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Experiential Learning Methods for Patient Safety in Undergraduate Medical Education: A Scoping Review Protocol

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ABSTRACT

Patient safety (PS) education trains future healthcare professionals with the necessary capabilities to reduce medical errors and improve healthcare outcomes. It involves Experiential Learning Methods (ELMs) to give students practical insights into patient safety principles. ELMs such as role-playing, case studies, and simulation-based learning offer engagement with real-world scenarios and promote critical thinking and problem-solving skills essential for patient safety. However, the wide range of ELMs and their effectiveness in enhancing patient safety competencies remain unclear. This scoping review aims to map the diverse range of ELMs used globally in undergraduate medical education for patient safety and study their impact on developing knowledge, skills, and behaviours aligned with the WHO Patient Safety Curriculum Guide. The review will follow the Joanna Briggs Institute (JBI) framework and adhere to PRISMA-ScR guidelines. Two independent reviewers, supported by three additional team members, will supervise the study selection and evidence charting processes. The findings will highlight critical factors for integrating ELMs into medical curricula to enhance patient safety education and distribute it through journal publications and conferences targeting educators and policymakers.

Keywords: Experiential Learning, Patient Safety, Medical Education, Scoping Review Protocol, Error Prevention

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INTRODUCTION

Patient safety has significantly advanced over the last two decades, driven by rapid awareness of medical errors and their effect on healthcare systems (1). As a cornerstone of high-quality healthcare, patient safety aims to minimise medical errors and adverse events to protect patients. According to the World Health Organisation (WHO), unsafe care accounts for substantial global morbidity and mortality, with approximately one in ten patients harmed during hospitalisation (2). Despite international efforts, challenges in mitigating harm persist, especially in low- and middle-income countries where resource limitations intensify the risks (3). Addressing these issues necessitates a comprehensive approach, with education as a pivotal element in preparing future healthcare professionals (4).

Undergraduate medical education provides a crucial foundation for introducing patient safety principles, as early exposure shapes future clinical behaviours. The WHO's Patient Safety Curriculum Guide emphasises integrating patient safety education throughout medical training to ensure comprehensive competency development (2). Traditional didactic teaching methods often fail to engage students or equip them with the practical skills needed for real-world application (5). As a result, experiential learning methods are growing, offering hands-on opportunities to apply theoretical knowledge in controlled environments (6).

Experiential learning methods have significantly boosted patient safety competencies by improving knowledge retention, decision-making skills, and teamwork (7). Research shows that simulation-based learning, in particular, reduces medical errors by allowing students to practice procedures in a risk-free environment before encountering real patients (8). Similarly, role-playing exercises improve communication skills, which is crucial for preventing adverse events in clinical practice (9). Case-based learning has been associated with better problem-solving abilities, enabling students to analyse patient safety incidents and develop preventive strategies (10). These benefits closely align with the WHO Patient Safety Curriculum Guide, which emphasises the need for active learning approaches in cultivating safety-oriented behaviours (2). By effectively integrating these methods, medical schools can bridge the gap between theoretical instruction and practical application, thus fostering a culture of patient safety in clinical environments.

As defined by Kolb, experiential learning involves active engagement through concrete experiences, reflective observation, abstract conceptualisation, and active experimentation (6). This approach has positively fostered critical thinking, decision-making, and teamwork skills essential for patient safety (7). Examples include simulation-based learning, role-playing, and case-based discussions, which enable students to interact with realistic clinical scenarios without risking patient harm (11). These methods improve cognitive understanding and develop practical competencies, bridging the gap between theory and practice.

Despite its recognised potential, implementing patient safety education remains inconsistent across institutions. Variations exist in the types of methods employed, the timing of their introduction, and the depth of content covered. While some institutions have successfully integrated innovative approaches, others face challenges such as curriculum overcrowding and resource constraints (12). The lack of standardisation has resulted in disparities in how medical students teach and understand patient safety (13).

Addressing these challenges requires systematically exploring current practices to identify effective strategies and areas for improvement. Scoping reviews provide an ideal methodology for mapping existing evidence and understanding the breadth of approaches used in patient safety education (14). By synthesising findings from diverse sources, this scoping review aims to systematically explore the range of ELMs employed in undergraduate medical education for patient safety and evaluate their alignment with the competencies recommended in the WHO Patient Safety Curriculum Guide. This review is intended to provide insights into best practices and inform the integration of ELMs within

broader educational modules. Ultimately, the findings will help strengthen patient safety education, preparing future healthcare professionals with the competencies to address real-world challenges and improve safety outcomes.

OBJECTIVES AND RESEARCH QUESTIONS

Objectives

1. To identify and categorise experiential learning methods used globally for patient safety education in undergraduate programmes.

2. To explore how ELMs have been applied to support the development of patient safety competencies by the WHO PS curriculum guide for undergraduates.

Research Questions

1. What are the types of experiential learning methods implemented globally in undergraduate programmes to teach patient safety?
2. To what extent have ELMs been used to support the development of patient safety competencies outlined in the WHO PS curriculum guide for undergraduates?

METHODS AND ANALYSIS

This scoping review follows the JBI framework and adheres to the PRISMA-ScR guidelines to ensure methodological rigour and transparency (15, 16). The protocol for this scoping review was registered with the Open Science Framework (OSF) in April 2024 under the following link: https://doi.org/10.17605/OSF.IO/PUZRT. To ensure transparency, any updates or modifications to the methodology during the review process will be documented and explained in the final scoping review report.

Review Team

The review team comprises five members (MAP, NHA, KAB, NAY, and NSR). The primary reviewer is a PhD student in the Emergency Department, specialising in patient safety and risk management. While the other reviewers are senior faculty in the School of Medicine at USM, each with over five years of experience. Two team members were actively involved in developing the Patient Safety Massive Open Online Course (MOOC), contributing to the team's expertise in patient safety and medical education.

Inclusion Criteria

Types of participants

This study will include studies focusing on undergraduate medical students and house officers as participants. Studies that examine one or more ELMs integrated into undergraduate medical curricula and their role in developing patient safety competencies will also be included. Multidisciplinary studies that involve undergraduate medical students alongside other healthcare disciplines will also be included, provided the data analysis for medical students is presented separately.

Concept

ELMs are structured, active learning approaches that allow students to gain practical experience by engaging in real-world scenarios and reflective practice (18). This scoping review will include records and resources describing ELMs implemented in undergraduate medical education for patient safety based on Kolb's experiential learning theory, which emphasises concrete experience, reflective observation, abstract conceptualisation, and active experimentation as key stages of learning (6). The concept focuses on the practical application of ELMs to develop essential competencies as highlighted in the WHO Patient Safety Curriculum Guide. Key topics include understanding and managing clinical risk, improving medication safety, fostering effective teamwork, and recognising human factors influencing safe practice (2). Commonly used ELMs, such as simulation, role-playing, case-based learning, and hands-on workshops, actively engage students, allowing them to bridge theoretical knowledge with clinical application. These methods enhanced critical competencies like communication, teamwork, and decision-making skills, ensuring safe medical practice. This review will explore the teaching methods and learning activities used in ELMs, alongside documented learning outcomes. Additionally, it will examine students' perceptions of ELMs in terms of their practical usability, particularly how these methods support the integration of patient safety concepts into clinical practice.

Context

This review will include studies conducted in academic and clinical settings, focusing on experiential learning within undergraduate medical curricula. Academic settings will consist of classroom-based and simulation centre environments that employ structured experiential learning methods such as case-based learning, role-playing, and simulation-based education. Clinical settings refer to real-world healthcare environments where students acquire hands-on experience under supervision, such as during ward rounds, clinical skills training, and patient safety workshops. This review will consider studies that explore how these settings facilitate the integration of experiential learning to develop patient safety competencies in undergraduate medical students.

Sources

This scoping review will incorporate both quantitative and qualitative primary research and secondary reviews, including narrative reviews, scoping reviews, systematic reviews, and meta-analyses. Grey literature will also be included to ensure comprehensive coverage, including conference proceedings, theses, dissertations, preprints, and protocols. Studies examining ELMs within undergraduate medical curricula and their contribution to patient safety education will be considered. Only articles published in English will be considered, due to the language proficiency of the primary reviewer. To ensure the credibility and reliability of the data sources, unpublished materials, websites, short communications, and blog posts will be excluded.

Search Strategy

This review will follow a three-step search strategy outlined in the JBI Scoping Review guidelines (15). In the first phase, a preliminary search will be conducted in PubMed (Medline) to identify key terms and indexing words commonly used in the relevant articles. Titles and abstracts will be reviewed to identify frequently appearing terms related to the study topic. Boolean logic will refine the search strategy, capturing relevant studies. The search keywords and Boolean combinations will include:

("experiential learning" OR "hands-on learning" OR "practical learning" OR "clinical practice") AND ("patient safety" OR "clinical safety" OR "healthcare quality" OR "error management") AND ("medical students" OR "undergraduate medical education" OR "junior doctors" OR "house officer" OR "houseman").

In the second phase, a structured search will be conducted using three key databases: PubMed (Medline), Scopus, and ERIC. These databases are chosen for their broad coverage of medical education, healthcare quality, and patient safety. While PubMed and Scopus provide extensive access to biomedical and healthcare studies, ERIC includes educational research for understanding experiential learning approaches (15). The search will target studies published between January 2010 and March 2024, aligning with the WHO Patient Safety Curriculum Guide (2009), which established foundational principles for patient safety education (2). To complement the database searches, reference lists of included studies will be manually screened to identify additional relevant literature.

Selection of Sources

All identified records will be imported into Rayyan.ai, a web-based software for systematic reviews, with duplicates removed automatically. Before the selection process, pilot testing will be conducted, where two authors (MAP and NHA) will screen the titles and abstracts independently. Subsequently, the titles, abstract and the full text content will be assed based on the inclusion criteria. Records not meeting these criteria will be excluded, with reasons documented. Any disagreements and conflicts will be resolved through team discussions or consultation with a third reviewer (KAB). The selection process findings will be reported and visually presented using the PRISMA-ScR flow diagram (16).

Data Extraction and Analysis

Data from the included studies will be extracted using a structured form (Appendix 1), recording details such as the title, authors, publication year, study aims, methodology, types of ELMs, patient safety competencies, and key findings. Two reviewers will independently extract and verify the data to ensure accuracy and consistency. To enhance reliability, the reviewers will discuss and refine their approach, pilot-testing the process using five sample records. Thematic analysis using NVivo software will identify patterns, themes, and variations across the studies (17). Visual representations such as charts and maps will summarise the findings. A draft version of the data extraction tool is included in Appendix 1

Presentation of Results

The results of this scoping review will be presented in a structured format to enhance clarity and accessibility. A PRISMA-ScR flow diagram will illustrate the selection process, detailing the number of records identified, screened, and included in the final analysis. Descriptive tables will summarise key study characteristics, such as author details, publication year, study design, and participant demographics. ELMs will be categorised based on their alignment with the WHO Patient Safety Curriculum Guide topics and related competencies. The outcomes of these methods will be systematically documented to highlight their contributions in enhancing patient safety knowledge, skills, and behaviours among undergraduate medical students.

The result will undergo thematic synthesis to identify recurring patterns, trends, and gaps, providing insights into the effectiveness of ELMs in supporting patient safety education. Visual tools, including geographic maps and charts, will contextualise the findings and illustrate the global distribution and implementation of ELMs. Particular attention will be given to methods addressing WHO-recommended competencies to demonstrate their practical relevance and contribution to improving patient safety education.

CONCLUSION

This scoping review aims to systematically identify and map the diverse experiential learning methods used in undergraduate medical education to enhance patient safety. By mapping these methods against

the competencies outlined in the WHO Patient Safety Curriculum Guide, this review contributes to effective strategies for medical practices. These findings will assist educators and policymakers to bridge the gap between theoretical knowledge and practical application. The comprehensive understanding gained from this review will contribute to improved patient safety outcomes and the preparation of competent healthcare professionals ready to meet the challenges of real-world medical practice.

ETHICS & DISSEMINATION

This scoping review involves secondary data analysis and does not require ethical approval. The findings will be shared through peer-reviewed journals and academic conferences, ensuring accessibility to educators, policymakers, and researchers in patient safety and medical education (12).

LIMITATIONS

This review is limited by the absence of quality appraisal and stakeholder consultations, which may have provided additional depth and broader perspectives. Additionally, restricting the search to English-language publications may limit the generalisability of findings to non-English speaking contexts.

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APPENDIX-1

Table 1: Descriptive data

Study ID	Author(s)	Study Title & Aim	Research Facility & Country	Study Design	Population	Experiential Learning Methods	Key Findings	WHO PS Topics
1								
2								
3								