

# Frameworks for the design, implementation, and evaluation of simulation-based nursing education: A scoping review

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## Abstract

This scoping review was conducted to identify and describe constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education globally, with a focus on their applicability in low-resource settings. Six electronic databases, three of which were on EBSCO Host (CINAHL, MEDLINE, ERIC), PubMed, Scopus, and ProQuest, as well as Google Scholar, were searched to retrieve studies published in the English language between 2012 and February 2022. The review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) checklist, and was guided by Arksey and O'Malley's five-step scoping review methodological framework. Data were extracted from five studies (four frameworks and a theory) and narratively synthesized. Hence, seven constructs were identified and described: context, background, simulation design, educational practices, facilitator, participant, and outcomes. The four frameworks and theory were developed in the context of developed countries, which reveals the lack of a context-specific framework to guide the design, implementation, and evaluation of simulation in nursing education in low-resource settings. Given resource limitations and the apparent gaps in applying simulation-based framework(s) developed in developed countries to low-resource settings, the findings of this review underscored the need for a context-specific framework that is locally tailored to the needs and resources of low-resource settings, to promote access to and use of simulation in enhancing student learning, and the development of clinical competence.

## KEYWORDS

clinical competence, clinical education, low-resource setting, nursing, nursing education, simulation, simulation theory, simulation-based framework

## Key points

- Globally, simulation-based clinical nursing education is considered the gold standard for facilitating the development of clinical competence in nursing education.
- The existing frameworks and theory developed to guide the design, implementation, and evaluation of simulation in nursing education were all created in developed countries,

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highlighting the gap in their application in a low-resource setting, given the contextual differences between high-income countries and the improvised low-resource settings.

- A context-specific framework that is tailored to meet the local needs and resources of low-resource settings is needed to promote access to and use of simulation in nursing education.

## 1 | INTRODUCTION

Nursing education seeks to provide nurses with the clinical competencies needed to function in the ever-changing healthcare setting. Clinical competence in nursing practice entails the use of knowledge, understanding, and judgment, as well as the competencies of the exhibition of skills, attitudes, and qualities, in the delivery of safe patient care in specific situations (Notarnicola et al., 2016; Park et al., 2013). To develop the clinical competence of nursing students, nursing education institutions (NEIs) have relied heavily on classroom teaching and skills-based training (demonstration and return demonstration) in skills laboratories, usually complemented by clinical placements (Aebersold, 2018; Salifu et al., 2019). However, this approach has been largely criticized for failing to facilitate the development of clinical competence (Cook et al., 2012; Salifu et al., 2019; Turale et al., 2008). Cook et al. (2012) believe, for example, that the approach largely promotes rote learning and does little to facilitate the development of critical thinking or sound clinical judgment abilities. Salifu et al. (2019) also found that clinicians were dissatisfied with the level of knowledge and skills displayed by students during clinical placements. Yet, NEIs continue to rely heavily on the traditional approach to clinical education to help students develop clinical competence. Furthermore, the lack of equipment and other learning resources within skills laboratories and NEIs as a whole has been identified as a factor that continues to promote the overdependence on traditional, clinical educational strategies (Salifu et al., 2019; Salifu et al., 2022).

As a result, clinical placements appear to present a suitable opportunity for students to build and hone their clinical competence. Unfortunately, relying simply on practice opportunities provided in clinical settings for the development of clinical competence appear unpragmatic and even unsafe. Lessons from the impact of the recent COVID-19 pandemic on clinical nursing education may lend credence to this assertion. The increasing student numbers in various parts of the world have resulted in overcrowding at clinical placement sites and sometimes makes it difficult to find placement sites suitable for the learning needs of students (Kim et al., 2016; Salifu et al., 2019). Even when less crowded with students, decisive interventions are required to support student learning during clinical placements. In the absence of such interventions—as is the case in most low-resource settings—qualified nurses are unlikely to fully support student learning as they tend to prioritize direct patient care over clinical teaching (Salifu et al., 2019; Salifu et al., 2022). Concerns have also been raised over the safety and the ethical implications associated with using real patients for clinical teaching and student learning, especially as patient acuity among hospital

inpatients is increasing because of the shift from hospital to community care (American Association of Colleges of Nursing, 2017; Amilia & Nurmalia, 2020; Kpodo et al., 2016).

The use of traditional clinical educational strategies in nursing education also contributes substantially to the theory–practice gap that is increasingly threatening the realization of the ideals of nursing education and practice (Salifu et al., 2019). It is therefore imperative that NEIs embrace new and innovative approaches to clinical nursing education to enhance the development of clinical competence. There has been a drive to increase nursing students' preparation in simulation laboratories before clinical placements in an attempt to address the challenges in clinical nursing education (Flood & Robinia, 2014; Kalayi & Akintola, 2013). Students' exposure to clinical scenarios in the simulation laboratories prior to clinical placement may help them develop clinical competence (Jeffries, 2016; Munangaire et al., 2019). In their recommendation for the use of simulation as a teaching strategy in nursing education, the National Council of State Boards of Nursing of the United States stated that using clinical simulation as a substitute for up to half of clinical placement time with actual clinical placement taking up the other half holds comparable benefits for traditional clinical placement in the attainment of graduate outcomes (Hayden et al., 2014). As a result, several NEIs and countries have developed and implemented simulation-based clinical nursing education (SBCNE) programs (Hill & Williams, 2017).

SBCNE is described as an instructional strategy used for simulating genuine clinical experiences in NEI simulation laboratories, thereby allowing students to study in a safe and nonthreatening atmosphere (Jeffries, 2016). For SBCNE to be effective, there is the need to establish a secure and congenial learning environment for students through the use of student-centered, team-based, experiential educational approaches in the clinical simulation laboratory (Jeffries, 2016). Effective SBCNE allows students to gain clinical competence by exposing them to situations that are similar to real-life conditions while avoiding the potential for injury to the patient (Jeffries, 2016). SBCNE employs a variety of simulation modalities, including role play, standardized patients, computerized manikins, virtual simulation, and task trainers to ensure effectiveness and accomplishment of the learning objectives and outcomes (Aebersold, 2018).

The International Nursing Association for Clinical Simulation and Learning (INACSL) has published best practice recommendations for the design and implementation of SBCNE to promote its use (INACSL Standards Committee, 2016). Some of the best practice recommendations by the INACSL Standards Committee (2016) include (1) conducting needs assessment to ensure availability of resources to support the simulation experience; (2) structuring the simulation

based on the overall purpose of the simulation experience, theory, and simulation modality; (3) designing a scenario to reflect the simulation-based experience; (4) adopting a facilitative, participant-centered approach that is based on the knowledge and experience level of the participants and the simulation outcomes; (5) commencing the simulation experience with prebriefing that entails the establishment of participant expectations and the setting of ground rules for the simulation experience; and (6) ending the simulation session with debriefing and feedback aimed at enriching the learning experience. Regardless of the INACSL recommendations, the most appropriate simulation modality in each particular situation is determined by the learning objectives and the availability of resources, thus necessitating contextualization. Although the usage of SBCNE has increased exponentially in most NEIs in Europe, the United States, Asia, and Australia, the literature demonstrates limited evidence and research on the use of simulation in low- and middle-income countries (Cant & Cooper, 2017). The underuse of SBCNE in the impoverished low-resource settings could be due to, among other factors, a lack of a simulation-based framework sensitive to the specific challenges of low-resource settings.

No previous review on simulation in nursing education has identified and described the constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation globally with a focus on their applicability in a low-resource setting (Adamson, 2015; Cant & Cooper, 2017; Kunst et al., 2018; Levett-Jones & Lapkin, 2014). The use of simulation in nursing education is a relatively new concept, so the frameworks and theories to guide its use in adopting different study designs are limited, thus making the conducting of a systematic review on the topic a difficult task (Arksey & O'Malley, 2005). A scoping review was therefore ideal for identifying and describing the constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation globally in nursing training settings, with a focus on their applicability in low-resource settings (Arksey & O'Malley, 2005). Thus, this review aims to identify and describe constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education globally, with a focus on their applicability to a low-resource setting.

## 2 | METHODS

The review was guided by the five-step methodological framework for conducting scoping reviews by Arksey and O'Malley (2005). Like systematic reviews, the five-step methodological framework ensures a rigorous approach to consolidating data from different studies with different designs and research paradigms, as was the case in this review (Arksey & O'Malley, 2005).

Additionally, the review observed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis- extension for Scoping Reviews (PRISMA-ScR) checklist (Tricco et al., 2018). This scoping review formed part of a bigger protocol approved by the Scientific Committee of North-West University, South Africa.

### 2.1 | Stage 1: Identifying the research question

A systematic review revealed limited research effort and simulation implementation in low- and middle-income countries, particularly in sub-Saharan Africa (Cant & Cooper, 2017), which led to the research question for this review. The Joanna Briggs Institute's "PCC" mnemonic (Population, Concept, and Context) (Peters et al., 2020) inspired the creation of the review question. The PCC mnemonic also served as a reference for the review's inclusion and exclusion criteria. The population being explored was "preregistration nurses," and the concept under study was "frameworks and theories of simulation for clinical competence" within the context of "nursing education." Thus, the review question: "What are the constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation for the development of clinical competence in preregistration nursing education?" guided this review.

### 2.2 | Stage 2: Identifying relevant studies

Initially, the study sought to identify and describe constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in low-resource settings. However, preliminary searches of several databases conducted on January 15, 2022, using the keywords "clinical competenc\*," "simulation," "framework," "theor\*," "nursing education" and "low-resource setting\*" combined with Boolean operators "OR" and "AND," and the wildcard "\*" (Clinical competenc\* AND Simulation AND Framework OR Theor\* AND Nursing education AND Low-resource setting\*) did not yield eligible results. Hence, the study objective and search strategy were modified and broadened to identify and describe constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education globally, with the focus on their applicability in a low-resource setting.

In line with this, EBSCO Host (CINAHL, MEDLINE, ERIC), PubMed, Scopus, and ProQuest were searched using the keywords "clinical competenc\*," "simulation," "framework," "theor\*," and "nursing education." These keywords were combined with the Boolean operators "OR" and "AND" and the wildcard "\*" (Clinical competenc\* AND Simulation AND Framework OR Theor\* AND Nursing education). In addition, relevant studies were searched manually in the reference lists of the retrieved articles. A Google Scholar search for gray literature on simulation frameworks and theories in nursing education was also done. The search was conducted independently by the first and second authors (D.A.S and C.D.C) between January 15 and February 25, 2022.

### 2.3 | Stage 3: Study selection

The review included studies that were focused on frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education published in the English language in all countries between 2012 and February 2022. Studies published in

other languages were excluded because the reviewers lacked the necessary language skills and translation resources. The search time frame was limited to the previous 10 years to retrieve contemporary frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education. Simulation frameworks and theories from other health and nonhealth disciplines or those that were multidisciplinary in scope were excluded from the review.

Studies identified from the databases were imported to the Mendeley reference manager, and duplicates were identified and merged. The titles and abstracts of the articles were then read and evaluated by D.A.S and C.A.C to determine their eligibility. Full-text articles were retrieved and read independently by the two reviewers to establish whether they met the inclusion criteria. Discrepancies between the two reviewers were resolved through discussion. When the reviewers could not agree on the eligibility of an article, a third reviewer's (Y.H., third author) opinion was sought. Although the reviewers were critical about the inclusion of studies based on the inclusion criteria, there was no formal quality appraisal or assessment done to include articles as it is not a prescription for scoping reviews (Arksey & O'Malley, 2005).

## 2.4 | Stage 4: Charting the data

The data from the included studies were charted onto a data extraction sheet developed by the research team and comprised the author (date), aim of framework/theory, development process, content of theory/framework, strengths/weaknesses of the theory/framework, and application setting. Our primary focus was on the content or constructs of the individual frameworks or theories and the application setting. The strengths and weaknesses of the frameworks and theory included in the review were assessed iteratively, largely because the reviewers could not find any suitable existing tool to guide the assessment process as proposed by the review. The data extraction sheet was pre-tested on three randomly selected studies by D.A.S and C.D.C. Minor changes were made to improve the data extraction sheet after consensus was reached between the two reviewers through discussions. Following the minor adjustment to the data extraction sheet, D.A.S and C.D.C. independently extracted the data from the included studies for analysis. Emerged discrepancies between the two reviewers were resolved through dialogue. Microsoft Excel spreadsheet was used to organize the data and later exported to Microsoft Word processor. The extracted data were verified by Y.H. for accuracy.

## 2.5 | Stage 5: Collating, summarizing, and reporting the results

Complementing the recommendations by Arksey and O'Malley (2005), the extracted data from the included studies were then narratively synthesized. The use of narrative synthesis enabled the comparison of constructs and identification of patterns across the frameworks and theory included in this review. The analysis was done by D.A.S. and C.D.C. independently. Discrepancies that emerged between the two

reviewers during the analysis were resolved through discussions. The result is therefore a summary of evidence concerning constructs of the frameworks and theory used to guide the design, implementation, and evaluation of simulation for the development of clinical competence in pre-registration nursing education in resource-limited contexts (Popay et al., 2006). Table 1 presents a summary of the analysis process.

## 3 | RESULTS

### 3.1 | Search outcomes

The search of the databases, Google Scholar, and the reference list of other relevant studies yielded 240 studies, which were reduced to 144 papers after the removal of duplicates. After reviewing the titles and abstracts, 135 papers were eliminated for not meeting the inclusion criteria of the review. The full texts of the remaining nine papers were retrieved and thoroughly evaluated against the inclusion criteria. Four papers (Chiniara et al., 2013; Cochrane et al., 2020; Harris et al., 2013; Khalili, 2015) were excluded because they did not focus on a framework or theory to guide the design, implementation, and evaluation of simulation in nursing education. Cochrane et al. (2020) focused on paramedicine rather than nursing, whereas Chiniara et al. (2013) and Khalili (2015) were multidisciplinary in scope. Harris et al. (2013) was focused on the call for a simulation framework in nursing education rather than presenting framework content. Five papers (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012, 2016; Kunst et al., 2018) that met the review's inclusion criteria were therefore retained. The included papers comprised one theory (Jeffries, 2016) and four frameworks (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Kunst et al., 2018). The PRISMA flow diagram of the search and inclusion process is illustrated in Figure 1.

### 3.2 | Characteristics of included studies

All the frameworks and the theory included in this review were developed in the context of developed countries. Four were developed in the United States (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016) and one in Australia (Kunst et al., 2018). Out of the five included papers, four were published within the last 6 years (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2016; Kunst et al., 2018), and one was published before or outside the last 6 years (Jeffries, 2012).

The aims of all the papers included in this review were to develop best practices in simulation design, implementation, and evaluation in nursing education. Furthermore, the approaches employed in the development process of the frameworks and theory were comparable. All four frameworks included used literature reviews in the framework development process (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Kunst et al., 2018). However, Daley and Campbell (2018) included experiences of the authors in teaching within a simulation-based pedagogy combined with the collective synthesis of the experiences of

**TABLE 1** Data analysis process

Categories	Subcategories	Supporting sentences
Context	Setting	The physical environment of occurrence of the simulation (skills laboratory or clinical setting) (Cowperthwait, 2020; Jeffries, 2016). Measures should be put in place in the physical environment to prevent physical harm to simulated participants (Cowperthwait, 2020).
	Purpose	The overall purpose of the simulation (instructional or evaluation) is fundamental in the design of the simulation (Cowperthwait, 2020; Jeffries, 2016).
Background	Benchmarks	Included in the background are participant expectations and the primary goal of the simulation (Cowperthwait, 2020; Jeffries, 2016).
	Resources	The background includes the needed resources (space, equipment, and personnel) and their allocation for the simulation (Cowperthwait, 2020; Jeffries, 2016).
	Curriculum integration	Included in the background is the need for alignment between the curriculum content and the simulation activities (Cowperthwait, 2020; Jeffries, 2016), and there is a need for integrating simulation throughout the curriculum (Daley & Campbell, 2018). Plan and structure the curriculum content in line with the simulation activities (Kunst et al., 2018).
	Guiding theory or framework	The theoretical perspective of the simulation is an essential component of the background (Cowperthwait, 2020; Jeffries, 2016). There is a need to structure the simulation design with a learning theory of framework (Kunst et al., 2018).
Simulation design	Learning objectives	A structural component of the simulation design includes a well spelled out, concise, and measurable learning objectives (Cowperthwait, 2020; Jeffries, 2012; Jeffries, 2016).
	Scenario development	The development of the simulation scenarios and the problem-solving complexity are guided by the learning objectives (Cowperthwait, 2020; Jeffries, 2016). The simulation design entails authentic scenario development with the requisite problem-solving complexity (Kunst et al., 2018).
	Fidelity	Keeping participants fully immersed by sustaining the realism of the simulation is key in achieving the learning objectives (Jeffries, 2016). Characteristics of the simulation environment should enhance the authenticity of the experience and suspend disbelief (Jeffries, 2016). Characteristics of the simulation environment should mimic reality (Jeffries, 2012). Fidelity focuses on making the simulation activity very realistic, and entails equipment, environment, and psychological fidelity (Daley & Campbell, 2018). There is the need for the simulation scenario to be realistic (Kunst et al., 2018).
	Pre-briefing	All scenarios begin with a prebriefing and orientation to set the stage for an effective experience (Cowperthwait, 2020; Jeffries, 2016). Dress rehearsal for all simulated participants is necessary before the commencement of the simulation (Cowperthwait, 2020). A structured prebriefing or orientation for students prior to the commencement of the simulation activity is necessary for a successful simulation experience (Kunst et al., 2018).
	Debriefing	Immediately after the simulation session, the facilitator and the participants engage in debriefing (Jeffries, 2012). The simulation design includes strategies for debriefing, all scenarios conclude with a debriefing session (Cowperthwait, 2020; Jeffries, 2016). Integral in the simulation is a debriefing period in which reflection on action can take place (Daley & Campbell, 2018). A structured debriefing is essential for simulation (Kunst et al., 2018).
	Educational practices	Experiential learning approaches
Facilitator	Facilitator attributes	The facilitator is described as a person responsible for providing support for students during the simulation activity (Cowperthwait, 2020; Jeffries, 2012; Jeffries, 2016). Selected demographics such as age, years of experience, and clinical expertise are believed to be related to the facilitator role (Cowperthwait, 2020; Jeffries, 2016). There is a need for effective training for staff to be equipped with knowledge in facilitating simulation (Kunst et al., 2018).
Participant	Participant attributes	Participant denotes a person who participates in simulation activities to gain knowledge and master skills in readiness to assume a professional role (Cowperthwait, 2020; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018).

(Continues)

TABLE 1 (Continued)

Categories	Subcategories	Supporting sentences
		The participant must possess both innate (age, gender, level of anxiety, and self-confidence) and modifiable (preparedness for the simulation) attributes (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2016).
Outcome	Participant	Participant outcomes include the increase satisfaction and self-confidence; acquisition of knowledge, skills, and attitudes; and behavior (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016). An effective simulation activity helps participants to acquire psychomotor skills, communication, teamwork, and professional behavior, clinical reasoning, and reflective thinking (Kunst et al., 2018).
	Patient	A successful simulation experience results in improved patient safety, excellence in nursing care and reflective practice (Daley & Campbell, 2018).
	System	System outcome refers to how nurses trained with simulation contribute to saving cost (cost-effectiveness) and change in practice (Cowperthwait, 2020; Jeffries, 2016).

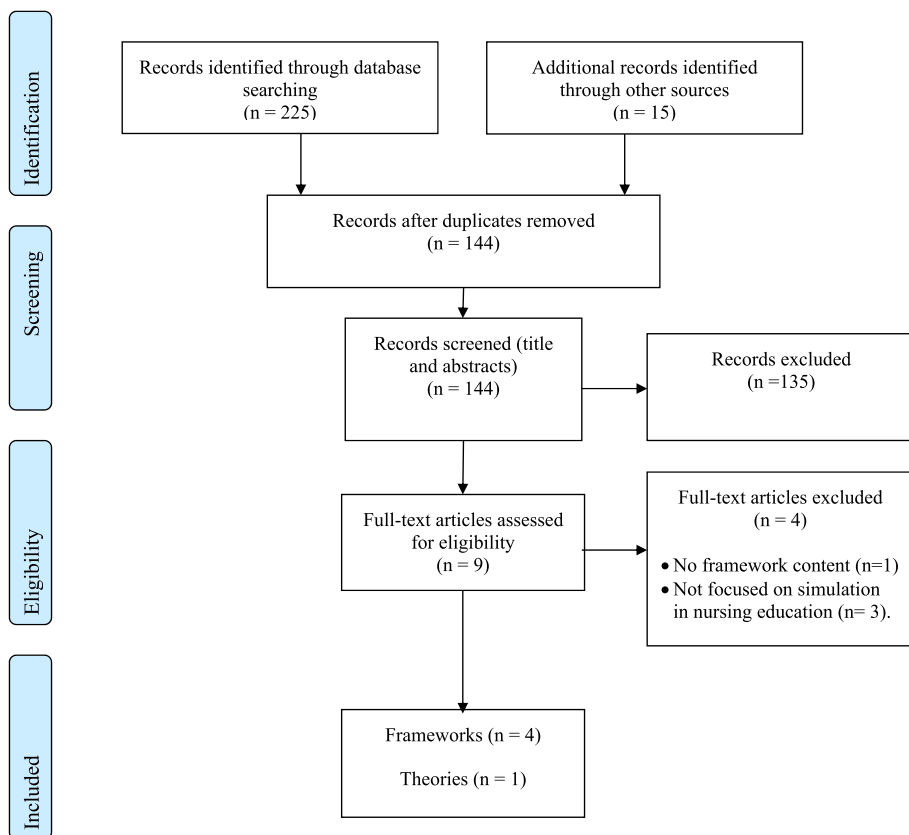


FIGURE 1 The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram of the search and inclusion process

simulation experts. Only Jeffries (2016) adopted a thorough systematic review of the literature in the theory development process of the National League for Nursing (NLN) Jeffries Simulation Theory (Adamson, 2015; Jeffries, 2016). Apart from the Jeffries (2012) simulation framework and the NLN Jeffries Simulation Theory (Jeffries, 2016), which have been validated and showed evidence in their application—particularly in developed countries—there is no evidence in the literature to support the validation or application of the other three remaining frameworks that were identified (see Cowperthwait, 2020; Daley & Campbell, 2018; Kunst et al., 2018). All the frameworks and the theory appeared to focus largely on the use of high-fidelity simulation (HFS) that focused narrowly on the design, implementation, and evaluation of simulation as an activity, but without considering the broader or larger

community of learning, which includes clinicians and regulatory bodies. The reviewers identified inconsistent use of nomenclature within and between frameworks. Table 2 summarizes the characteristics of the included studies and findings regarding the constructs of the frameworks and theories that were used to guide the design, implementation, and evaluation of simulation in nursing education.

### 3.3 | Lack of simulation frameworks for low-resource settings

All of the frameworks and the theory that were identified in this review were developed in the context of developed countries such as the United



**TABLE 2** Summary of findings

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
Jeffries (2012)	The framework was developed to define simulation education variables and provide an organized guide.	This framework is an evolution based on an evaluation of Jeffries (Jeffries, 2005, 2007) by 21 researchers and educators.	<p>This framework consists of five constructs: facilitator, participant, educational practices, simulation design characteristics, and outcomes.</p> <p><b>Facilitator:</b> The facilitator is described as a person with the responsibility of providing support for students during the simulation activity.</p> <p><b>Selected demographics</b> such as age, years of experience, and clinical expertise, are believed to be related to the facilitator role.</p> <p><b>Participant:</b> Participant denotes a person who participate in simulation activities to gain knowledge and master skills in readiness to assume professional role. Attributes believed to be associated with the participant role include; age, program, and level.</p> <p><b>Educational practices:</b> The educational practice construct of this framework consists of active learning, feedback, student/faculty interaction, collaboration, high expectations, diverse learning, and time on task.</p> <p><b>Simulation design characteristics:</b> This construct of the framework comprises five elements; objectives, fidelity, problem solving, student support and debriefing.</p> <p><b>Outcomes:</b> This consists of the acquisition of knowledge, skill performance, learner satisfaction, critical thinking skills, and self-confidence.</p>	<p><b>Strength[s]:</b> The framework is underpinned by three learning theories (constructivism, sociocultural, and learner centered).</p> <p>The framework is thought to contain key constructs for the design and implementation of simulation.</p> <p>There is evidence of the use of the framework in nursing education to guide the design and implementation of simulation particularly in the United States and other developed countries (Lafond &amp; Van Hulle Vincent, 2013).</p> <p><b>Weaknesses:</b> The framework has been criticized as not been nursing-specific (Lafond &amp; Van Hulle Vincent, 2013).</p> <p>The framework does not include the need for initial assessment of available resources necessary for the planning of simulation.</p> <p>There are inconsistencies between in-text variable descriptions and those contained in the figure (Lafond &amp; Van Hulle Vincent, 2013).</p> <p>There is inconsistent use of terminology in the description of some constructs of the framework—participant and student were used interchangeably, and facilitator and teacher were also used interchangeably.</p> <p>The framework did not consider the initial preparation and training of participants and facilitators before the simulation activity.</p>	United States
Jeffries (2016)	The National League for Nursing (NLN) Jeffries theory aims to establish fundamental principles, standards, and practices to guide the design,	The NLN Simulation Theory was developed from insights gained from theoretical and empirical literature related to simulation in nursing,	The theory consists of seven constructs: context, ackground, design, simulation experience, facilitator/educational	<p><b>Strength[s]:</b> The NLN Simulation Theory evolved from a validated framework.</p> <p>The NLN Simulation Theory was developed based on a</p>	United States

(Continues)

TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
	implementation, and evaluation of simulation used as a teaching strategy in nursing	medicine, health care, and other non-health-related disciplines and a thorough systematic literature review related to the NLN Jeffries Simulation Framework.	<p>strategies, participant, and outcomes.</p> <p>Context: The context involves the physical environment in which the simulation is occurring (the school environment (skills laboratory) or the clinical setting) and the overall purpose of the simulation (instructional or evaluation).</p> <p>Background: Existing within the context, the background comprises participant expectations, the theoretical perspective the simulation, the primary goal, needed resources and resource allocation for the simulation, and how the simulation fits into the curriculum.</p> <p>Design: Structural components of the simulation design include well-spelled-out learning objectives to guide the development of the simulation scenarios and the problem-solving complexity, desired fidelity, facilitator cues, participants and observer role assignment, the sequence of the simulation activities, and strategies for briefing/debriefing.</p> <p>Simulation experience: Established on an environment of mutual trust between the facilitator and participants, the simulation experience is defined as experiential, interactive, collaborative, and learner centered.</p> <p>Facilitator and educational strategies: Key facilitator attributes include skills (teaching and clinical), educational techniques, and preparation. The facilitator provides support and guidance for participants during the simulation activity by adjusting educational strategies, providing feedback, and debriefing.</p>	<p>thorough systematic review of the literature done by Adamson, (2015) ensuring rigor.</p> <p>It is well grounded in learning theories.</p> <p>The theory includes a component of needs assessment described under the context and background. This is consistent with the International Nursing Association for Clinical Simulation and Learning standards of best practice guidelines.</p> <p>There is evidence of its use in nursing education to guide the design and implementation of simulation, particularly in the United States and other developed countries.</p> <p>Weakness:</p> <p>The influence of some concepts such as age and gender, listed as innate attributes of participants on the simulation experience or outcomes, are not explained.</p> <p>The theory did not include the need for an initial preparation and training of participants and facilitators before the simulation activity.</p> <p>Despite having been widely used in guiding the design and implementation of simulation in nursing education, there appear to be no evidence of its use in nursing education in low- and middle-income countries.</p>	



TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
Cowperthwait (2020)	To set a foundation for a theoretical framework, a simulation framework for simulated participant methodology.	An integration of key components from the NLN Jeffries (2016) simulation theory into simulation-based education that includes simulated participants.	<p>Participant: Described as the person who participates in simulation to gain knowledge and skills, the participant must possess both innate (age, gender, level of anxiety, and self-confidence) and modifiable (preparedness for the simulation) attributes.</p> <p>Outcomes: The outcomes focus primarily on the participant, patient, and system.</p> <p>However, participant outcome is what is largely reported in the literature and include increased satisfaction and self-confidence; acquisition of knowledge, skills, and attitudes; and behavior.</p> <p>Patient and system outcomes are new areas and less reported in the literature. The patient outcome looks at the transfer of knowledge acquired in the simulation to direct patient care as contributing to positive patient outcomes.</p> <p>System outcome refers to how nurses trained with simulation contribute to saving cost (cost-effectiveness) and change in practice.</p>	<p>Strength: The framework has identified specific essential elements in the design, implementation, and evaluation of simulation using stimulated participants based on an established theory (Jeffries, 2016).</p> <p>Weaknesses: The suggested modifications to the NLN Jeffries simulation theory to establish the framework for simulated participant methodology is not supported by research evidence or that aspect is not reported in the paper. There is no evidence to support the appraisal or validation of the framework.</p>	United States

(Continues)

TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
			<p>Context: Inclusion of safety measures for SPs and the need to ensure environmental fidelity.</p> <p>Background: Inclusion of the need to prepare SPs.</p> <p>Design: Inclusion of the need to choose SP appropriate for the role and the need for dress rehearsals for SPs.</p> <p>Educational practices: The simulation activity should exist within an environment of mutual trust between the facilitator and participant. It should be learner centered, collaborative, and interdisciplinary.</p> <p>Participant: In addition to the description of the participant as contained in the NLN Jeffries simulation theory, NLN/Jeffries simulation framework for simulated participant methodology recommends the need to set expectations for SP feedback during debriefing.</p> <p>Facilitator: In addition to the description of the facilitator as contained in the NLN Jeffries simulation theory, NLN/Jeffries simulation framework for simulated participant methodology recommends the need to add the following facilitator attributes: experience with SP methodology, knowledge of the Association of Standardized Patient Educators' Standards of Best Practice, knowledge of how to deliver SPs feedback during debriefing.</p> <p>SP educator: The SP educator role is a new inclusion and it entails: the establishment of standards for simulation fidelity, SPs recruitment, development of character descriptions.</p>	<p>No quality assessment was done for the included papers in the literature review of the framework.</p> <p>There appears to be no evidence of its use to guide the design and implementation of simulation in the literature.</p>	

TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
Daley and Campbell (2018)	The framework aims to present a student-centered approach to learning through simulation-focused pedagogy for integration throughout the nursing curriculum.	The framework for simulated learning for nursing education was developed based on a review of the literature on simulation, the experiences in teaching within a simulation-focused pedagogy by the authors, and combined with the collective synthesis of the experiences of experts in simulation.	<p>SP: There is the need for SPs to be adequately prepared for their role. SPs must show high level of commitment to the character they are assigned.</p> <p>There is the need to establish whether the SP has some experience with the role or potential personal biases.</p> <p>Outcomes: In addition to the outcomes in the area of participant, patient, and systems, the NLN/Jeffries simulation framework for simulated participant methodology includes outcomes in relation to a simulated participant that focuses on the enhancement of the SP's role.</p> <p>Initial assessment: The framework recommends an initial assessment of the student experiences, level of education and culture before the commencement of the simulation. The cultural factors as identified by the framework include race, ethnicity, gender, sexual identity, age, and socioeconomic status.</p> <p>Simulation goals: The framework identified critical thinking, effective communication, and the demonstration of clinical competence as the broad goals of simulation.</p> <p>Curriculum integration: The framework highlights the need for integrating simulation throughout the curriculum.</p> <p>Educational principles: The educational principles in use in simulation as outlined in the framework include interactive learning, learning to learn, and foundational knowledge.</p>	<p>Strength: The work was based on published research evidence in simulation.</p> <p>Weakness: The framework has not been appraised, evaluated, or validated.</p> <p>Not adopting a systematic or a more formalized review approach of the literature could introduce some personal biases of the literature review findings.</p> <p>No quality assessment was done for the included papers in the literature review.</p> <p>There appears to be no evidence with regard to its use to guide the design and implementation of simulation.</p>	United States

(Continues)

TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
Kunst et al., 2018	The framework was developed to establish best practice in simulation.	The best practice framework was developed through the synthesis of three existing best practice guide elements.	<p>Fidelity: Fidelity focuses on making the simulation activity very realistic, and entails equipment, environment, and psychological fidelity.</p> <p>Debriefing: The debriefing period is essential in the simulation experience because it allows for the evaluation of the simulation activity thereby promoting reflective thinking.</p> <p>Outcome: The framework holds the view that, a successful simulation experience results in improved patient safety, excellence in nursing care and reflective practice, and satisfaction, which goes a long way to transform nursing practice.</p>	<p>Strengths: The framework contains some essential elements of the simulation activity such as the need for staff training and prebriefing/orientation, which were not included in other frameworks. The inclusion of those elements were consistent with the standards of best practice guidelines for simulation (International Nursing Association for Clinical Simulation and Learning Standards Committee, 2016).</p> <p>Weaknesses: There is no evidence of any quality assessment of studies used in developing the framework.</p> <p>The framework was not appraised or tested.</p> <p>No evidence of its use in guiding the design and implementation of simulation in nursing education.</p>	Australia

TABLE 2 (Continued)

Author, date	Aim of the theory/ framework	Development process	Content	Strengths and weaknesses	Application
			<p>A structured prebriefing or orientation for students prior to the commencement of the simulation activity is necessary for a successful simulation experience. It should focus on familiarizing the students to the learning objectives, simulation activity, simulation environment, and equipment.</p> <p>A structured debriefing is essential for simulation. For debriefing to be effective, it must be organized in a safe environment, facilitated by a trained person, and address the following areas: psychomotor skills, communication, teamwork, and professional behavior; clinical reasoning, and reflective thinking.</p> <p>Evaluation: A comprehensive evaluation of both the participant and facilitator with regards to their perception of the simulation experience, organization, and support is essential.</p> <p>Student performance could also be evaluated in simulation (formative and summative evaluation).</p>		

States (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016) and Australia (Kunst et al., 2018). This occurrence demonstrates the lack of a context-specific framework to guide the design, implementation, and evaluation of SBCNE in low-resource settings.

### 3.4 | Identified constructs of frameworks and theory used to guide the design, implementation, and evaluation of simulation in nursing education

Of the simulation theory and frameworks included in this review, seven constructs were identified, namely context, background, simulation design, educational practices, facilitator, participant, and outcome. All five included studies (see Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012, 2016; Kunst et al., 2018) identified facilitator, participant, educational practices, and outcome as essential constructs for the design, implementation, and evaluation of

simulation in nursing education. Four studies included simulation design (Cowperthwait, 2020; Jeffries, 2012, 2016; Kunst et al., 2018) as a construct for designing, implementing, and evaluating simulation, and two of the studies included context and background as prominent elements (Cowperthwait, 2020; Jeffries, 2016).

### 3.5 | Context

“Context” is considered foundational in the implementation of simulation pedagogy. The setting, including the intended physical environment of occurrence of the simulation (school or practice environment) as well as the overall purpose of the simulation (for instructional or evaluation purposes) are essential elements of the context to be considered in the design, implementation, and evaluation of simulation (Cowperthwait, 2020; Jeffries, 2016). Contextual elements are mostly used to drive the formulation of broad simulation goals, which in turn have an impact on the

development of specific learning objectives (Cowperthwait, 2020; INACSL Standards Committee, 2016; Jeffries, 2016).

### 3.6 | Background

“Background” is an element that exists within the context and has a significant impact on the simulation activity. Essential elements of background include the objectives of the simulation activity, alignment of the simulation activity with the curriculum, theory or framework guiding the simulation, and the available resources to support the implementation of the simulation (Cowperthwait, 2020; Jeffries, 2016). More important, background provides an opportunity for in-depth assessment of the available resources such as physical infrastructure, human and material resources, and the curriculum of the educational system or institution seeking to execute the simulation program (Cowperthwait, 2020; INACSL Standards Committee, 2016; Jeffries, 2016). It is crucial for the simulation activity to be well structured and mapped with the course material and learning objectives as specified in the program curriculum to guarantee effective design and implementation (Cowperthwait, 2020; Jeffries, 2016). Despite not highlighting background as a framework construct, Kunst et al. (2018) and Daley and Campbell (2018) emphasized the importance of effectively incorporating simulation activities in the curriculum—a position long espoused by quality indicators for the design and implementation of simulation (Arthur et al., 2013).

### 3.7 | Simulation design

All the frameworks and the theory included in this review considered simulation design as a key element in the design, implementation, and evaluation of simulation in nursing education (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012, 2016; Kunst et al., 2018). Learning objectives, scenario development, fidelity, prebriefing, and debriefing were among the simulation design features identified. The inclusion and description of simulation design features were similar in four of the included studies (Cowperthwait, 2020; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018).

The formulation of clear, concise, and measurable learning objectives, adequately mapped with content areas contained in the curriculum, was viewed as a prerequisite for the successful design, implementation, and evaluation of simulation in nursing education (Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018). The four frameworks therefore suggested the need to give learning objectives to students prior to the start of the simulation activity to enhance the attainment of learning outcomes.

Also perceived as inextricable in the simulation design construct is the development of scenarios based on the objectives and outcomes of the simulation (Cowperthwait, 2020; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018). The simulation scenario establishes the appropriate context for the simulation experience to begin. Cues must be generated as part of the scenario design process to serve as

prompts to aid participants in accomplishing the desired objectives of the simulation (Jeffries, 2016).

All the frameworks and the theory included in this review underscored the need for sustaining fidelity in the simulation experience. However, there was inconsistency in the description of fidelity in the included studies. Jeffries (2012) appeared to limit the description of fidelity to include only the technological ability of equipment to mimic realism, whereas the other studies broadened the description of fidelity to include conceptual, psychological, and physical or environmental fidelity (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2016; Kunst et al., 2018). Most of the authors described conceptual fidelity as the creation of a proper linkage between all simulation scenario components to help the participants make meaning (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2016). The authors also described psychological fidelity as the ability to suspend disbelief in participants enrolled in the simulation experience, whereas physical or environmental fidelity refers to how authentic the immediate environment of the simulation activity is (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018).

### 3.8 | Prebriefing

Three of the included studies emphasized the need to brief participants prior to the start of the simulation experience (Cowperthwait, 2020; Jeffries, 2016; Kunst et al., 2018). Prebriefing is a well-structured orientation session aimed at familiarizing students with the learning objectives, ground rules, role allocations, environment, equipment, and simulation modality prior to the simulation experience (Cowperthwait, 2020; Jeffries, 2016; Kunst et al., 2018). Prebriefing ensures the establishment of a safe supportive environment for a successful simulation experience (Jeffries, 2016). Cowperthwait (2020) recommended the need for dress rehearsals for participants selected to act out the simulation scenario when role play is the chosen simulation modality.

### 3.9 | Debriefing

All five included studies discussed debriefing as an essential component of the simulation activity (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018). Debriefing allows the students and the educator to reflect on their actions during the simulation experience, thus promoting self-awareness, reflective learning, and correction (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018). The authors hold the view that for debriefing to be effective, it must be well structured and centered on the learning objectives and outcomes of the simulation. The debriefing session must be safe, less threatening, and nonjudgmental (Jeffries, 2016). This enables participants to freely share their experience of the simulation session.



### 3.10 | Educational practices

Educational principles such as learner-centered, immersive, interactive, interprofessional, and collaborative teaching and learning strategies were used to establish a more conducive learning environment. This concept was addressed in all the included studies (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018). The establishment of a safe, non-threatening, and nonjudgmental learning environment built on mutual trust between facilitators and participants is intricately linked to the realization of the objectives of the simulation experience (Jeffries, 2016). Three of the included papers classified these features under educational principles (Daley & Campbell, 2018; Jeffries, 2012; Kunst et al., 2018), whereas one detailed them under simulation experience (Jeffries, 2016). Despite adapting the NLN Jeffries Simulation Theory (Jeffries, 2016) to guide the NLN Jeffries Simulation Framework for Simulated Participant Methodology, Cowperthwait (2020) classified the experiential learning activities under educational practices rather than those under simulation experience.

### 3.11 | Facilitator

All of the studies (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018) identified the facilitator as an important simulation construct. The authors are of the view that the facilitator, who is defined as a qualified professional with knowledge and skills to provide support to participants during the simulation activity, must also be knowledgeable in prebriefing and debriefing to guarantee a successful design, implementation, and evaluation of simulation.

### 3.12 | Participant

According to the authors, a participant is a person who participates in a simulation activity to improve clinical competence. Participants' age, gender, level of anxiety, self-confidence, readiness for the simulation, educational level, culture, and personal experiences were among the factors that Jeffries (2016) highlighted as having an impact on the attainment of learning objectives. In the papers considered, the words facilitator and participant were used inconsistently. Some of the papers referred to facilitator as an educator (Daley & Campbell, 2018) and a participant as a learner or student (Daley & Campbell, 2018; Kunst et al., 2018). Jeffries (2016) favored the terms "participant" over "student" and "facilitator" over "teacher" or "educator." Jeffries (2016) contended that the term "student" is too narrow and excludes healthcare professionals.

### 3.13 | Outcomes

All five studies included in this review (Cowperthwait, 2020; Daley & Campbell, 2018; Jeffries, 2012; Jeffries, 2016; Kunst et al., 2018)

identified outcomes as a key construct for the design, implementation, and evaluation of simulation. The authors maintained that the achievement of outcomes is the ultimate purpose of simulation pedagogy. The outcomes of the use of simulation pedagogy in nursing education are multifaceted and focused on the participant, patient, and systems (Jeffries, 2016). However, there is a scarcity of research on the effects of simulation on patients and systems (Jeffries, 2016). The patient outcome examines how knowledge gained in simulation is used to direct patient care, resulting in positive patient outcomes (Jeffries, 2016). System outcome refers to how simulation-trained nurses contribute to cost savings (cost-effectiveness) and practice change (Jeffries, 2016).

## 4 | DISCUSSION

Simulation-based clinical nursing education is widely used by NEIs in developed countries to facilitate student learning and the development of clinical competence (Hill & Williams, 2017; Niederhauser et al., 2012; The Nursing Education Stakeholders Group, 2012). Despite reported evidence of the positive impact of simulation in enhancing the clinical competence and critical thinking skills of nurses (Hayden et al., 2014; Jeffries, 2016), the concept appears poorly embraced by NEIs in low-resource settings. The low adoption of SBCNE as a teaching strategy by NEIs in low- and middle-income countries is partly due to limited context-specific literature to guide the design, implementation, and evaluation of simulation activities (Cant & Cooper, 2017; Munangaire et al., 2019). Moreover, no previous review on simulation in nursing education has identified and described the constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in other parts of the world, with a focus on their applicability in a low-resource setting and thus the gaps hindering their application in low-resource settings (Adamson, 2015; Kunst et al., 2018). Such a review could set the foundation for the development of a context-specific SBCNE framework to promote the use of simulation in nursing education in low-resource settings. In an attempt to address this lacuna, this study sought to identify and describe constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education globally, with a focus on their applicability in a low-resource setting, in a manner that no previous study has done.

This review found that all the simulation frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education were developed using data and experts from developed countries. None of the frameworks or the theory included in this review was developed within the context of a low-resource setting, thus indicating a gap when it comes to using these frameworks and theory as guiding measures for the adoption and application of SBCNE in low-resource settings. Seven constructs detailing context, background, simulation design, educational practices, facilitator, participant, and outcomes were identified and described. The findings revealed that all the frameworks and the theory included in this review appeared to focus largely on HFS.

Corroborating the findings of this scoping review is a previous systematic review by Cant and Cooper (2017) on the use of simulation-based learning in undergraduate nursing education, which also noted the scarcity of research and simulation implementation in low- and middle-income countries. The lack of a context-specific framework or theory to guide the design, implementation, and evaluation of SBCNE as revealed in this review appears to be one cause of the underuse of the concept in low-resource settings. The simulation activity risk becoming patchy and disorganized in contexts where the simulation design, implementation, and evaluation processes are not standardized with the use of a context-specific theory or framework (Jeffries, 2016). In advancing the development of context-specific frameworks for the design, implementation, and evaluation of SBCNE, other countries resorted to the use of literature reviews, perspectives of simulation experts, and personal experiences with simulation pedagogy (Jeffries, 2016; Kunst et al., 2018). The approach enabled the identification of constructs leading to the development of context-specific frameworks. Similarly, constructs identified and described in this review with reference to their applicability in a low-resource setting provide a data set that could be used to aid in the development of a context-specific framework to guide the design, implementation, and evaluation of SBCNE in low-resource settings.

Similar to the findings of this review, other simulation guidelines have recommended the inclusion of planning, simulation design characteristics, educational principles, key players of the simulation experience (facilitator and participant), and outcomes as key constructs to effectively guide the design, implementation, and evaluation of SBCNE (Arthur et al., 2013; INACSL Standards Committee, 2016; Issenberg et al., 2005). In furtherance of the success of SBCNE, efficient planning, availability of resources, and effective curriculum integration are required. Despite the importance of efficient planning and the availability of resources in the design, implementation, and evaluation of simulation in nursing education, empirical evidence suggests that poor planning and a lack of resources (material and human resources) impede SBCNE design, implementation, and evaluation in low-resource settings (Munangatire et al., 2019; Munangatire & Naidoo, 2017). The training of nurse educators to assume the role of simulation facilitators is central in the design, implementation, and evaluation of SBCNE, as the findings of this study revealed. However, evidence from the literature suggests a trend of poor or inadequate staff training and curriculum integration to allow for a smooth simulation design, implementation, and evaluation, particularly in low-resource settings (Kunst et al., 2018; Munangatire & Naidoo, 2017).

To address the challenge described here, a policy shift is required toward one with a multistakeholder approach, with the ministries of health (MOH) collaborating closely with nursing and midwifery councils (NMC), NEIs, and universities. Short simulation courses might be offered at universities, with incentives for nurse educators to participate. Alternatively, nurse educators from low-resource settings could be mentored by experienced colleagues from developed countries through effective collaboration between NEIs from developed and low-income countries (Burch, 2014). Simulation experts from other countries might also be brought in to teach nurse educators to work as

simulation facilitators in low-resource settings. Before implementing SBCNE in low-resource settings, nurse educators should receive effective training as simulation facilitators to boost their confidence and preparedness to facilitate the implementation of SBCNE acceptably and successfully (Munangatire & Naidoo, 2017). Furthermore, experiential learning in SBCNE may necessitate the creation of broad outcomes that are aligned with the course content as specified in the curriculum (Akaike et al., 2012; Arthur et al., 2013; Jeffries, 2016; Kunst et al., 2018). Unfortunately, in a scoping review of the use and impact of simulation in Australian undergraduate nurse education, Kunst et al. (2018) identified a lack of congruence between learning outcomes and simulation activities. In low-resource settings, where SBCNE is an emerging strategy to complement the traditional teaching methods, there is a need for a policy shift led by the regulatory bodies of NEIs (NMCs and the MOHs) that will direct NEI curricula reviews to ensure adequate alignment of course content with simulation outcomes. This could help facilitate the smooth implementation of SBCNE in the setting.

The central focus of previous simulation frameworks and theories on HFS appear to suggest a challenge in their application in low-resource settings where the use of HFS appears restricted because of the expensive nature of the approach. Most NEIs in low-resource settings are unable to use SBCNE as a teaching approach because of the high cost of setting up and maintaining simulation, particularly HFS (Burch, 2014; Massoth et al., 2019). Setting up the simulation environment, procurement and maintenance of simulation equipment, and training of standardized patients are all capital-intensive tasks that most NEIs in low-resource settings cannot afford (Burch, 2014; Lapkin & Levett-Jones, 2011). It is worth noting that, because the implementation of HFS is not exclusively dependent on computerized simulators, a HFS simulation modality such as use of standardized patients may be implemented in low-resource settings at a relatively cheaper cost when compared with modalities such as computerized simulators. When the implementation of HFS is considered more critically within the context of low-resource settings, especially in sub-Saharan Africa, where expertise to train standardized patients is lacking, standardized patients as a HFS modality may still be very expensive to implement. Moreover, empirical evidence suggests that the use of low-fidelity simulation (LFS) provides benefits comparable to HFS (Aebersold, 2018; Cheng et al., 2015; Massoth et al., 2019; Nimbalkar et al., 2015). In support of the use of LFS, Daley and Campbell (2018) reported that using role playing to act out simulated scenarios helps students develop competence. Therefore, given the positive impact of SBCNE in facilitating the development of clinical competence (Jeffries, 2016; Kim et al., 2016) and the apparent challenges faced by students in the clinical practice setting (Salifu et al., 2019), LFS, such as the use of role play and task trainers should be adopted to supplement clinical placement opportunities in low-resource settings (World Health Organization, 2013). Notwithstanding the recommendation for the use of LFS in low-resource settings, the central government's involvement in providing financial support to aid in the implementation of SBCNE is critical to the success of the program (Kunst et al., 2018). The simulation activity requires identifying and providing necessary resources such as space and

equipment to support at least the use of LFS in low-resource settings (Jeffries, 2016). This will facilitate the smooth design, implementation, and evaluation of simulation in low-resource settings.

As a simulation design characteristic, the nature of the simulation scenario should be guided by the learning objectives, which should be synchronized with student-centered experiential learning activities with varying degrees of complexity and authenticity to foster critical thinking (Jeffries, 2016; Kunst et al., 2018). Other researchers have noted the importance of maintaining the simulation scenario's authenticity and realism (Arthur et al., 2013; INACSL Standards Committee, 2016). By simulating real-life clinical situations, fidelity in the simulation experience assures realism. The inconsistency in the studies' descriptions of fidelity necessitates greater precision in the term's application to avoid ambiguity. Maintaining authenticity in the simulation experience in low-resource settings poses a significant difficulty (Burch, 2014). The majority of the skill laboratories in NEIs in low-resource settings are neither designed nor equipped for simulation (Munangatire et al., 2019; Munangatire & Naidoo, 2017). As a result, maintaining environmental fidelity becomes challenging, affecting the simulation's believability. For the successful implementation of simulation in this context, it is recommended that skills laboratories be modified to resemble the real clinical environment of the setting. It is proposed that skills laboratories be adapted to reflect the real clinical environment of the setting for the successful use of simulation in this context. The simulation objectives, outcomes, and resource availability must all be considered when selecting a simulation modality to achieve the appropriate authenticity (Arthur et al., 2013).

Effective debriefing is crucial for SBCNE to thrive, because it enables the identification of challenging procedures for deliberate or repetitive practice in simulation laboratories (Clapper & Kardong-Edgren, 2012). Though the studies included in this review indicated the need for debriefing sessions to be structured and supervised by a well-trained facilitator, they fell short of prescribing the specific debriefing framework(s) to be adopted. As a result, further research is needed to identify suitable framework(s) to guide debriefing sessions in SBCNE in low-resource settings.

Also, researchers in SBCNE appear to disagree about the use of videography in simulation design and debriefing sessions. Whereas Cheng et al. (2016) and Levett-Jones and Lapkin (2014) found no significant difference between video and non-video-guided simulation debriefings, others have shown that using videography in debriefing contributed to participants' reflective thinking and self-confidence (Zhang et al., 2019). However, in the same study the authors also reported that the use of videography intimidated some participants. Further research is therefore required to evaluate the use of videography in SBCNE, particularly in low-resource settings.

Consistent with the findings of this review, in a systematic review of the literature in relation to the NLN Jeffries Simulation Framework, Adamson (2015) highlighted inconsistency in the use of terminologies. In furtherance of this notion, Lafond and Van Hulle Vincent (2013) have long expressed the need to adopt a uniform nomenclature in simulation pedagogy in order to promote shared values and unity of purpose.

The participant outcome is recorded substantially in the literature and includes increased satisfaction and self-confidence, the acquisition of knowledge, skills, and attitude, as well as behavioral change (Aebersold, 2018; Cook et al., 2018; Jeffries, 2016; Kim et al., 2016). What is debated is how SBCNE contributes to knowledge transfer and improvement in patient care and the health system (Cowperthwait, 2020; Jeffries, 2016). Studies that linked SBCNE to better patient outcomes have been criticized for their lack of robustness and methodological validity (Kunst et al., 2018). With the introduction of SBCNE in low-resource settings, more studies in sub-Saharan Africa will therefore be required to offer sufficient data to warrant the usage of SBCNE.

## 5 | LIMITATIONS

Despite the thoroughness of the search strategy used for this scoping review, the search was limited to identifying frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education. In addition, confusing titles or abstracts, as well as inadequate indexing, may have resulted in the omission of certain relevant studies. Moreover, with the scope of this review limited to identifying and describing constructs of frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education, simulation frameworks and theories used in other disciplines including multidisciplinary ones were not included in the scoping review. The study therefore provided relevant findings and constructs of simulation frameworks and theories used in nursing education ensuring discipline contextualization.

## 6 | IMPLICATIONS FOR FUTURE RESEARCH

Based on the findings of this review, further research is needed to develop a context-specific and appropriate simulation framework tailored to the needs and resources of low-resource settings to promote access and use of simulation pedagogy. Additionally, further research can be conducted to investigate barriers to integrating simulation pedagogy in nursing education within low-resource settings more thoroughly. Considering the growing literature on the use of simulation in nursing education, as well as the development of frameworks and theories to guide the process, future research should focus on developing an evaluation tool specifically for evaluating simulation frameworks and theories used to guide the design, implementation, and evaluation of simulation in nursing education.

## 7 | CONCLUSION

This scoping review examined five studies from which to identify and describe constructs used to guide the design, implementation, and evaluation of simulation in nursing education. Seven constructs were

identified and described: context, background, simulation design, educational practices, facilitator, participant, and outcome. The findings of this scoping review revealed the lack of a context-specific framework to guide the design, implementation, and evaluation of simulation in NEIs in low-resource settings—all the frameworks and the theory contained in this review were developed in the context of developed countries. The review thus provided a greater understanding of the constructs of the current simulation frameworks and theory used in nursing education around the world, as well as their applicability in guiding the design, implementation, and evaluation of simulation in low-resource settings. Given that SBCNE has become a panacea in the pursuit of an ideal strategy to promote the development of clinical competence, less expensive, feasible, and sustainable alternatives must be embraced in the design, implementation, and evaluation of SBCNE in low-resource settings after having considered the contextual intricacies of the more resource-endowed and the impoverished low-resource countries. As a result, future research should focus on developing a context-specific, simulation-based clinical nursing education framework that is locally tailored to the needs and resources of low-resource settings. Such a framework may promote the use of simulation in the setting.

#### AUTHOR CONTRIBUTIONS

Study design: David Abdulai Salifu conceived and designed the study as a PhD student under the supervision of Christmal Dela Christmals and Gerda Marie Reitsma. Data collection: David Abdulai Salifu and Christmal Dela Christmals conducted the search and extracted the data, which were verified by Gerda Marie Reitsma. Data analysis: David Abdulai Salifu and Christmal Dela Christmals analyzed the data, which were verified by Gerda Marie Reitsma for accuracy. Manuscript writing: David Abdulai Salifu drafted the manuscript under the guidance of Christmal Dela Christmals. Christmal Dela Christmals and Gerda Marie Reitsma critically reviewed the draft manuscript and made significant inputs.

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#### CONFLICT OF INTEREST

None declared by the authors.

#### DATA AVAILABILITY STATEMENT

The authors affirm that the data supporting the findings of this review are contained in the article.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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