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Systematic Review of Voluntary Participation in Simulation-Based Laparoscopic Skills Training: Motivators and Barriers for Surgical Trainee Attendance ☆

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OBJECTIVE: To examine and report on evidence relating to surgical trainees' voluntary participation in simulation-based laparoscopic skills training. Specifically, the underlying motivators, enablers, and barriers faced by surgical trainees with regard to attending training sessions on a regular basis.

DESIGN: A systematic search of the literature (PubMed; CINAHL; EMBASE; Cochrane Collaboration) was conducted between May and July 2015. Studies were included on whether they reported on surgical trainee attendance at voluntary, simulation-based laparoscopic skills training sessions, in addition to qualitative data regarding participant's perceived barriers and motivators influencing their decision to attend such training. Factors affecting a trainee's motivation were categorized as either intrinsic (internal) or extrinsic (external).

RESULTS: Two randomised control trials and 7 case series' met our inclusion criteria. Included studies were small and generally poor quality. Overall, voluntary simulation-based laparoscopic skills training was not well attended. Intrinsic motivators included clearly defined personal performance goals and relevance to clinical practice. Extrinsic motivators included clinical responsibilities and available free time, simulator location close to clinical training, and setting obligatory assessments or mandated training sessions. The effect of each of these factors was variable, and largely dependent on the individual trainee. The greatest reported barrier to attending voluntary training was the lack of available free time.

CONCLUSION: Although data quality is limited, it can be seen that providing unrestricted access to simulator equipment is not effective in motivating surgical trainees to voluntarily participate in simulation-based laparoscopic skills training. To successfully encourage participation, consideration needs to be given to the factors influencing motivation to attend training. Further research, including better designed randomised control trials and large-scale surveys, is required to provide more definitive answers to the degree in which various incentives influence trainees' motivations and actual attendance rates. (J Surg Ed ■:■■■-■■■. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEYWORDS: simulation-based education, surgical education, laparoscopy, voluntary training, self-directed learning, Motivation

ACGME COMPENTENCIES: Practice-based learning and improvement, Medical knowledge

INTRODUCTION

Altered depth perception, lack of tactile feedback, and the need for unique psychomotor skills meant that the performance of laparoscopic surgery is not immediately intuitive.

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During training, operative time is increased, especially in the early stages of a trainee's learning curve. Work-hour restrictions, pressures to increase theater throughput, and the ethical debate regarding inexperienced surgeons operating on live patients meant that the traditional apprenticeship model of surgical training needed to be revised.

There is now a demand to increase training efficiency, accelerate trainee skill acquisition, and ensure competency-based training. Simulation-based education (SBE) can achieve these goals. SBE allows trainees to practice task-specific exercises without risk to patients or themselves. It has been established that SBE improves technical surgical skills, and that skills learned in the simulation laboratory are transferrable to the operating theater.[1,2] Despite much investigation, the most appropriate way to effectively incorporate SBE into the surgical training curriculum is yet to be established.

Delivery of SBE can be a labor- and resource-intensive exercise. Costs include hiring of laboratory technicians and educators, and purchase of expensive simulator equipment. The implementation of self-directed simulation training programs, where the individual has responsibility for their own learning activities, has been proposed as one means to limit the staffing costs associated with SBE while still promoting continuing education. When attended on a voluntary basis (i.e., unrostered training sessions whenever the trainee has free time), self-directed learning has the additional benefit in which trainees can have potentially unlimited access to training outside the confines of scheduled sessions or the availability of training staff.

AIM

The purpose of this review is to examine and report on evidence relating to surgical trainees' voluntary participation in simulation-based laparoscopic skills training. This review specifically examines the underlying motivators, enablers, and barriers faced by surgical trainees with regard to practicing SBE on a regular basis. The results from this review can be used to inform training providers about planning and implementing ongoing SBE activities within the surgical training curriculum.

MATERIALS AND METHODS

Search Strategy

A literature search was conducted (by author H.G.) using PubMed, Cochrane Collaboration, EMBASE, and CINAHL online databases during May 2015 to July 2015. Searches were conducted without a language restriction. The core search strategy used the terms "(*educat** OR *train**) AND *simulat** AND *laparosc** AND" with the addition of "*mandatory,*" "*obligatory*," "*voluntary*," "*participation*," "*self-directed*," or "*motivation*." Article titles and abstracts were reviewed for relevance. Articles were retrieved when they were judged to possibly meet the inclusion criteria. Reference lists of retrieved articles were also searched to locate any articles that were not identified by the electronic database searches. Two reviewers (authors H.G. and N.M.) then independently applied the inclusion criteria to the retrieved articles. Any differences were resolved by discussion between the 2 reviewers (shown in Figure for search strategy flowchart).

Inclusion Criteria

Articles were included if they investigated the voluntary participation in simulated laparoscopic skills training by surgical trainees. The training simulator needed to be available for use during the regular working week (rather than a stand-alone training course). Included studies had to report on the following: measures of training session attendance (sessions attended, time spent on training, or number of attempts made at training tasks), qualitative data regarding participant's perceived barriers and motivators influencing their decision to attend voluntary training, and suggestions on how to increase attendance.

Articles were excluded if the SBE did not relate to laparoscopic technical skills, if nonsurgical participants were enrolled (e.g., medical students only, or Nursing/Allied Health Practitioners), or if attendance rates or qualitative data were not reported.

For the purpose of this review, we defined voluntary training as the provision of SBE at times convenient to the trainee. That is, without formal scheduling or free from penalties for nonattendance.

Data Extraction and Analysis

One reviewer (H.G.) extracted data into data extraction sheets designed for this review, and a second reviewer (N.M.) checked the data extraction. Study design and outcome reporting were highly variable. Owing to the heterogeneity of the results, statistical pooling was not possible; however, similar outcomes have been grouped narratively in the results. Factors influencing participation were grouped according to whether or not they are intrinsic (internal to the participant, for example, personal enjoyment and sense of achievement or purpose) or extrinsic (external influences, for example, simulator location, compulsory assessments, or mandated participation). Data extraction and analysis was undertaken in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement.[3]

Details of Included Studies

Nine studies investigating the uptake of voluntary participation in simulated laparoscopic skills training are included