Exploring the observer role and clinical reasoning in simulation: A scoping review

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Abstract

Aim: This scoping review aimed to explore nursing students experience as simulation observers and their level of engagement in learning through use of clinical decision-making models and learning scaffolds.

Background: A gap continues to exist between the published empirical literature, the role and experiences of the simulation observer, and teaching scaffolds that enhance learning outcomes, despite the increased understanding of simulation and its role in preparing nursing students for practice. Further, little is known about the nursing student's experience of clinical reasoning whilst observing simulation and the impact of scaffolding observations using clinical decision-making models.

Design: This scoping review was conducted using the methodological framework of Arksey and O'Malley (2005) and the PRISMA checklist for systematic reviews (Page et al, 2020).

Methods: A comprehensive search of the literature published in Medline and CINAHL databases between 1999 and 2020 was undertaken in May 2019. The studies selected for this review (n = 18) were analyzed thematically. The validated Mixed-Methods Appraisal Tool assessed quality of the quantitative, qualitative, and mixed methods studies.

Results: The role of the observer in simulation was explored and included observation to transform practice in self and observation to transform practice in others, namely peers in the nurse role in simulation. Application of the MMAT indicated that of the 18 studies included only 6 (33.3%) had a clear research question. Research aims or objectives were found in another six studies (33.3%). In this review 13 studies (72%) included answers to the research question or aim, three (17%) did not, and in two (11%) it was impossible to tell.

Conclusions: Results of this review indicate the paucity of research relating to nursing student's experience of clinical reasoning while observing simulation. Further, it highlights the value of nurse educators optimizing the observer role and maximizing learning by scaffolding observer activities within the simulation experience.

Key words: Observer; Simulation; Clinical reasoning; Undergraduate; Nursing

Highlights

- The observer role can enhance learning outcomes in simulation
- The observer role is undervalued.
- Clinical reasoning models are a valuable learning tool to maximise nursing student learning.

Exploring the observer role and clinical reasoning in simulation: A scoping review

Introduction

Simulation is an established pedagogy in nurse education which immerses participants in realistic environments and enables the opportunity to develop critical thinking, problem solving and practical skills within a safe and controlled learning context (Gaba, 2004; Yuan et al. 2012 Tutticci et al. 2016). Critical thinking is a prerequisite for clinical reasoning, which is the foundation for effective clinical decision making (Forsberg et al. 2014). Simulation is an active, experiential form of learning for those directly involved in the simulation scenario, engaging nursing students cognitively and emotionally (Cant and Cooper, 2017; Tutticci et al. 2016). Typically, simulation experiences have three elements, (pre-brief, simulation and debrief) and learning occurs primarily during simulation and debrief (*INACSL Standards of Best Practice: SimulationSM Simulation Design* 2016). Simulations usually include active roles where participants enact simulated care as well as the more passive role of the observer, who is in close proximity to the simulation but does not participate in the scenario but does contribute to the debrief. By increasing the engagement of the observer through active observation of the scenario and participation in the debrief, this has the potential to improve learning generally and more specifically about clinical decision making from peer feedback and reflection. Clinical decision making supported by clinical reasoning can be practiced within a simulation scenario (Forsberg et al. 2014). However, the role of the observer in simulation, opportunities for observer engagement and developing clinical reasoning skills through simulation experiences is unclear.

Simulation provides nursing students with opportunities to practice clinical care skills as well as role play decision making processes such as recognizing a deteriorating patient or end of life situation (Cant and Cooper, 2017). Simulation has enabled practice contexts to be replicated as an immersive experience for nursing students, with simulation increasingly used by at all levels of nursing education to develop and practice clinical reasoning (Forneris et al., 2015; Liaw, et al., 2018). Simulation and active learning are intrinsically linked (Miles, 2018) but high-quality learning outcomes are not supported unless simulation design and execution intentionally includes active learning strategies throughout the simulation experience and reflective debrief. This is true for both the participant and observer.

Scaffolding thinking during simulation debriefing can assist the student (observer or participant) to both navigate and actively engage with the simulation experience. Pritchard (2005, p. 31) articulated, "Scaffolding is the process of giving support to learners at the appropriate time and at the appropriate level of sophistication to meet the needs of the individual" and that the learner, with assistance, can master the next level of development that he or she could not have done independently. Scaffolding is intentional teaching and includes prompted content, materials, and tasks, as well as teacher and peer support, to facilitate learning (Pritchard, 2005; Vygotsky,1978). Simulation best practice (International Nursing Association for Clinical Simulation and Learning [INACSL], 2016) requires structured participant activities to optimize learning through cognitive engagement. One such type of scaffold is the clinical decision-making model, by Levett-Jones et al. (2010) which use the cognitive process of clinical reasoning and metacognitive process of reflection to direct clinicians in making effective decisions to optimize patient safety (Banning 2008). If clinical decision-making models provide useful scaffolds that enhance learning outcomes and if use of such supports improve observer learning is unclear, it is imperative that clinical decision making is explored in the context of simulation observation.

The clinical reasoning model, developed by Levett-Jones, et al. (2010), when embedded in the 'practice' of clinical practice, such as simulation, is one such scaffold which can assist in the development of clinical reasoning. It utilizes a cycle of assessment, planning, implementation and evaluation to effectively apply reasoning in the clinical context (Levett-Jones et al., 2010; Levett-Jones, 2013). It is not a linear process, rather an iterative process to review and revise the plan of care in step with the constantly changing clinical status of the patient. Clinical reasoning is a cognitive process (Forsberg et al. 2014) and is defined as the way clinicians think about the problems they deal with in clinical practice (Levett-Jones, et al., 2018; INACSL, 2016). The primary focus and intent of clinical reasoning is to optimize patient outcomes for a return to health, surveillance and maintenance of chronic conditions and to prevent significant clinical deterioration (Mccarthy 2003). Clinical reasoning was identified by Lapkin, Levett-Jones, Bellchambers and Fernandez (2010) as critical for nursing competency in a landmark systematic review examining the effectiveness of simulation to teach clinical reasoning skills. Clinical reasoning skill is both an objective and an outcome of simulation experiences, especially when opportunities for exposure to salient learning events such as

patient deterioration situations cannot be guaranteed on clinical placement. To address this deficit, it is imperative undergraduate nursing students (simulation participants and observers) are guided to practice building and critiquing their clinical decisions.

Despite the increased understanding of simulation and its role in preparing nursing students for practice, a gap continues to exist between the published empirical literature, the role and experiences of the simulation observer, and teaching scaffolds that enhance learning outcomes. Further, little is known about the nursing student's experience of clinical reasoning whilst observing simulation and the impact of scaffolding observations using clinical decision-making models. No other scoping reviews specifically examined the concept of clinical decision making by simulation observer (nursing student) to optimize engagement in the simulation experience. A scoping review protocol by Griffits, Hines, Moloney and Ralph (2017) outlined a review of the literature on the characteristics and processes of clinical reasoning used by registered nurses but did not propose to explore clinical reasoning from the perspective of undergraduate nursing students engaged in simulation. De Menezes et al., (2015) examined the use of clinical reasoning in undergraduate nursing education yet did not examine the role of observer in simulation and the impact of this learning experience on the acquisition of clinical reasoning

The aim of this scoping review was to explore work published on the use of clinical reasoning to engage undergraduate nurses observing simulation. The findings will inform nurse educators on the evidence for employing clinical reasoning as a scaffold that stimulates active learning in the simulation observer. Further, the effectiveness of guided observer tools, based on the clinical reasoning cycle to explicitly direct simulation observer thinking will be explored.

1. Methods and materials

2.1 Design

This study was conducted as a scoping review of the literature with the aim of exploring relevant literature on clinical decision making within the context of simulation by undergraduate nurses observing simulation and to find gaps in the existing body of knowledge on this topic. Conducted with Arksey and O'Malley's framework for scoping reviews (2005) and in line with the PRISMA checklist for

systematic reviews (Page et al, 2020), the scoping review process included the following phases: 1) identification of research questions and aim of the review, 2) identifying relevant studies, 3) selection of studies, 4) charting of the data and 5) collating, summarizing and reporting findings.

2.1.1 Identification of research questions

The three research questions for this scoping review of the literature were:

Q1. What is the nursing student's observer role in simulation?

Q2. What is the nursing student observer learning from the use of clinical decision-making models in simulation?

Q3. To what extent do learning scaffolds embed clinical reasoning for the nursing student observer within the simulation experience?

2.1.2 Identifying relevant studies

The search terms for describing the experience of undergraduate nursing students participating in simulation were observer and clinical reasoning (and its derivations). The undergraduate nurse was defined as nursing students completing a bachelor's degree, singularly. A three-step search strategy was utilized (Aromataris and Munn, 2020). The search strategy aimed to locate both published and unpublished studies and was limited to English language papers published from January 1999 – January 2020 as simulation within health care started to emerge as a training and development pedagogy at this time. The observer role has limited exposure in the literature, so an extended publication range facilitated identification of simulation discourse with inclusion of the observer role. Databases searched include: CINAHL, MEDLINE, PsycINFO, ERIC (EBSCOhost), Embase, JBI Database of Systematic Reviews and Implementation Reports, Web of Science and Mednar. Sources of unpublished studies searched included ProQuest Dissertations and Theses, Mednar, Trove and Google Scholar. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for MEDLINE and CINAHL and adapted for each included information source. For example, the search strategy for MEDLINE combining all identified keywords and index terms using Boolean phrases (i.e. "AND" "OR") was MH "Clinical Decision-Making" OR clinical N2 decision N2 making MH "Decision Making+"

"clinical reasoning" MH "Clinical Competence" OR "clinical competence" "clinical judgement*"critical

N2 thinking" experiential learning" AND (MH "High Fidelity Simulation Training") OR "high fidelity simulation"(MH "Patient Simulation") OR human W3 patient W3 simulat*(MH "Manikins") OR manikin* OR mannequin*"clinical simulation*""realistic simulation*"AND(MH "Students, Nursing") OR nursing N3 student*(MH "Education, Nursing+") OR "nursing education"(MH "Education, Nursing, Baccalaureate")(MH "Universities") OR university OR college OR "higher education" AND MH Observation OR observation* OR "observational learn*" OR "observer*" AND Limit – (Date Range 2009-2020).

The reference list of all studies selected for critical appraisal was screened for additional studies.

2.1.4.*Selection of studies*

A total of 1641 studies were found (Fig. 1). The selection of relevant studies was conducted using inclusion and exclusion criteria. The inclusion criteria applied were: 1) nursing students at Bachelor degree level, (undergraduate nursing students completing a bachelor's degree singularly) 2) studies describing undergraduate nurses' experience of simulation as an observer and clinical reasoning and 3) studies conducted in English and 4) qualitative and quantitative and grey literature. The exclusion criteria applied were: 1) Undergraduate nursing students completing a bachelor degree in dual form with another heath related discipline, 2) registered nurses, Non-nursing health care providers, Enrolled Nurses, Unlicensed health care providers, Caregivers, Assistants in Nursing, Advanced practice nurses (e.g. nurse practitioners), 3) systematic reviews, 4) studies discussing clinical reasoning but not the simulation observer role and 5) studies not published in English. Finally, 18 studies (Fig. 1) were chosen for the scoping review since they answered the research questions and met both inclusion and exclusion criteria.

2.1.4. Charting of data

Data were charted aiming for a general understanding of the selected studies. A data extraction tool was developed and used to collate data. The tool was tested by the research team to ensure consistency of data extraction process and findings. Summaries were developed for each article relating to authors, publication year, country, study design, study population, study time period, study

aim, sample size, primary results, presence of scaffolding and clinical decision-making models (Table 1). Team members worked in pairs to review data extraction. Inclusion of data was confirmed when all reviewers were in agreeance. The included studies (n=18) were read by the authors (NT, KT).

Among the 18 selected studies (Table 1) five used qualitative methods, six used quantitative non-randomized methods, three were quantitative descriptive, two with a mixed methods design and two discussion papers. Together, they represented approximately 1817 nursing students (n = 640 from the qualitative studies, n=1064 from the quantitative studies and n = 113 from mixed methods studies, n= unknown from the discussion papers. All the students were undergraduate nursing students, but in different educational years (Table 1). All these studies aimed to describe, explore or compare the subject under study. The sample sizes varied from three to 528 participants. There were two papers that did not provide participant numbers (qualitative and discussion papers) and are not therefore included in in these sample sizes (Cato et al., 2005; Witt et al., 2010).

2.1.5. Analysis of data

After carefully reading through the included studies, the process of interpretation and synthesizing were conducted. A thematic analysis was undertaken of the material in order to grasp and understand key concepts and the sources of evidence (Arksey and O'Malley, 2005). Data from study findings and key contextual indicators that answered the aim of this review was logged and sorted according to key issues and themes. Two of the authors (NT and KT) reviewed the key issues and themes both independently and collaboratively.

2.1.6. Quality appraisal

The methodological quality of the studies was assessed using the mixed method appraisal tool (MMAT) - Version 2018 (Hong et al., 2018).

3. Results

Our findings are based on 18 studies, published between 2006-2018, from the following countries: North America (9), Australia (2), Scandinavia (2) Other (Brazil and Korea (2), not stated (2). A total of five studies were qualitative, nine studies quantitative, two studies mixed methods and two discussion

papers. MMAT screening of the 18 studies identified six (33.3%) had a clear research question. Research aims or objectives were found in another six studies (33.3%). In this review 13 studies (72%) included answers to the research question or aim, three (17%) did not, and in two (11%) it was impossible to tell.

The five qualitative studies demonstrated congruence between qualitative approach and research question and data collection methods sufficient to address the research question. Appropriate methodology for data analysis was evident in all the studies. Interpretation of results sufficiently substantiated by the data was evident in four of the six studies and coherence across the qualitative research process was likewise supported by MMAT analysis in the same four (of the six) qualitative studies (Abelsson and Bisholt, 2017; Cato et al.,2009; de Oliveira et al., 2015; Wighus and Bjørk, 2018).

Of the nine quantitative studies, there were six (67%) non randomized studies and three (33%) descriptive studies (Table 1). In the non randomized studies (n = 6) 50% (n = 3) represented the population of interest and clearly detailed their sampling approach (Lehr and Kaplan, 2013; Thidermann and Söderhamn 2015; Wood and Toronto, 2012) with all but one study (Dobbs, et al., 2006) the intervention was administered as intended. The three quantitative descriptive design studies mostly met the MMAT criteria for robust sampling strategies to minimize bias and to provide a sample representative of the target population. Likewise, most of these studies used tested instruments and selected statistical analyses were justified and aligned with the research questions.

Two of the 18 studies categorized as mixed method (Tutticci, et al., 2018; Lee, et al., 2015) articulated a rationale for this design approach and integration of qualitative and quantitative components were demonstrated when answering the research questions and interpreting the data. Less clear was the reporting of discrepancies in one study (Tutticci, et al., 2018) and trustworthiness was not sufficiently demonstrated in one study (Lee, et al., 2015).

Of the 18 studies, fifty percent (n=9) employed approaches in which participants switched between simulation participants (nurses) and observers, eight in which nursing students were either simulation participants OR observers, and one in which the study participants were only the observer. Whilst all studies referred to an observer role, sixty-one percent (n=11) gave some details of what the role entailed (Abelsson and Bisholt, 2017; Guhde, 2010; Grierson et al., 2012; Hober and Bonnel, 2014; Kim-Godwin et al., 2013; Lee, Kim and Park, 2015; Lehr and Kaplan, 2013; Levett-Jones et al., 2015; Thidermann and Söderhamn 2015; Norman, 2018; de Oliveira et al., 2015). Two overriding themes were present in those papers that detailed the observer role and highlight a dual role of the observer; observation to transform practice in self (n=11) and observation to transform practice in other, namely peers in the nurse role in simulation (n=10). The observer assumed both roles in most papers that provided details of the observer role (n=11).

Observation to improve one's own practice was predominantly through self-reflection and self-assessment. Observation can build reflective capacity (Hober and Bonnel, 2014; de Oliveira et al., 2015; Wighus and Bjørk, 2018) and critical thinking (Hober and Bonnel, 2014; Kim-Godwin et al., 2013; Thidermann and Söderhamn 2015). Analyzing critical thinking and gaining an awareness of current knowledge and gaps in knowledge and skills was associated with self-reflection (Abelsson and Bisholt, 2017; Guhde, 2010; Hober and Bonnel, 2014; Kim-Godwin et al., 2013). Through observation, nursing students gained knowledge as well as confirmed the knowledge they already possessed (Abelsson and Bisholt, 2017). High fidelity simulation also played an essential role in nursing student's learning by creating awareness of their knowledge and lack of knowledge through self-reflection and group debriefings *(*Levett-Jones et al., 2015).

Vicarious learning is a commonly reported perceived advantage of the observer role, particularly in high fidelity scenarios (Thidermann and Söderhamn 2015) and includes learning from what peers do correctly as well as incorrectly (Hober and Bonnel, 2014; Kim-Godwin et al. 2013; Lee, et al., 2015; Lehr and Kaplan, 2013; Thidermann and Söderhamn 2015; Wighus and Bjørk, 2018; Lehr and Kaplan, 2013). In one study, (Lehr and Kaplan, 2013) 100% of participants agreed that they learned as much from observing their peers as they did as a simulation participant. Further to this, one observer in Hober and Bonnel's (2014) study commented that without the pressure of performing,

learning was greater than in the participant role. Thidermann and Söderhamn (2015) conclude that vicarious learning contributes to the development of skills in reflective and critical thinking.

The observer role was also focused on peer improvement through providing feedback (Hober and Bonnel, 2014; Kim-Godwin et al., 2013; Grierson et al., 2012; Levett-Jones et al., 2015*;* Wighus and Bjørk, 2018) and peer evaluation (Kim-Goodwin et al., 2013; Thidermann and Söderhamn 2015). Observers were tasked with varying degrees of observing, analyzing and assessing their peers formally or informally and providing feedback based on their performance. Peer evaluation enhances active student involvement in the learning process (Kim-Godwin et al. 2013). Providing feedback to peers is an important developmental skill necessary for professional practice (Levett-Jones et al., 2015) and can direct future action (Wighus and Bjørk, 2018) for example a teacher in Wighus and Bjørk (p146) stated that scaffolding feedback for observers in simulation changed the way students delivered feedback, 'Before feedback was often about difficulties, but now they are much more focused on providing constructive feedback..' This finding aligns with results from Hober and Bonnel (2014) whose observers were '..able to give a different perspective than those who participated. I can provide constructive feedback.'' (p510).

The observer was typically involved in debriefing and providing feedback following the simulation which allowed consolidation of learning for self and peers (Witt et al., 2010; Lee and Park, 2015) and optimizes the observer role (Hober and Bonnel, (2014). A thirty-minute debriefing session in Witt et al.'s (2010) study allowed observers (and faculty) to provide feedback to their peers, which encouraged peer evaluation. Providing feedback was not always easy and was presented as an obstacle to learning (Abelsson and Bisholt, 2017) particularly if the observer had insufficient knowledge of the topic (Wighus and Bjørk, 2018). However, nursing students benefitted from practise and instruction on how to give feedback (Wighus and Bjørk, 2018). Providing emotional support to peers was linked to the feedback process and was noted by teachers as valuable for further learning (Wighus and Bjørk, 2018).

The observer role involved different levels of engagement with the scenario, ranging from a cognitively active role e.g. utilizing a guide to scaffold critical thinking, or being tasked with a specific area of focus to observe and provide feedback to a more passive observe role without scaffolding.

Being fully engaged as an observer involves actively seeking to understand and learn from their peers (Thidermann and Söderhamn 2015). Hober and Bonnel, (2014) recommend pre-simulation orientation to the role of observer as part of the active role for learning. Active engagement in the observer role in Levett-Jones et al.'s 2015 study, involved the audience as theatre critics to an unfolding drama (the simulation) where observers were tasked with imagining, directing and reflecting on change by the nursing student 'actor'. Conversely, no details of the observer role were provided in 39 percent of studies (n=7) and the observers were not provided with directives for engagement in the scenario. Even in those studies which provided details of the observer role, the role was not always clear prompting nursing students to request more detailed information about the role (Wighus and Bjørk, 2018).

Clinical decision-making models were adopted in four studies (Cato et al., 2009; Hayes et al., 2015; Hober and Bonnel, 2014; Levett-Jones et al., 2015) and a further three papers, whilst not using a specific model, adopted a clinical decision-making approach (Dobbs et al., 2006; Thidermann and Söderhamn 2015; Norman, 2018). Of the papers that adopted a clinical decision-making model, only two reported on its use by those taking the observer role (Hober and Bonnel, 2014; Levett-Jones et al., 2015*).* Levett-Jones' 2015 study utilized a clinical reasoning model (Levett-Jones, Hoffman and Dempsey, 2019) which showed a self-reported improvement by observers in clinical reasoning skills, clinical decision-making ability, knowledge of clinical strengths and weakness, and enhanced practice and learning. The use of clinical judgement and cyclical patterns of noticing, interpreting and reflecting were reported by observers in Hober and Bonnel's (2014) study which adopted Tanner's (2006) model of clinical judgement.

Hayes et al. (2015) and Cato et al.'s (2009) studies, adopted Tanner's Clinical Judgement Model (2006) model which guided study participants to notice, interpret, respond to and reflect on their experience within a safe environment and which can facilitate the development of critical thinking and reasoning skills (Hayes et al., 2015). Whilst these studies adopted a clinical decision-making model,

neither distinguished between the simulation participant or the observer, nor reported specifically on the observer learning in simulation.

Jeffries' framework, whilst not a clinical decision-making model or approach, requires critical thinking to be an outcome of simulation and was utilized in 2 studies (Thidermann and Söderhamn, 2015; Hayes et al. 2015). The framework sets up the expectation that sound clinical decisions are made (or practised) within simulation. Improvements in observer's clinical knowledge, satisfaction with learning and self-confidence was reported for both observers and participants in Thidermann and Söderhamn's (2015) study. Whilst Hayes et al (2015) utilized this framework, no results were provided on the observer role.

The remainder of the papers (n=11) made no mention of a clinical decision-making model or framework.

Given that scaffolds provide supportive structures to promote creativity, application and analysis of knowledge and improve critical thinking skills (Venne and Coleman, 2010) it is not surprising that fifty percent of papers (n=9) referred to learning scaffolds to facilitate student's learning in simulation (Cato et al. 2009; Grierson et al. 2012, Guhde, 2010; Hober and Bonnel, 2014; Kim-Godwin et al. 2013; Levett-Jones et al., 2015; Norman 2018; de Oliveira et al., 2015; Wighus and Bjørk, 2018). The clinical reasoning cycle is a decision-making scaffold evaluated by Levett-Jones et al., (2015) in their study on the efficacy of tag team simulation to promote engagement by simulation observers. Pleasingly the clinical reasoning cycle facilitated structured feedback by observers to their peers. Eight of these nine studies referred to scaffolding learning specifically for the observer during simulation. The paper by Cato (2009) makes no reference to observer scaffolding. The use of scaffolding led to a reported enhancement of self–reflection during observation but also as applied to observer performance (Wighus and Bjørk, 2018).

Scaffolding allows for a structured approach to observers' analyzing their own critical thinking and can facilitate learning through increased reflection and metacognition (Wighus and Bjørk, 2018). When

clinical reasoning was used as a scaffolding for observers in simulation, cyclical patterns of noticing, reflection on action, interpreting findings, were reported and termed "'thinking while sitting" as opposed to 'thinking on my feet'" by an observer in Hober and Bonnel's (2014 p511) study. Further, in Levett's 2015 study which employed clinical reasoning scaffolds, nursing students reported developed clinical reasoning skills, clinical decision-making ability and skills in early recognition of patient deterioration. The evaluation rubric for the Creighton Simulation Evaluation Instrument (CSEI) which scaffolded learning in Kim-Godwin et al.'s 2013 study, was reported as helpful in the peer evaluation process.

The eight studies with scaffolding for the observer were categorized into two groups: (1) studies with elements of clinical reasoning and (2) studies without elements of clinical reasoning. Twenty-two percent of studies (n=4) contained a scaffold with elements of clinical reasoning (Levett-Jones et al., 2015; Kim-Godwin et al., 2013, Guhde, 2010; Hober and Bonnel, 2014). The CSEI was used by student observers in Kim-Godwin et al.'s 2013 study and consists of four sub scales including assessment, communication/ feedback, critical thinking, and technical skills. Nursing students reported learning in the areas of assessment, communication, critical thinking and technical skills and self-reflection enhanced through repetition. Hober and Bonnel's (2014) study supported the use of a guided observer worksheet as scaffolding to help observers engage and foster a structured approach to the role of noticing, interpreting and recording peer performance. Observers in Guhde's (2010) study were provided with a list of questions/ prompts that aligns with clinical reasoning by including prompts on patient assessment, identification of priority problems and evaluation of interventions. Outcomes for observers in these studies included gaining knowledge for effective clinical judgement (Hober and Bonnel's (2014), vicarious learning (Kim-Godwin, 2013) and active engagement of observers in learning (Levett-Jones et al., 2015).

Twenty-two percent of studies (n=4) utilized scaffolding for the observers that did not contain elements of clinical reasoning (Grierson et al., 2012, Norman 2018, Wighus, de Oliverri). Scaffolding in these papers took the form of collaborative interactivity to provide feedback on skill performance (Grierson, 2012), an Observation Guide (Norman, 2018), a checklist to guide observation (de Oliveira, 2015) and scaffolding to provide feedback on skills execution (Wighus and Bjork, 2018). Whilst

observers using an Observation Guide in Norman's (2018) study reported greater satisfaction with the simulation experience compared to those without the guide, no significant improvement in knowledge, self-confidence or collaboration was reported. It is worth noting, that in one study (de Oliveira et al., 2015) it was difficult to determine if the scaffolding contained elements of critical thinking and further information could not be obtained from the author and so was categorized as without elements of clinical reasoning.

Half of the studies had no scaffolding (n=9) (Abelsson and Bisholt, 2017;Dobbs et al., 2006; Hayes et al., 2015; Lee and Park, 2015; Lehr and Kaplan, 2013; Thidermann and Söderhamn 2015; Tutticci et al., 2016) although 2 of these (Lehr and Kaplan, 2013; Thidermann and Söderhamn 2015) whilst not reporting on scaffolds referred to instructions to direct observer's attention on certain areas of the simulation, In Lehr and Kaplan's 2013 study observers were instructed to think of strategies they would employ if they were involved in the scenario, whilst observers in Thidermann and Söderhamn's (2015) study focused on the participant nurse's assessment and handling, team collaboration and communication.

There are gaps in the literature on clinical reasoning as a scaffold for observers in simulation.

4.Discussion

This scoping review has identified the existing body of evidence related to clinical reasoning as a strategy to engage the undergraduate nursing student in observing simulation. It highlights the dearth of research conducted into nursing student's experience of clinical reasoning while observing simulation.

With the growing trend of simulation hours being recognized as contributing to required clinical hours in undergraduate nursing education programs (Hayden et al., 2014) the efficacy of simulation in developing 'practice ready' graduates is important. Understanding how learning outcomes from simulation experiences contribute to clinical reasoning skill acquisition is vital as the use of simulation increases. Maximizing the learning opportunities for all nursing students, both hands on participants

and observer, contributes to practice ready graduates who have the relevant clinical skills to practice as a registered nurse.

All participants in simulation need to be actively engaged in the simulation experience using clear and identifiable objectives to obtain tangible learning outcomes (Hober and Bonnel, 2014) regardless of role allocation. The observer role can be either passive or actively engaged in the simulation experience and when actively engaged can play a valuable part in enhancing nursing students' simulation experience, as a conduit for transforming clinical practice in themselves and in their peers. Whilst a small majority of papers detailed this role of the observer, many still provided little details of the role, other than to report that the role existed. Further, studies often made no distinction between the simulation participant and the observer in reporting results, treating them as a homogenous group rather than as distinct roles with unique opportunities to develop the critical thinking skills and thus clinical reasoning required of a nurse. This would suggest an undervaluing of the role and an untapped opportunity for developing clinical decision-making skills. In the studies that did distinguish between roles, the observer role was associated with other positive learning outcomes, ranging from active engagement, reflection, peer review, self-evaluation, team evaluation, and increase in confidence. It is therefore imperative that both observer and facilitator integrate and engage with active learning strategies to optimize the observer role (Bonnel and Hober, 2016).

The clinical practice of the new graduate nurse demands the application of clinical reasoning to their clinical decision-making, thereby averting sentinel events (Levett-Jones, 2013). However, on the whole, in these studies, clinical decision-making models and scaffolds which direct observer's clinical reasoning were poorly utilized. Undergraduate curriculums should no longer partition and discreetly develop these cognitive and meta-cognitive skills, instead higher education pedagogy needs to respond by developing teaching and learning strategies which mimic and scaffold the complexity of thinking and 'being' like a professional nurse (Theobald and Ramsbotham, 2019). With continued practice, cognitively embedded frameworks that operationalize the concept of clinical reasoning can be recalled and implemented during students' transition to professional practice and can focus the beginner nurses' thinking in a systematic and logical way.

The use of structured tools and approaches to direct and prompt the learner and bridge the gap between current and desired outcomes and knowledge (Vygotsky,1978; Wood, Bruner, and Ross (1976) is intended to provide objective, learning outcomes and focused commentary on the observed simulation. Scaffolds which actively engage and guide the observer in critical thinking, can facilitate a student nurse's ability to gradually extend their knowledge and understanding to a deeper level. Effective use of scaffolding in nursing course design, therefore, enables learner progression towards these higher level concepts and encourages independent student inquiry, as well as allowing foundational concepts to be introduced at beginner level and built on throughout the whole education program. The absence of models or tools to scaffold observers' critical thinking during simulation highlights a missed opportunity in undergraduate nurse training and could indirectly indicate the low value educators place on the observer role (O'Regan, 2016). Undergraduate training can maximize the opportunity for nursing students to develop and practice clinical reasoning skills through actively engaging the observer through scaffolding their learning in simulation scenarios.

The Clinical Reasoning Model adopted by Levett-Jones utilizes a cycle of assessment, planning, implementation and evaluation to effectively apply reasoning in the clinical context. It is not a linear process, rather an iterative process to review and revise the plan of care in step with the constantly changing clinical status of the patient (Levett-Jones et al., 2018). It is in the final step of evaluation that the nurse is required to critically reflect on the outcome of the clinical decision, to deconstruct and reconstruct to improve future cognitive responses to a similar patient encounter. These elements of clinical reasoning: reflection and evaluation were not consistently evident in these reviewed studies, a deficit which could have implications further understanding of the link between reflection and practice transformation.

Nurse educators have a responsibility to guide and assert critical thinking and reflective practice to ensure that the clinical reasoning loop is both closed and opened (again) in response to the dynamic nature of nursing practice. Without deconstruction and reconstruction of clinical practice i.e. critical reflection, the practitioner is immobilized and will not adapt their practice or confirm effective practice within their clinical constructs (Tutticci et al., 2016). This can limit the potential for clinical reasoning to shape and guide effective clinical practice for the future.

The absence of randomized controlled trials in this scoping review suggests a real-time gap in rigorously understanding the role of observer in the simulation experience and opportunities for clinical reasoning acquisition. Improvements in quality research in this area are yet to be fully realized with only just over half of the studies stating a clear research question and congruence between data collected and research aim. This scoping review has highlighted a largely untapped learning opportunity in undergraduate nursing students, namely the simulation observer. Greater engagement of the observer in simulation, including through scaffolding learning can provide the opportunity to maximize critical reasoning skills.

4.1 Limitations

Although the search strategy was comprehensive, we cannot guarantee that all relevant studies have been included in this scoping review as the language and data bases may have affected the number of articles found. The search strategy was limited to studies published in English so there is no guarantee that all studies were located.

5.Conclusion

In this scoping review we explored the experience of nursing students as simulation observers and their level of engagement through using clinical decision-making models and learning scaffolds. Simulation provides a viable learning experience for nursing students (both participant and observer) to cultivate their clinical skills in a safe environment. The observer role, when actively engaged in the simulation experience, can enhance learning outcomes for both the observer and peers. The complexity of clinical practice demands the new graduate nurse demands apply clinical reasoning to their clinical decisions. Undergraduate training can maximize the opportunity for nursing students to develop and practice clinical reasoning skills through actively engaging the observer and using scaffolds in simulation scenarios thereby facilitating students' ability to build on what they already know to attain a deeper understanding of new material.

However, the observer role is undervalued. Scaffolding nursing student's learning through clinical reasoning models and approaches can maximize the observer role and learning outcomes. Further

research is warranted to explore the factors that contribute to the development of clinical reasoning in nursing students in the observer role and in the observer's capacity to "think like a nurse".

Conflicts of interest

There is no conflict of interest in this project.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at

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