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PROTOCOL

Simulation-enhanced interprofessional education in surgery – a scoping review protocol

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ABSTRACT

Introduction:
Simulation-enhanced interprofessional education (Sim-IPE) has been successfully employed in health professions education and appears a promising strategy for improving quality and safety in the field of surgery. This scoping review aims to map how Sim-IPE in surgery is practiced, researched and discussed.

Methods:
The scoping review will include references published after 1st January 2000 that pertain to simulation-based education and interprofessional education and surgery. The population of study is health professionals, who may be students, trainees or fully qualified. The scoping review is contextualised to the hospital setting and the work of surgeons.

Future Impact:
The findings are anticipated to illuminate the current state of practice of Sim-IPE in surgery, identify facilitators and barriers to implementation and reveal gaps in the literature where further research would be beneficial. This knowledge may inform educators, researchers and policy makers and influence the future practice and research of Sim-IPE in surgery.

Introduction

Simulation-based education (SBE) has been well established in the health professions [1]. A key benefit of SBE is the opportunity for experiential learning without risk of patient harm [2]. Additionally, with the focus on education rather than clinical care, simulation may provide a more conducive environment for learning. Involving instances of high complexity, patient risk and practitioner stress, the medical specialty of surgery seems well suited to SBE [3]. Traditionally, SBE has been used in surgery to acquire medical knowledge and technical skills

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[3]. More recently, SBE has been used in surgery to develop other core competencies of surgical practice such as communication, collaboration, teamwork and leadership [4]. A prominent example is the Non-technical Skills for Surgeons (NOTSS) training system [5]. While the term 'non-technical skills' is commonly used in the literature, the negative formulation may imply inferiority to technical skills [6]. As this is not the intent [7], for the purposes of this study, the term 'professional skills' is preferred.

Interprofessional education (IPE) is two or more health professions learning with, from and about one another's roles to improve collaborative, patient-centred practice and quality of care [8–11]. IPE has been increasingly incorporated into health professions education [12]. Reported benefits of IPE include improving interprofessional collaboration and teamwork [13], ameliorating negative professional stereotypes [14] and enhancing the quality of patient care [15]. Influential institutions such as the United States' Institute of Medicine and the World Health Organization have recommended that IPE be incorporated into health professions education [16,17]. In recent decades, the surgical community has focussed on the concept of professionalism and the necessity of professional skills [18]. Surgical colleges now identify collaboration and teamwork with peers, trainees and other health professionals as important core competencies to optimize patient-centred care [19,20]. As such, IPE incorporation into surgical education and training programmes has become more frequent, providing evidence of beneficial outcomes [21,22].

Simulating a healthcare experience has been utilized to enhance IPE in health professions education [23,24]. Several terms have been used for this concept including Interprofessional Simulation-Based Education [25], Simulation-Based Interprofessional Education [26] and Simulation-Based IPE [27]. For the purposes of this scoping review, the term 'Simulation-enhanced Interprofessional Education' and its abbreviation 'Sim-IPE' will be used to align with the Society for Simulation in Healthcare's 'The Healthcare Simulation Dictionary' [10].

Health professions where Sim-IPE has been employed include nursing, medicine, physical therapy and pharmacy [24]. Sim-IPE programmes have typically involved health professions students, showing improvement in communication and teamwork [23]. Among fully qualified health professionals, Sim-IPE has most commonly been utiliszd in critical care [28]. With preventable serious adverse outcomes in surgery being both common [29] and often involving deficits in the execution of professional skills [30], Sim-IPE in surgery appears to be a promising technique for improving the quality and safety of surgical care. Yet, significant resources are required to establish and conduct Sim-IPE: faculty development, sacrifice of clinical productivity, and the procurement and maintenance of specialized equipment [31]. Additionally, 'concepts of professionalism within surgery may be in conflict with the tenets of interprofessionalism held by other health and medical professionals', potentially hindering the successful implementation of Sim-IPE in surgery [18].

Thus, a need exists to understand the state of Sim-IPE in surgery. A search of PubMed, EMBASE, Web of Science, PsycInfo, ERIC, Cochrane Database of Systematic Reviews and PROSPERO did not identify any completed or proposed

Table 1: Eligibility criteria

	Inclusion	Exclusion
Population	• Healthcare professionals • Students, trainees, fully qualified	• Non-healthcare professionals • No involvement of surgeons or surgical trainees or medical students learning surgical topics
Concept	• Simulation-based education • Interprofessional (two or more healthcare professions – including surgery – learning with, from and about one another to improve collaborative practice) • Involves surgery (with surgery defined as the medical specialty primarily responsible for managing surgical conditions) • The assessment or management (operative or non-operative) of patients with surgical conditions	• Education that does not involve simulation • Education that involves participants from a single healthcare profession only OR from multiple healthcare professions *but* they do not learn with, from about one another to improve collaborative practice • Obstetrics and gynaecology • Unrelated to surgery or surgery is peripheral to the central focus of the education intervention
Context	•Hospital setting (including emergency department, operating theatre, wards)	• Out-of-hospital settings (e.g. general practice, pre-hospital) • Studies published prior to 1 January 2000
Evidence type	• Interventional studies • Non-interventional studies (editorials, commentaries, perspective articles, review articles and book chapters in English language) that contribute to overall knowledge of simulation-enhanced interprofessional education in surgery	• Non-English language • Non-interventional studies (editorials, commentaries, perspective articles, review articles and book chapters) • Conference abstracts

reviews on Sim-IPE in surgery. The chosen methodology for conducting this synthesis of evidence is a scoping review. This technique enables the inclusion of a wider range of sources – including gray literature such as editorials, commentaries, position statements, policy documents and training curriculums – than would typically be included in a systematic review. This approach will better achieve the broad nature of the objectives of this study: to map how Sim-IPE in surgery is practised, researched and discussed.

Methods

This scoping review will follow the methodological framework described by Arksey and O'Malley and advanced by Levac [32,33]. Additionally, the reporting will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews checklist [34]. The Joanna Briggs Institute Manual for Evidence Synthesis and other best practice guidelines for conducting scoping reviews have also contributed to the development of this scoping review protocol [35,36].

Eligibility criteria

The eligibility criteria for this review are summarized in Table 1.

Population

This scoping review will consider references where healthcare professionals are the population. We will include references where healthcare professionals are students, trainees or fully qualified. References must include surgeons, surgical trainees or medical students learning surgical topics for inclusion.

Concept

For inclusion, references will need to describe SBE *and* IPE *and* apply to the field of surgery. SBE is defined as a technique of learning, whereby a real-life task is performed in a modified learning environment [37]. While the definition of IPE is 'two or more health professions learning with, from and about one another to improve collaborative, patient-centred practice and quality of care', for the purposes of this review, the definition of interprofessional will be expanded to include individuals of the same profession (e.g. medical practitioner) who are of different specialties (e.g. surgery and anaesthesia). However, education where participants practise tasks (e.g. suturing) independently of each other will not be considered IPE. Similarly, if faculty but not participants are interprofessional, this will also not be considered IPE (e.g. all participants are surgical residents).

While the term 'discipline' refers to an organized body of knowledge, a 'profession' is those individuals who apply the knowledge of the discipline in practice [38]. Similarly, multidisciplinary (drawing on knowledge from different disciplines but staying within their traditional boundaries), interdisciplinary (interaction between disciplines that leads to a blurring of boundaries), transdisciplinary (integration of disciplines that leads to a transcendence of boundaries) and interprofessional (the interaction between practitioners of different professions) have different meanings that are subtle and conceptual [39]. Moreover, these terms are used inconsistently and often interchangeably in the literature [39]. For the purposes of this study, articles using the terms interdisciplinary, multidisciplinary and transdisciplinary in the absence of interprofessional will still be considered for inclusion.

Surgery is defined as the medical specialty primarily responsible for the management of surgical conditions. References where surgery is peripheral – rather than central – to the subject matter will be excluded (e.g. SBE for extracorporeal membrane oxygenation in the Intensive Care Unit where the major focus is critical care). References relating to medical practitioners other than surgeons performing surgical procedures (e.g. skin excision by a general practitioner or repair of a laceration by an emergency physician) without the involvement of surgeons will be excluded.

Context

This review will include all references on Sim-IPE in surgery published after 1 January 2000. Only references pertaining to a hospital setting (e.g. emergency department, operating theatre or surgical ward) will be included. References concerning surgery or surgical procedures in general practice or pre-hospital settings will be excluded.

Evidence type

Where non-interventional articles (e.g. editorials, commentaries, perspective articles, review articles and book chapters) contribute to the understanding of Sim-IPE in surgery, then they will be included. Where such references do not contribute more than would commonly be found in the introduction of interventional studies, they will be excluded. Conference abstracts will be excluded. Non-English language references will be excluded.

Information sources

The search for references pertaining to Sim-IPE in surgery will employ five electronic databases: Medline, EMBASE, Web of Science, PsycInfo and ERIC. Simulation-based journals not indexed by these databases (Clinical Simulation in Nursing and International Journal of Healthcare Simulation) will be manually searched for relevant articles.

Search strategy

Table 2 demonstrates keywords for the search strategy of titles and abstracts in these databases. A review of the reference lists of each study included for analysis will provide additional sources missed in the original search. Google searches in English using the above-mentioned search terms will allow for the identification of relevant gray literature.

Selection process

All references will be imported into Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia, www.covidence.org), a web-based collaboration software platform for reference management and data extraction. After the removal of duplicated references, two researchers (SS and OM) will independently and manually

Table 2: Search strategy for scoping review

Term (title/abstract)		Term (title/abstract)		Term (title/abstract)		Term (title/abstract)
Simulat*	AND	Educat* OR	AND	Inter-profession* OR	AND	Surg*
		Train* OR		Interprofession* OR		
		Teach OR		Inter-disciplin* OR		
		Learn OR		Interdisciplin* OR		
		Collaborat* OR		Multi-disciplin* OR		
		Cooperat* OR		Multidisciplin* OR		
		Assess*		Multi-profession* OR		
				Multiprofession* OR		
				Transdisciplin*		

screen all references by title and abstract for eligibility. Included references will then proceed to full-text review to determine suitability for inclusion in the analysis of the scoping review. Where full-text references are unavailable, the corresponding author will be emailed regarding access to a full-text manuscript. If the full text cannot be obtained after such efforts, references will be excluded from the analysis. Resolution of discrepancies at either phase of selection will be by consensus with the involvement of an additional researcher (DN) as required.

Data charting

Charting of data will be manually performed by two researchers (SS and OM) using Covidence. Given the breadth of article types, not all data items will be applicable to all articles. The following data items will be charted:

- Authors, year, country of publication, country of all authors, DOI
- Reference type (e.g. interventional study, review, editorial, commentary, scenarios)
- Ethics approval (yes/no)
- Funding (academic/industry)
- Aims of the article/study
- Study design
- Inclusion criteria
- Exclusion criteria
- Description of intervention
- Description of comparator group
- Simulation modality (e.g. computer-based, mannequin, simulated participants, role play, etc.)
- Study participants:
  - Number
  - Profession (e.g. doctor, nurse, allied health, other)
  - Specialty (e.g. emergency, intensive care, anaesthesia, surgery, medicine, radiology, other)
  - Training level (e.g. student, trainee, consultant, other)
- Setting (e.g. theatre, emergency department, ward, outpatient clinic, other)
- Educational theory
- Theoretical frameworks
- Outcome measures
- Modified Kirkpatrick evaluation level [40]
- Important results
- Barriers and facilitators to implementation of Sim-IPE in surgery

Data analysis and presentation

The data charted from the selected references will be analyzed quantitatively and qualitatively. Quantitative data regarding article characteristics (including the number of articles, article type, number and nature of participants, setting and simulation modalities, etc.) will be analyzed with a simple descriptive numerical summary. Qualitative data will be analyzed using descriptive-directed content analysis [41]. Both quantitative and qualitative data will be presented in tabular form and narrative summary to describe how Sim-IPE in surgery is practiced, researched and discussed. Consistent with best practice recommendations for scoping reviews, data aggregation and quality assessment of references will not be performed [32,33].

Stakeholder consultation

In accordance with the Levac methodological framework for conducting scoping reviews, stakeholders have been involved in developing this protocol to enhance methodological rigour [33]. Stakeholders include clinicians (surgeons, emergency medicine physician and nurse), educators, administrators and trainees. Stakeholders will continue to be invited to provide insight and guidance in subsequent phases of the review (data extraction, data analysis, manuscript review). Reporting of stakeholder involvement will utilize the ACTIVE (Authors and Consumer Together Impacting on eVidencE) framework [42].

Anticipated results and outcomes

The results from this scoping review will map the existing literature on Sim-IPE in surgery. The findings are anticipated to illuminate the current state of practice of Sim-IPE in surgery, identify facilitators and barriers to implementation, and reveal gaps in the literature where further research would be beneficial. This knowledge may inform educators, researchers and policy-makers and influence the future practice and research of Sim-IPE in surgery.

Declarations

Author contributions

SGS (conceptualisation, methodology, project administration, writing – original draft), OM (methodology), DC (methodology, supervision), VM (methodology, supervision), JP (writing – review and editing) and DN (methodology, supervision, writing – review and editing). All authors have reviewed and approved the final manuscript.

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Availability of data and materials

Data and materials pertaining to the study will be made available upon reasonable request to the corresponding author.

Ethics approval and consent to participate

None applicable.

Competing interests

There are no conflicts of interest to declare.

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