The ROYAL COLLEGE of OPHTHALMOLOGISTS

BRIEF COMMUNICATION

Ophthalmic surgery techniques can be simulated and supervised remotely in the home environment: a proof-of-concept report

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INTRODUCTION

The role of simulation is increasingly recognised in ophthalmic training, for new skill acquisition and refining established techniques. Virtual reality cataract simulation has been made mandatory by the Royal College of Ophthalmologists to ensure all trainees have adequate familiarity and competence prior to live surgery. A recent study demonstrated increased usage of the Eyesi simulator (VR-magic, Tübingen, Germany) during periods away from the operating theatre [1]. Surgical interludes can lead to de-skilling, anxiety and confidence loss, which disproportionately affects trainee surgeons. Regular simulation can preserve surgical skills, but issues such as availability, resources, access, and supervisory requirements remain barriers to engagement [2].

METHODS

To address potential inequalities of access and the recent lack of in-person teaching, the Young Ophthalmologists' Programme Committee of the United Kingdom and Ireland Society of Cataract and Refractive Surgeons (UKISCRS) piloted a novel high-fidelity, low-cost, national simulation teaching event incorporating video-conferencing to provide remotely supervised simulation at home. Hosted via Zoom in March 2021, an evening of suturing tutorials focusing on eyelid and corneal laceration repair was delivered. Set-up instructions were provided, and bespoke simulation kits were posted directly to participants' homes (Fig. 1). Each participant was required to obtain a ring light with phone mount (for illumination and live video) and use a second device to record hand positioning. Each tutorial was followed by consultant supervised practical sessions in virtual breakout rooms.

Self-confidence regarding interrupted, mattress and butterfly suturing techniques pre- and post course was evaluated via a Likert scale.

RESULTS

Twenty-five trainees attended the event (27 registrations; 92.6% uptake). All participants received the simulation equipment and were able to connect with the online tutorial and breakout rooms from home. All performed suturing under consultant supervision (ratio of 1 supervisor to 5 trainees). 87.5% stated this supervision was adequate or better. Significantly increased confidence was reported post course for interrupted (median scores 6 pre, 9 post), mattress (4.5 pre, 7.5 post) and butterfly (2.5 pre, 8 post) suturing ($p < 0.001$; Wilcoxon signed-rank test). All delegates stated the event filled an education gap and would attend further home-simulation events. Participants favoured convenience, time management, value for money, privacy and flexibility around childcare as advantages for home-based simulation (Fig. 2).

DISCUSSION

Engagement with ophthalmic simulation has been shown to be cost-effective and results in less surgical complications [3]. Unlike the fixed location, expensive Eyesi simulator, low-cost simulation can be mobilised by utilising desktop microscopes [4]. However, our event demonstrated that everyday technology such as mobile phones and laptops are sufficient to perform this function. We believe this pilot study provides a proof-of-concept for effective home-based simulation. Microscope-free, low-cost simulation at home with remote supervision increased surgical confidence through ensuring competence. Adequate supervision enabled participants to become familiarised with correct techniques. Simulated ocular surgery at home promotes educational equality by providing convenience and flexibility for all, including those trainees constrained by geography, equipment availability, or personal caring responsibilities. Remote supervision with commonly accessible technology potentiates greater connectivity and support for surgical training beyond traditional borders [5].

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Fig. 1 Montage of images demonstrating bespoke simulation kit containing vannas scissors, model eye, foam, keratome, 6-0 and 9-0 double ended sutures, toothed and non-toothed forceps. Phone mount and ring light device and still images from smartphone and Zoom meeting with various device angles.

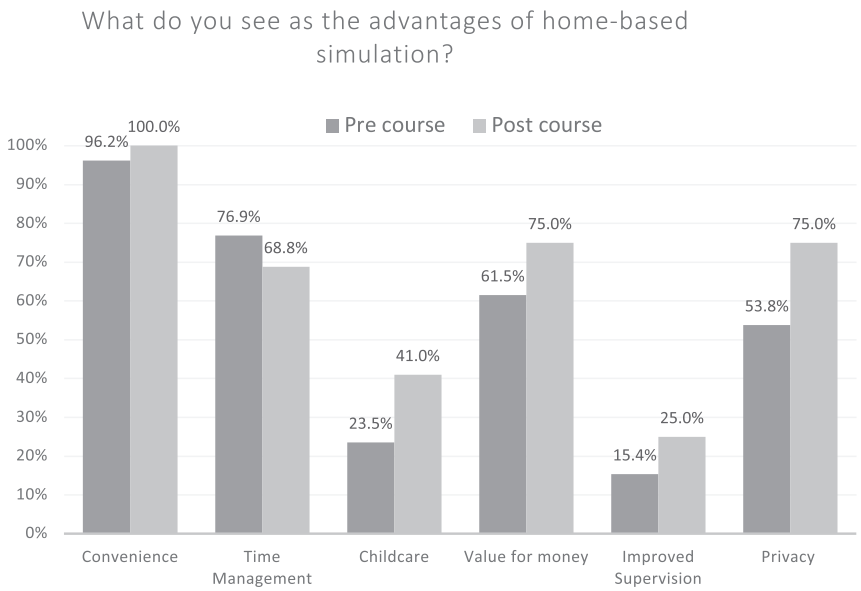

Fig. 2 Delegate views on the advantages of home simulation. Note childcare, improved supervision, value for money and privacy all received greater scores following participation in this UKISCRS home-simulation event.

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AUTHOR CONTRIBUTIONS

LM, SM, KA, YN, SK and DL all contributed to the design and delivery of the study and each approved the final paper.

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COMPETING INTERESTS

The authors declare no competing interests.

CONSENT FOR PHOTOGRAPHS

We can confirm that each person whose image appears in Fig. 1 has been contacted individually and have each provided consent for their image to be used in print and online media.

ADDITIONAL INFORMATION

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