

Simulation-based teaching and education in pediatrics: a paradigm shift

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Jorge Alberto Pleitez Navarrete

National Institute of Health, San Salvador, El Salvador.

* Correspondence

✉ jpleitez@gmail.com

0000-0002-2520-2886

Dear Editor,

David Gaba described, "Simulation is a technique, not a technology, for replacing or amplifying real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner¹."

Medical education has steadily progressed continually, particularly in high-risk specialties such as anesthesia, obstetrics, pediatric emergency-intensive care and neonatal-perinatal medicine. Advances have increased with the implementation of simulation-based training. Clinical simulation changes the traditional view of teaching, which focused on the weaknesses or deficiencies of professionals of health at the time of direct patient care. Based on that experience, they learned how to avoid harm to the next patient².

Clinical simulation-based educational programs, such as the American Academy of Pediatrics (AAP) Helping Babies Breathe (HBB), implemented 23 years ago in more than 80 low-resource countries, have taught essential neonatal resuscitation and newborn care skills to support newborns presenting with apnea at birth in low-fidelity simulators, saving many lives³.


A systematic review measuring the effect of this program was conducted in 2022, using random-effects models to assess heterogeneity using Cochrane Q e 12; it found a decrease in overall mortality, intrapartum stillbirth mortality and first-day mortality⁴. This meta-analysis found high heterogeneity and concluded that implementation of the low-fidelity simulation

program in low- and middle-income countries has a significant impact on reducing early neonatal mortality⁴.

Simulation as a method of teaching and education with the use of new technologies has allowed the use of high-fidelity mannequins in the neonatology area, which not only approximate the size and weight of term newborns, but also those born prematurely and which also have a realistic airway, skin color and umbilical blood vessels. These advantages also allow the healthcare professional caring for newborns to practice incorporating or improving skills in certain procedures, such as endotracheal intubation, thoracostomy and umbilical catheter placement⁵.

In pediatrics, simulation teaching and education was studied by a group from the University of Calgary, Canada, who conducted a meta-analysis using a GRADE (Grades of Recommendation, Assessment, Development and Evaluation) approach in the Pediatric Advanced Life Support (PALS) program to compare the effectiveness of high versus low fidelity manikins in the context of advanced life support training to improve knowledge and skills at the end of the course. The meta-analysis demonstrated a moderate benefit for high-fidelity manikins compared to low-fidelity manikins⁶.

Simulation-based training provides a safe and secure environment for pediatricians who provide care for newborns and children in special conditions to develop and maintain competency. In addition, simulation-based training is also a valuable tool in teaching behavioral skills such as effective communication, teamwork and leader-

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ship, which are essential aspects of health personnel performance in an emergency.

Simulation can be used to develop these non-technical skills that may not otherwise be learned using traditional teaching methods and can be used to improve confidence and knowledge. It is through the various well-designed scenarios, based on real cases presented in hospital assistance, that learners can relate to and trigger cognitive and psychological responses. Simulation is also used to train health care personnel in the cognitive, technical and behavioral skills needed for complex low-frequency, high-risk activities.

The creation and innovation of the modern National Simulation Center at the National Institute of Health is an initiative and product with a vision for the future, grounded on solid scientific and human bases for the teaching and education of pediatricians and health personnel who attend neonatal and pediatric emergencies.

The vision of this form of teaching not only represents a change in education, but also leads to a paradigm shift in order to improve skills and reduce complications in the care of children. As Dr. Perretta, professor of medicine and Clinical Simulation instructor at the SIMMER Center in Buenos Aires, Argentina, says: "Thinking of simulation as a technology is a mistake; clinical simulation is a new educational tool that brings with it a paradigm shift"⁷.

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