

ABSTRACT

BACKGROUND

A myriad of personnel is required to staff an operating room (OR), each contributing a specific set of knowledge and skills to ensure safe delivery of care during surgery. Without proper professional development and knowledge, gaps in care can occur which increase the potential for patients to experience adverse events. Simulation has been shown to improve team dynamics, interpersonal communication, and prioritization skills (Hibberson et al., 2021).

OBJECTIVE

This program evaluation project explored the current multidisciplinary simulation implemented at a midsized, Midwestern hospital. The goal is to seek evaluation and methods to improve the simulation experience for participants to produce greater knowledge development on simulation topics, communication, and teamwork. In addition, this project aims to improve team performance in response to emergency situations.

METHODS

Pre- and post-simulation surveys were sent out to participants two weeks before and two weeks after simulation, respectively. Surveys contained questions pertaining to participant demographics, perceived knowledge and confidence related to the simulation topic, and knowledge-based questions to assess actual knowledge of the simulation topic. A critical indicator and debrief checklist was utilized to assess performance-based metrics for participants during the simulation and questions to guide debrief and allow participants the opportunity to provide feedback to the multidisciplinary simulation team.

RESULTS

An overall improvement in knowledge occurred following the simulation experience. Difficulty index scores for multiple choice questions demonstrated an increase in knowledge for simulation participants related to the simulation topic. Items completed on the critical indicator checklist demonstrated proficient performance in response to the simulation. Debrief results displayed mixed reviews regarding the current simulation program and recommendations for alterations in the simulation were provided by participants.

CONCLUSIONS

Simulation has been proven to be a beneficial component for continuing education of the multidisciplinary operating room team. While the current simulation program established provided an increase in knowledge and performance on the simulation topic, room for improvement exists. The large size of groups involved provided mixed reviews as participants enjoyed the simulation leadership but desired for an increase in the hands-on nature of simulation.

PICO

For

(P) multidisciplinary operating room personnel at a midsize midwestern hospital

(I)does implementation of a standardized method for evaluating the effectiveness of a multidisciplinary simulation program

(C) compared to no standardized evaluation method

(O) improve staff knowledge and performance for emergencies in the operating room as indicated by a difficulty index score from 40% for pre- to 70% for post-simulation knowledge surveys and completing at least 85% of indicators on a standardized critical indicator and debrief checklist?

METHODS

- **Theory:** NLN Jeffries Simulation Theory (Jeffries et al., 2015)
- **Sample:** Convenience from all OR personnel
- **Evaluation:**
 - Pre- and post-simulation surveys
 - Gather participant demographic data
 - Compare results to determine knowledge improvement
 - Critical indicator and debrief checklist
 - Monitor completion of all simulation aspects
 - Guide for debrief after simulation with response space
 - **Simulation topic:** Undiagnosed Pheochromocytoma

SIMULATION DAY EVALUATION

- See Figure 2 for the Critical Indicator Checklist with results
 - Majority of indicators received 100% completion
 - Evaluations with indicators not completed were missing data
 - Both evaluators were in same OR, however 3rd evaluator in that OR marked as completed generating an inter-rater discrepancy
- Debrief consisted of three questions with top emerging theme reported
 - See Table 2 for the key theme for each question and participant quotes to supporting
- Question 1: What went well during the simulation?
- Question 2: What were things during simulation that you felt could have been done better?
- Question 3: How do you feel your team communicated during this simulation to the effect of emergency response?

PRE- AND POST-SIMULATION SURVEYS

- See Table 1 for demographic data of participants
- Perceived knowledge and confidence rated using Likert scale 1 (*minimal*) to 10 (*high*)
 - Knowledge
 - Pre-simulation: 9/67 reported high
 - Post-simulation: 25/31 reported high
 - $p > .001$
 - Confidence
 - Pre-simulation: 9/67 reported high
 - Post-simulation: 20/31 reported high
 - $p > .001$

TABLE 1: Pre- and Post-Simulation Survey Demographics

Demographics	Pre-Simulation Responses n (%)	Post-Simulation Responses n (%)
Job title/position		
Surgical staff	10 (15)	2 (6)
Support staff	36 (54)	13 (42)
Anesthesia staff	16 (24)	12 (39)
Other	5 (7)	4 (13)
Years in current position		
0-4 years	22 (33)	14 (45)
5-10 years	24 (36)	12 (39)
11-15 years	8 (12)	2 (6)
16+ years	13 (19)	3 (10)
Prior participation in a pheochromocytoma emergency		
Yes	6 (9)	3 (10)
No	60 (91) ^a	28 (90)

Note^a One participant failed to answer this question

FIGURE 2

Expected Actions	Yes	No	Blank	% of Groups Completed
Communication				
1 Anesthesia communicates patient's deteriorating clinical status to surgeon and circulating nurse	14	1	0	93%
2 Names used to provide direct communication between team members	15	0	0	100%
3 Promptly calls for help	4	1	0	93%
4 Closed-loop communication occurred throughout simulation	13	0	2	100% ^a
Teamwork				
5 Team leader established	13	0	2	100% ^a
6 Clear roles established by team leader	13	0	2	100% ^a
7 Demonstrates professional respect during emergency response	15	0	0	100%
Event Specific				
8 Recognition of pheochromocytoma signs/symptoms (HTN, tachycardia or bradycardia, diaphoresis)	15	0	0	100%
9 Recognizes need for arterial line and lab draw (ABG, electrolytes)	15	0	0	100%
10 Promptly recognizes ventricular fibrillation and calls code	15	0	0	100%
11 ACLS algorithm is followed	15	0	0	100%
12 Critical care is consulted for post-cardiac arrest care	15	0	0	100%
13 Considers need for post-arrest cardiology consult	15	0	0	100%

Note^a Percentages calculated after removing missing data

- Knowledge-based questions: See Figure 1 for difficulty index scores results
 - Question 1: What is a pheochromocytoma?
 - Question 2: What are some signs/symptoms of a pheochromocytoma?
 - Question 3: What lab test is needed to diagnose a pheochromocytoma?
 - Question 4: What are potential triggers for pheochromocytoma manifestations?
 - Question 5: If a cardiac arrest arises, where is the necessary code cart located (within your primary work unit)?
 - Question 6: What discipline should be consulted after a cardiac arrest from hypertensive emergency?

FIGURE 1

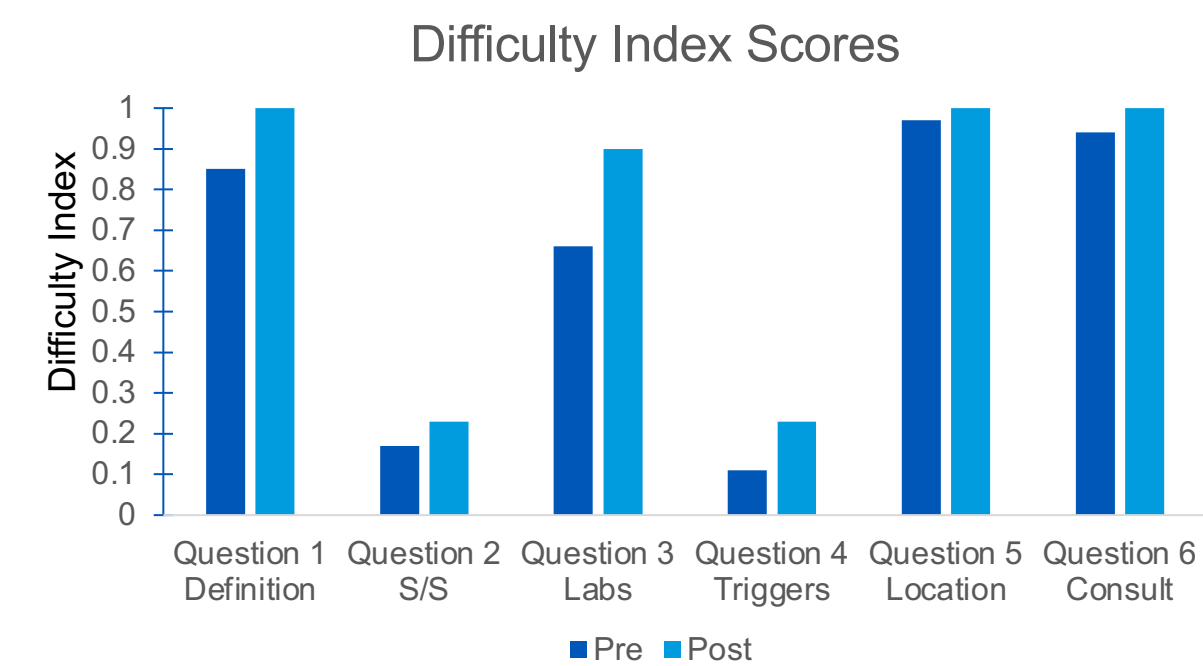


TABLE 2: Debrief Key Themes

Question	Key Theme	Comments
1	High-quality communication	“Open communication/discussion and brainstorming” “Great job by Alex leading, which led to very good, active engagement & conversations”
2	Participant engagement	“More participation-voicing interventions” “Performing an actual simulation as opposed to just talking through things”
3	Good communication	“Very good. We discussed the best way to communicate and gave suggestions” Dissenting view: “not much communication. Have more hands-on activity and role-playing to simulate real communication”

DISCUSSION

- Short term knowledge improvement occurred
 - Recommendation for 6-month post-simulation survey to assess long-term knowledge improvement
- Strengths
 - High participation from multiple disciplines
 - High stakeholder buy-in
- Limitations
 - Variations in survey questions and surveys unpaired causing inability to compare direct participant improvement individually
 - Data transfer errors from REDCap to Excel for data analysis
 - No education on how to complete critical indicator checklist causing inadequate data collection by observers

CONCLUSIONS

- Simulation is useful for OR personnel when properly implemented
- Improvements occur in staff knowledge of simulation topic
- Improvements in communication and teamwork occurred
- Mixed reviews on simulation group size
 - Enjoyed simulation being led by multidisciplinary simulation team
 - Desire for more hands-on simulation experience
- Room for improvement in simulation program currently established
 - Multidisciplinary simulation team adopting survey and checklist templates
 - Results will be used to further refine simulation program

REFERENCES

- Hibberson, M., Lawton, J., & Whitehead, D. (2021). Multidisciplinary simulation training for perioperative teams: An integrated review. *Journal of Perioperative Nursing, 34*(2), e-3-e-13. <https://doi.org/10.26550/2209-1092.1111>
- Jeffries, P. R., Rodgers, B., & Adamson, K. (2015). NLN Jeffries simulation theory: Brief narrative description. *Nursing Education Perspectives, 36*(5), 292-293. <https://doi.org/10.1097/00024776-201509000-00004>