INNOVATION AND RESTRUCTURING OF LAB AND CLINICAL SIMULATION IN UNDERGRADUATE NURSING PROGRAMS AS A RESPONSE TO THE COVID-19 PANDEMIC: PROTOCOL FOR AN INTEGRATIVE REVIEW

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Abstract

The COVID-19 pandemic brought the world to a standstill, forcing businesses to close or adjust operations to online platforms. Nursing Educational Institutions (NEIs) were similarly affected by the implementation of public health measures to reduce the transmission of COVID-19, leading to abrupt lockdowns and campus closures, reduced or no face-to-face time in labs, and a sudden loss of clinical placement sites for students. To combat this problem, NEIs had to adjust their conventional practices and find alternative, novel approaches to fulfill the required hands-on lab teaching and clinical practice hours for their students. Many NEIs turned to simulation to close this gap for nursing students. Therefore, this integrative review seeks to explore what innovative simulation strategies were used during the pandemic era and the lessons that can be learned from these innovations.

Key Terms: COVID-19, simulation, innovative strategies, undergraduate nursing

Introduction

Nursing requires not only the acquisition of knowledge but also the capacity to apply the knowledge into practice. Skills such as conducting a thorough health assessment, inserting a urinary catheter, or making critical clinical decisions cannot be taught using didactic teaching methods. Simulation is a widely used pedagogical approach to allow students to engage in an immersive environment that mimics real clinical situations (Aebersold, 2018; Foronda et al., 2013; Kim et al., 2015; Lee & Peacock, 2020). One of the key advantages of using simulation in nursing education is to allow students to practice their skills in a low-risk environment.

The term fidelity in simulation refers to the realism of the simulation scenario (Karlsaune et al., 2023). The realism of the scenario can range from high fidelity to low fidelity. High-fidelity simulation involves the use of manikins that are technologically equipped to mimic human physiology or the use of human actors who can be trained in advance to play certain roles (Nehring & Lashley, 2011). Medium fidelity refers to the use of task trainers or equipment that is not as technologically advanced (Lapkin & Levett-Jones, 2011). Low fidelity simulation can be done with the use of teaching strategies such as role-playing and/or discussing case studies (Karlsaune et al., 2023).

Simulation-based education (SBE) has exploded in recent years to accommodate issues with clinical placement areas, and other factors that inhibit nursing students from practicing to full capacity. The Nursing and Midwifery Council (NMC) in the UK recently released an announcement that they are giving nurse educators flexibility in utilizing simulation to deliver up to 600 hours out of the 2300 practice hours (Nursing and Midwifery Council, 2023). This is double what the hours were prior to the announcement. Announcements like this show how simulation is taking the place of clinical practice hours and the need for Nursing Educational Institutions (NEI) to accommodate simulation in their curricula.

The COVID-19 pandemic was declared on 11 March 2020 by the World Health Organization (WHO, 2023). During the pandemic, public health measures led to reduced or lack of face-to-face time in labs. The other issue was a lack of clinical placement areas for students to complete clinical practice hours. To combat this problem, NEIs had to look at innovative solutions to fulfill lab teaching and clinical practice hours. One of the directions from nursing governing bodies was to increase simulation hours to ensure nursing students were able to successfully attain the learning objectives of the lab and clinical practice courses.

COVID-19 forced NEIs to pivot to strategic measures to complete the required lab and clinical hours. Therefore, this integrative review will seek to explore what innovative simulation strategies were used during the pandemic era and what we can learn from these innovations. The reason for choosing the topic is to explore what novel approaches emerged during this time to replace actual hands-on clinical and lab practice. The expectation of this integrative review is to provide direction for future research to demonstrate what novel approaches were delivered by nurse educators as they endeavour to meet practicum and lab expectations set forth by academic institutions.

Methods

An integrative review is being used to explore the topic in question. An integrative review is suitable when you wish to gain a deeper understanding of a phenomenon (Soares, 2014). This integrative review followed the guidelines from Whittmore and Knafl. These guidelines are divided into five sections: 1. the problem; 2. the literature; 3. the data evaluation; 4. the data extraction; and 5. the presentation of the results (Whittemore & Knafl, 2005).

Step 1: Problem Identification

To obtain a clear picture of the topic under study during the review of white and grey literature, the researchers developed some guiding questions.

1. What types of approaches were used to engage students learning to replace a clinical practicum?

2. What novel approach was used to engage students learning in labs?

Step 2: Literature Search

See Tables 1 and 2 below for the following databases that were included in this search and the terms used to guide the search of the literature.

Table 1: List of searched databases

For published articles	For grey literature
1. Pubmed 2. CINAHL (EBSCO) 3. Academic Search Complete (EBSCO) 4. ERIC (EBSCO) 5. Embase (OVID) 6. Scopus	1. Google 2. Google Scholar 3. openGrey 4. ProQuest Dissertation and Thesis Global

Table 2: Search terms

Concepts	Search keywords
Undergraduate nursing students	baccalaureate*, bachelor*, nurs*, BSN, BN, BScN
Simulation	simulation-based, "Computer Simulation", "Patient Simulation", "High Fidelity Simulation ", "Simulation Training", "Virtual Reality" OR simulat*, "Manikins", lab*
COVID-19	2019 novel coronavirus disease, COVID19
Innovation and restructuring	restructur*, innovat*, adapt*, supplemen*, replac*, augment*, modif*, and novel

Inclusion and exclusion of studies

A set of defined inclusion and exclusion criteria was developed by the research team, see Table 3. This review consists of both white and grey literature. Articles will be downloaded onto Rayyan platform and then screened by two of the researchers initially. All duplicates will be removed prior to screening. Screening will be blind, and title and abstract will be reviewed for inclusion in the review. Both reviewers will then meet to come to a congruence of selection, and those articles that meet the inclusion criteria will be screened for full-text review. In the event that there is a discrepancy, a third author will be called upon to resolve the discrepancy and to reach a mutual agreement.

Table 3: Inclusion/exclusion criteria

Inclusion Criteria	• Studies: Original research with innovation or restructuring of simulation interventions during COVID-19 • Populations: Undergraduate nursing students • Nursing programs should be a 3- or 4-year undergraduate nursing program leading to an undergraduate degree in Nursing. • Design: Any types of studies • Outcomes: Includes but not limited to any innovations or restructuring of simulation to deliver clinical or lab teaching during COVID-19
Exclusion Criteria	• Studies not describing innovation or restructuring of simulation for clinical and/or lab • If the description of the simulation activity lacked detail such as this was an innovation or restructuring of a simulation • No original studies, e.g., publications in the form of editorials, reviews, or opinion articles • Studies not in English • Undergraduate Nursing programs that are less than 3 or 4 years in length • Undergraduate nursing programs that do not lead to an undergraduate nursing degree

Step 3: Data Evaluation

Data extraction will be done using a predefined tool which the team has determined. This tool will be piloted by two members of the research team with the use of five of the articles to come to an agreement for what data extraction headings are to be used. Two members of the team will perform data extraction to remove bias and ensure consensus.

Step 4: Data Analysis

To obtain an in-depth description of the data and the topic, we will utilize Ritchie & Spencer's (2002) five step process for coding the data. The steps consist of 1. Familiarizing ourselves with the data, 2. Identifying the framework to elucidate themes and ideas, 3. Indexing the date to apply the framework, 4. Charting the data into a matrix for visualization and 5. Mapping and interpreting the data into major characteristics for display.

Step 5: Presentation

In this step, the extracted data will be both analysed and synthesized to draw conclusions from the data. During this stage, all literature will be appraised using the Mixed Methods Appraisal Tool and the Authority, Accuracy, Coverage, Objectivity, Date, and Significance (AACODS) tool.

Outcomes

The purpose of this comprehensive integrative review is to identify and analyze the different innovative simulation strategies that were used during the COVID-19 pandemic to fulfill the lab and clinical hour requirements of the nursing degree program. With this study, we will be able to analyze these strategies in terms of their effectiveness and how they can be used to supplement or replace traditional lab and clinical practice in the future. Barriers, facilitators, and outcomes of the existing simulation strategies in nursing education will be identified as well. Through this study, we anticipate gaining insight into how nursing educators adapted to the limitations due to the pandemic and the benefits of doing so. This study will determine what types of simulation strategies may work for undergraduate nursing students.

Potential Impact

The findings from this integrative review will help nursing educators and institutions better respond to the changing landscape of the current lab and clinical practice. New simulation techniques could be useful in the training of future nurses. This review has the potential to inform the design and implementation of novel simulation methodologies, which in turn may enhance nursing curricula and produce more competent graduates. Further, our analysis has the potential to aid efforts to enhance nursing programs and ensure that students receive the support they need with regard to meeting the clinical requirements of their program even in the face of challenging situations. Finally, this review may highlight the need for further research to develop and evaluate innovative simulation strategies in nursing education.

Strengths

Through the assistance of a librarian, this integrative review will employ a systematic and structured approach with specific inclusion and exclusion criteria and encompassing search terms to yield comprehensive results from multiple databases. The search will be inclusive of both original research and grey literature, forming a diverse and solid foundation to gain insight into the innovations in simulation that were used to fill in for lost face-to-face lab time and clinical placements during the COVID-19 pandemic. Valid tools will be used by two reviewers to appraise the literature independently to prevent bias.

Limitations

This integrative review will be limited to articles published only in the English language and to simulations used in undergraduate baccalaureate nursing programs, which may exclude relevant innovations outside of these parameters. Additionally, the wide range of included literature may result in less rigorous findings.

Knowledge Translation

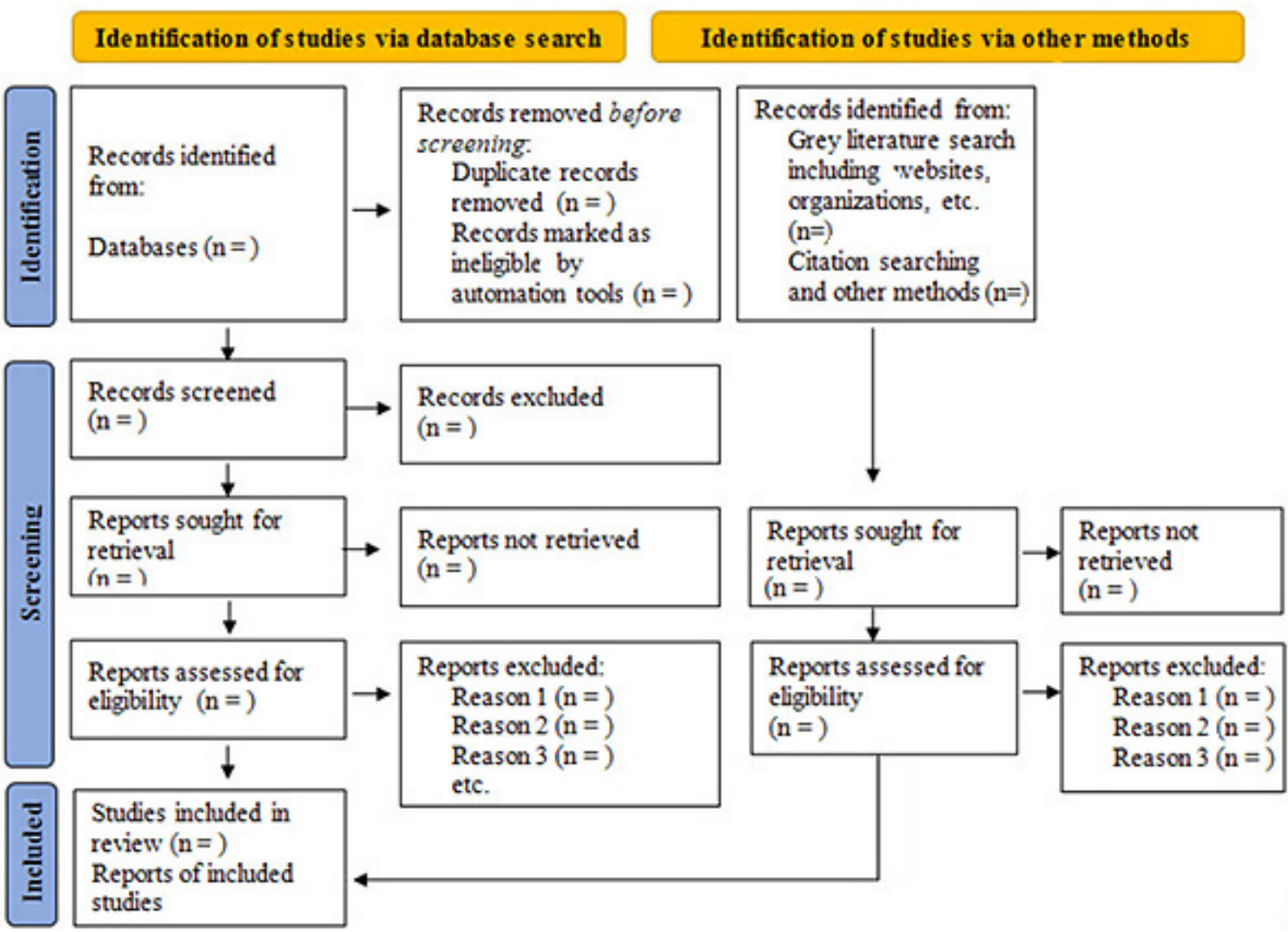
Knowledge translation plans include presenting to academic audiences both locally and globally. The researchers will also endeavour to present at both local and global conferences. The results of this integrative review will be submitted to an open-access journal for wider dissemination.

Declarations

All authors have nothing to declare and have received no financial support for this integrative review.

Appendices

Figure 1: Literature Search Flow Diagram



Note. Flow diagram of search and selection process for the integrative review
(Adapted from "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," by Page et al., 2021).

Data Extraction Table

Extraction Table						
Author (year), Title, Country	Study Aim	Study Design	Sample Size & Undergraduate Year	Innovation / Restructuring - Lab or Clinical (Intervention)	Key Findings	Comments

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