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Medical Emergencies in the Primary Care Setting: An Evidence Based Practice Approach Using Simulation to Improve Readiness

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ABSTRACT

Background: Simulation is an evidenced based strategy which has been shown to impact office-based readiness to respond in a medical emergency. Medical emergencies occur in the primary care setting on a less frequent basis than in the inpatient setting. Clinicians working in primary care may benefit from an opportunity to refresh their skills.

Methods: This descriptive pre and post survey design evidenced based project examined staff reported levels of competence and confidence when responding to an emergency in a pediatric primary care office. Simulation educators partnered with ambulatory nursing and medical leaders to create a mock code program for staff in a care network. During a 14-month period, simulations were conducted in 30 primary care sites. Staff completed pre- and post-simulation surveys to assess levels of confidence in decision-making skills and competence when managing medical emergencies.

Findings: A statistically significant increase in the mean scores for both confidence and competence was demonstrated when comparing pre- and post-simulation survey results.

Discussion and application to practice: Simulation as an educational technique resulted in an increased level of competence and confidence of primary care office staff to respond to an emergency. Additionally, staff developed an overall heightened awareness of emergency processes and recognized of the value of simulation as an educational tool.

Emergency preparedness in the pediatric primary care setting is of utmost importance. Generally, the majority of patient visits are children who are well or have mild to moderate illness. Healthcare trends suggest that the site of care for more acutely ill and medically complex patients is shifting toward the ambulatory office (Kuo, Cohen, Agrawal, Berry, & Casey, 2011). The primary care team must be prepared to respond to a medical emergency involving patients, adult caregivers, and staff members. However, emergency response skills are not used with the same frequency in primary care as in other settings. As such, primary care providers, particularly those who have worked outside of a hospital setting for a prolonged period may presumably feel ill-prepared to emergently manage ill patients, family members and staff.

Background

A tragic event that occurred in a primary care practice within this large pediatric healthcare system confirmed this gap in readiness to manage emergent situations in the office. Subsequently, an apparent cause analysis revealed staff perceptions of a lack of competence and confidence when managing medical emergencies. To address and mitigate this potential safety concern, simulation was employed to engage frontline clinicians and provide opportunities to practice these skills in the clinical environment.

This pediatric system provides primary care to children from birth to age 21 years in and around the Philadelphia region. There are 30 clinical practice sites spread over more than 130 miles and across 2 states. These practices vary in size ranging from 3500 to 32,000 patients. The primary care network consists of 4 inner-city practices and 26 suburban practices. Each practice has several physicians, and most practices have at least one nurse practitioner providing direct patient care. Clinical support staff includes registered nurses, licensed practical nurses, and certified medical assistants. Additional office support is provided by patient service representatives who function as front–desk, customer-service agents. A few practices also have laboratory technologists, mental health providers, and/or social workers.

The physical office space housing each practice is unique. Some of the structures are older buildings that have been modified for use as an ambulatory pediatric office, while others are new. The size of each office varies widely with as few as 7 or as many as 56 exam rooms.

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Emergency communication strategies in the offices also vary. Some offices have handheld communication devices, others use an overhead paging system, and some staff shout out to one another to communicate the presence of an emergency situation.

Historically, emergency supplies in the primary care sites were not standardized. Each office had a code cart with basic life support (BLS) supplies. The process of maintaining the cart supplies, checking expiration dates, and ordering new medications and supplies had been the responsibility of a nurse or medical assistant in the office. For some, the task was performed inconsistently.

EBP purpose

All of the aforementioned factors, such as infrequent emergent events, the variety of communication systems, the lack of familiarity of code cart contents, the varied size and layouts of each office, and poorly standardized processes for maintaining the carts, may have contributed to staff in the primary care offices feeling ill prepared to handle an emergency. Thus, the aim of this evidence-based practice project was to increase the competence and confidence of staff members in responding to an emergency in the primary care offices.

Literature synthesis

Using the PICO (Problem/Population Intervention Comparison Outcome) format, a clinical question was developed to guide the literature search strategy. The PICO question asked "Does participation in simulation-based education affect primary care clinicians self-reported level of confidence and competence in responding to an emergent event?" The authors performed a literature search using PubMed and CINAHL with two limitations: year of publication between 2008 and 2019, and English language. The search terms included mock code, simulation, primary care, ambulatory, and pediatric. The Boolean operator "AND" and "OR" were used to combine key terms together in multiple ways to increase evidence yield. The authors found 51 articles and the abstracts were screened for relevance. Fourteen articles were included in the appraisal with the level of evidence ranging from level 1 to level 7 based upon the Levels of Evidence for Intervention Questions developed by Melynk and Fineout-Overholt (2015). This included 2 systematic reviews (La Cerra et al., 2019; Paige, Fairbanks, & Gaba, 2018); 2 randomized controlled trials (Bordley, Travers, Scanlon, Frush, & Hohenhaus, 2003; Robinson, Bray, Willson, & Weeks, 2011); 9 descriptive/quantitative studies (LaVelle & McLaughlin, 2008; Monachino, 2005; Pendleton & Stevenson, 2015; Santillanes, Gausche-Hill, & Sosa, 2006; Scaramuzzo, Wong, Voitle, & Gordis-Perez, 2014; Strachan, Graham, Hormis, & Hilton, 2011; Toback, Fiedor, Kilpela, & Reis, 2006; Von Arx & Pretzlaff, 2010; Walsh-Kelly, Bergholte, Erschen, & Melzer-Lange, 2004) and 1 expert opinion (Kusler-Jensen, 2014). All of the articles met criteria for a quality rating of either high or medium (Melynk & Fineout-Overholt, 2015).

Eight of the studies (Bordley et al., 2003; Kusler-Jensen, 2014; Pendleton & Stevenson, 2015; Robinson et al., 2011; Santillanes et al., 2006; Scaramuzzo et al., 2014; Toback et al., 2006; Walsh-Kelly et al., 2004) took place in an outpatient setting, 3 of the articles described a hospital setting (Monachino, 2005; Paige et al., 2018; Von Arx & Pretzlaff, 2010), and 3 took place in a classroom setting (La Cerra et al., 2019; LaVelle & McLaughlin, 2008; Strachan et al., 2011).

The American Academy of Pediatrics Committee on Emergency Medicine recognized the importance of primary care providers' readiness for treating pediatric emergencies in the ambulatory setting (American Academy of Pediatrics [AAP], 2007) and released a policy statement with recommendations for practices. Included in the recommendations is guidance for practices to (a) complete an office-based self-assessment to determine level of preparedness; (b) establish an educational program for parents to learn the signs of emergency and to identify the appropriate facility in which to seek care; (c) institute processes to prepare office staff for medical emergencies; (d) maintain specific emergency supplies onsite; (e) provide education to healthcare providers to maintain their emergency care skill set; (f) ensure proper documentation during medical emergencies; and (g) foster collaborative relationships with community emergency care providers.

"The best way to ensure readiness for an emergency is to practice regularly in the office setting, with as many office staff members as possible participating. Simulated exercises, or mock codes, provide a good opportunity for staff members to practice the steps of an emergency" (AAP, 2007, p.204). Further, it is recommended that the entire staff participate in simulations, as often a receptionist is the first person in an office to encounter a child experiencing a medical emergency.

Pediatric healthcare workers

Studies that took place in a pediatric setting or with a pediatric provider are few and largely outdated. Of those focusing on pediatrics, approaches to improving providers' readiness to manage patient emergencies were varied. Toback et al. (2006) led a study to assess pediatric provider confidence in providing lifesaving care for patients in primary care sites with the use of onsite simulation. Pre and post simulation data demonstrated a significant improvement in provider confidence and a decrease in anxiety after participation. Conversely, Walsh-Kelly et al. (2004) demonstrated that mail-distributed guidelines for management of pediatric emergencies were minimally effective in improving physician preparedness. An office-based educational program for pediatric providers demonstrated that participation in the program resulted in staff seeking additional emergency training as well as the development of written office policies addressing emergency management (Bordley et al., 2003). Finally, von Arx and Pretzlaff (2010) evaluated the impact of mock code training on inpatient nurses' readiness to manage pediatric emergencies and found a significant positive impact on participant comfort and knowledge after the intervention. The value of practicing emergency response in ones' work setting is noteworthy.

Onsite training

Office layout and the presence and location of supplies are important elements of emergency preparedness. A review of the literature revealed several articles describing onsite educational efforts to prepare staff for medical emergencies (Bordley et al., 2003; Kusler-Jensen, 2014; Toback et al., 2006). Ironically, in several studies, ambulatory staff were educated on the management of medical emergencies in a classroom, training room, or educational facility outside of the patient care setting rather than in the patient care setting (LaVelle & McLaughlin, 2008; Strachan et al., 2011).

Simulation based education

Simulation-based education has been used in a variety of ways to support staff preparedness for emergencies. Education using simulation has demonstrated an effect on provider confidence and/or comfort during emergency response (LaVelle & McLaughlin, 2008; Monachino, 2005; Strachan et al., 2011; Toback et al., 2006; von Arx & Pretzlaff, 2010). Robinson et al. (2011) used simulation to enhance knowledge, communication skills, patient assessment acumen, and to facilitate teamwork among staff in an ambulatory pharmacy setting. In ambulatory settings, low-technology CPR task trainers rather than high-fidelity manikins are commonly used during simulation education (Scaramuzzo et al., 2014; Toback et al., 2006; von Arx & Pretzlaff, 2010). This may be attributed to concern with transporting expensive simulation supplies and equipment to onsite training opportunities. One exception was found in Lavelle and McLaughlin's (2008) publication, which described the use of moderate-fidelity manikins to increase staff education, their sense of confidence, and teamwork.

Outcome measures

Historically, the impact of onsite emergency response training has been measured in a variety of ways. Examples of measured variables include patient safety (Scaramuzzo et al., 2014), staff knowledge (Bordley et al., 2003;Lavelle & McLaughlin, 2008; Robinson et al., 2011), teamwork (Lavelle & McLaughlin, 2008; Robinson et al., 2011), confidence and competence (Lavelle & McLaughlin, 2008; Toback et al., 2006; von Arx & Pretzlaff, 2010), and office preparedness (Pendleton & Stevenson, 2015; Santillanes et al., 2006; Walsh-Kelly et al., 2004). Simulation-based education has been embraced by the healthcare community to promote acquisition of requisite knowledge, skills, and attitudes that impact the safety, effectiveness, and efficiency of healthcare systems and patient outcomes (Paige et al., 2018). Thus, simulation was chosen as the educational strategy to meet the needs of the primary care staff. While the evidence on the relationship between self-confidence, knowledge and patient outcomes is limited, the outcome measures of self-reported confidence and competence were chosen as the initial step in this project with the intent of improving these components and adding to the body of evidence before focusing on performance measures.

EBP conceptual framework

The Evidence Based Practice Model, Advancing Research and Clinical Practice through Close Collaboration (ARCC) was used to guide this project. Steps of the model include (1) asking the clinical question, (2) searching for the best evidence, (3) critically appraising the evidence, (4) addressing the sufficiency of the evidence to determine to implement or not, and (5) evaluating the outcome of the evidence implementation (White, Dudley-Brown, & Terhaar, 2016).

Methods

Sample and setting

A descriptive pre and post survey design was implemented. Two hundred and eleven staff working in the primary care network: physicians, advanced practice nurses, registered nurses, licensed practical nurses, medical assistants, social workers, patient service representatives, and practice management leaders participated in a 2-hour instructor-led educational session. Sessions were conducted at all 30 primary care sites over a 14-month period.

Measures

All participants completed anonymous written surveys twice, once before and once after the simulation. The surveys captured individual's self-reported levels of confidence in decision-making skills and competence when managing medical emergencies. Participants were asked to respond to 2 statements using a 5-point Likert Scale with 1 indicating strong disagreement and 5 indicating strong agreement. The statements included for assessment were "I feel confident in my decision-making skills during an emergency situation" and "I understand how to respond to an emergency in my practice location." Staff also completed a post-simulation evaluation that measured their reaction to the simulation and debriefing and the degree of learning that occurred. Shortly after the session, a written summary of the key findings identified during the simulation was sent to the leadership of each site. An example of a summary report is provided in Table 1.

Intervention

Certified Healthcare Simulation Educators collaborated with ambulatory nursing and medical leaders to develop this educational session to improve staff confidence and competence in responding to an emergency in the primary care office. Discussions with providers, nurses, and nurse educators identified a lack of knowledge related to the care of a patient experiencing a seizure and a patient experiencing anaphylaxis which influenced the decision to create simulations based upon these clinical situations. Learning objectives were developed to cover both these situations (see Table 2 for Anaphylaxis objectives), and full immersive simulation scenarios were created to help achieve the desired learning outcomes. Care was taken to design the scenarios so that all members of the inter-professional team would be included and to make the scenario as realistic as possible. The anaphylaxis scenario presented in Table 2, involved a patient who displayed signs and symptoms of an allergic reaction while sitting in the waiting room. The rationale for choosing the waiting room as the setting for the simulation was to give the front desk staff the opportunity to be more closely involved in the simulation and to practice the steps of recognizing a patient in distress, calling for help, controlling the scene (moving other patients/families) so that the clinical staff could assess and treat the patient, and to observe a team response. It was up to the responding clinicians to determine whether to treat the patient in the waiting area or move treatment to an examination room.

The second scenario focused on a patient who experienced a seizure while in an examination room. In both cases, the person discovering the patient in distress would have to call for help using whatever communication system the site had in place and the responding team would need to obtain emergency supplies. Actual emergency equipment was removed from the code cart and replaced with simulated supplies

Table 1
Example of summary report sent to care network practice site.

What went well
Communication and teamwork (roles and responsibilities) • PSR quickly identified the patient in the waiting room was in distress and called for help which arrived within seconds and 911 was notified early • The leader verbalized her thought process to the rest of the team and created a safe environment for other team members to share suggestions • "Is there anything else we are not thinking about?" Discussed how talking out loud, sharing your diagnostic reasoning and plan of care is helpful to organize the team • Roles were self-identified quickly, the necessary roles were covered - assessing airway, administering medications, recording, assessing vital signs • Team was attentive to parent's needs and concerns
Medical management • Vital signs were obtained, and the patient was reassessed after each intervention • The team leader was able to manage the patient's changing condition and redirect the medical management based upon new information • The signs and symptoms of anaphylaxis were identified, and the team provided the appropriate interventions including administering the epi auto injector correctly
Resource utilization • Code cart was positioned outside the door to the waiting area • Oxygen, nebulizer, epi-auto injector arrived to patient quickly
Opportunities for improvement
Communication and teamwork (roles and responsibilities) • Team identified "closed loop communication" would have helped clarify medications and interventions ordered and delivered
Medical management • It is appropriate to administer a nebulized treatment (racemic epi or albuterol) by hooking the tubing to an oxygen tank if the patient requires oxygen
Resource utilization • Team identified some unfamiliarity with the contents of the code cart and that sometimes it is difficult to identify supplies. **Suggestion**: take pictures of the code cart contents and include the name of the supplies and medications
Take home points shared by team • Need for clarifying orders, good communication, and clearly identified roles • When arriving, ask team leader "what can I do?" • More aware of the medications in the code cart • Need to review the respiratory supplies

Table 2
Care network anaphylaxis scenario.

Learning objectives	• Practice principles of teamwork and communication in emergency situations • Identify roles and responsibilities in an emergency situation • Simulate the steps to activate a code/emergency response • Manage anaphylaxis including oxygen delivery and administration of Epinephrine
Scenario	Jimmy, a 4-year-old male patient in the office for a GI illness. He has no significant past medical history. No known food or drug allergies. Weight 16.3 kg. His mother picked him up from school with complaint of stomach ache. Several other students were out with a GI illness. There was a birthday party celebration at school with snacks provided. Jimmy's mother rushes up to front desk with concerns for vomiting and welts appearing. Jimmy presents with facial swelling, watery eyes, and labored breathing. He begins vomiting.
Expected action	• Remain with patient, call for help, notify physician • Perform respiratory assessment (PSR not be expected to do this) • Obtain vital signs/pulse ox • Call for code cart
Vital signs	HR: 136 RR: 36 BP: 96/62 Pulse ox: 93%
Exam	Diffuse wheezing B/L, suprasternal retractions, spreading urticaria, skin warm and dry, brisk cap refill
Expected actions	• Administer O2 • Continuous pulse ox • Administer Epi/EpiPen and albuterol via neb as ordered • Call 911 • Continue to monitor vital signs • Document on code sheet
Time	5 min have elapsed. EpiPen administered and albuterol administered
Vital signs	HR: 152 RR: 44 BP: 80/40 pulse ox: 91%
Exam	Patient continues wheezing B/L with labored breathing, cap refill 3 s
Expected actions	• Increase O2 concentration • Repeat Epi IM as ordered • Give Solumedrol as ordered • Place in supine position with feet elevated

including medications containing a yellow sticker that stated “Not for Patient Use — For Educational Use Only” so that the participants were practicing with realistic equipment while not incurring the cost of replacement supplies. Participants were unaware of the scenarios in advance, allowing real-time identification of and response to the emergency. Each care network office agreed to close their doors to patients during the 2-hour timeframe so that all staff working that day could participate. Staff were split into two groups, with Group One participating in the first simulation and Group Two observing. The second simulation reversed the roles of the groups. A simulation educator facilitated the simulation, an ambulatory nursing practice specialist played the role of the patient's parent, and a high-technology manikin controlled by the simulation educator was the patient. Simulations lasted approximately 15 min and were followed by a 40-minute debriefing session. The session began with a pre-briefing that included a review of the simulation ground rules and an introduction to the manikin. Staff were informed that they could use emergency supplies that were marked with a yellow sticker and instructed to call for additional assistance in whatever manner they traditionally would use. A debriefing was conducted by the simulation educator after each simulation, and participants identified aspects of the simulation that went well and those that presented opportunities for improvement. Observers were invited to participate in the debriefing and asked to share their observations regarding teamwork and communication. Medical management of the patient's condition, teamwork, communication, and roles and responsibilities of participants were discussed.

Findings

Data were grouped by Likert Scale response comparing pre and post levels of agreement with the confidence and competence statements. These results are shown in Figs. 1 and 2. Trends demonstrate an improvement in self-reported levels of both attributes with decreased “neutral” responses and increased “strongly agree” responses after the simulation.

The mean results of all respondents' pre- and post-surveys were analyzed for a change in the self-reported competence and confidence scores as shown in Figs. 3 and 4. Additionally, results were segregated by role, provider (physician or nurse practitioner), nurse (RN or LPN), medical assistant, patient service representative, and other (practice management, social work, clinical support personnel) and each role's responses were analyzed using descriptive statistics and ANOVA testing, as depicted in Table 3. There was a significant effect, at the $p < .05$ level, of simulation on provider confidence ($F = 9.53$; df between groups $= 1$; df within groups $= 92$; $p = .003$) and competence ($F = 23.285$; df between groups $= 6.704$; df within groups $= 91$; $p = .000$). Similarly, a significant effect of simulation was demonstrated in the RN/LPN group on confidence ($F = 22.601$; df between groups $= 1$; df within groups $= 135$; $p = .000$) and competence ($F = 15.615$; df between groups $= 1$; df within groups $= 135$; $p = .000$). The medical assistant group showed an increase in the mean scores of confidence and competence however, the increase was not statistically significant in either confidence ($F = 3.017$; df between groups $= 1$; df within groups $= 27$; $p = .094$) or competence ($F = 2.781$; df between groups $= 1$; df within groups $= 27$; $p = .107$).

Discussion

Retrospective analysis of implementation

A retrospective analysis of the implementation demonstrated a statistically significant increase in the mean scores for both confidence and competence when comparing pre to post simulation survey results. This finding is similar to the data described in the literature review. A significant improvement was identified in the provider, nurse, and patient service representative groups. Although the mean scores for the medical assistant group showed an increase in confidence and competence from before the simulation to after it, the increase was not statistically significant.

The relevance of this difference is unclear and warrants further investigation; however, one potential explanation may be considered. Often medical assistants defer patient care to team members who have more education and training and thus may not fully appreciate their value to the team during an emergency response. This deference impacts their hands-on experience. As such, simulation alone may not produce a significant impact on their perceived confidence and competence. An opportunity exists to define tasks that fall within the scope of practice for medical assistants, to supplement their training, and thus educate the entire team. Each member of the care team has an important role and must be held accountable for completing the tasks that fall within their scope.

Evidence application to practice

An educational initiative based upon evidence application to practice, using high-technology simulation in the primary care setting, provided opportunities for learning both technical and nontechnical skills, such as effective communication and teamwork. Physicians, nurses, and medical assistants became more familiar with the contents of the code cart, including the list of available medications and respiratory adjuncts. During the debriefing, participants reflected on teamwork and the importance of clearly defined roles and responsibilities in an emergency. Participation in the simulations also prompted discussions in many practices about the need to develop a more formalized response plan. Comments on post-simulation evaluations reflected a positive response to the educational events. “Extremely thorough and helpful to refresh response skills. Would like more frequent refresher course

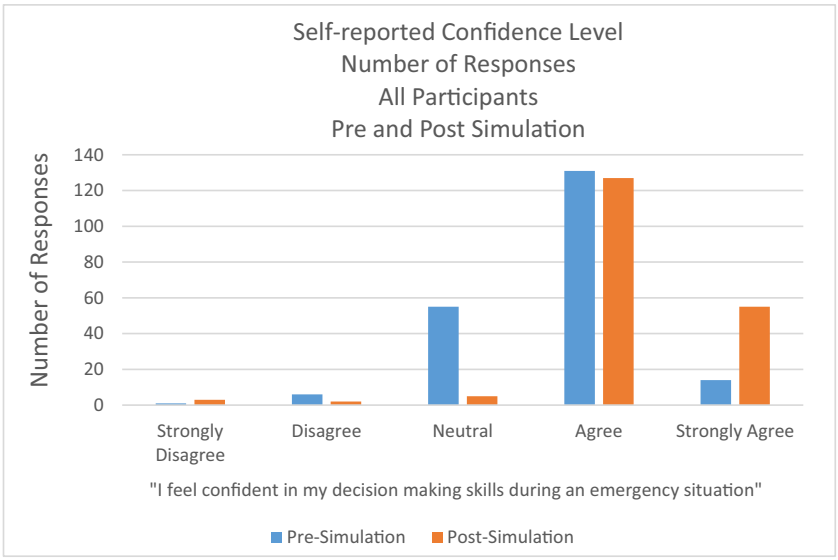

Fig. 1. Self-reported confidence level, number of responses, pre and post simulation.

every 6 months"; "I came in on my day off to be able to participate. Always stressful, but also worthwhile"; and "I've never participated in a mock code before, but it was a great learning experience."

In addition, an overall heightened awareness of the potential for medical emergencies in the primary care offices was evident at both the site and institutional level. The simulations sparked a gestalt in the practitioners. Prior to the first year of simulations, office staff were hesitant to dedicate the time for the education, and after participation in these events, they recognized the value and asked for regular simulation sessions.

Another result of these office simulations was the serendipitous discovery of several system and process issues that may affect the performance of teams, performance of the system or patient safety. These findings are shared at an organizational level through a centralized multi-disciplinary committee that is tasked with overseeing the quality of emergency preparedness in the ambulatory network. The ability to discuss the findings and receive support from the institution's leadership has led to resolution of identified concerns throughout CHOP. Several barriers to efficient workflow during office emergencies were discovered and solutions identified:

- The existing emergency event record was lengthy and more appropriate for an advanced life support response. A simpler, 1-page emergency record, more appropriate for documenting a BLS emergency response was created to replace the 3-page record.
- Code cart contents were not well maintained and unfamiliar to staff. Since the inception of these simulations, the cart contents have been reviewed with the hospital Resuscitation Committee and revised to include appropriate, easily identified supplies for a BLS-level response. Nursing staff were educated regarding the changes via nursing leadership meetings, onsite staff visits, and annual skills fairs.
- Office staff consistently cited a lack of knowledge regarding proper use of available oxygen delivery devices. Tip sheets were created to assist staff with reviewing the supplies. Oxygen guidelines are now standard on all oxygen tanks, and education on the use of the respiratory equipment was incorporated into the annual skills fair for all nursing staff.

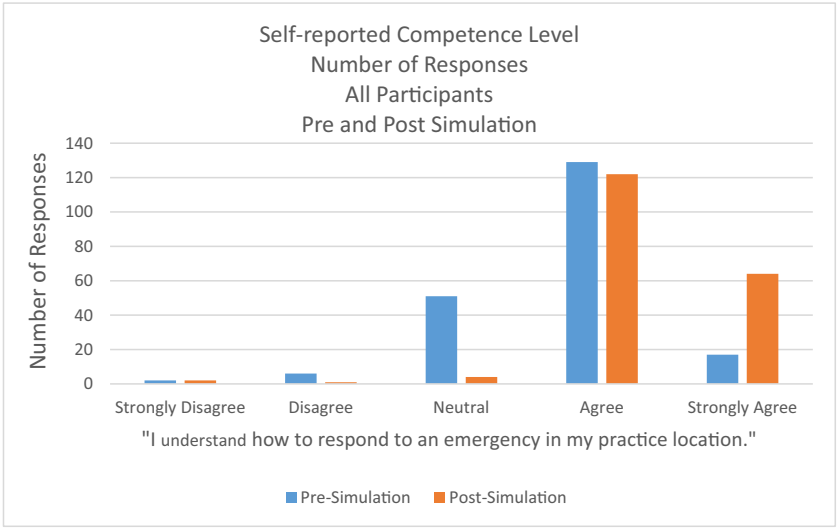

Fig. 2. Self-reported competence level, number of responses, pre and post simulation.

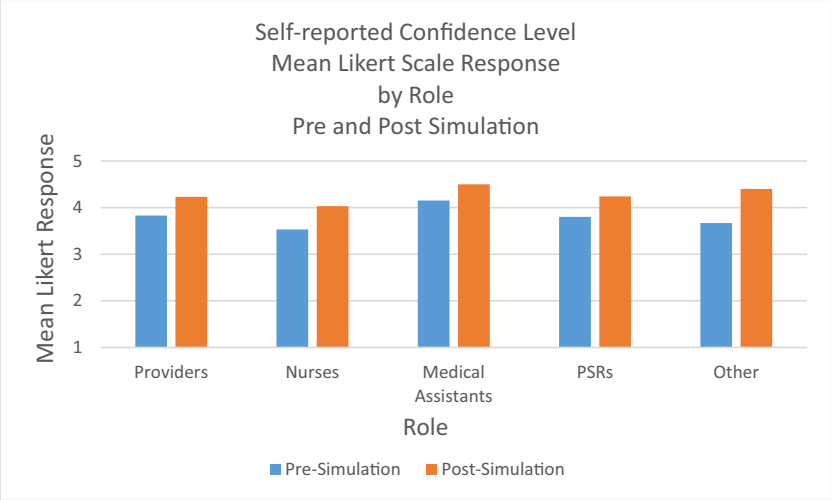

Fig. 3. Self-reported confidence level, mean Likert Scale response, pre and post simulation.

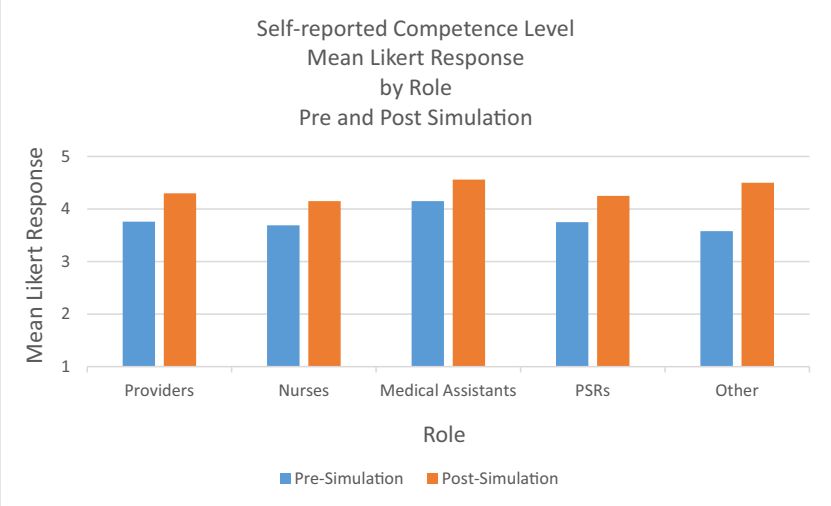

Fig. 4. Self-reported competence level, mean Likert Scale response, pre and post simulation.

Research implications

Research implications include more frequent surveys to determine if perceived confidence decreases over time; objective measures of ability to identify emergency response steps and properly use equipment; and a measure of the impact of simulation training on actual performance in patient events. Although there are still gaps in the literature, specifically around preparing staff to respond to an emergency in the primary care setting, this evidence based initiative provided an opportunity to contribute to the body of evidence demonstrating a correlation between confidence and competence. The next step is to ascertain if this educational modality is related to an improvement in practice and patient outcomes.

Table 3
Self-reported confidence and competence by role.

Role	Frequency (n)		Mean				Significance ($p < .05$)	
			Confidence		Competence			
	Pre-intervention ($n = 208$)	Post-intervention ($n = 191$)	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Confidence	Competence
Providers	47	47	3.83	4.23	3.76	4.3	.003	.000
RN/LPNs	71	67	3.53	4.03	3.69	4.15	.000	.000
Medical assistants	16	13	4.15	4.5	4.15	4.56	.094	.107
Patient service representatives	65	51	3.8	4.24	3.75	4.25	.002	.000
Other	12	10	3.67	4.4	3.58	4.5	.003	.002

Limitations

The authors note several factors that influence the success of such an endeavor. Offering mock code events that are not mandatory and only occur once per year does not ensure all staff will be exposed to the learning opportunity. Staffing and scheduling a 2-hour time block needed for the education, especially during the winter/viral season, as well as the geographical location of medical offices, makes it difficult to offer these formalized events more frequently than once per year. Another limitation may be constraints on simulation staff to plan and conduct the simulations. Sites may perceive that simulations are important but not a priority and cancel or reschedule. Obtaining buy in from an office staff who perceives medical emergencies as a rarity or lacks ownership of emergency preparedness may be challenging and limit positive results. Of note, surveys used in this exercise were self-reported measures of confidence and competence. The pre and post measures were not matched measures; the sample size for the post measure dropped from 208 to 191, thus the results were reported as a means. Additionally, measures of confidence and competence were only taken annually in conjunction with delivery of the simulation exercise. The lack of evidence showing the correlation between the effectiveness of high-fidelity patient simulation on under-graduate and post-graduate nursing student self-efficacy, self-confidence, and patient outcomes (La Cerra et al., 2019) is another limiting factor that may be generalized to the population participating in the primary care simulations.

Conclusions

In this evidence-based practice project, simulation as an educational technique resulted in an increase in perceived competence and confidence in the ability of primary care office staff to respond to an emergency. Practitioners appreciated the value of having dedicated time for team training to practice responding to an emergency situation in their clinical environment. Performing the simulations at the primary care sites contributed to the development of improvements in workflow and patient safety. To continue this forward progress and reinforce the yearly simulations, individual offices may organize and run mini-emergency event refreshers and review emergency equipment with their staff. More frequent practice of the skills needed to respond to an emergency in a primary care setting will ultimately enhance the outcome for emergently ill patients, family members, and staff.

Authorship statement

The following individuals are the authors of the above manuscript:

Anne Marie Monachino, MSN, RN, CPN, CHSE-A: Conceptualization; Data curation, Formal analysis, Methodology, Writing – original draft and review and editing.

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Eliza White, DNP, CRNP: Conceptualization; Data curation, Formal analysis, Methodology, Project administration, Writing – original draft and review and editing.

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