Review Article

Received: 2024/03/28   Revised: 2024/05/31   Accepted: 2024/06/03

DOI: https://doi.org/10.15441/ceem.24.224

Simulation intervention related to family presence during resuscitation for physicians and medical students: A scoping review

Running title: Family presence during resuscitation simulation

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Abstract

Objective: Family presence during resuscitation (FPDR) is known as part of family-centered care. However, it is unknown or how physicians are educated for FPDR. We aim to review the current status of simulation related FPDR for physicians and medical students.

Methods: A scoping review of literature published from 1999 to May 5 2023 and written in English was undertaken. The articles were searched for using keyword combinations of the following words; family, resuscitation, and simulation-related words.

Results: Eight articles were included in the final review. This review of FPDR simulation for physicians and medical students revealed findings in three categories; measuring CPR quality, investigating participant responses after FPDR simulation, and extracting exemplar good communication elements. First, in four studies measuring resuscitation quality, physicians participated in adult resuscitation, and resuscitation quality was reduced with overt reaction family presence. Second, in three studies investigating the response to simulation training, interprofessional teams participating in pediatric resuscitation had negative responses to FPDR simulation. Third, in one study, good communication elements during FPDR were found in infant simulation, in which interprofessional teams participated. FPDR simulation training for medical students has not been reported.

Conclusion: It highlighted a gap in FPDR simulations involving physicians and/or medical students. Physicians were more concerned with resuscitation quality than supporting families during resuscitation simulations. Medical students should be considered as the main participants for FPDR simulation. More high-evidence studies with interprofessional teams including physicians and/or medical students are needed to evaluate curriculum design and participant response changes following FPDR simulation.

Keywords: Cardiopulmonary resuscitation; Family support; Patient-centered care; Physicians

Capsule summary
What is already known: Family presence during resuscitation (FPDR) is challengeable situation, but it is family-center care and humane treatment with professionalism. Most FPDR research study subjects have been nurses or nursing students, with physicians and/or medical students participating in a few studies.

What is new in the current study: Review of FPDR simulations involving physicians and medical students revealed studies conducted for three purposes; measuring CPR quality, investigating participant responses after FPDR simulation, and extracting exemplar good communication elements. More high-evidence studies with interprofessional teams including physicians and/or medical students to evaluate curriculum design and participant response changes following FPDR simulation.
INTRODUCTION

Family presence during resuscitation (FPDR) is defined as a parental presence for a minor child or family members being present during the resuscitation of adult relatives. FPDR has been both supported and criticized by families and health professionals. Patients and their families express that FPDR is their right and helps them mourn their family, and does not lead to treatment interruption or psychological trauma. Patients and/or families wanted to be physically close to the patient during resuscitation, and understood better the overall resuscitation situation. In cardiopulmonary resuscitation (CPR) situations, families wanted health professionals to understand them, to provide more support, to be better trained, and to treat them more humanely with professionalism. Physicians were concerned about family interference with resuscitation, inadequate staff to support families, and lack of support from healthcare organizations. Physicians also expressed concerns about creating discord among the resuscitation team, increasing legal liability, and interfering with resident training. However, in a prospective randomized controlled trial (RCT) in France, FPDR had no effect on resuscitation characteristics, patient survival, or emotional stress levels of healthcare professionals. There was no effect on medical-legal actions after 20 months of follow-up. Comparing a control group naturally exposed to resuscitation and an experimental group who were offered a choice and chose to witness resuscitation, the rate of post-traumatic stress disorder in the control group was high, and the rate of anxiety was high in the families who chose to not witness resuscitation. Therefore, it is important to give the family the choice of witnessing resuscitation. When a family decides to observe resuscitation, a family support person (FSP) is required. The FSP explains the process of resuscitation and plays a role in supporting psychological stability of the family during resuscitation; social workers, nurses, healthcare workers, and healthcare chaplains were FSPs in most instances. However, physicians may also serve as an FSP or family facilitator.

FPDR and notification of patient of death can be considered elements of resuscitation. Therefore, education for healthcare professionals and hospital guidelines for FPDR are needed. Pediatric Basic
and Advanced Life Support of the American Heart Association (AHA) Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care (ECC) strongly recommended that an FSP assist families during infant or pediatric resuscitation. FPDR in adult patients is not included in AHA guidelines, despite evidence from a greater number of scientific studies on FPDR in adult patients than children. European Resuscitation Council Guidelines 2021 is supportive of FPDR. From an ethical standpoint, FPDR is also recommended to promote shared-decision making and respecting autonomy for families.

FPDR education for healthcare professionals is required for familiarization and to support development of knowledge, perceptions, and skills to support appropriate effective FPDR practices. Classroom, simulation and online e-learning have been reported as educational interventions for FPDR. As resuscitation skills are commonly practiced and learned through simulation, simulation can likewise provide safe and effective learning for FPDR. Integrating FPDR into repeated resuscitation learning and certification can enhance make healthcare professional’s familiarity and skill managing FPDR. FPDR simulation has educational purposes, and can change practice. Studies have measured participants’ knowledge, skill, and attitude competency outcomes of FPDR simulation, and of practice changes including the establishment of an FPDR policy and procedure, interprofessional education research, and development of strategic resources including instrument design and psychometric testing. Most FPDR research study subjects/participants have been nurses or nursing students. This may be because nurses play an active role in policy development or guideline education regarding FPDR, considering it part of family-centered care. During resuscitation, even if a physician does not directly support the family, they need to be familiar with FPDR.

The aim of this scoping review is to survey and synthesize research results regarding FPDR simulation studies involving physicians and/or medical students.

METHODS
We used the PRISMA extension for scoping reviews framework\textsuperscript{17} to find and analyze articles focusing on FPDR simulation for participants including physicians and/or medical students using original articles with qualitative or quantitative research design. We included the articles that met all three criteria; physicians and/or medical students (population), simulation (concept), and clinical setting (context). Simulation intervention includes any type of simulation, including on high-fidelity simulation, standardized or simulated patients, or virtual reality, in which physicians and/or medical students participated. Simulation inclusion criteria required resuscitation of patients with shock, critical illness, trauma, or cardiac arrest in a hospital setting (Table 1).

Relevant articles using combinations of keywords were developed to identify articles on the topic of FPDR simulation for physicians and/or medical students were identified in collaboration with a health science librarian (MKK). Keywords entered during searches combined family-related words, resuscitation-related words, and simulation-related words (Appendix 1). Literature searching was conducted on May 5 2023. Articles published from January 1, 1999 to May 5 2023 were searched using Web of Science, CINAHL (EBSCO), PubMed/MEDLINE, and Embase (Elsevier) databases. Our English language search was conducted from January 1, 1999, since the oldest article in the single published FPDR education systematic review was published in March 1999.\textsuperscript{13}

One researcher (KHP) screened all titles to remove unrelated and duplicate articles. Three researchers (KHP, BWB, JL) independently reviewed abstracts and concluded that it was appropriate for the review purpose after discussion. The full text was also independently reviewed by each researchers and consensus was reached as to whether it was appropriate for this scoping review. Each article included in the final review was evaluated for evidence level, study design, simulation intervention, setting, participants, data collection, and key findings (Fig. 1). The level of evidence was assigned according to the Johns Hopkins Evidence Level and Quality Guide.\textsuperscript{18}

**RESULTS**
The initial search yielded a total of 1,707 articles after exclusion of duplicate records. One-hundred ninety abstracts were screened after exclusion of non-relevant records, and 18 full texts were assessed for eligibility. Ten articles were excluded due to lack of any type of simulation, non-FPDR focus, and absence of research content (Fig. 1). Eight articles eligible for the a-priori established criteria and are included in this scoping review. According to the purpose of the simulation, eight articles were classified into three categories; to measure CPR quality during FPDR, investigation of provider response to FPDR, and to analyze health care professional’s communication during FPDR (Table 2).

**To measure CPR quality during FPDR**

CPR quality in FPDR simulation was measured in four articles.²⁰⁻²² Two were conducted in Germany²⁰,²¹ and the others were conducted in the United States²⁰ and Netherlands.²¹ All studies were level I RCTs comparing CPR quality between groups. All studies defined a control group and an experimental group, and each experimental group incorporated a distractor, such as family or noise. In the experimental group, simulated patients (SPs) acting as family members were present during CPR and were scripted to remain either quiet or express extreme reactions. All studies simulated adult resuscitation, and all study participants were physicians. Physician specialties included emergency medicine, anesthesia, internal medicine, and surgery. Elapsed time from simulation to event initiation was reported for initiation of active resuscitation and major resuscitation events. Other reported measurements included performance according to resuscitation guidelines, subjective mental workload, and the effect of leadership on CPR. Time to critical events was similar across groups with respect to initiating CPR and attempting endotracheal intubation.²⁰ Total chest compression time was shortened by the presence of family.²¹,²² In contrast, the time to deliver the first defibrillation was longer, fewer total shocks were delivered the groups with families expressing extreme reactions.²⁰,²¹ In addition, higher ventilation rates were observed in the same group.²¹ The presence of a relative was associated with increased mental demands and task load on the resuscitation team.²¹,²²
Investigation of provider responses to FPDR

Three articles investigated participant reactions after experiencing FPDR simulation for education.23-25 The studies were conducted in France,23 Canada,24 and Switzerland.25 All studies were level III, with two observational studies and one qualitative study. All simulations included the SP acting as a parent during a pediatric resuscitation. Participants in all studies were part of an interprofessional team, including physicians, nurses, and respiratory therapists, and in one study, medical students. In two studies, a questionnaire was used to ask about participant experiences, opinions, stress, and satisfaction. In another study, the debriefing conversation was recorded and analyzed. Participants were satisfied with the FPDR simulation, and their stress levels decreased after the simulation.25 There was no difference in perceived stress levels between the different type of healthcare professionals.25 More than half participants were opposed FPDR because of psychological trauma for the parents, the risk of interference with medical management, and the CPR team’s stress.23 They thought FPDR required additional resuscitation team dynamics.24

Analyze health care professional’s communication during FPDR

One article investigated behavior promoting good communication during FPDR.26 This study was conducted in Canada. An SP who played the role of a parent participated in an infant resuscitation simulation. An interprofessional team including a pediatrician, a nurse practitioner, and a respiratory therapist participated. As a level III qualitative study, conversations and behaviors between participants or between participants and SPs video-recorded simulations were analyzed to extract core behaviors that could be considered good communication. Core behaviors reported as suitable for good communication included self-introduction, using the infant’s name, acknowledging parental presence, preparing parents, stopping resuscitation without asking parents, clearly mentioning death, providing or enabling proximity, sitting down, decreasing guilt, permitting silence, having knowledge about procedures after death.26
DISCUSSION

We reviewed FPDR simulation studies in which physicians and medical students participated. Finally, eight studies were identified and classified into three categories: measuring CPR quality during FPDR, participant reaction after experiencing simulation FPDR for education, and identifying good communication during FPDR.

In studies measuring CPR quality in FPDR simulation, resuscitation with a family showing extreme reaction caused delay in delivering defibrillation compared to no family presence or quiet family presence, but there was no major deviation from overall CPR quality standards. This suggests that if an experienced and trained FSP can support families who want to be present during resuscitation, there will be little impact on CPR quality. In studies investigating responses after FPDR simulation participants were satisfied with the simulation and their personal stress level regarding FPDR decreased. However, they reflected that FPDR changed the resuscitation environment and team dynamics, and more than half of the participants were still not in favor of parental presence during child resuscitation. Since studies show that FPDR is different from resuscitation situations without family presence, healthcare professionals require FPDR specific training, using well designed simulations in order to change perceptions and understanding that FPDR should be considered as an element of family-centered care. Communication during FPDR will require both the principles of general medical communication and the principles of bad news delivery. Communication with parents in FPDR is more difficult because the resuscitation room is unfamiliar, intimidating, and uncomfortable and resuscitation is generally an unexpected situation. Although good communication behaviors identified in the articles reviewed may vary depending on culture and language, it is clear that supportive communications can be identified in simulation applied to real-life FPDR, or simulation can be used as an evaluation tool to measure communication skills in FPDR simulation if needed.
All studies were conducted in North America (United States, Canada)\textsuperscript{19,24,26} or Europe (Netherlands, Germany, France, Switzerland).\textsuperscript{20,23,25} Studies from countries other than North America and Europe were not included in this scoping review. Perceptions of FPDR differ according to culture and religion. United States, United Kingdom, and Australia view FPDR positively, while Singapore, Turkey, Belgium, Germany, and Israel view FPDR negatively.\textsuperscript{27} In studies measuring FPDR and CPR quality, two included studies were published by the same research group in Germany.\textsuperscript{21,22} There is a lack of studies investigating the reactions of physicians and medical students after FPDR simulation in countries or cultures that view FPDR negatively.

In two studies measuring CPR quality using a level I RCT 1,000 participants were included\textsuperscript{21,22} strengthening the results. The other two studies measuring CPR quality were also level I RCTs with less than 100 participants.\textsuperscript{19,20} The results in these reports were similar to findings in studies focused on paramedic and nursing students, in that there were similar negative impacts of FPDR on CPR quality.\textsuperscript{28,29} However, only physicians participated and only adult resuscitation was simulated, further studies involving interprofessional teams and pediatric resuscitation are needed.

Other four studies investigating participant reactions after FPDR simulation or analyzing communication during FPDR were level III observational studies. Two were observational studies with more than 100 participants,\textsuperscript{23,25} and the others were qualitative analysis of the video-recorded debriefing or simulation itself with a small number of participants.\textsuperscript{24,26} Tripon et al’s study design was not robust, since the questionnaires were sent to emergency physicians who compulsorily participated in a Pediatric Emergency Procedure university course including simulated child CPR with parental presence.\textsuperscript{23} The outcome was not measured immediately following training, and were collected over a period of 6 years. By collecting survey responses from emergency department nurses who did not participate in the simulation, but they were invited to complete the survey by the physicians who participated a FPDR workshop.\textsuperscript{23} Each of these three studies did not conduct a questionnaire before the simulation, so it was not possible to compare participant perceptions of FPDR before and after FPDR simulation.\textsuperscript{23-25}
Research to measure the impact of simulation, such as the educational effect of simulation, a quasi-experimental study that measures reaction before and after the simulation is required to raise the level of evidence. Alternatively, in studies to improve knowledge and perspective of FPDR lectures and discussions without simulation also were conducted, enabling an educational intervention RCT design comparing education methods. Interestingly, the studies measuring responses to simulation involved interprofessional teams, and were all in pediatric resuscitation. Thus, it may be possible to compare adult resuscitation with pediatric resuscitation. An interprofessional team also participated in a study designed to extract good communication elements of FPDR in infant resuscitation.

In the studies that did not measure CPR quality, pediatric CPR was simulated, and interprofessional teams participated. The American College of Emergency Physicians has a policy for parent- or family-centered care only for pediatric patients. In addition, AHA Guidelines for CPR and ECC strongly recommend family presence in pediatric CPR. Since interprofessional teams actually participate in real-life resuscitation, physicians must actively participate in FPDR simulations with other health care professionals to become familiar with FPDR and understand the process, even if they do not actively manage family members.

All studies included in this scoping review that evaluated CPR quality included only physician participants. On the other hand, two of the studies investigating the response to FPDR simulation involved interprofessional teams, with more non-physician participants. Based on these results, research focusing on physicians and resuscitation appears to focus on CPR quality rather than supporting families and interacting with families during CPR. In a study during which the guidelines for FPDR were taught through lectures and discussions, eighty-five nurses participated but only nine physicians participated, and it was not possible to compare physician responses, because physicians did not respond to a survey following the education. Physicians perceived FPDR more negatively than nurses and were less supportive of it. Additionally, physician perceptions or attitudes do not change even after education. Physicians might not directly support the family during resuscitation, but they play a key role in interactions with families, such as leading FPDR and directly informing the
family of patient death. In FPDR, some elements of CPR quality are reduced, providing outcome target for improvement through simulation. To do so, the perception of FPDR must be positive. Regarding medical students as study participants, only two medical students participated in one study, not as main study participants. Studies involving nursing students in FPDR simulation were not rare. Professional identity formation for medical students as well as other healthcare professionals begins at an early stage. Medical students begin to form their professional identity as a physician through the socialization process which they begin to experience upon entry into medical school. Since FPDR is a medical practice that requires attention to patient- or family-centered care beyond the knowledge and skills of CPR, students need to learn the importance of FPDR, while recognizing some elements of CPR quality can be reduced in FPDR, and that healthcare professionals experience added stress with FPDR. Early experience may be needed to positively change the perception of FPDR. For example, in one reported FPDR simulation for residents, non-technical skills rather than CPR knowledge and skills, such as teamwork, crisis management skill, and implementing strategies to involve the family in resuscitation without affecting CPR quality were the main learning outcomes.

Since resuscitation is a medical practice performed by an interprofessional team, and the dynamics of teamwork of a resuscitation team can change in FPDR, it is important for interprofessional teams and team members to participate in FPDR simulation. In a study by Porter et al, interprofessional communication was a major component of FPDR. In addition, it is suggested that an interdisciplinary task force should participate in the development of the family presence program. To date, this is the first scoping review of FPDR simulation including physicians and medical students as part of the participants. It has been more than 35 years since the research in which the concept of FPDR was first introduced, and studies published since 1999 were searched, but only 8 studies involving physicians and medical students were found. Because all studies that measured CPR quality involved only physicians in adult resuscitation simulations, RCTs involving pediatric resuscitation simulations and interprofessional teams are needed. In particular, since interprofessional
teams perform resuscitation in real clinical settings, the CPR quality of interprofessional teams should also be measured. Conversely, studies investigating responses after FPDR simulation should be conducted in adult resuscitation. Since the evidence level is low, it is necessary to strengthen the research results with level I or II studies to further inform strategies for FPDR clinical protocols and implementation.

This study has several limitations. First, only eight publications involving physicians and medical students were found. Among them, each of the 3 studies that measured the response to simulation had evidence level III, so the evidence level of the other included studies (62%) was low. Second, non-English publications were not included in this scoping review. Third, we used major search engines to search for research articles related to medicine and nursing, but some articles that are only available in other search engines may not have included.

In Summary, this scoping review of FPDR simulations involving physicians and medical students revealed studies conducted for three purposes; measuring CPR quality, investigating participant responses after FPDR simulation, and extracting exemplar good communication elements. When measuring CPR quality, adult resuscitation involving only physicians was found, suggesting that physicians might be more interested in CPR quality than supporting families. There is a need for FPDR simulation program design and development suitable for medical students because we found no publications in which medical students were the main participants. FPDR simulation studies with a high level of evidence involving adult and pediatric resuscitation and with interprofessional teams including physicians and medical students in various cultures and countries are needed to evaluate curriculum design and understand changes in participant responses following FPDR simulation.
Ethics approval: Not applicable.

Conflict of interest statement: The authors declare no competing interests.

Funding: None

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Acknowledgments: This article was previously presented as a meeting abstract at the 2024 International Meeting for Simulation in Healthcare on January 21, 2024.
REFERENCES
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Table 1. Scoping review eligibility criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Simulation</th>
<th>Clinical setting</th>
</tr>
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<tbody>
<tr>
<td>Any groups</td>
<td>Simulation intervention using</td>
<td>Resuscitating any age patients</td>
</tr>
<tr>
<td>including medical</td>
<td>standardized or simulated</td>
<td>with shock, critical illness,</td>
</tr>
<tr>
<td>Inclusion</td>
<td>patients, role-play, high-fidelity</td>
<td>trauma, or cardiac arrest in</td>
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<tr>
<td>students or physicians</td>
<td>simulation, or virtual reality</td>
<td>hospital (emergency room, intensive care unit, or wards)</td>
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<tr>
<td>Exclusion</td>
<td>Any intervention without</td>
<td>Pre-hospital resuscitation</td>
</tr>
<tr>
<td>Groups without</td>
<td>simulation, Simulation with part</td>
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<tr>
<td>medical students or</td>
<td>task trainer, table-top simulation,</td>
<td></td>
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<tr>
<td>physicians (e.g.</td>
<td>case-based discussion.</td>
<td></td>
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<tr>
<td>nurses, nursing</td>
<td></td>
<td></td>
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<tr>
<td>students, etc.)</td>
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</table>
Table 2. Summary of studies investigating family presence during resuscitation simulation interventions

<table>
<thead>
<tr>
<th>Source (country, year)</th>
<th>Study design (Evidence level)</th>
<th>Simulation intervention; setting</th>
<th>Participants</th>
<th>Data collection</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fernandez R et al. (United States, 2009)(^1)</td>
<td>Randomized controlled study (Level I)</td>
<td>High fidelity simulation (1) without family witness (2) with a nonobstructive quiet family witness, and (3) with a family witness displaying an overt grief reaction; adult asystole resuscitation</td>
<td>60 emergency medicine residents</td>
<td>The overall length of the resuscitation attempt, the time to critical events, and recognition of a potential drug administration error</td>
<td>Time to critical events was similar across groups with respect to initiating CPR, attempting intubation, and pronouncing death. Time to deliver the first defibrillation shock was longer for the overt reaction witness group compared with the other groups. Fewer total shocks were delivered in the overt reaction witness groups compared with the other groups.</td>
</tr>
<tr>
<td>Krage R et al. (Netherlands, 2014)(^1)</td>
<td>Randomized controlled study (Level I)</td>
<td>High fidelity simulation (1) without additional distractors (2) with additional distractors (noise or family member); adult pulseless VT or VF resuscitation</td>
<td>20 anesthesia residents and 10 consultant anesthetists</td>
<td>Resuscitation performance assessed by a score based on European Resuscitation Council guidelines</td>
<td>External distractors reduced the quality of cardiopulmonary resuscitation; delayed defibrillation and delayed chest compression. No interaction was observed between additional distractors and experience level.</td>
</tr>
<tr>
<td>Sellmann T et al. (Germany, 2022)(^1)</td>
<td>Randomized controlled study (Level I)</td>
<td>High fidelity simulation (1) without relative (2) with withdrawn relative, and</td>
<td>1,229 physicians (residents in internal medicine, anesthesiology, or hands-on time, the level of interaction with the relative, NASA Task Load</td>
<td>The presence of a relative did not affect hands-on time. Interaction level was lower in a withdrawn relative than in an agitated relative. Presence</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Study design and intervention details are based on summary of studies.
(3) with agitated relative; Adult VF resuscitation an adult in VF surgery)

Index questionnaire, compliance with different aspects of CPR guidelines, and impact of the appointed leader of a relative increased frustration, effort, and perceived temporal demands, in addition, more mental demands and total task load in agitated relative. Teams confronted with an agitated relative showed more unsafe defibrillations, higher ventilation rates, and a delay in starting CPR. The type of leadership condition had no effects.

<table>
<thead>
<tr>
<th>Investigation of provider responses to FPDR</th>
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</thead>
<tbody>
<tr>
<td>Tripon C et al. (France, 2014)²¹ Observation study (Level III)</td>
</tr>
</tbody>
</table>

Willmes M et al. (Germany, 2022)²⁰ Randomized controlled study (Level I) High fidelity simulation (1) without family (2) with family; adult VF resuscitation 1,085 physicians (residents in surgery, internal medicine and anesthesia) Hands-on time, the level of interaction with the family member, NASA Task Load Index questionnaire, various aspects of international CPR guidelines, and the effect of designated leadership Family presence had no effect on hands-on time. Interaction with family member occupied 24% of the time of resuscitation, and was associated with rescuers’ frustration and perceived temporal and mental demands, but had no relevant negative effect on the CPR quality. Leadership condition had no effects.
<table>
<thead>
<tr>
<th>Study Authors and Year</th>
<th>Study Design and Level</th>
<th>Simulation Type</th>
<th>Participants</th>
<th>Data Collection</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deacon A et al. (Canada, 2020)(^{22})</td>
<td>Qualitative study (Level III)</td>
<td>High fidelity simulation with parent; infant asystole resuscitation</td>
<td>32 nurses, 15 respiratory therapists, and 27 resident physicians in pediatric resuscitation teams</td>
<td>Selected video recordings of debriefings of a simulated resuscitation event</td>
<td>FPDR changed the resuscitation environment, had an impact on resuscitation team members' affective, cognitive, behavioral responses, and required additional team dynamics.</td>
</tr>
<tr>
<td>Bordessoule A et al. (Switzerland, 2022)(^{23})</td>
<td>Observational study (Level III)</td>
<td>High fidelity simulation with parent; child resuscitation - hemorrhagic shock, seizures, accidental extubation, and tricyclic acid intoxication.</td>
<td>67 advanced practice registered nurses, 60 registered nurses, 28 assistant nurses, 44 physicians, and 2 medical students</td>
<td>Questionnaire exploring the experience with parental presence, perceived stress levels associated with parental presence, satisfaction</td>
<td>There was no association between stress and healthcare professional category, age, gender, or working experience. Perceived stress associated with parental presence decreased after simulation. The participant satisfaction ratings after simulation was high.</td>
</tr>
<tr>
<td>Lizotte MH et al. (Canada, 2020)(^{24})</td>
<td>Qualitative study (Level III)</td>
<td>High fidelity simulation with a trained provider (neonatal nurse or respiratory therapist) and parents; Infant pulseless resuscitation</td>
<td>15 pediatric residents, 5 neonatal fellows, 3 neonatologists, 3 neonatal nurse practitioners, and 5 transport and resuscitation team providers</td>
<td>Analyzing videotaped simulated neonatal resuscitation using open-ended questions of 3 aspects that were well done and 3 that were not</td>
<td>Core behaviors associated with good communication were as follows: self-introduction, using the infant’s name, acknowledging parental presence, preparing parents, stopping resuscitation without asking parents, clearly mentioning death, providing or enabling proximity, sitting down, decreasing guilt, permitting silence,</td>
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and having knowledge about procedures after death.

CPR, cardiopulmonary resuscitation; FPDR, family presence during resuscitation; VT, ventricular tachycardia; VF, ventricular fibrillation; NASA, National aeronautics and space administration
**Figure Legend**

**Fig. 1.** PRISMA flow diagram of article selection. PRISMA, Preferred reporting items for systematic reviews and meta-analyses; FPDR, family presence during resuscitation