RESEARCH ARTICLE

A longitudinal study on the impact of simulation on positive deviance through speaking up

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Background: Students reported positive learning outcomes during a simulation study addressing compliance and speaking up.

Purpose: Investigate if the impacts of the simulation had a lasting effect on participants after moving into practice.

Method: Semi-structured interviews focusing on memory of the study, psychological impacts, educational impacts, professional impacts, and experiences in practice were conducted with Advanced Care Paramedics (3) and Respiratory Therapists (7) between 19 and 24 months after the original study.

Discussion: Participants indicated the simulation helped them develop the skill and confidence to speak up, preparing them to speak up in practice. Primary findings included: (*i*) the importance of experience for speaking up, (*ii*) the benefit of high-impact simulation, and (*iii*) the importance of simulation training.

Conclusions: Simulation for speaking up should occur early. Conducting high-impact simulations for speaking up is a practical and actionable intervention that appears to enhance confidence, ability, and likelihood of speaking up in practice.

Key Words: *education; challenging authority; longitudinal; compliance; obedience; healthcare professionals*

INTRODUCTION

To promote patient-centered care and patient safety and to uphold professional values, members of healthcare teams often need to challenge authority by engaging in positive deviance through speaking up (PD/SU) [1] (see Table 1 for a list of relevant terms). Despite the importance of PD/SU, speaking up is a difficult task, particularly for students [2]. Efforts to promote PD/SU are increasing, yet the outcomes of education and training are inconsistent [3, 4]. Simulation is a promising modality for studying and training for speaking up, though more evidence is required including the longitudinal impacts of education and training [3, 5, 6] and the emotional and psychological dimensions of speaking up [6].

During the 2019 winter semester, a simulation study was run with Respiratory Therapy (RT, n = 40) and Advanced Care Paramedic (ACP, n = 20) students to examine obedience to authority and PD/SU [7, 8]. The simulation involved an airway management scenario where it was necessary to challenge a physician to prevent a negative patient outcome. The physician would initially be dismissive of participants before indicating that he was responsible for the outcome of the situation. The scenario ended when participants made a strong persistent challenge or if participants did not escalate the challenge. Thirty-six per cent of students did not successfully challenge the physician [7].

During debriefing many RT students were surprised situations could occur where a physician may not be responsive to their questions and suggestions and were uncertain about how to challenge a physician. Students that did not successfully challenge wanted to learn more about how to handle such situations. As a result of the simulation RT students indicated they had a better understanding of how they would behave in a compliance scenario and felt more confident in themselves and their ability to handle the situation. For ACP students the situation was not novel due to prior practice experience; however, the simulation re-enforced the need to speak up giving ACPs confidence in their knowledge and ability. Debriefing questions related to the study prompted students to think about responsibility and moral implications related to speaking up. Both RT and ACP students indicated the simulation was good exposure to a situation requiring PD/SU and was a positive learning experience [8].

Based on the reported positive learning outcomes an opportunity was presented to fill three gaps in the literature: (*i*) more research on simulation for education and training on speaking up [5, 6], (*ii*) the need for longitudinal study on education and training for speaking up [3], and (*iii*) to focus on the emotional and psychological dimensions of speaking up [6]. To address these needs two research questions were developed:

(*i*) Does a high-intensity simulation focused on obedience to authority and PD through speaking up have any effects after students have moved into practice?

(*ii*) Are there any implications for education and training that can be derived from student's experiences?

METHODS

Participants

Students from the initial study were contacted by email to participate. The email contained an information letter about the purpose of the study and participants were offered a $15 Amazon Gift card. Interested participants contacted the Primary Investigator (PI) and were sent a consent form, and a time for a telephone interview was scheduled. The initial sample of RT and ACP students was selected as these professions play a critical role in patient care, and there is a need to expand the research on PD/SU to professions beyond medicine and nursing [2]. All

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TABLE 1

Glossary of terms

Construct	Definition
Positive deviance through speaking up (PD/SU)	Action, specifically through voicing concern, that counters behaviour that erodes professional values or creates negative outcomes, often to prevent harm and negative consequences to a patient [9, 10].
Stress/stressor	A force that is applied. In a learning context this can be a challenge or learning expectation. The amount of stress/stressor can be variable and can have positive or negative outcomes, can lead to eustress or distress, and is not necessarily perceived the same by all students [11].
Eustress	A beneficial or healthy response to a stress/stressor associated with positive feelings and outcomes including positive learning and performance outcomes. An optimal amount of stress [11].
Distress	A negative affect as a result of a stress/stressor with physiological and psychological manifestations that can inhibit learning and performance. An excessive amount of stress [11].
Fidelity*	The degree to which a simulation technology or scenario matches a "real" practice context [12]. The level of authenticity or realism and meaningfulness evoked by component aspects of simulation, e.g., physical fidelity, to produce a worthwhile learning experience [13].
Physical fidelity	The look and feel of the simulation technology and environment, e.g., overall realism of simulation rooms and equipment [12].
Psychological fidelity	Whether the simulation faithfully replicates the critical elements of the task such that participants feel that they can engage in it authentically as they would in clinical practice [12].
Sociological fidelity	The degree to which a simulation scenario addresses the reality of the interprofessional care context, including issues of power, hierarchy, and professional boundaries [12].
High-impact simulation	A simulation that combines the necessary component aspects of fidelity to produce a challenging scenario eliciting psychological and emotional engagement that results in an authentic experience and learning.

*The concept of fidelity in simulation is considered complex with no single definition or consistent use in the literature [12].

participants from the initial study were considered eligible for follow up. The study received ethics approval from the Northern Alberta Institute of Technology Research Ethics Board (#2020-07).

Materials

A semi-structured interview was designed to understand the impact of the initial study and simulation as participants moved into practice. The interview questions focused on memory of the study, psychological impacts, educational impacts, professional impacts, and experiences in practice (see Supplemental Materials[1]). The interview questions were reviewed and revised by a subject matter expert in patient advocacy as well as a nonexpert to ensure that the questions addressed the research questions and were coherent for a nonexpert.

Procedures

The interviews were conducted between 19 and 24 months after the initial study, November 2020–March 2021. The PI contacted participants by telephone and verbal consent to participation and audio recording of the interview was obtained. The PI had interacted with participants during the previous stage of the study [7, 8] but had no other relationship with the participants, e.g., teaching or grading. All interviews were audio recorded and transcribed verbatim. Audio recordings were anonymized prior to transcription. Recruitment was continued until saturation was reached. All data were kept on a password-protected hard drive that was only accessible to the PI.

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[1]Supplementary materials are available at https://www.cjrt.ca/wp-content/uploads/Supplement-cjrt-2022-006.docx.

Analysis

A qualitative descriptive approach was taken, as the purpose of the interviews was to understand the effect of a specific experience in a structured manner rather than build theory or derive themes [14, 15]. Participants conveyed personal experiences and information that was not possible to corroborate with observation or other data; therefore, a direct realism approach was taken to the interpretation of the data [16]. Limitations of the study are addressed in the Discussion section.

RESULTS

Participants

Ten interviews were conducted with three ACPs and seven RTs, at which point it was determined saturation was reached. The sample was an equivalent proportion to the sample size of the initial study [7]. Interviews averaged 29 min and ranged from 19 to 57 min. All participants completed the full interview. If the participant thoroughly addressed initial items, not all probing or follow up questions were asked. No participant or aspect of participant data were excluded from the analysis. Participant quotations that support the results are included throughout the Results section. Nine participants were in practice, and one ACP was completing a final practicum placement. Six RTs worked in hospital settings with one holding a concurrent position with a private company, and one RT worked exclusively for a private company. Two ACP students were working in an urban setting and one in a rural setting. Participants recalled the simulation in explicit detail. Recall of the details of the study were moderate.

Learning outcomes

The simulation was notable and meaningful for all participants. In the overall context of education and training, the simulation had a significant impact for five participants; for five others, the simulation had a minor impact. The simulation had a direct and tangible connection to participant's jobs. The only discordant perspective was an ACP who had experienced similar situations as a Primary Care Paramedic. For all RT participants, the simulation was the first experience that made them aware situations could occur where a doctor might disregard their concerns about a patient. The main benefit of the simulation for participants was gaining experience in PD/SU and overcoming discomfort doing so. All participants felt the simulation created a general preparedness that could help them in similar situations in different care contexts in the future.

For RTs, the primary learning outcome was learning the skill of speaking up and feeling more confident and prepared to speak up even if it is uncomfortable. Relatedly, RTs learned the necessity of being persistent and bold when someone does not acknowledge your concerns. Other learning outcomes included: realizing doctors are imperfect and have lapses in judgment, inaction can cause harm, patient safety and patient-centered care is everyone's prime responsibility, and good communication is essential.

ACPs already knew similar situations could occur, but still found value in the simulation. All ACPs thought speaking up becomes easier with experience and the simulation provided valuable practice that reinforced the need for speaking up with pertinacity.

> "If we don't train ever to kind of speak up, then it'll be really hard when that situation actually occurs." (ACP).

> "When I started working, and I got more confident, then I actually did relate back to that simulation and remembered that I have just as much to say as anyone else in the room, and I have a right to speak my opinion, my mind, like if I needed to advocate for a patient. I am able to use what I learned from that simulation, like, literally every single day that I go to work." (RT)

> "And I think that simulation prepares students really well, especially, like, that boost your courage, that boost your self-confidence. And I think that definitely makes a huge impact on the follow-up, like, the practicum I had." (RT)

Personal and professional impacts of the simulation

After completing the simulation all participants thought about the simulation and discussed it with peers in the days and weeks after. Five participants thought about the simulation intermittently up to the time of the interview, including while working. One participant discussed the simulation with various colleagues after moving into practice.

Though the simulation was stressful, no participant had any distress or adverse effects. Two participants experienced eustress in the days after the simulation as they reflected on their performance and how to perform better and what to do in the future. Other participants engaged in reflection but did not relate the reflection to distress or eustress.

> "It had a pretty big impact on me, I was just thinking about how, yeah, how important my role could be at times. And I guess I knew that, but I think practically having it play out in a real-life scenario kind of helped solidify that." (RT)

> "I remember sharing about it with my family and my friends and just talking about how that kind of thing had a really big impact on me." (RT)

When asked if the study impacted them as a person, most participants discussed professional impacts instead. Two participants indicated professional growth from the simulation carried over into their personal lives by making them less shy.

All participants thought the simulation had a positive professional impact by preparing them for "real-life". Preparation for "real-life" occurred through greater comfort in speaking up and increased awareness of the need and expectation to speak up to authority. The RT students indicated the simulation made them more aware of hierarchies in healthcare and that people may not always be open to other opinions. The simulation also helped RT students realize it is possible and necessary to go against a hierarchy and that everyone brings different value, knowledge, and opinions. The simulation also changed RTs perception of doctors, leading them to realize individual variability exists in attitudes and skill. The ACPs were already aware of these issues.

Similar situations in practice

All participants experienced at least one scenario like the simulation since the initial study, with some situations almost identical to the simulation. Six had experienced multiple similar situations.

RT participants experienced situations with procedures across their scope of practice including intubation, extubation, bronchoscopy, and ventilator support. Three participants recounted situations where they spoke up repeatedly; however, the doctor proceeded with the course of action, including after the participant involved nurses or other RTs. In each situation, there was an adverse patient outcome.

One RT recounted a situation nearly identical to the simulation. During a bronchoscopy, the doctor was slow to pull out the bronchial tube as they were focused on getting a sample and the patient began de-saturating. The participant indicated the patient's status and told the doctor they should pull out and start bagging. The doctor ignored the participant, so the participant challenged again, and the doctor pulled out. Other situations were recounted where speaking up was well received and there was a positive patient outcome.

The ACPs also related situations where it was necessary to make a strong challenge. In one case, an unstable patient was being transported and the participant thought the patient should be intubated. The doctor refused to intubate, and the ACP performed the intubation themselves. In a situation involving a critical care patient with a possible case of COVID-19, proper safety precautions were not being taken by a charge nurse. The participant repeatedly challenged the nurse, and the challenges were aggressively rejected. The participant ultimately extricated themselves from the situation. In both cases, the patient outcome was positive.

Five participants thought the simulation directly influenced their actions during these situations. The remainder thought the simulation had an indirect or "subconscious" influence. No participants explicitly thought about the simulation before speaking up, though most thought about the simulation after. All participants felt the simulation led to quicker action by making them more comfortable and more cognizant of the need to speak up.

When challenging, participants primarily felt "nervous", "stressed", and "frustrated". Positive and negative emotions were experienced after speaking up. Positive emotions included feeling happy or satisfied about speaking up, a sense of affirmation, and feelings of empowerment and confidence. Negative emotions were primarily focused on frustration. Frustration was experienced due to an inability to change the situation, situational ambiguity, unclear roles, or not being listened to. Participants also experienced disappointment in themselves and others. Speaking up and good communication from a doctor decreased feelings of frustration.

Feelings of personal responsibility led to action, though feelings of responsibility varied from total to minimal. Participants felt less responsibility when many people were present or when they thought they had done all they could. All participants felt greater responsibility when performing a procedure related to their profession.

> "[I thought] Wow, that was very, very similar to the study, and you know, in, like, six, seven years of working, I haven't really been put into that situation very much. So, I just thought it was kind of funny [laughs]. Yeah, I'd say that that impacted. It just reduced how long it took for me to say anything." (ACP)

Reality of the simulation

Overall, participants thought the simulation was very real. When asked to rate the simulation's realism compared with practice, participant ratings ranged from 5 to 10 (median = 7.5, mean = 7.2), with 10 being maximal realism. Participants disagreed on the realism of the doctor's demeanor, realism was reduced by the doctor's skills and knowing it was a simulation. Some participants had not encountered any doctors as challenging as the doctor in the simulation while others had encountered much more challenging doctors. All participants thought similar simulations should be conducted more frequently to prepare students for situations where PD/SU is necessary. Participants felt more exposure can help a person act quicker and be a form of "stress inoculation".

Participants found the simulation to be beneficial and enjoyable and were glad they had the opportunity to participate. Participants did indicate more follow-up discussion and opportunities for reflection with classmates and instructors after the simulation would have been helpful.

> "It would be fun to have more sort of surprise impromptu things like that in school." (ACP)

> "I really remember enjoying this scenario because it was kind of one of the things we never touched on, like, we read about challenging and stuff, but it was a good scenario to actually be in the situation where you really have to put your foot down and challenge someone with a higher authority than you." (ACP)

Participants were also asked to rate the impact of simulation training in general. Ratings ranged from 6 to 10 (median = 8, mean = 8.1). Participants thought the simulations during their education closely replicated and prepared them for practice and noted learning things in simulation they could not learn in a classroom, book, or lab. Some participants tempered their response by stating nothing can completely replicate the clinical environment. Four participants thought it would have been possible to practice without simulation training, but the transition to practicum and practice would have been more difficult and they would have been a burden to colleagues. Overall, participants thought simulation was crucial preparation for practice.

> "I think simulation is where we, like, I did most of my learning in that three-year program. Like, as much as you can learn in

class, I don't think I would have been at all prepared for clinical if we hadn't done simulation... like, it's not something you can learn in a classroom." (RT)

DISCUSSION

Both research questions were answered in the affirmative; 2 years after participation the simulation remained salient and relevant to participants with clear lessons that helped participants when they moved into practice. Students indicated the simulation was one of the most memorable aspects of their education and thought experiencing a challenging scenario where it is necessary to speak up would be beneficial for other students.

Primary findings

Three primary findings can be derived from the interviews: (*i*) the importance of experience for speaking up, (*ii*) the benefit of high-impact simulation, and (*iii*) the importance of simulation training.

Importance of experience for speaking up

Simulation is a safe and controlled space yet in simulation many people struggle to challenge a physician [17–20]; during a real clinical scenario, challenging is even more difficult [2, 21]. Emerging evidence indicates prior experience is essential for speaking up [8, 18, 22, 23] and is a skill that should be practiced. In the present study, the confidence participants gained and the expectations around speaking up that were developed prepared participants for speaking up in real clinical scenarios. Experiencing and practicing speaking up in a simulated compliance scenario can build confidence by either teaching new knowledge and skills or reinforcing prior knowledge and skills. Practice is important as speaking up is a less frequently used skill, relative to other skills. Simulation experience can ensure the first experience with speaking up isn't when there is a real risk of patient harm

Benefit of high-impact simulation

High-impact simulation, meaning high physical fidelity and high psychological and sociological fidelity [12], can be beneficial for providing experience. Simulations designed to address compliance need to be authentically challenging by being situationally and interpersonally difficult to elicit psychological and emotional engagement. Students indicated that the simulation they participated in met these characteristics, resulting in a learning experience that led to lasting change.

High-impact simulation is an opportunity for psychological growth and building resiliency [24]. Concern exists about creating psychological or moral distress in simulation [25]; however, moral distress is not a pathology, and it can be necessary to "stretch" students [24, 26]. While students found the simulation itself highly stressful, they did not experience distress, rather reflection and personal development occurred through eustress. The simulation gave students confidence, reinforced the need to speak up, reinforced responsibility for patient safety, and resulted in feelings of empowerment. In turn, participants felt more capable of speaking up in practice. When participants spoke up in practice, confidence and empowerment grew. A positive feedback loop is created, speaking up leads to more speaking up.

Importance of simulation training

Not all simulations need to be high impact, but high-quality simulation training is important. The transfer of learning in simulation to practice is not always apparent [26]. For the current sample after moving into practice, while identifying that nothing compares to the clinical environment, participants found simulation had a high transfer of training and created general preparedness. Participants believed the preparedness would not have been obtainable without simulation. A health professional program using simulation informed by educational theory and fully integrated in the curriculum through careful planning and design can enhance readiness upon entering the workplace. While the present study was conducted with RT and ACP students, the results would likely be generalizable across professions [27, 28].

Educational implications

Participant's frustration and distress was reduced by speaking up and by good communication on the part of an authority. It has been previously suggested interprofessional education (IPE) should focus on producing individuals that will be good collaborators regardless of those around them through preparation for the real, not the ideal [29]. The emphasis should be placed on preparing individuals to act to uphold professional values and patient safety regardless of the leadership qualities and behaviours of those around them. The importance of experience, individual behaviour, and the positive feedback loop, suggests providing experience, education, and training on PD/SU should occur as early as possible.

Education and training should not only exist theoretically or in low stress settings but also be experienced practically and intensely. Going beyond didactic, role playing or low-intensity simulation approaches [23, 30–32] will benefit students in the long term. A high-impact simulation, such as the one used, is easy to conduct; however, it must be well planned, meaningful, and purposefully integrated into curriculum addressing patient advocacy. Education, practice, and training should align with the Kolb–Lewinian cycle of experiential learning: Abstract Conceptualization > Active Experimentation > Concrete Experience > Reflective Observation [33, 34]. High-impact simulations should not just be for stress exposure, but rather create eustress and support learning and personal development. Moreover, such simulations should not be used for assessment but rather as experiential lessons.

To create authentically challenging high-impact simulations where PD/SU is difficult, misdirection, deception, or minimal information may be necessary, these are controversial topics in simulation [25, 26, 35, 36]. Monteiro and Sibbald [37] discussed the misuse of simulation, critiquing simulation training that utilizes surprise or does not provide learners with full knowledge about the simulation's purpose and relies on debriefing for teaching. The primary fault is the misapplication of Kolb's theory and discovery learning as a result of poor lesson planning, poorly or undefined learning objectives, and a lack of follow up or active skill development.

Concerns have been raised about how hierarchy and professional position may negatively impact psychological safety, learning, and perceptions of other professions in interprofessional simulations [38]. In the present simulation the other professional, an anesthesiologist, was played by an actor and the purpose of the simulation was for students to directly confront and address professional hierarchies through PD/SU. Post-simulation none of the participants indicated an increased negative perception of physicians but realized everyone they encounter may not be an adept interprofessional collaborator and it is necessary to move across professional barriers for patient safety [8]. With proper design and debriefing, interprofessional simulation can be used to provide experience addressing hierarchies while fostering learning in a psychologically safe setting.

LIMITATIONS

The original study was conducted with a single cohort from a school with a state-of-the-art simulation facility where simulation is a major component of the RT and ACP programs. For students with less or no simulation experience or if the simulation is conducted in lower fidelity, a similar simulation may not be as impactful.

It was not possible to corroborate experiences related during the interview and participants' reports, so the impact of the simulation must be taken at face value. Direct observation, or a quantifiable measure of longitudinal effects, would be needed to further establish the validity of the simulations influence and benefit for practice. Multiple methods should be used in future evaluation.

Part of the simulation's impact may have been the uniqueness of participating in a novel simulation associated with a research study. Participating in research studies was not common for the ACPs and RTs.

CONCLUSION

Prior experience appears to be essential for speaking up, and a high-impact simulation can provide that experience. The present simulation was part of a study examining compliance and not designed as a learning experience; yet, it was influential and showed transfer of training with longitudinal effects. Fully integrating compliance simulations designed for PD through speaking up as a planned aspect of established curriculum can likely have an even greater impact [23]. Conducting high-impact simulations for speaking up is a practical and actionable intervention that appears to enhance confidence, ability, and likelihood of speaking up in practice. Increasing the ability and likelihood of speaking up by healthcare professionals entering practice can benefit patients and the healthcare professionals themselves.

AUTHOR DISCLOSURES

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