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Learning in Pediatric Emergency Situations: A Qualitative Study of Residents' Perspectives*

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Objectives: To explore resident learning in the context of emergency situations. The guiding research questions were: How do residents learn in emergency situations? What factors facilitate or hinder their learning?

Design: A qualitative approach was used in order to understand the different perspectives of participants and explore the context of emergency situations. Aware of the complex sociocultural interactions in emergency situations, we used the methodology of constructivist grounded theory.

Setting: A medium-sized pediatric academic hospital in San Antonio, TX.

Subjects: Twenty pediatric residents participated in semi-structured interviews.

Interventions: None.

Measurements and Main Results: We used an iterative process of data collection and analysis. The process continued until thematic saturation was reached. The data were coded and analyzed using constant comparison. Codes were clustered into themes informed by the theory of situated learning. Several methods were used to ensure trustworthiness of results. Three main themes were identified. First, resident participation in emergency situations takes different forms. Residents participate mostly in helping roles. Watching is an under-recognized form of participation yet offered unique experiences. Managing roles are rarely afforded to residents. Second, resident participation is informed by the context of the emergency situation. Based on contextual clues (e.g., safety, needs), residents infer potential risks and values from their participation, which guides their participatory role. Residents may shift their form of participation, based on changes in the context. Supervisors play a significant role in guiding resident participa-

tion. Third, engagement, a state of cognitive and emotional focus, is critical in learning. The context of the emergency situation plays a role in the level of resident engagement. Supervisors may also foster resident engagement.

Conclusions: Resident participation in emergency situations is complex and informed by the context. Learning in emergency situations is influenced by residents' level of mental engagement. Supervisors may positively guide resident participation, foster engagement, and enable them to reach their learning goals in emergency situations. (*Pediatr Crit Care Med* 2020; 21:886–892)

Key Words: context; emergency; engagement; learning; participation; resident

Pediatricians must learn to manage emergency situations during their residency training. Residents' learning is grounded in their participation in clinical activities (1). However, different factors limit the opportunities for residents to participate in emergency situations. The exposure to emergency situations varies among residents, even in programs with high clinical volume (2). Also, the implementation of work-hour restrictions during residency was associated with decreased opportunities for patient care during critical care rotations (3). A deeper understanding of how residents learn in the clinical context of emergency situations may shed light on how to optimize their training.

The role of context on learning was expanded by the theory of situated cognition. According to situated cognition, learning originates in personal experiences, which are based on interactions between learners and the environment (4). The clinical context encompasses all the complex and evolving interactions between learners with their physical and social environment (5). Consequently, all learning and memory processes are context-dependent (4).

The importance of social and psychologic contexts on learning was elegantly demonstrated in emergency departments and critical care units. In a study of residents' learning in the emergency department, four different types of learning episodes were described (6). Residents reported learning by participating in the clinical environment and by exposure to repetitive scenarios. Focused learning moments, for example, directed teaching, were

*See also p. 901.

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reported. Last, residents learned from intense experiences, for example, difficult cases, first times, or mistakes. However, in a study of learning in critical care units, two models of resident learning were identified (7). The first learning model was of explicit “learning bubbles,” with teaching occurring in series with patient care. During medical crises, learning occurred through implicit “learning-flashes,” with teaching occurring in parallel with patient care. These two studies suggest that within the same physical environment (emergency departments or ICUs, respectively), residents may learn differently, depending on the social or psychologic context. These studies mention medical crises and intense experiences but do not describe how the learning context was different during these episodes. Pediatric emergency situations occur with much lower frequency compared to adults (8). However, while their outcomes are improving, pediatric emergency situations continue to be associated with high mortality rates (9). Given the low frequency and high stakes, the learning context during pediatric emergency situations likely differs from other clinical settings.

The purpose of this study is to explore how residents learn in the context of pediatric emergency situations and to specifically focus on how this context influences their learning. Two research questions were investigated: How do residents learn in pediatric emergency situations? What are the factors facilitating or hindering learning in pediatric emergency situations? The findings of this study may have implications in residents’ learning in pediatric emergency situations. First, they may allow pediatric residents to better regulate their learning during emergency situations. Second, they may inform supervisors in improving the learning context in emergency situations.

MATERIALS AND METHODS

Setting and Participants

We analyzed the experiences of pediatric residents of learning in emergency situations occurring in clinical contexts. Study participants were pediatric residents enrolled in two pediatric training programs: the San Antonio Uniformed Services Health Education Consortium and Baylor College of Medicine (BCM). Both pediatric residency programs are medium in size, with an average of 13 residents enrolled every year. These two programs were selected as their residents receive a significant portion of their exposure to acute care while working at the Children’s Hospital of San Antonio (CHofSA), a medium-sized, academic, tertiary care hospital with more than 200 beds. In average, a total of 45 events of cardiopulmonary resuscitation are reported every year in the hospital (including emergency department, pediatric wards and critical care units). The teams responding to these emergency situations usually include an attending physician, one or several residents, nurses and respiratory therapists. In both programs, residents participate in high-fidelity simulation training. On average, they participate in team-based training of four simulated pediatric emergency situations every year. The study was approved by the institutional review boards of BCM and the CHofSA.

Design and Instruments

We chose a qualitative design as it allowed us to interpret residents’ personal meaning constructed from their experiences in

emergency situations (10). As our focus was to explore the social and sociopsychological processes unfolding during emergency situations, we chose the methodology of constructivist grounded theory (11). We adopted a constructivist approach, acknowledging the role of the researchers in the process of data collection and analysis (12). We invited residents to participate in individual, semi-structured interviews. Individual interviews were selected for data collection as they allow a personal exchange of information and exploration of possibly sensitive topics (13). A written, informed consent was obtained prior to individual interviews.

Data Collection

Interviews were conducted in person by Dr. Petrescu and focused on residents’ learning experiences during pediatric emergency situations at any location of the hospital. During interviews, residents were asked to reflect on their experiences of emergency situations encountered during residency training. Depending on their clinical experience, physicians’ understanding of what constitutes an emergency situation may vary. In this study, we explored the process of learning in emergency situations, as it occurred in the emergency context perceived by the residents. Therefore, we purposefully avoided defining emergency situations a priori and instead used the operational definition proposed by residents. As our goal was to explore participants’ overall experiences about learning in emergency situations, we asked the participants to reflect on their prior experiences that were not time-bound. We wanted to explore residents’ global experiences with learning in emergency situations and therefore have not purposefully interviewed residents shortly after an emergency situation. By doing so, participants could describe specifics of the situations whereas maintaining confidentiality and a psychologically safe interview.

Following the prescribed methodology of qualitative research, we adopted a purposive sampling strategy by interviewing a sample of all potential participants that enabled us to gain most insight into the research purpose. We chose a purposive maximum variation sampling strategy by collecting maximally diverse points of view, based on institution and year of training. Although the number of participants needed for sampling is difficult to predict, the literature suggests that samples of 10–20 individual interviews may provide sufficient data (13). A professional company (ANP Transcriptions, Ramsey, NJ) transcribed the audiotaped interviews.

Data Analysis

The data analysis followed the principles of constructivist grounded theory (11). An initial list of codes (i.e., labels) was created. Through an iterative process of data collection, followed by data analysis, the list of codes was constantly refined. By comparing and contrasting the data and the codes, we created categories of codes sharing a similar concept. As our theoretical lens was situated cognition, during the analysis, we paid further attention to the data describing elements of the emergency context. Through an inductive process, we engaged in creating a unifying theoretical framework explaining the data.

The Atlas.ti software (Scientific Software Development GmbH, Berlin, Germany) facilitated data storage and analysis.

Trustworthiness

Dr. Petrescu conducted interviews over an extended period of time until no new themes were identified (i.e., thematic saturation). Dr. Petrescu also confirmed the themes with key participants (member checking) and debriefed themes with the other investigators. He also routinely engaged in recording the steps taken during data collection and analysis through written memos. To facilitate transferability, Dr. Petrescu created detailed descriptions of the data (“thick descriptions”). The results were discussed with other pediatric intensivists for increased confirmability.

RESULTS

From April 2015 to February 2017, 20 pediatric residents were interviewed (male:female ratio 1:1), representing all years of residency training. The average interview time was 37 minutes (ranging from 25 to 58 min). We identified three major themes centered around the forms of participation in emergency situations, the values and risks of participation, and the role of resident engagement. Our purpose was to explore emergency learning during residency training without attempting to differentiate among years of training. However, similar findings were found across all years of training and the themes represent a distillation of all personal experiences in emergency situations.

Theme 1: Forms of Participation: The Eyes, the Hands, the Brain

Learning in emergency situations was intertwined with resident participation. Most commonly, participation took the form of “helping.” The analogy for helping was “being the hands.” When discussing “helping,” residents used action verbs (“doing”), and moving toward the center of the situation (“stepping-in”). Helping residents also self-identified as being “within” the emergency. Learning through helping had a physical quality, with the body strongly informing the resident experience. Residents were often aware of the role of the body in their learning, one resident sharing how the body created a connection between her brain and the emergency. During participation by helping, these brain-body connections occurred through both motor output and sensory input:

For me, it’s being able to actually get hands-on and learning, getting that muscle memory of how to feel, how it’s supposed to feel, how things are supposed to look (P16)

Helping was reported to occasionally hinder learning as helping on a specific task confined the focus on the “hands” instead of the learning through the “eyes-brain” connection:

...when they’re actually given a role and a task, they can just put like blinders on and finish the task (P13)

A second form of participation in emergency situations was by watching. Watching was identified as “being a fly on the

wall” and “taking things in.” Watching afforded residents a different vantage point and type of experience compared to helping: “...you get to see all the moving parts, versus just being one of the moving parts.” (P13)

When residents had a “personal interest” or “stake” in the emergency situation, watching could be very effective in their learning. Watching afforded residents opportunities to observe the situation and reflect on actions during the emergency: “When you’re watching you have more time to step back and think through what’s going on” (P8). Some residents were aware of the opportunities for learning offered by different forms of participation and attempted to alternate roles in order to enhance their learning.

...I actively tried to step back when I could and just digest stuff where I was kind of physically be back a little bit farther, still be in the room, but I was just trying to take kind of visual snapshots of what was going on to kind of remind myself of the process. (P18)

Managing, being “the brain,” was a third and only infrequently reported form of participation. Residents identified managing as making decisions and controlling the emergency situation. The largest missed opportunity for managing was the residents’ expectation to participate in other roles in the presence of supervising physicians. Opportunities to manage seemingly occurred only in the absence of supervisors.

You’re usually the first one that’s bumped or the first one that ends up getting shifted to the back of the room, ...when people who are higher levels or closer to being an attending are there, you’re put on the back-burner sometimes. (P16)

The process of residents “getting bumped” or removed from a participation role was determined by the patient status and influenced by supervisors. Bumping or “nudging out” by supervisors could be implicit or explicit but was clear to residents.

Being nudged out of the way is either physically or verbally. If you are instructed or insinuated to get out of the way, to allow somebody else to do your task (P15)

Nighttime emergency situations offered residents more managing opportunities: “...usually there are less staff around, so you do have more autonomy and more chances to give your input. There are just fewer cooks in the kitchen” (P10)

Residents also reported opportunities for increasing participation in a managing role. One senior resident shared his wish to refrain from doing chest compressions and be assigned to stand next to the supervisor as a “helper to the manager.” This would have created a window into the managing role and enabled the resident to “steal knowledge” from the supervisor. Another senior resident suggested for supervising physicians to become “code-whisperers” and instead manage the emergency through the managing resident.

Theme 2: Risks and Values of Participation

Resident participation in emergency situations was influenced by their anticipation of consequences associated with their participation in the care of the patient. Participation in emergency

situations is perceived by residents as being associated with risks, factors of negative valence and also values, factors of positive valence. Either the resident or the patient may be the subject of these inferred risks and values. Residents reckon with the perceived balance of potential risks versus values of their participation in emergency situations. This, in turn, influences how they assume participation roles.

Sometimes it doesn't feel appropriate to jump in. Whether it's because I am not comfortable with the attending or they haven't told me, hey, jump in. They haven't encouraged me or if I feel like this is out of my league... (P15)

Participation was influenced either by residents aiming to mitigate risk or add value.

Risk-Mitigated Participation. Emergency situations were adequately identified by residents as situations with potentially high safety risk to patients. Residents described emergency situations as crashing patients or events when "life, limb or eye-sight is jeopardized or vulnerable" (P4). The potential risk-to-patient influenced the form of resident participation: "I just watched that case because he was so unstable" (P1). Residents often doubted their preparedness for emergency situations and questioned if their participation increased the risk-to-patient.

... I'm afraid of doing it wrong. I'm afraid of being in the way. There are nurses that are starting (IV) lines that are way faster than me. So I'm not going to try it right now because that's not best for the patient. (P13)

Supervisors could influence resident participation by decreasing the perceived risk-to-patient.

...people I feel like I gravitate towards because they are naturally good with striking or maybe they're intentionally trying to strike the balance of giving you that management role but by also protecting the patient (P14)

Residents participating in emergency situations may also incur risks-to-self. Participation in emergency situations often elicited emotions with a negative valence for residents. These emotions included discomfort, anxiety, or fear. The range of residents' emotions was wide and for some, the experience of emergency situations became a fight for the preservation of self.

...in emergency situations, when you're already pushed to your limit, in terms of you're at the borders of your understanding of physiology, you're at the kind of edge of your comfort level... Instead of feeling, oh, I'm at the edges of things and I'm like, the pool is a little too deep but I can swim, now you feel like you're drowning (P12)

The impact of these negative emotions may extend beyond the acute emergency: "I'm pretty good at forgetting and becoming detached as long as I don't know the kid." (P3)

Residents may also experience the fear of being evaluated by supervisors while participating in emergency situations: "You're there to learn but you're being graded on how well you perform. I think for a lot of people that balance is really difficult" (P7)

Residents assumed different participation forms in order to reduce the perceived risk-to-self: "I had the opportunity to just watch and not have to be involved. Free learning." (P5)

The supervisor's behavior could influence the perceived risks to residents: "If an attending is not approachable,...then you're just not going to be able to do as much physically..." (P15)

Value-Guided Participation. Some residents viewed their participation in emergency situations as possibly exerting positive effects on patient care. This perceived value-to-patient influenced their participation.

I wasn't really excited to be jumping in line to do compressions on a kid... I decided that it was just time for me to do it and move on because it just had to happen and the patient needed it. (P18)

Value was not an inherent feature of the resident participation. Value, or rather value-added, was attributed only when their participation helped in the situation or made a difference. The presence of other providers was interpreted as a lack of value addition from their resident participation: "There were more people in the room, and more people around the kid, so I was pretty much hands off." (P13)

Participation in emergency situations afforded learning opportunities to some residents and therefore was associated with value-to-self. Residents' individual traits and prior training influenced the perception of value-to-self added by their participation.

... every resident probably has different personality traits and so steps into some of those opportunities but maybe stays away from others of those opportunities, just because of their personality, or previous experience (P7)

This value-to-self was influenced by personal motives including resident's career and learning goals: "in general you've got people who want PICU (pediatric intensive care) and you've got people who don't." (P3)

Supervisors, the "master-puppeteers," were reported to have a critical role in creating value-to-self for residents. One resident reported the value afforded by the supervisor while performing procedures during an emergency: "She immediately told me to, you know, kind of jump in... she would kind of correct me as I was doing it, kind of real time" (P20). Supervisors were reported to enhance the value-added by participation by identifying residents' needs and goals prior to the emergency: "The best teachers I've had know that I'm out of my league because beforehand they talk with me about my experiences and what I want to do and what I want to learn." (P15)

Theme 3: Role of Engagement

If participation was defined based on how residents "acted" during the emergency, learning from participation was greatly influenced by what residents "thought" and "felt." Engagement was described as a state of mind characterized by two elements. The first element was cognitive focus. Engaged residents paid attention and were aware. Second, engagement was characterized by emotional investment: "There was investment, there was a personal investment there. At that time I wanted to learn...I went down there with that mindset." (P5)

If participation is visible, engagement may not be apparent to an observer, residents being able to maintain participation despite decreased levels of engagement.

...sometimes it's easier to be a little less engaged because you can't really see what's going on, or you don't really feel like an essential part of the process. So, it's a lot easier to just kind of zone out a little bit. (P20)

Engagement was a prerequisite for learning in emergency situations: "When you're useful and you're engaged, I think you're learning as much as you can" (P1). The absence of resident engagement negatively impacts their learning through participation: "I just go through the motions. I'm physically there, but I'm not actively learning." (P15)

Although engagement was commonly reported with participation by helping, helping in emergency situations did not guarantee engagement. Occasionally, the residents who were helping the team could lose their focus or emotional investment: "...basically everyone was just telling me what to do. I'm trying to order like a secretary" (P1). Engagement cannot be achieved only through helping in emergency situations but also by watching:

"...(I was) talking to myself about what's going on and everything you need to be thinking about in the patient with anaphylaxis, um, in my mind. And again, this is all going on in my mind, but as far as things I'm actually doing, um, it's not very much." (P19)

Engagement was influenced by several attributes related to the individual residents, the emergency situation, and the supervisors. Individual's attributes, including curiosity and their desire to learn, clearly influenced their degree of engagement. One resident suggested that engagement may be actively turned on: "I think in your brain you just have to turn it on, turn it on to your learning brain and open everything up to absorb as much information as you can." (P5)

The attributes of the emergency situation clearly influenced resident engagement. Poorly controlled or chaotic situation may hinder resident engagement:

"Hectic environments, everybody screaming, disorganized chaos. If I can't clear my head, if I can't focus, the last thing I'm going to be thinking about is learning and more of just—the more stressed I am the less attention I pay and the more frustrated" (P3)

Supervisors and their attributes had a critical role in engaging residents: "If you notice there is a medical student, resident, someone who is standing off to the side, just remind them that hey, you're part of a team. Come over here, you don't need to stand in the corner... I think that switches their mindset." (P1) Supervisors may also foster engagement when they maintain resident focus by thinking out loud or teaching the participating residents.

"...what I'm calling actively being involved while the event's happening even if it's just you're watching, but the attending's going, look at this, look at this sign. This is what I'm thinking right now and then discussing it if time permits" (P15)

Residents also shared experiences of disengagement associated with certain behaviors portrayed by their supervisors: "I would shutoff very quickly if the attending or upper-level resident were dismissive or not trying to involve me as a junior resident or new learner." (P18)

DISCUSSION

The goal of our exploratory research was to deepen our understanding of resident learning during pediatric emergency situations, as it may inform how to facilitate their learning within this context. We chose the setting of pediatric emergency situations as they are infrequent, unpredictable, and high risk situations. Our results suggest that resident participation in emergency situations is socially complex and influenced by multiple interconnected factors. It is only partially based on residents' prior training or learning goals. In fact, residents adopt participatory roles mostly based on their interpretation of the emergency context. We have also uncovered the role of resident engagement on learning during emergency situations. The results confirm the crucial role of the emergency context in residents' learning, as suggested by the theory of situated cognition. Based on our results, we would like to suggest two posits about learning in emergency situations. First, we must dissociate the concepts of action, participation, and engagement. Second, individualizing participation and optimizing resident engagement is critical for learning. We will discuss these two posits in order.

The pervasive understanding for participation in patient care is related to performing tasks. In our study, residents espoused the idea of participation as limited to "doing." According to residents, participation included only helping or managing. Viewed more broadly, the definition of participation is "having a part or share in something" (Merriam-Webster dictionary, online edition). Although residents identified participation by "doing", they described the attributes of "taking a part" when they were cognitively engaged. They described situations of "actively watching" (i.e., "not doing"), as maintaining a state of focus, and also an awareness of the emergency situation. Residents also reported switching between watching and helping roles, based on the dynamics of the situation. Engaged learners who are watching are in fact a part of the whole of the emergency response and hence are participating. We argue that the concept of participation in emergency situations should be expanded to include watching.

A surprising finding of our study is the concept of engagement as a state of mind encompassing cognitive focus and emotional investment. The concept of engagement has been loosely used in the educational literature as describing the involvement of learners in their learning environment. Its uses have ranged from describing learners' attributes associated with learning processes (e.g., motivation) to features of the learning environment intended to promote learning (14). Engagement may be best understood as a spectrum, from the microlevel view (engagement of a learner with a momentary task) to macrolevel (engagement of groups of learners over an extended period of time) (15). In our article, we were focused at the microlevel, the engagement of residents in pediatric emergency situations. In order to clarify the concept of engagement, a critical review of education and organizational literature was performed, with the ultimate purpose of serving simulation education. According to this review, engagement was defined as a "context-dependent state of dedicated focus toward a task wherein the learner is involved cognitively,

behaviorally and emotionally” (16). In the context of pediatric emergency situations, our findings of engagement as state of cognitive focus and emotional involvement are in alignment with the above definition. Learner engagement differs from learner participation but is similarly influenced by the emergency context. However, one cannot overlook the intrinsic connections between resident engagement and participation.

In a study of learning in primary care setting, two factors were associated with learning: engagement and opportunity. Engagement was not defined in this study. However, learner engagement was associated with their sense of being recognized, respect for the clinical and educational enterprise, an appreciation for the relevance of the activity, and positive emotional experiences. The study did bring to the forefront of clinical learning the learners’ state of mind (17). In our study, elements of learner recognition, relevance, and positive emotion also influenced resident participation and their engagement in pediatric emergency situations. Emotions have a complex role on cognitive processes, motivation, and learning (18). In an experimental study on the role of emotions in learning, residents assigned to experiencing a scenario triggering negative emotions had impaired learning processes and outcomes, compared to residents exposed to an emotionally-neutral scenario (19). In our study, negative emotions experienced by residents during emergency situations, added to their perception of risk, influencing their participation and also level of engagement. Residents’ negative emotions experienced during emergency situations could be mitigated during the debriefing process. Emotional debriefing, focused on the effect of the emergency situation on providers, has been suggested in the literature, in order to alleviate negative emotions and improve emotional resilience (20).

Our results challenge the learning paradigms in emergency situations. The formerly accepted “see one-do one-teach one” dictum suggests a hierarchy of learning, with “doing” as a superior form of learning to “seeing.” In emergency situations in particular, “doing” has been adopted as the preferred learning method. As a consequence, two of the authors (M.P., S.T.), in their roles of pediatric intensivists, have been promoting learning by instructing and/or encouraging residents to perform tasks during emergency situations. We admittedly believed that residents might enjoy, engage, and learn more by doing something. Our study suggests that participation in emergency situation rarely provides residents with the ideal experiences needed to achieve their own learning goals. Helping uniquely facilitates acquisition of specific knowledge and skills such as procedural skills. Participation by helping may be effective in learning as it involves the body in the learning process. If the learner’s focus is only on the physical task, participation as helping may limit the resident experience to the performance of the task itself. Interestingly, participation by watching offers residents a different form of experience. In the absence of action, or motor output, this experience is mostly related to integrating sensory inputs from the environment. If residents are engaged, watching may not offer therefore an inferior learning experience during emergency situations, compared to helping. In fact, watching may allow learners to have a more global

experience of the situation, a situational awareness. Situation awareness represents how the learner perceives the elements of the environment, understands their meaning and may predict their status in the future (21). Situation awareness is a critical nontechnical skill required in effective resuscitation (22). As clinicians and educators, our decision to involve residents in different forms of participation should be informed by the strengths and limitations of each form of participation on resident learning.

Learner readiness is defined as the individual’s capacity to learn from what they know, can do and value (23). In addition to participating based on their readiness in emergency situations, residents “negotiate” their participation by interpreting clues from the context. A study of factors influencing residents to attempt procedures in the emergency department found that the majority of opportunities for procedures did not result in procedural attempts (24). In that study, influencing contextual factors were related to learners, teachers, and the environment. In our study, many of the contextual clues are modifiable by supervising physicians. By increasing the perceived value and minimizing risks of resident participation, supervisors may enable residents to participate in a form more congruent with their learning goals. For example, if supervisors establish, preferably before the emergency, the resident’s learning priorities, this may increase the value added by participation. On the other hand, controlling chaos and displaying inclusive behaviors may reduce the perceived risks of participation. Increasing the opportunities for managing experiences may also increase the value of participation. Given the lack of room for errors during emergency situations, we do not support blindly offering managing roles to residents. However, some residents have already achieved mastery of procedural skills in emergency situations. If their learning goals include management in emergency situations, instructing these residents to assume a co-managing role next to the supervisor may offer an optimum participation during emergency situations. Co-managing the patient may optimize the outcome balance of resident participation (i.e., creating value to residents and reducing risks to patients). For these residents, helping may not be an ideal form of participation, and they must be protected from simply assuming helping roles in emergency situations. Based on the results of our study, we have created a list of suggestions for supervisors to foster resident learning in emergency situations (**Table 1**).

These suggestions have not been validated but they inform the practice of the main author. Since the study was performed, the main author started frequently noticing residents “lurking” in the periphery of the emergency. Instead of assigning residents to specific tasks, he instead started acknowledging residents (e.g., “come, you need to know this!” or “come, I need your help”), without being too prescriptive. He has also started inquiring residents of their learning goals in an emergency (e.g., “what would you like to learn during the next emergency situation?”).

Our study has a few limitations. It is unclear to what degree the interviewed residents were aware of and shared all their

TABLE 1. Supervisor Tips for Fostering Learning in Emergencies

Timing	Suggestions
Before emergency	Clarify resident learning goals and readiness
	Determine a desired range for participation for next emergency
	Discuss an option for comanagement, as appropriate
During emergency	Empower individual residents, depending on dynamic of situation
	Create psychologically safe environment to decrease cost
	Create value for residents after ascertaining optimal patient safety
	Limit chaos to foster engagement and decrease cost

learning processes. There may also be a recall bias present in situations when participants experience strong emotions (25). Many of the interviewed residents were enrolled in a military training program and served as active-duty military officers. Their emphasis on team training and leadership may differ from nonmilitary residents. The credibility of our results could have been enhanced by using investigator and method triangulation. Last, the main investigator, through his lens of supervising physician, may have contributed to a shift in focus during the data analysis.

CONCLUSIONS

Our study is challenging prior assumptions of resident participation and learning in emergency situations. We have identified that watching, not only helping, may be a legitimate form of learner participation. The study did unveil a lack of opportunities for managing experiences. Instead of participating in roles congruent with prior experience and learning goals, learners “read” contextual clues using a lens of perceived risks and values. We have also identified that engagement, a state of cognitive and emotional focus, is required for learning through participation in emergency situations.

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