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Barriers to the implementation and uptake of simulation-based training programs in general surgery: a multinational qualitative study

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ABSTRACT

Background: Despite evidence demonstrating the advantages of simulation training in general surgery, it is not widely integrated into surgical training programs worldwide. The aim of this study was to identify barriers and facilitators to the implementation and uptake of surgical simulation training programs.

Methods: A multinational qualitative study was conducted using semi-structured interviews of general surgical residents and experts. Each interview was audio recorded, transcribed verbatim, and underwent emergent theme analysis. All data were anonymized and results pooled.

Results: A total of 37 individuals participated in the study. Seventeen experts (Program Directors and Surgical Attendings with an interest in surgical education) and 20 residents drawn from the United States, Canada, United Kingdom, France, and Japan were interviewed. Barriers to simulation-based training were identified based on key themes including financial cost, access, and translational benefit. Participants described cost (89%) and access (76%) as principal barriers to uptake. Common facilitators included a mandatory requirement to complete simulation training (78%) and on-going assessment of skills (78%). Participants felt that simulation training could improve patient outcomes (76%) but identified a lack of evidence to demonstrate benefit (38%). There was a consensus that simulation training has not been widely implemented (70%).

Conclusions: There are multiple barriers to the implementation of surgical simulation training programs, however, there is agreement that these programs could potentially improve patient outcomes. Identifying these barriers enable the targeted use of facilitators to deliver simulation training programs.

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Introduction

Residents are required to experience and learn new procedures to attain competency and eventual expertise, without the same exposure to patients during training that their predecessors may have enjoyed.[1] Patient safety is paramount in the delivery of a modern-day healthcare service, and modern training methods for surgery have undergone a paradigm shift in recent decades. The environment in which residents are expected to train has changed in terms of restricted working hours, loss of team-based structures, multiple handovers, and frequent rotations between different hospitals.[2] The traditional model of Halstedian training associated with surgical training cannot be implemented in this new environment and is ineffective as apprenticeship is no longer uniformly practical.[3,4]

There is an abundance of literature demonstrating the potential efficacy of modern training methods, which include simulation training, nontechnical skills training, mental rehearsal, and coaching.[5-8] Studies have shown improved performance following the use of simulation training and additional adjuncts to conventional training, yet aside from the Fundamentals of Laparoscopic Surgery course in the United States, broad integration of simulation training on an international basis is limited.[9] Historically, the impact of simulation training on practical skills has been explored and has been shown to shorten learning curves during the early stages of training in a new procedure. Researchers have observed significant improvements in the time taken to perform a procedure, improved pace of movement, and confidence.[10-12]

Despite the evidence showing the advantages of simulation training, there has been limited research exploring the direct impact of simulation training programs on actual clinical performance. Surrogate markers of performance, such as procedure times and economy of movement, have been used previously. Several studies have been conducted during the early stages of junior doctor training to explore the value of this. These have consistently demonstrated improved clinical performance after a simulation training intervention.[13-15]

The limitations to implementation and integration of simulation training have not yet been fully explored in the literature. Some have cited various factors including costs and resource availability yet these have not been formally assessed.[16] High uptake costs are often cited for the lack of simulation curricula; the cost of high-fidelity simulators can range from hundreds to hundreds of thousands of dollars.[17] There is also an additional cost because of the requirement for a dedicated faculty with contemporaneous dedicated training time for residents. Healthcare costs are also increasing because of evolving treatments and an ageing population. Funds allocated to surgical training have been diminished during a period of financial austerity and so the cost of implementing a simulation-training curriculum needs to be strongly justified.[18]

To our knowledge, there have been no studies performed to determine the perceptions of trainers and residents on the barriers to the implementation of structured simulation programs in general surgical training and what can be done to improve both uptake and implementation.

The primary aim of this study was to identify perceived barriers and facilitators to the uptake and implementation of simulation-based training. Definitions, experience, and perceived value of simulation-based training in general surgery were also explored.

Methods

Participants and setting

Convenience-based sampling of experts, who were specified as surgical attendings with final specialty board credentials, and residents (trainees) from the specialties of General and Vascular Surgery were contacted via e-mail for recruitment into this study to include the views expressed by key stakeholders in surgical training. Both experts and trainees had varied levels of simulation training experience ranging from none to heads of school and recruitment was not restricted to centers with dedicated simulation training units to give a representative sample. Nontraining grades were excluded from the study. Nontraining grade refers to doctors who are employed by the hospital and not enrolled on to a local or national training program in surgery. A total of 12 different training programs were captured at either trainee or expert level.

Participants were invited via e-mail or in person from the United Kingdom, United States, Canada, France, and Japan. Participants were given a 1-mo window to confirm participation in this study. Data collection ceased when thematic saturation was reached.

Study procedure

A semi-structured interview topic guide was developed by the research team and piloted before use with six clinicians and researchers (Appendix 1). Trained patient safety researchers with a background in surgery individually interviewed participants. Key topics that were explored included identification of perceived barriers and facilitators to the uptake and implementation of simulation-based training. Definitions, experience, and perceived value of simulation-based training in general surgery were also explored.

Interviews were conducted by a single researcher and took place between November 2015 and February 2016. Interviews were conducted in-person, via videoconferencing or on the telephone and lasted between 15 and 50 min. These were audio recorded and then transcribed verbatim, and participants were offered the opportunity to review their transcript at the end of the interview if they wished to do so.

Approval for this study was granted by the local research ethics committee (15SM2849). Informed consent was gained from all participants before interviews were conducted.

Data analysis

Interview transcripts were checked for consistency and completeness with the original recordings. Three researchers with a background in surgery and patient safety developed a