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An observational study exploring soundscapes in clinical simulation

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Introduction

Simulation-based medical education (SBME) is routinely utilized in undergraduate medical education to improve skill acquisition and readiness for practice [1,2]. In 2011, the UK Department of Health recommended that clinical skills be practised in a simulated environment prior to the clinical setting, and the recent Ockenden report recommended that SBME be further embedded into healthcare training [3]. The Association for Simulated Practice in Healthcare acknowledges that changes in healthcare delivery have reduced the clinical exposure and teaching opportunities available to students, highlighting an increased role for SBME [4]. Discussions regarding optimal simulation fidelity are commonplace, particularly as high-fidelity SBME becomes more familiar and accessible to educators [2]. Systematic reviews have demonstrated enhanced knowledge and skill acquisition when higher fidelity simulations are employed [5]. Physical fidelity refers to how closely the training device replicates reality; however, enhancements are often associated with increased costs, which can easily reach prohibitive degrees. Psychological fidelity represents how closely a simulated environment resembles reality in the participants' cognition. Clinical environments are often noisy, distracting environments that are rarely explicitly reported in simulation designs. We propose that soundscapes are a seldom explored, low-cost intervention that can improve psychological fidelity in SBME.

Innovation

We incorporated clinical soundscapes into a bespoke simulation programme for final-year medical students from King's College London medical school (KCL). All students rotating through their transition to FY1 (TTF1) module at Queen Elizabeth Hospital Woolwich (QEH) and University Hospital Lewisham (UHL) between January and June 2022 were invited to participate in a half-day simulation programme. Ambient hospital noise soundscapes were played in the simulated clinical environment using a Bluetooth Bose portable smart speaker. We utilized open-source, online recordings to create the soundscapes, avoiding confidentiality issues associated with recording local clinical areas highlighted by previous researchers. Candidates and embedded faculty members were not informed of the addition of the soundscapes to the simulated clinical environment until the end of the session. Each session consisted of four simulated scenarios including ward rounds, acute assessment of an unwell patient, treatment escalation planning and palliative care. Candidates actively participated in

Figure 1: Selected participant comments related to themes of realism.

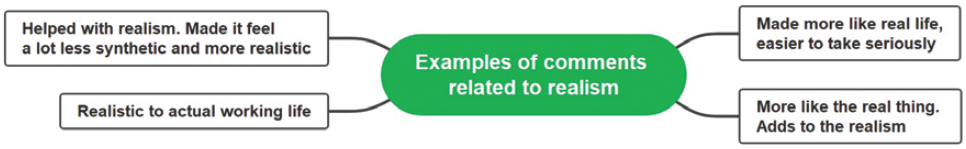

Figure 2: Selected participant comments related to themes of communication.

at least one scenario and observed others via a camera link from an adjoining room. Each session included two embedded faculty members, two session organizers and one simulation technician.

Evaluation

Candidates were asked to complete a pre-intervention questionnaire (n = 59) prior to the introduction and a post-intervention questionnaire (n = 57) afterwards. We utilized 100-point Bandura scales to collect quantitative data related to self-efficacy, 10-point Likert scales to collect data on satisfaction and engagement, and white space questions to collect qualitative data. Faculty feedback was also collected.

Outcomes

Fifty-four per cent of candidates reported that they noticed the soundscape, and 80% of these noted it more as observers rather than as active participants in the scenario. Candidates reported that the soundscape improved the psychological fidelity of the simulation, and that the session was more enjoyable than previous simulation experiences. Thematic analysis of qualitative data identified both positive and negative themes. Twenty-four students commented that the soundscape conferred heightened realism, and 10 students commented on the value of practising in noisy environments, highlighting opportunities to rehearse coping strategies (Figure 1). Five students reported improved self-efficacy and performance in the simulation. However, 13 candidates made reference to the soundscape as being distracting with 6 candidates describing a negative impact on their ability to hear and communicate during the simulation. Four candidates commented on themes of confusion related to the soundscape (Figure 2). Faculty feedback revealed that 43% of faculty members noticed the soundscape more as an active participant in the simulation, and 50% reported that they found it more noticeable as an observer. Six per cent did not notice the soundscape as a participant or observer. Qualitative data analysis revealed similar themes to candidate feedback. Positive themes reported by faculty were those of realism and heightened fidelity, and reported negative themes pertained to distraction and confusion.

What's next

This project has highlighted that further research should investigate different soundscapes, particularly whether volume and the inclusion of background conversation impact levels of distraction. Moreover, it would be useful to highlight the soundscapes during pre-briefing, and explore how aware participants were of the intervention and how they dealt with subsequent effects. We also intend to explicitly engage in debrief discussions around the negative impacts of noisy environments and their impact on communication, decision-making and situational awareness, which we feel are highly relevant and translatable to real-world practice. A brief review of the literature has revealed a paucity of other organizations reporting the use of soundscapes in simulation for medical students and doctors. We have demonstrated that clinical soundscapes are a low-cost and effective means for improving psychological fidelity with meaningful positive and negative impacts in SBME and are easily transferrable to other institutions and contexts such as postgraduate training and multidisciplinary SBME programmes.

Declarations

Authors' contributions

TS conceived of the idea presented. SC and HW designed and delivered the simulation programme and collected the data. SC took the lead in analysing the data and writing the manuscript. TS supervised the project.

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Availability of data and materials

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Ethics approval and consent to participate

None declared.

Competing interests

None declared.

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