preparing for disasters as well as coordinating care thereafter. Although it is sometimes difficult for nurses to conceive how they may participate in future disaster response, it is nonetheless necessary for nurses, as an important member of the multidisciplinary response team, to understand disaster management. Nurses possess unique skills in the areas of assessment and triage, collaboration, and addressing both acute and preventive health care needs through referrals and advocacy from the individual through population levels. The specific roles of the nurse in disaster response include: a) first responder (with triage at both individual and population levels); b) epidemiology and ongoing surveillance; c) rapid needs assessment of the community in disaster communication; d) disaster response ethics; and e) sheltering effected individuals as needed (Stanley, Farra, & Hassmiller, 2016).

Despite the demand for these roles to be filled, the nursing profession is largely ill-prepared in the specific skills required for disaster care and preparation (Veenema et al., 2017).

The complexity of possible disasters requires a highly educated healthcare workforce (ICN, 2009). As the largest group of healthcare providers, nurses can provide care after disasters and also provide community leadership across all phases of disaster management: pre-incident; during the incident; and post-incident. The ICN Disaster Nursing Competencies, published in 2009, provides a framework for educating nurses and clarifying their roles in disasters. The competencies are organized under four areas: mitigation/prevention; preparedness; response; and recovery/rehabilitation. Additionally, this framework provides a basis for curriculum development. Within the four areas, ten specific domains are identified, including ethical practice, legal practice and accountability. Ethical practice in early disaster response, and the ethical reasoning required for this, is the framework focused on in this report.

Simulation training for ethical complexities of disaster response

The ability to authentically prepare for mass casualty incidents is convoluted by the complexity, variety, and uniqueness of ethical dilemmas healthcare providers experience in the midst of early disaster response (Merin, Ash, Levy, Schwaber, & Kreiss, 2010). For example, during a standard hospital day, priority care is given to the most acutely ill patients. Conversely, situations involving mass casualties and limited resources require healthcare providers to focus on victims with decidedly survivable injuries, while leaving the most severely injured and resource-intensive victims to their fate (Best, 2009; Fletcher, Justice, & Rohrig, 2015; Merin et al., 2010). Being in this triage position, which ultimately affects who receives survival resources, is emotionally distressing to first responders; yet, this dilemma is rarely discussed when preparing for mass casualty events (Johnstone & Turale, 2014). During a disaster, complex ethical decisions are needed not only at the individual level, but on the community level as well. For example, a process for making ethical policies for care during early disaster management is required (Merin et al., 2010).

There is value in simulating a mass casualty incident as disasters disrupt nurses' standard routines and ethical norms and therefore require practice (Johnstone & Turale, 2014). However, in a systematic literature review of 12 studies, all of the critically reviewed articles reported a lack of clinical and emotional preparedness amongst nurses for public health emergencies, with only one study directly addressing the ethical considerations of planning, preparedness, and response (Johnstone & Turale, 2014). Therefore, more information is needed to understand the role of simulation in ethics training for disaster work.

Teaching ethical reasoning

Ethical reasoning is one component of nursing ethics education for undergraduate nursing students. Responding to ethically complex situations requires: 1) recognizing that the situation has an ethical component; 2) using ethical reasoning to identify and understand the complexities of the situation and the options for action; 3) deciding which action is most ethically appropriate; 4) acting on the decision; and 5) reflecting on the decision, wherein ethical reasoning is one teachable and measurable step of this process (Smith et al., 2014). The Madison Collaborative 8 Key questions (8KQ) can be used to teach ethical reasoning to college students (Smith et al., 2014).

The 8KQ are a product of James Madison University's Quality Enhancement Plan that encompasses eight values, or lenses, one might consider when faced with an ethical decision, and was developed in accordance with the goals of the Southern Association of Colleges and Schools Commission on Colleges (Alger, Sternberger, & Goldstein, 2013). They were designed to investigate *Fairness*, *Outcomes*, *Responsibilities*, *Character*, *Liberty*, *Empathy*, *Authority*, and *Rights* (The Madison Collaborative [MC], 2013).

Complementing the 8KQ are seven student learning outcomes (SLOs) associated with the MC initiative. These include five cognitive and two non-cognitive outcomes (Appendix 1). Non-cognitive traits and skills are those beyond traditional academic proficiencies that allow students to succeed in their workplaces and contribute meaningfully in their homes, workplaces, and other societal contexts (Smith et al., 2014).

Simulation for teaching ethical reasoning

Simulation exercises have been successful in increasing students' confidence in navigating ethical reasoning, yet have not been tested for students' confidence in ethical reasoning in disaster scenarios. In one report of over 600 students exposed to virtual patient simulations, 74.2% of the participants agreed or strongly agreed that the simulation experience increased their self-reliance when making decisions with ethical implications (Hooper, 2015). In another study that incorporated high-fidelity simulations into a Nurse Ethics Residency program, both qualitative data and narrative reflections of participants showed an increase in self-efficacy regarding clinical ethics after the simulation intervention (Robinson et al., 2014). Furthermore, the effectiveness of simulations in teaching ethical reasoning importance was found to be superior to the comparative in-person and online case studies (Smith, Witt, Klaassen, Zimmerman, & Cheng, 2012). Simulations are therefore seen as effectual educational approaches to developing ethical reasoning confidence, which is important since students who are confident in their ethical reasoning capabilities are more likely to engage in the ethical reasoning process when making decisions (Smith et al., 2014). An attitudinal shift regarding the significance of ethical reasoning is critical in motivating students to advance their ethical reasoning confidence; if students perceive ethics as important, they will strive to implement the ethical reasoning process more frequently and consistently when faced with difficult decisions (Smith et al., 2014). Of note, implementing this knowledge has the potential to ultimately enhance students' application of ethical reasoning in the clinical setting and beyond to the many roles of nursing care.

Summary of literature and gaps in nursing education

Nurses comprise the largest workforce within the healthcare system (American Association of Colleges of Nursing, 2017), and they are vulnerable to the ethical dilemmas posed during early disaster response, such as which patients and communities will receive care amidst insufficient resources and medical personnel. Despite this reality, there is limited research that explores nurses' ethical preparedness for early disaster response. Although ethical reasoning can be taught, and simulation is shown to be a promising method for teaching ethical reasoning (Hooper, 2015; Smith et al., 2014), there are no studies testing ethical reasoning in early disaster simulation. This research begins to narrow that gap by describing a high-fidelity simulation of early disaster response for Bachelor of Science in Nursing (BSN) students with measures of participants' ethical reasoning and perceived ethical reasoning skills.

Methods

Procedures

This research study utilized a pre-experimental design to test two iterations of a disaster simulation and ethical debriefing. Each time, a survey was administered before the simulation (the “pre-test”) and after the simulation (the “posttest”). The first iteration was a pilot study in fall of 2015. The study was repeated on a larger scale for the second iteration in spring of 2016.

Sample

In the pilot study, a convenience sample was selected to participate in the simulation based on their community health clinical group assignment. Students were included if they were a member of the convenience sample clinical group and excluded if they were a member of another clinical group. The pilot study was used to tested the research methods, determine feasibility for the larger study, and gather preliminary data. Given the feasibility focus, there was no control group for the pilot study. In the larger study, all BSN students at James Madison University in the third semester of their training completed the disaster simulation as part of their community health course work. Plans were made for students who missed the simulation class time to be offered alternative training, though this was not necessary as all students attended. The students in the pilot study completed the simulation as one group. In the second iteration of the study, the simulation was repeated six times over the course of one week. Although students completed the simulation as part of their coursework, participation in the research survey was optional.

Ethical considerations

Institutional Review Board approval was obtained from James Madison University prior to the simulation. In order to protect students from coercion and fear of retaliation, both the pilot and the larger study survey were anonymous. Moreover, no demographic information was collected to further protect those who opted out of the research portion of the experience. In addition, the researcher introducing the survey to the students was not a course instructor. Data from the survey were analyzed by a researcher who was not a course instructor only after the course ended and grades were submitted. When pilot study data showed an increase in ethical reasoning confidence for students, the researchers determined it may have been unethical to use a control group for the larger study.

Simulation methods

In preparation for the simulation, in the week before the activity, students were provided with five texts (Best, 2009; Grimaldi, 2007; Priest, 2009; The Madison Collaborative, 2013; University Hospitals EMS Training & Disaster Preparedness Institute, 2010) and one video (Beam, 2011) on the topics of the START System, ethical reasoning, and ethics of early disaster response. Additionally, the students attended a lecture on the content of disaster nursing in their community health class several weeks prior to the simulation (Friberg, Turner, & Weepie, 2012). Upon entering the simulation room, students were provided with supply bags filled with varying basic first-aid materials. Students worked in pairs to assess victims, prioritize care, and communicate effectively with each other and the victims. Triage tags that reflected the color-coded levels of the Simple Triage and Rapid Treatment (START) system were used, and students were instructed to adjust triage levels if a victim's condition changed throughout the scenario (Beam, 2011; University Hospitals EMS Training & Disaster Preparedness Institute, 2010). A nursing faculty member was present in the simulation room to monitor for students who were showing signs of emotional distress and to intervene if necessary.

The disaster simulation utilized high-fidelity simulators and standardized patients to simulate the sights, smells, and noises expected in an actual disaster scenario, in this case the impact of a toxic chemical spill caused by a train derailment on a neighborhood in a southeastern United States town. The simulation lasted approximately 15 min and was developed based on best practice protocols and standards for simulation (International Nursing Association for Clinical Simulation and Learning [INACSL], 2013). A simulation template was used to create victim profiles, standardized patient scripts, moulage, and simulator trends for the high-fidelity patient simulators. Specifically, there were three high-fidelity patient simulators: one female adult fatality on arrival, one male adult impending fatality, and an 18-month male baby with survivable injuries. Standardized patient actors included two elderly victims, a middle aged pregnant female (full term), a middle aged female caregiver to the pediatric patient simulator, a non-English speaking young adult male, and a female teenager. All actors were oriented prior to the simulation and provided with a standardized script to accompany their clinical progression or deterioration throughout the exercise. Actors were recruited and debriefed following standard procedures for simulation training.

All facilitators of the debriefing session were trained to use a debriefing guide specific to the disaster simulation (see Appendix 2).

During the debriefing process following the simulation, students were first asked to reflect upon ethical dilemmas they encountered during the simulations. Next, students were instructed to identify one decision they made during the scenario that they believed to have the greatest ethical implications and to share this experience with their peers. The group then chose one ethical decision they encountered to consider in more depth using each of the MC's 8KQ for developing ethical reasoning (The Madison Collaborative, 2013). Finally, students were asked to role play the words and conversations it would take to begin implementing their decision. Students were asked to do this since the faculty believed it was important to provide students with tools for acting on their ethical decisions to prevent subsequent moral distress. Knowing the right thing to do while being constrained from acting accordingly can cause much moral and even physical distress, and although systemic changes are needed to prevent this discomfort, it is also useful to train the practical skills needed when encountering situations that engender such anxiety (Hamric, 2012). In order to create a safe space for debriefing, no data were collected on these conversations.

Instrument

SER.[1] To assess nursing students' perceived ethical reasoning confidence, as well as their perceived importance of ethical reasoning and ethical reasoning skills, the Survey of Ethical Reasoning (SER) was used, created in collaboration with JMU's Center for Assessment and Research Studies (Smith et al., 2014). There are four subscales of the SER. The first section asks students to prioritize 10 different skills from the most important (1) to the least important (10), including: artistic, budgeting, critical thinking, ethical reasoning, oral communication, organization, programming, time management, interpersonal, and writing. The second section includes five statements about perceived importance of ethical reasoning and five statements about confidence in applying the ethical reasoning process. These were answered using a Likert-type scale. Factor analysis results on a large sample of JMU freshmen (Smith et al., 2014) indicated items were comprised of two factors, labeled *Importance* and *Confidence* based on item content. Thus, it may be appropriate to report two scores for this portion of the SER: an *Importance* subscale score and a *Confidence* subscale score. The results also suggested that it is inappropriate to report an overall or total score for this section of the SER since it is not unidimensional (Smith et al., 2014).

Given the two-factor internal structure of this section of the SER, appropriate reliability estimates were computed for the *Importance* and *Confidence* subscales. Cronbach's alpha reliability estimates for the *Importance* subscale were 0.99 (very high) for the pre-simulation SER. Reliability for the post-simulation SER could not be completed because all nursing students answered almost identically. The *Confidence* subscale scores also demonstrated adequate reliability (0.91 and 0.90 for the pre- and post-simulation scores, respectively). Thus, subscale scores were computed as the mean *Importance* and mean *Confidence* scores at two time points, pre- and post-simulation.

The SER's second section also includes six statements that correspond to The Madison Collaborative Student Learning Outcomes (SLOs) and the 8KQ (e.g., "*When faced with an ethical situation, I can correctly identify the most relevant key questions*"). Students were asked to indicate how much they agree with each statement using a five-point Likert scale (1 = *Strongly Disagree*; 2 = *Somewhat Disagree*; 3 = *Neither Agree Nor Disagree*; 4 = *Somewhat Agree*; and 5 = *Strongly Agree*). In a large pilot study of the SER, first-year students' responses to these six statements of the SER were weakly correlated with Ethical Reasoning Identification Test (ERIT) cognitive assessment scores ($r(771) = 0.121$, $p = 0.001$; Bashkov, Smith, Fulcher, & Hawk, 2014). The relationship was not considered practically significant (Cohen, 2016). Second-year students' responses were not significantly correlated with cognitive assessment scores ($r(694) = 0.012$, $p = 0.752$; Bashkov et al., 2014). For this study, a mean score for these six items, at pre- and post-assessment, was computed and correlated with *Confidence* subscale scores, both pre-assessment and post-assessment.

A third section of the SER is worded such that it captures change over time. Survey respondents are asked to rate (1 = Never; 2 = Every Few Months; 3 = Monthly; 4 = Weekly; 5 = Daily) how often they engage in behaviors such as thinking about ethical reasoning. Since this particular section of the SER measures change over time, we excluded this from the study. All other sections of the SER were appropriate for use in measuring the pre/post-student experience.

The final section of the SER lists each of the 8KQ separately, during which students were asked to indicate how important each KQ is in their ethical reasoning process using a five-point Likert scale (1 = *Not At All Important*; 2 = *Slightly Important*; 3 = *Somewhat Important*; 4 = *Important*; and 5 = *Very Important*).

Data analysis

Surveys were administered electronically using Qualtrics. Students created a unique study ID that served to anonymously pair their pre- and post-test survey results, protecting subjects' identities. Statistical analysis was completed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., 2013).

Results

Demographics/response rate

In the pilot study, of the 17 students who completed the educational experience, 16 (94%) elected to participate in the research and completed both the pre- and post-simulation surveys. In the second iteration, 74 students (90% of the 82 who completed the educational activity) consented to participate in the research and completed the pre- and post-simulation surveys. Both groups were in their third of four semesters, completing BSN student training at. No further demographic data were collected.

Part 1: ranking of skills

For the first part of the SER, recall that students are asked to rank-order ten skills, one of which is ethical reasoning. A rank of 1 indicates students felt the skill was most important to their life or career after graduation whereas a rank of 10 indicates students felt that upon graduation the skill was least important to their life or career. A Wilcoxon signed-rank test indicated the ranking of ethical reasoning importance differed from pre- to post-simulation ($Z = -4.955$, $p < 0.001$). Specifically, the median rank for pre-simulation was 4.0. This median rank increased in importance to 2.0 post-simulation, indicating nursing students tended to rank ethical reasoning as more important after participation in the simulation than prior to participation. Additionally, these findings were statistically significant. Pre- and post-simulation rankings of ethical reasoning importance are summarized in Table 1.

Part 2: importance and confidence

Statistically significant growth was seen in students' ethical reasoning confidence scores ($t(89) = -6.609$, $p < 0.001$). Specifically, students gained approximately one-half point on the *Confidence* scale from pre-simulation ($M_{pre} = 4.08$) to post-simulation ($M_{post} = 4.46$). This difference represents a large effect size ($d = 0.63$).

A dependent-samples *t*-test indicated that mean *Importance* scores changed from pre- to post-simulation ($t(89) = -2.832$, $p = 0.006$). Before the exercise, students scored an average of 4.7 out of 5 on the

[1] The SER is owned by the Center for Survey Research at James Madison University and it not available for public distribution at this time.

Table 1
Median ranking of ethical reasoning importance, pre- and post-simulation.

Pre-simulation	Post-simulation	Wilcoxon signed-rank test (*Z*)	Significance (*p*)
4.0	2.0	−4.955	< 0.001

1 = most important, 10 = least important.

Table 2
Importance and confidence subscale scores, pre- and post-simulation.

8KQ value	Pre-simulation mean	Post-simulation mean	*t*-Test	Significance (*p*)
Confidence	4.08	4.46	−6.609	< 0.001
Importance	4.7	4.85	−2.832	0.006

1 = strongly disagree, 5 = strongly agree.

Importance scale, and after the simulation scored an average of 4.85 on the *Importance* scale, representing a moderate effect size ($d = 0.24$). These items tended to exhibit a ceiling effect, indicating that BSN students already responded very high before the simulation. The *Confidence* and *Importance* subscale scores before and after the simulation are summarized in Table 2.

The remaining six self-report items in Part 2 of the SER indicated a significant improvement in all items using a Wilcoxon signed-rank test. Table 3 shows that for all items, students' self-reported abilities increased significantly after the simulation. However, it's important to note this increase might reflect an increase in confidence in ethical reasoning, as opposed to an actual increase in ability, since students are not directly asked to perform the task (i.e., state the 8KQ from memory); rather, they're asked whether they agreed with the statement that they could perform it.

As mentioned previously, a mean score for the six skill items, at pre- and post-assessment, was computed and correlated with *Confidence* subscale scores. These results are found in Table 4. Both correlations indicate the self-report composite has a strong, positive relationship with the *Confidence* subscale at the post-assessment point ($r = 0.631$, $p < 0.001$). Because students' self-reported abilities increased significantly from pre-simulation to post-simulation on these items, it can be inferred that it was their confidence in their abilities that actually increased.

Part 3: importance of individual 8KQ

In part 3 of the SER, students ranked the Eight Key Questions in terms of importance (where 1 = most important and 8 = least important). Specifically, Table 5 reports the median ranks for KQ showing significant differences from pre- to post-simulation. A Wilcoxon signed-rank test indicated students scored several key questions as significantly more or less important after the simulation and debriefing activity versus before. The key questions investigating *Outcomes* and *Empathy* were ranked significantly higher in importance at the post-assessment when compared to the pre-assessment; each increased in importance by one unit on the ranking scale. The key questions surrounding *Fairness* and *Rights* significantly decreased in importance as seen in the post-assessment; *Fairness* ranked lower by one unit on the ranking scale while *Rights* ranked two units lower post-simulation.

Discussion

Comparative assessment of pre- and post-simulation results, specifically the *Confidence* subscale scores and students' self-reported abilities to use the Eight Key Questions in Part 2 of the SER, indicates a significant increase in students' confidence when applying, discussing, and engaging in the ethical reasoning process. Specifically, in the second study, students' *Importance* subscale scores in Part 2 of the SER showed an upward trend post-simulation that was not statistically significant. As mentioned previously, this is likely due to the ceiling effect of the data; since nearly all students responded in the highest response category for the five *Importance* items in the pre-test SER, there was little room for growth in the post-test scores. However, in Part 1 of the SER, students ranked ethical reasoning skills significantly higher amongst other skill sets following the simulation. This demonstrates students' perceptions of ethical reasoning as a priority in nursing care increased after the intervention. Another study supporting the use of a high-fidelity patient simulation scenario to help nursing students learn the importance of ethical content in their nursing practice was found to be a transformational learning experience, with the simulation's effectiveness in teaching ethical reasoning importance surpassing the comparative in-person and online case studies' results (Smith et al., 2012).

Students' responses to the last six statements in Part 2 of the SER showed significant increase in their self-reported abilities to utilize the 8KQ and make ethically sound decisions, suggesting that their self-efficacy improved after the simulation and debriefing intervention. However, as mentioned previously, students were asked if they could perform the task (i.e. correctly identify the most relevant KQ in an ethical situation), without actually completing it. Therefore, the improved self-efficacy scores actually reflect improved *confidence* in utilizing ethical reasoning skills. To more accurately measure self-efficacy, student performance of the aforementioned SER tasks would have to be assessed; this was not included in the scope of study at this time.

One emerging concern when teaching students or clinicians to ethically reason is that they will subsequently experience moral distress if they do not also develop skills for implementing their decisions. To offset this, faculty asked students to describe the conversations that would have been necessary for implementing the decision. We discussed strategies for clear communication and students before role-played these conversations. Moral distress was not measured in this study. However, others have also suggested that similar conflict resolution training as part of simulation can enhance student resilience and empowerment, which may serve to protect against moral distress (Pines et al., 2014). However, additional research is needed.

Students' positive responses to the Eight Key Questions Ethical Reasoning Framework, such as their greater understanding of what constitutes an ethical dilemma and their increased confidence in applying the appropriate Key Question(s) to a particular dilemma, support this method as an effective and beneficial model for guiding such thought processes. However, further research is needed to determine the effectiveness of the Eight Key Questions when compared to other

Table 3
Students' self-reported abilities to use the 8KQ.

Skill	Wilcoxon signed-rank (*Z*)	Significance (*p*)
I can state from memory the 8KQ of ethical reasoning	−6.748	< 0.001
When faced with an ethical situation, I can correctly identify the most relevant KQ	−5.820	< 0.001
I can weigh and balance the relevant KQ to make an informed decision	−5.613	< 0.001
I can apply the 8KQ ethical reasoning framework to aspects of my personal life	−4.887	< 0.001
I can apply the 8KQ ethical reasoning framework to aspects of my professional life	−5.112	< 0.001
I can apply the 8KQ ethical reasoning framework to aspects of my civic life	−4.720	< 0.001

Table 4
Correlation of confidence subscale scores and students' self-reported abilities to use the 8KQ, pre- and post-simulation.

	Confidence pre-assessment	Confidence post-assessment	Self-report pre-assessment	Self-report post-assessment
Confidence pre-assessment	1	0.590**	0.528**	0.234*
Confidence post-assessment	0.590**	1	0.439**	0.631**
Self-report pre-assessment	0.528**	0.439**	1	0.499**
Self-report post-assessment	0.234*	0.631**	0.499**	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

ethical reasoning frameworks, including reflective journaling prompts, the Nurses' Ethical Reasoning Skills, and the Moral Orientations of Care and Justice frameworks utilized in other studies (Callister, Luthy, Thompson, & Memmott, 2009; Fairchild, 2010; McLeod-Sordjan, 2014).

Limitations and recommendations

Similar to other pilot studies, this research design utilized a relatively small sample size from a single university. Additionally, students in the pilot simulation were recruited to participate in the study based on their clinical instructor assignment, thereby preventing random selection. Feasibility and ethical considerations prohibited the use of a control group. A larger sample size of nursing students from various programs is recommended.

Some variations existed between the first and second iteration of the simulation. In response to student feedback after the first simulation in the fall semester, an additional 5–10 standardized patient actors were added to the second round of simulations in the spring. Furthermore, the exact course of each standardized patient's clinical progression and narrative varied slightly from one simulation to the next in order to realistically reflect possible interventions and questions posed by students. Additionally, some participants in the spring semester attended a presentation on the pilot study prior to partaking in the simulation. Despite these adjustments, survey responses were not significantly different between fall and spring simulation groups. Moreover, measuring change to ethical reasoning over time would better investigate the lasting impact of this intervention. To ideally measure changes in students' attitudes towards ethical reasoning, the study should be implemented in the first semester of the nursing program and repeated with the same students each semester, and perhaps after graduation, to observe changes over time.

Despite these limitations, this study provides information leading to steps with which to fill the gap in literature on ethical reasoning training for BSN students who complete simulation training using a disaster scenario. In response to these findings, nurse educators should consider:

- Using simulation to teach ethical reasoning.
- Exploring ethical reasoning specific to disasters.
- Using the SER in research of ethical reasoning with nursing students.

Conclusions

Implications for nursing practice

Ethical reasoning is an integral part of nursing practice, particularly in mass casualty situations. Nursing programs must continue to integrate ethics and disaster preparedness into course curricula to ensure students are equipped to make difficult ethical decisions with confidence, as self-assured ethical reasoners will likely utilize the skill more often than those who are not. Utilizing the SER, results indicated that nursing students went into the simulation valuing ethical reasoning skills, and that importance of the 8KQ and ethical reasoning remained high after the simulation and debriefing. From these findings, it is concluded that ethically-charged disaster simulations and guided debriefing show great potential to develop and advance students' ethical reasoning processes.

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Table 5
Rankings of individual 8KQ importance pre- and post-simulation.

8KQ skill	Pre/post	Median	Wilcoxon signed-rank (*Z*)	Significance (*p*)	Comment
Fairness	Pre	3	−2.327	0.020	Ranked as significantly *less* important post-simulation
	Post	4			
Outcomes	Pre	5	−3.935	< 0.001	Ranked as significantly *more* important post-simulation
	Post	4			
Rights	Pre	2	−4.810	< 0.001	Ranked as significantly *less* important post-simulation
	Post	4			
Empathy	Pre	4	−3.956	< 0.001	Ranked as significantly *more* important post-simulation
	Post	3			

1 = not at all important, 5 = very important.

Appendix 1. Student learning outcomes

There are seven student learning outcomes (SLOs) associated with The Madison Collaborative: Ethical Reasoning in Action (MC) initiative. These include five cognitive and two non-cognitive outcomes, listed below.

Cognitive SLOs

1. Students will be able to state, from memory, all eight Key Questions. Alternate assessment: From a list of ways of conceptualizing issues, students will correctly identify the eight Key Questions.
2. When given a specific decision and rationale on an ethical issue or dilemma, students will correctly identify the Key Question most consistent with the decision and rationale.
3. Given a specific scenario, students will identify appropriate considerations for each of the eight Key Questions. Alternate approach: Students will be able to provide the specific considerations raised or rationale implied when applying every Key Question to an ethical situation or dilemma.
4. For a specific ethical situation or dilemma, students will evaluate courses of action by applying (weighing and, if necessary, balancing) the considerations raised by KQs.
5. Students will apply SLO 4 to their own personal, professional, and civic ethical cases. NOTE: Implied within this SLO is the students' ability to identify an ethical situation, based on the belief that the process of ethical reasoning increases discriminatory capacities. This will be addressed via the assessment rubric.

Non-cognitive SLOs

6.	Students will report that they view ethical reasoning skills as important.
7.	Students will report increased confidence in their ability to use the ethical reasoning process.

Appendix 2. Simulation pre/debriefing guide

Pre-simulation (30 min)

- Have students complete the research consent form and administer the Pre-Test Survey.
- Assign students randomly into teams of two and explain that they will be working in teams throughout the simulation.
- Inform students that an instructor will be in the lab room and will be available for support if they become overwhelmed by the simulation experience.
- Review with students the simulation objectives (assessment, prioritization, and communication) and how to use the triage tag system.
- Provide students with 8 Key Question cards, objective cards, and bags of supplies.
- Read students the scenario. At the end of the scenario, a member of the Sim Lab staff will enter into the debriefing room and urgently usher students to the Sim Lab. This is the start of the simulation.

Scenario

A train derailment has caused a toxic chemical spill in the neighborhood of Harrisonburg, VA. A group of nursing students on their way to clinical are the first to witness and respond to the disaster. There were 9 victims of the crash who are experiencing varying degrees of injury. Amongst the victims are a child, a full term pregnant mother, and a non-English speaking individual. Biochemical waste being carried on the train is no longer contained and poses a threat to individual and environmental health. Available resources are limited to the basic assessment and first aid supplies students have on hand for their day of clinical. It is expected to be approximately 30 min before additional help can arrive.

Post-simulation debriefing (1 h)

- Have each student identify a decision that they made during the scenario that they believe had ethical implications and write it down on a piece of paper.
- Have students share individual experiences with the debriefing group.
- After each person has shared, identify if there were any decisions that multiple students found to be an ethical dilemma or to have caused moral distress. Have the group collectively choose one of the ethical decisions, and consider it using each of the 8 key questions (see question-specific guide below).
- Discuss how the 8 key questions could have informed your decision. In most experiences, more nuanced options for action will come from the reflection.
- Discuss that making a decision and failing to act on it may cause moral distress. Practice/role plays implementing a related action using the 8 key questions. Write the “words” that could be used and practice saying them.
- Ask students how could this be applied to other professional situations? If time allows, students can also practice applying the Eight Key Questions to their personal lives.
- Lastly, ask students to take the Post-Test Survey.

Eight Key Questions-specific guide

- Fairness – How can I act equitably and balance legitimate interests?
  - Ask students to describe the legitimate interests they have to take into consideration when reasoning through the ethical decision being analyzed.
- Outcomes – What achieves the best short- and long-term outcomes for me and all others?
  - Ask students to identify the short- and long-term outcomes related to the decision being analyzed. Have students predict how making a different decision would result in different outcomes.
- Responsibilities – What duties and/or obligations apply?
  - Have students state the duties and obligations that apply to them as students, as nurses, and as citizens. Ask students to reflect on whether these responsibilities would have changed if the decision being analyzed was made in an acute care setting, rather than the disaster setting.
- Character – What action best reflects who I am and the person I want to become?
  - Prompt students to think about the personal values and beliefs that constitute their character. Ask students to analyze how these personal values and beliefs influenced the decision being analyzed.
- Liberty – How does respect for freedom, personal autonomy, or consent apply?
  - Ask students to describe barriers to obtaining consent or honoring the liberty of the victim in the ethical dilemma being considered.
- Empathy – What would I do if I cared deeply about those involved?
  - Ask students to reflect on how their responses may have changed if they personally knew the victim in the ethical dilemma being analyzed.
- Authority – What do legitimate authorities (experts, law, my religion/god) expect of me?
  - Students will identify the authorities they are responsible to as a student, nurse, and citizen. Ask students to consider if they would perceive themselves to be accountable to different authorities if the dilemma was to occur in an acute care setting.
- Rights – What rights (e.g. innate, legal, social) apply?
- Ask students to identify the different rights they had to consider when reasoning through the ethical dilemma being analyzed. Did the decision they made affect victims' rights differently?

Appendix 3. Eight Key Questions (8KQ)

- **Fairness** - How can I act equitably and balance legitimate interests?
- **Outcomes** - What achieves the best short- and long-term outcomes for me and all others?
- **Responsibilities** - What duties and/or obligations apply?
- **Character** - What action best reflects who I am and the person I want to become?
- **Liberty** - How does respect for freedom, personal autonomy, or consent apply?
- **Empathy** - What would I do if I cared deeply about those involved?
- **Authority** - What do legitimate authorities (e.g. experts, law, my religion/god) expect of me?
- **Rights** - What rights (e.g. innate, legal, social) apply?

References

Alger, J. R., Sternberger, L., & Goldstein, B. (2013). *The Madison Collaborative: Ethical reasoning in action.* Harrisonburg, VA: James Madison Universityc2013. Retrieved from http://www.jmu.edu/files/qep-proposal.pdf.

American Association of Colleges of Nursing (2017). Nursing fact sheet. Retrieved from http://www.aacn.nche.edu/media-relations/fact-sheets/nursing-fact-sheet.

Baack, S., & Alfred, D. (2013). Nurses' preparedness and perceived competence in managing disasters. *Journal of Nursing Scholarship, 45*, 281–287. https://doi.org/10.1111/jnu.12029.

Bashkov, B. M., Smith, K. L., Fulcher, K. H., & Hawk, E. (2014). Madison Collaborative annual assessment report. Retrieved from https://www.jmu.edu/mc/slos/assessment.shtml.

Beam, B. (2011). *START triage basics.* Video Omaha, NE: University of Nebraska Medical Center. Retrieved from https://app1.unmc.edu/nursing/heroes/elc_mci_tb.cfm.

Best, L. (2009). Nursing not as usual: Hazard preparedness in the workplace. *Minnesota Nursing Accent, 81*(3), 8–9.

Bremner, M., Aduddell, K. F., & Amason, J. (2008). Evidence-based practices related to the human patient simulator and first year baccalaureate nursing students' anxiety. *Online Journal of Nursing Informatics, 12*(1), Retrieved from http://ojni.org/12_1/bremner.html.

Callister, L. C., Luthy, K. E., Thompson, P., & Memmott, R. J. (2009). Ethical reasoning in baccalaureate nursing students. *Nursing Ethics, 16*(4), 499–510. https://doi.org/10.1177/0969733009104612.

Cohen, J. (2016). A power primer. In A. E. Kazdin (Ed.). *Methodological issues and strategies in clinical research* (pp. 279–284). (4th ed.). Washington, DC, US: American Psychological Association. https://doi.org/10.1037/14805-018.

Dreifuerst, K. (2009). The essentials of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives, 30*(2), 109–114. 6 p. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/19476076.

Fairchild, R. M. (2010). Practical ethical theory for nurses responding to complexity in care. *Nursing Ethics, 17*(3), 353–362. https://doi.org/10.1177/0969733010361442.

Federal Emergency Management Agency (FEMA) (2018). Disaster declarations for 2017. Retrieved from https://www.fema.gov/disasters/grid/year.

Fletcher, L., Justice, S., & Rohrig, L. (2015). Designing a disaster. *Journal of Trauma Nursing, 22*(1), 35–39. https://doi.org/10.1097/JTN.0000000000000098.

Forneris, S. G., Neal, D. O., Tiffany, J., Kuehn, M. B., Meyer, H. M., Blazovich, L. M., ... Smerillo, M. (2015). Enhancing clinical reasoning through simulation debriefing: A multisite study. *Nursing Education Perspectives, 36*(5), 304–310. https://doi.org/10.5480/15-1672.

Friberg, E. E., Turner, E. P., & Weepie, A. K. W. (2012). Public health nursing and the disaster management cycle. In M. Stanhope, & J. Lancaster (Eds.). *Public health nursing: Population-centered health care in the community* (pp. 507–531). (8th ed.). Maryland Heights, MO: Elsevier Mosby.

Grimaldi, M. E. (2007). Ethical decisions in times of disaster: Choices healthcare workers must make. *Journal of Trauma Nursing, 14*(3), 163. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18080580.

Gun Violence Archive (2017). Retrieved from http://www.gunviolencearchive.org/reports/mass-shooting.

Hamric, A. B. (2012). Empirical research on moral distress: Issues, challenges, and opportunities. *HEC Forum, 24*(1), 39–49. https://doi.org/10.1007/s10730-012-9177-x.

Hooper, C. (2015). Ethics virtual patients: A new pedagogical tool for educators? *Journal of Medical Ethics, 41*(7), 549–552. https://doi.org/10.1136/medethics-2012-101154.

IBM Corp (2013). *IBM SPSS statistics for Windows, version 22.0.* Armonk, NY: IBM Corp.

International Council of Nurses (2009). ICN framework of disaster nursing competencies. Retrieved from http://www.icn.ch/images/stories/documents/networks/DisasterPreparednessNetwork/Disaster_Nursing_Competencies_lite.pdf.

International Nursing Association for Clinical Simulation and Learning (INACSL) (2013). Standards of best practice: Simulation. *Clinical Simulation in Nursing, 9*(6), ii–iii. https://doi.org/10.1016/j.ecns.2013.05.008.

Jiang, L., He, H.-G., Zhou, W.-G., Shi, S.-H., Yin, T.-T., & Kong, Y. (2015). Knowledge, attitudes and competence in nursing practice of typhoon disaster relief work among Chinese nurses: A questionnaire survey. *International Journal of Nursing Practice, 21*, 60–69. https://doi.org/10.1111/ijn.12214.

Johnstone, M., & Turale, S. (2014). Nurses' experiences of ethical preparedness for public health emergencies and healthcare disasters: A systematic review of qualitative evidence. *Nursing & Health Sciences, 16*(1), 67–77. https://doi.org/10.1111/nhs.12130.

Kimhi, E., Reishtein, J. L., Cohen, M., Friger, M., Hurvitz, N., & Avraham, R. (2016). Impact of simulation and clinical experience on self-efficacy in nursing students: Intervention study. *Nurse Educator, 41*(1), E1–E4. https://doi.org/10.1097/NNE.0000000000000194.

Lavoie, P., Pepin, J., & Boyer, L. (2013). Reflective debriefing to promote novice nurses' clinical judgment after high-fidelity clinical simulation: A pilot test. *Dynamics, 24*(4),

36–41. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/24616950.
McLeod-Sordjan, R. (2014). Evaluating moral reasoning in nursing education. *Nursing Ethics, 21*(4), 473–483. https://doi.org/10.1177/0969733013505309.
Merin, O., Ash, N., Levy, G., Schwaber, M., & Kreiss, Y. (2010). The Israeli field hospital in Haiti—Ethical dilemmas in early disaster preparedness. *The New England Journal of Medicine. 362*(38), https://doi.org/10.1056/NEJMp1001693.
Pines, E. W., Rauschhuber, M. L., Cook, J. D., Norgan, G. H., Canchola, L., Richardson, C., & Jones, M. E. (2014). Enhancing resilience, empowerment, and conflict management among baccalaureate students: Outcomes of a pilot study. *Nurse Educator, 39*(2), 85–90. https://doi.org/10.1097/NNE.0000000000000023.
Priest, C. (2009). Catastrophic conditions, tough decisions: The roles and responsibilities of nurse leaders in disaster settings. *Nurse Leader, 7*(3), 48–50. https://doi.org/10.1016/j.mnl.2008.07.013.
Robinson, E. M., Lee, S. M., Zollfrank, A., Jurchak, M., Frost, D., & Grace, P. (2014). Enhancing moral agency: Clinical ethics residency for nurses. *Hastings Center Report, 44*(5), 12–20. https://doi.org/10.1002/hast.353.
Rocha, V., & Wagner, M. (2017). *The latest on the Las Vegas shooting investigation.* CNN. Retrieved from http://www.cnn.com/2017/10/05/us/las-vegas-shooting-latest/index.html.
Schmidt, C. K., Davis, J. M., Sanders, J. L., Chapman, L. A., Cisco, M. C., & Hady, A. R. (2011). Exploring nursing students' level of preparedness for disaster response. *Nursing Education Perspectives, 32*(6), 380–383. https://doi.org/10.5480/1536-5026-32.6.380.
Smith, K. L., Bashkov, B. M., & Fulcher, K. H. (2014). *Assessing attitudes toward ethical reasoning: Examining the factor structure of the survey of ethical reasoning.* Harrisonburg, VA: James Madison University.
Smith, K. V., Witt, J., Klaassen, J., Zimmerman, C., & Cheng, A. (2012). High-fidelity simulation and legal/ethical concepts: A transformational learning experience. *Nursing Ethics, 19*(3), 390–398. https://doi.org/10.1177/0969733011423559.
Smith, S. J., & Roehrs, C. J. (2009). High-fidelity simulation: Factors correlated with nursing student satisfaction and self-confidence. *Nursing Education Perspectives, 30*(2), 74–78. (5 p.). Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/19476068http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,cookie,url,cpid,uid&custid=s8863137&db=rzh&AN=105509978&site=eds-live&scope=site&authtype=ip,uid.
Stanley, S. A. R., Farra, S. L., & Hassmiller, S. B. (2016). Public health nursing practices and the disaster management cycle. In S. Stanhope, & J. Lancaster (Eds.). *Public health nursing: Population-centered health care in the community*(9th ed.). Maryland Heights, MO: Elsevier.
The Madison Collaborative. (2013). The eight key questions handbook. Retrieved from https://www.jmu.edu/mc/Docs/131101%208KQ%20Handout%20Revision.pdf.
University Hospitals EMS Training & Disaster Preparedness Institute (2010). S.T.A.R.T. simple triage and rapid assessment. Retrieved from http://www.emsconedonline.com/pdfs/starttriage.pdf.
Veenema, T. G. (2012). *Disaster nursing and emergency preparedness for chemical, biological, and radiological terrorism and other hazards* (3rd ed.). New York, NY: Springer Publishing Company.
Veenema, T. G., Griffin, A., Gable, A. R., MacIntyre, L., Simons, R. N., Couig, M. P., ... Larson, E. (2016). Nurses as leaders in disaster preparedness and response—A call to action. *Journal of Nursing Scholarship, 48*(2), 187–200. https://doi.org/10.1111/jnu.12198.
Veenema, T. G., Lavin, R. P., Griffin, A., Gable, A. R., Couig, M. P., & Dobalian, A. (2017). Call to action: The case for advancing disaster nursing education in the United States. *Journal of Nursing Scholarship, 49*(6), 688–696. https://doi.org/10.1111/jnu.12338.
Whittaker, J., McLennan, B., & Handmer, J. (2015). A review of informal volunteerism in emergencies and disasters: Definition, opportunities, and challenges. *International Journal of Disaster Risk Reduction, 13*, 358–368. https://doi.org/10.1016/j.ijdrr.2015.07.010.
World Health Organization (2008). Glossary of humanitarian terms. Retrieved from http://www.who.int/hac/about/reliefweb-aug2008.pdf?ua=1.
World Health Organization & International Council of Nurses (2009). *ICN framework of disaster nursing competencies.* Geneva, Switzerland: ICN.