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SHORT REPORT

A study to assess the influence of interprofessional point of care simulation training on safety culture in the operating theatre environment of a university teaching hospital

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ABSTRACT

Interprofessional point of care or *in situ* simulation is used as a training tool in our operating theatre directorate with the aim of improving crisis behaviours. This study aimed to assess the impact of interprofessional point of care simulation on the safety culture of operating theatres. A validated Safety Attitude Questionnaire was administered to staff members before each simulation scenario and then re-administered to the same staff members after 6–12 months. Pre- and post-training Safety Attitude Questionnaire—Operating Room (SAQ-OR) scores were compared using paired sample t-tests. Analysis revealed a statistically significant perceived improvement in both safety ($p < 0.001$) and teamwork ($p = 0.013$) climate scores (components of safety culture) 6–12 months after interprofessional simulation training. A growing body of literature suggests that a positive safety culture is associated with improved patient outcomes. Our study supports the implementation of point of care simulation as a useful intervention to improve safety culture in theatres.

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KEYWORDS

Interprofessional learning; operating theatres; safety climate; simulation; teamwork climate

Introduction

Interprofessional point of care or *in situ* simulation training uses mobile simulators to provide safe educational experiences in clinical environments (Miller, Riley, Davis, & Hansen, 2008; Riley, Davis, Miller, Hansen, & Sweet, 2010). Best practice for team training is to provide appropriate educational and professional contexts, allowing participants to play their own professional role, thereby improving authenticity (McGaghie, Issenberg, Petrusa, & Scalese, 2010). Simulation scenarios are designed to highlight the importance of clear communication and teamwork, reflecting crisis resource management theory (Gaba, Howard, Fish, Smith, & Yassier, 2001). Such training may enhance the transfer of learning from simulation to the workplace. Point of care simulation scenarios allow detection of active failures and latent threats in the environment, which, if addressed, could avoid adverse clinical incidents and harm to patients (Patterson, Geis, Falcone, LeMaster, & Wears, 2013; Riley et al., 2010).

Interprofessional point of care simulation has been used as a training tool in our operating theatre directorate for three years aiming to improve crisis behaviours and patient safety. However, tools to measure clinical outcomes from simulation training are limited. The Francis Report (2013) has acknowledged the need to identify and validate measures of safety in National Health Service institutions.

“Safety culture” is described as “The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour” (Health and Safety Commission, 1993,

p. 23). Organisations with a positive safety culture are characterised by communication founded on mutual trust and shared perceptions of the importance of safety and the efficacy of preventive measures. To achieve high reliability a majority of staff must promote safety principles almost all of the time. In healthcare organisations, the impact of safety culture on patient outcomes is increasingly recognised (Neily et al., 2010; Patterson, Geis, LeMaster, & Wears, 2013). Tools have been developed to measure this culture (Sexton et al., 2006). Safety and teamwork climates (the feelings and attitudes of everyone in a work unit) are two components of safety culture that are readily measured and amenable to improvement by focused interventions.

Methods

A pre-/post-survey design was adopted to assess the perceived impact of interprofessional *in situ* simulation on operating theatre safety and teamwork climates, and the magnitude of any change seen. This intervention study was carried out in a theatre directorate of a large teaching hospital with a pre- and post-intervention comparison of safety and teamwork climate scores.

Data collection

Subjects were members of theatre teams undergoing nine points of care simulation sessions providing specialty

appropriate clinical scenarios. The survey instrument was the Safety Attitude Questionnaire—Operating Room (SAQ-OR) Teamwork and Safety Climate version (Sexton et al., 2006). Language was modified for use in a UK setting. Data was anonymised using unique identifiers and participant demographic data collected.

Originally tested in aviation, the SAQ is used in high-risk settings for organisational benchmarking purposes. It is psychometrically sound, specific, has been linked to patient outcomes, and has been shown to be a good indicator of caregiver impressions and attitudes towards safety (Sexton et al., 2006). A total of 27 questions pertaining to domains of safety and teamwork were completed before the training intervention and re-administered to the same staff members 6–12 months later.

Analysis

Pre- and post-training SAQ-OR scores were compared using paired sample t-tests. Quantitative and text-based feedback was obtained 6–12 months later to assess the subject's response to the intervention.

Ethical considerations

The study was reviewed by the local Trust Research and Development Board and was exempt from the formal ethical approval process since the project met the criteria for service improvement. All participants consented to take part in the study and for anonymised data to be used in reports or publications.

Results

Eighty-four staff members participated in the study, of which 45 (54%) were trained nursing staff, 14 (17%) were healthcare assistants, 15 (18%) were operating department practitioners, and 10 (12%) were doctors. Around 50% of participants had worked in the organisation for eight years or more. Seventy-two remained in the trust six months later.

Of the 72 staff followed up post simulation, 64% completed quantitative and text-based feedback. Forty-six of 72 (64%) participants available for follow-up completed SAQ-OR questionnaires both pre and post training. There was a significant improvement in both safety and teamwork mean climate scores 6–12 months after training, representing large and moderate effect sizes, respectively (see Table 1).

Table 1. Changes in mean safety and teamwork climate scores (scale 0–100).

Outcome measure	Pre-intervention mean	Post-intervention mean	Pooled SD	<i>p</i> value	Effect size (Cohen's <i>d</i>)
Safety climate	65.8	73.9	13.37	<0.001	0.604
Teamwork climate	73.6	78.9	13.76	0.013	0.382

The training was well received, with over 90% reporting increased awareness of critical incidents and 85% reporting increased confidence in dealing with such incidents. Around 100% felt that point of care simulation provided a valuable learning experience and 81% supported at least six-monthly training.

Discussion

This study revealed statistically significant perceived improvements in both teamwork and safety climate scores and improved awareness of and confidence in dealing with critical incidents 6–12 months after implementation of interprofessional point of care simulation sessions.

It is difficult to correlate effective team training and improved safety culture with reduction in patient harm. Emerging evidence suggests that a positive safety culture is associated with improved patient outcomes and thus the current study is relevant to a growing body of literature. Neily et al. (2010) assessed the effect of an interprofessional team training programme demonstrating lower surgical mortality in 74 participating Veterans Health Administration hospitals. The SAQ has been used in the paediatric emergency department setting where attitude changes after interprofessional team training were demonstrated with a recorded decrease in adverse patient events (Patterson, Geis, LeMaster, & Wears, 2013). Positive outcome measures including decreased length of intensive therapy unit stay have been found in environments with better safety cultures (Huang et al., 2010). Our study supports the implementation of interprofessional point of care training as a useful intervention to improve safety and teamwork climates in the operating theatre environment.

Limitations of our study include a modest sample size and the inability to demonstrate improved patient outcomes in terms of mortality and morbidity. Reasons for improved clinical outcomes are multifactorial and only changes in attitude are shown. Ultimately, larger studies are needed. Further research should investigate how lessons learned during simulation are transferred into practice. The way in which active failures and latent threats are identified during simulation and addressed post scenario is another important area of study. A synthesis of studies using other interventions shown to improve safety and teamwork climates would be relevant to develop ways to improve safety culture.

The Francis Report (2013) demonstrates the need for metrics that can identify unsafe or failing organisations. The SAQ is a valid and reliable measure that can be utilised more widely to assess “safety culture” of an institution or its components. The SAQ is also useful as an outcome measure for educational interventions such as interprofessional point of care simulation, which are aimed at improving patient safety.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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