

LITERATURE REVIEW

Learning by simulation – is it a useful tool for midwifery education?

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ABSTRACT:

Background: In both undergraduate teaching and post-registration education, simulation is increasingly being used as a teaching tool within midwifery to teach both emergency situations and practice skills. Yet simulation may not suit the needs of all. It can increase stress, especially if it is related to assessing competency. A literature review was undertaken with the aim of exploring and facilitating a greater understanding of simulation as a learning strategy within midwifery from a pedagogical perspective.

Methods: CINAHL Plus and Science Direct databases were searched using the search terms: simulation, drill and midwifery or obstetrics. Inclusion and exclusion criteria were applied, resulting in 15 studies being reviewed. These studies used both qualitative and quantitative methodologies so a thematic analysis was undertaken to identify the consistent themes.

Findings: Eight themes were identified demonstrating that simulation is frequently used within midwifery education. Simulation supports feelings of confidence and self-efficacy but in order to be effective needs to include briefing, good communication, observation (witnessing peers/being observers), repetition, reflection/debriefing and evaluation. Lecturer preparation is important as is the realism of the simulation.

Conclusion: Although simulation can improve confidence, it is less convincing as a determinant of skill acquisition/clinical ability. Ongoing caution is warranted before considering simulation as a substitute to clinical practice experience without further evidence of its impact on clinical outcomes. As exposure to clinical emergencies can be rare it is important to ensure that substitute education is appropriate. Simulated activities, that allow participants to establish expectations, seek clarification, collaborate, assess against an accepted standard and integrate reflections, can improve learning. Further research is necessary which recognises the "expectant" and "observational" nature of midwifery and how this could be incorporated into simulation activities.

Key words: Midwifery, simulation, pedagogy, learning, education

INTRODUCTION

There has been a growth in the use of simulation as a learning tool within midwifery education (Laschinger et al., 2008). This has been influenced by numerous factors, such as declining inpatient populations, rarity of some emergency clinical situations, safety concerns and advances in learning theory, forcing educators to move away from traditional clinical encounters to support student skill acquisition (Laschinger et al., 2008; McKenna et al., 2011). Simulation is being used in undergraduate midwifery education as a way of preparing students to practise safely; it has the potential to ensure graduate midwives are capable of assuming the full mantle of responsibilities and accountabilities of a midwife on graduation (Lake & McInnes, 2012).

Ongoing education for registered midwives is a recertification requirement (MCNZ, 2014), with some education workshops incorporating simulation activities, such as the mandated combined emergency skills day (MCNZ, 2014). Whilst simulation learning with role play is being used within midwifery education, it can also be seen as problematic. Some participants may find this type of learning stressful and may be unable to perform effectively if the simulation lacks fidelity. There are a variety

of ways of learning aimed at stimulating the differing learning styles of learners. Simulation is one of these tools and as such has a role within education. However, it would appear that in some instances simulation activities are being used to determine competency. This has the potential to influence a participant's willingness to engage in the simulation and raises the questions of for whom, how and whether simulation should be used to judge midwifery competency.

Pedagogy, the "art" and "science" of education (Daniels, 2002), is constantly evolving, as new techniques and ways of teaching are assimilated into education. Simulation is the imitation of a real life process or situation (Skelton, 2008). For simulation to be useful within education it is important that the context is realistic and has depth and credibility (Skelton, 2008). Fidelity refers to the "realism" or resemblance of real-life experience of a simulation method, with high fidelity being the words used to indicate the most realistic (Reznick & MacRae, 2006). An example of a model used is a mannequin for vaginal examination practice.

Role play is a common simulation term and considered an important aspect of simulation in clinical education, particularly in relation to teaching communication because it supports clarity

in roles and expected responses. It is unconcerned with clinical skills laboratories and technical equipment, instead utilising dialogue. The focus of the simulation becomes the implications of "language" and meaning (Skelton, 2008). This literature review aims to explore and facilitate a greater understanding of simulation as a learning strategy within midwifery from a pedagogical perspective.

METHOD

A formal literature review was undertaken using defined search criteria and terminology. The search terms used were: 'simulation' or "drill" and "midwifery" or "obstetrics". The inclusion and search criteria were:

- Full text being accessible on line
- English language only
- Published within the previous 5 years (2008 - February 2013)
- Published research, in peer reviewed and academic journals with midwives or student midwives as subject participants.

The search was limited to two electronic databases, with this review being undertaken as a post-graduate study activity. CINAHL Plus with full text and Science Direct were selected, as both cover a broad spectrum of health and social sciences. The alternative term 'obstetrics' was included to extend the search and as a way of increasing the likelihood of there being midwifery participants. The search elicited 178 articles, with 15 meeting the eligibility criteria (Table 1). One article was published as one of a three-part series which required additional searching to ensure all three were included. The total number (n) of participants from all the studies combined was 409, with the total number of review articles being 47. Papers included both quantitative and qualitative research findings, so thematic analysis was used to identify consistent themes due to its sensitivity and ability to summarise both types of research (Liamputtong, 2009). Eligible articles were evaluated with concepts categorised and displayed thematically. Themes were determined by searching across the data set, deconstructing data categorically and making connections for repeated patterns of meaning (Liamputtong, 2009). This process required immersion in the topic with repeated reading of the data generated until it made sense and could be organised in a meaningful way.

FINDINGS

Eight themes were identified as being important for understanding the pedagogy of simulation within midwifery education.

Briefing

It would appear that preparation in the form of briefing prior to simulated learning activities is important. This was discussed in several studies (Cohen, Cragin, Wong, & Walker, 2012; Dow, 2012a; Smith, Gray, Raymond, Catling-Paull, & Homer, 2011). This involved preparation of both the teachers and those being taught. Pedagogical preparation (consideration of teaching methodology) and orientation to the simulation environment were found to notably improve lecturer performance of facilitation (Cohen et al., 2012). When midwifery students were given the opportunity to consider the simulation requirements and to practise, their confidence was increased (Dow, 2012a; Smith et al., 2011), which was important when working within a team and appeared to enhance learning (Smith et al., 2011). When the students were not afforded an opportunity to prepare, they reported misgivings about what was to happen, e.g., "*well I actually felt quite nervous because I didn't know what to expect and then we went into the room*" (Dow, 2012a, p. 512).

Confidence/Self-efficacy

Confidence or self-efficacy featured frequently within the studies with an expectation that simulation would strengthen confidence in practice (Birch et al., 2007; Cohen et al., 2012; Cooper, Bulle et al., 2012; Cooper, Cant et al., 2012; Dow, 2012a, 2012c; Harder, 2010; Norris, 2008; Skirton et al., 2011). The hypothesis is that simulation has the power to mitigate fear because the familiarity with settings and emergency scenarios can give an insight into clinical practice and support an increase in confidence and ability to manage the situation (Dow, 2012a, 2012c; Norris, 2008).

Cohen et al. (2012) examined the relationship between low-technology and high-fidelity (realistic) simulation-based training and changes in participant self-efficacy over pre-determined time frames. A statistically significant increase of self-efficacy in all categories was achieved immediately post-training, which was maintained at above pre-training levels four months later. Students concluded that the training had increased their confidence. "*I feel more secure, and that gives me strength to assure that I am capable of solving any complications*" (Cohen et al., 2012, p. 21). However, length of time since the simulation did diminish confidence, so the authors stressed that repeating the activity is important.

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In a comparative study for obstetric skills and drills that included midwives, it was found that when evaluating lecture-based teaching (LBT), simulation-based teaching (SBT) and a combination of these two (LAS), only SBT demonstrated sustained improvement in perceived knowledge and confidence at a three-month retest. LBT and LAS scores decreased over time while SBT increased by a point. Although the finding was not statistically significant, the SBT group felt they had transferable skills and that they would be less anxious in subsequent emergencies (Birch et al., 2007).

During simulation any deterioration in the woman's wellbeing was found to increase the anxiety of participants, with stress causing poorer performance (Cooper, Bulle et al., 2012). Skirton et al. (2011) reported that their newly registered midwife participants desired simulation of high-pressure situations within the practice environment, finding that simulation within a realistic clinical setting bolstered their preparation and confidence prior to practice.

In their systematic review of simulation-based learning in midwifery education, Cooper, Cant et al. (2012) revealed improvements in self-efficacy, confidence and clinical judgment in postpartum haemorrhage simulations. They found that participants had gained improved clinical judgment from practising estimating blood loss, along with improvements in perceived technical competence and stress hardiness (coping strategies) from simulated obstetric emergencies. Similarly, Birch et al. (2007) noted that training, which included simulation for emergencies, improved performance and communication as well as reducing anxiety.

Increased self-efficacy may not always correlate with improved performance. In another systematic review (Harder, 2010), several studies found students did not demonstrate statistically significant

improvements in competency but scored statistically higher in self-confidence and perceived competence. Similarly, Cohen et al. (2012) found simulation training was statistically significant in improving self-efficacy above pre-training levels in all areas (cognitive, behavioural and technical) but found a small decrease at the four-month follow up, theorising a regressive relationship between leaving the safety and support of the simulation environment and entering practice settings.

Witnessing Peers/Observer

It would appear that there may be benefits to the participants if they are able to witness peers or be observers during simulation activities (Dow, 2012c; Freeth et al., 2009). Team participation could also be seen as a mechanism important to both learning and team/relationship building. Respect for differing roles and perspectives was fostered by witnessing other practitioners (Freeth et al., 2009). Observation enabled learning; alternative strategies were able to be explored as perceptions of their own performance were compared to how others managed. The more critical nature of performance review in clinical practice, compared to simulation, was also discussed, suggesting that errors during simulation invoked less fear of real life repercussions (Freeth et al., 2009). Simulation situations which supported corrections to responses before going into clinical practice were considered to be beneficial (Dow, 2012c; Norris, 2008).

Facilitation

The skills of those facilitating simulation activities were considered to be important, with the potential to impact on the quality of the learning experience for the learner (Bogossian et al., 2012; Dow, 2012a, 2012c; Dowie & Phillips, 2011; Fox-Young et al., 2012; Skirton et al., 2011; Smith et al., 2011). Skirton et al. (2011) found that undergraduate midwifery students wanted more involvement from teachers in the simulation as a way of supporting practice, especially when the simulation involved high-pressure situations and complications. Teacher input within simulated activities was viewed as a valuable component of preparation to practise, with students learning better when they felt "safe" and "secure" during emergency skills practice (Smith et al., 2011). Knowledge retention also improved if students could relate skills to a practice scenario and if the environment was perceived as non-urgent and supportive (Smith et al., 2011). Poor insight by lecturers about students' anxiety, misgivings and their feeling daunted or nervous was considered to be a barrier to learning (Dow, 2012a).

Lecturer preparation was a significant component necessary for facilitation (Bogossian et al., 2012; Dow, 2012a, 2012c; Fox-Young et al., 2012). Simulation is used extensively within undergraduate/student midwifery education (Bogossian et al., 2012; Fox-Young et al., 2012); yet setting up for simulation education is not without challenges. There is the need to have preparation time, adequate knowledge, appropriate venues, technical/academic support, sufficient funding and appropriate equipment if the simulation is to be successful (Bogossian et al., 2012). Low resourcing, lack of preparation and low confidence were issues found by Fox-Young et al. (2012) in their focus group research with Australian midwifery academics. In this study the midwives were asked to discuss barriers and enablers for simulation in midwifery education. Many expressed frustration about their role in simulation education; one stating, for example: *"there's usually one of you trying to be the actress, be the assessor, support the student... it's really difficult"* (p.498).

Dow (2012a, 2012b, 2012c), in her case study series exploring the application of midwifery undergraduate clinical simulation in the hospital setting, also found that there were excessive

workload demands on lecturers during simulation activities. Participants reported the struggle of competing clinical demands and expectations, with other issues being given priority. This was because simulation activities were considered as resource intensive but not time sensitive and, as such, they were more easily delayed or not undertaken (Dow, 2012a). When simulation is not prioritised there are fewer learning opportunities (Dow, 2012c). Dowie and Phillips's (2011) review of lecturers (n=20), exploring perceptions of delivering high-fidelity simulation, noted only 40% felt confident in using simulation, with just 35% feeling sufficiently prepared in its use. However, 80% indicated that education about facilitating high-fidelity simulation would improve confidence. All participants believed high-fidelity simulation was a beneficial approach to learning. Lecturers often did not use the full capabilities of the manikins; they were not aware of them and thus were unable to prepare fully for simulation scenarios.

Team participation could also be seen as a mechanism important to both learning and team/relationship building.

Although simulation is embedded within the Australian midwifery curricula (Bogossian et al., 2012; Fox-Young et al., 2012; McKenna et al., 2011), it is clearly apparent that most lecturers feel underprepared for teaching using this modality (Bogossian et al., 2012; Dowie & Phillips, 2011; Fox-Young et al., 2012).

Fidelity

Simulation fidelity, or feelings of "realism", is discussed extensively in the literature about simulation (Bogossian et al., 2012; Cooper, Bulle et al., 2012; Dow, 2012b; Fox-Young et al., 2012; Harder, 2010; McKenna et al., 2011; Skirton et al., 2011; Warland & Smith, 2012). Cooper, Bulle et al. (2012) found that during scenarios in which there was a deterioration in the woman's wellbeing the student's anxiety increased and she became less aware of what was happening around her. It was thought that this "poor performance" occurred and was compounded by the artificial nature of the simulated scenarios. Help-seeking behaviour, such as calling medical teams, was reduced, hampering demonstration of good decision making. Students anticipated support as unavailable within the simulations (Cooper, Bulle et al., 2012).

In their examination of perceptions related to realism, McKenna et al. (2011) found that education leaders found it difficult to integrate midwifery philosophical tenets with practice during simulation. This difficulty related to creating simulation environments that captured the important, but somewhat intangible, practice philosophies of being "with woman", "holism" and "women-centred" care provision. The unique challenges of midwifery were highlighted as in this quote: *"often unlike other practice-based disciplines such as nursing, midwifery involved not having hands-on, but rather standing aback and observing. This meant that there were fundamental aspects that did not lend themselves to simulation"* (McKenna et al., 2011, p. 684). It was also perceived that midwifery's extrinsic, sensory and cultural experiences were difficult to simulate when it came to such as smells, noises and adrenaline rushes, as this quote explains: *"you're going to miss the culture, you're going to miss the social aspects, the psychological aspects, so there's a lot you can't capture"* (McKenna et al., 2011, p. 685). This concept was also supported by Fox-Young et al. (2012) whose participants expressed their concerns with the ability of simulations to replicate the complex physical, social and psychological contexts of midwifery care, particularly when

considering the being "with woman", "holism" and the sometimes seemingly "passive" nature of clinical care. *"The dynamics of sitting with somebody and watching them labour...knowing when not to do, when you actually have to stop yourself from intervening"* (Fox-Young et al., 2012, p. 497).

When the environment is unfamiliar there is more likely to be poor performances during simulation, so environment is an important factor to consider (Harder, 2010). However, when simulation is undertaken with highly realistic scenarios (high fidelity), clinical skills are improved regardless of the environment (Harder, 2010). Harder (2010) found also that there were no differences in performance between simulation exercises and other, more traditional methods of teaching (three studies) and, of note, no poorer performances when using simulation method. Dow (2012b) argues that the clinical skills laboratory should be similar to the clinical environment because context-dependent memory is thought to play an important role in the application of knowledge and skills, gained from simulation, to practice.

Skirton et al. (2011) found that, in the absence of practice experience, simulation was considered an appropriate alternative, especially for activities such as suturing, neonatal resuscitation and cannulation. Conversely, respondents also indicated that simulation was not always seen as the total solution to the problem with there being no substitute for reality: *"That fake arm is one thing but a real arm is something else"* (Skirton et al., 2011, p.5).

Fox-Young et al. (2012) found that simulation is used extensively in Australia even though it was not considered to be amenable to the expectant and observational nature of midwifery care. This acknowledges that being "with woman" is not replicable. With clinical requirements becoming more difficult to achieve due to increased placement costs and increasing "medicalisation", a curriculum tension can often develop. As exposure to physiological birth diminishes, simulation becomes the curriculum substitute (Fox-Young et al., 2012).

There is an absence of evidence to support improved clinical outcomes or justify replacement of clinical experience with simulation. However, midwifery programmes need to be resourced in order to provide high-quality simulation experiences in addition to providing quality clinical placement experiences (Bogossian et al., 2011).

Communication

Fostering of communication skills was considered important in simulations but could be both positive and negative (Birch et al., 2007; Dow, 2012a, 2012b; Freeth et al., 2009; Norris, 2008; Warland & Smith, 2012). Norris (2008) highlighted that students enjoyed the opportunity to have dialogue and work within a team with participants, stating: "...applying the theory to practice was an excellent idea especially in a controlled environment with the opportunity to ask questions" (p. 234). It was unclear as to whether this progressed into ongoing improvements within the multi-disciplinary team functionality. Although the finding was not statistically significant, improved multi-disciplinary communication was reported by the SBT participants within the Birch et al. (2007) study. The development of professional awareness and team work was also a positive feature within Dow (2012a). Simulation activities can improve communication as scenarios facilitate building relationships. Conversely, threats to a positive environment were possible when there were entrenched hierarchies and pre-existing inter-professional tensions. These conflicts made it hard for some participants to work well or respond appropriately, suggesting a need for increased support and awareness from the facilitators. A small study using asynchronous, on-line role-play, via a discussion board, found that effective

communication skills and communication style could be fostered (Warland & Smith, 2012). This medium gave the opportunity for debate and increased knowledge by presenting a viewpoint the participants did not hold but were required to discuss (Warland & Smith, 2012). Another facet of simulation that improved communication was if patient actors were used rather than manikins, as there were improved interaction and realism (Warland & Smith, 2012).

Repetition

The opportunity for repetition or practice of skills was a recurrent theme expressed within several studies (Cooper, Bulle et al., 2012; Dow, 2012a, 2012b, 2012c; Freeth et al., 2009; McKenna et al., 2011; Norris, 2008; Smith et al., 2011). Simulation enables students to be exposed to rare and unfamiliar situations that are adapted to the needs of the student until they feel competent with the skills involved (Norris, 2008). This appears to foster the opportunity for skill mastery without harm. Repeated practice allows for mistakes to be rectified and gives the student a sense of "safety" and control over their own learning (Norris, 2008). Simulation along these lines is more commonly used within undergraduate teaching. Correction of common errors prior to going into practice was seen as beneficial by midwifery lecturers (Dow, 2012c). Students also recognised repetitive practising as important in their preparation for actual practice, with incremental steps enabling knowledge to be built on (Dow, 2012a; Smith et al., 2011). Simulation of emergency skills and other skills not frequently used in clinical practice was considered to be an important aspect of technical skill enhancement by midwifery lecturers (McKenna et al., 2011).

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When there is a highly stressful situation (also explored within confidence/self-efficacy), especially when a woman's condition is deteriorating, the practitioner's performance can be affected. Repetitive performance or practising many times was noted to at least "maintain" a level of skilled (or "competent") performance (Cooper, Bulle et al., 2012).

Similarly the opportunity to "rehearse" or repeat emergency skills established links to practice, with participants reporting that they felt more prepared for "real" emergencies after the simulation (Freeth et al., 2009). The ability to focus on developing practical skills to a safe standard as often as necessary to gain that, i.e., repetition, was felt by lecturers and mentors to be beneficial. However, this finding was not supported by any ongoing links to clinical practice (Dow, 2012b).

Reflection/Debriefing

Dedicated reflection time or debriefing was found to be a beneficial component to learning via simulation (Cooper, Bulle et al., 2012; Dow, 2012a, 2012c; Fox-Young et al., 2012; Freeth et al., 2009). The opportunity to examine, critique and analyse behaviour was an important bonus (Freeth et al., 2009). Dow (2012a) uses the term "insight" to describe how participants' simulation experiences can heighten awareness of practice and provide a learning catalyst as students gain experience and become open to other learning.

Poor performance or "failings" within simulated activities had links to workplace culture (Cooper, Bulle et al., 2012). Participants' reflection on their simulation performance identified their practice "reality": *"we don't do it like that here"*. This suggests the need to

understand the practice reality and ensure that the scenarios fit the practice context (Cooper, Bulle et al., 2012, p. 34). Several studies identified the importance of the facilitator in the debriefing of participants following simulations (Dow, 2012c; Fox-Young et al., 2012; Freeth et al., 2009). Important expectations of facilitators were their ability to foster a supportive atmosphere by providing both a "safe" and "open" environment for sharing and an appropriate level of challenge. Effective facilitation was described as enabling of learning with participants by making links between daily practice and the simulated emergencies (Freeth et al., 2009).

Assessment and Evaluation

Simulation may also be used for evaluative purposes and is commonly used as an assessment tool (Bogossian et al., 2012; Fox-Young et al., 2012; Harder, 2010; Warland & Smith, 2012). Whether this improves learning is debatable (Fox-Young et al., 2012; Harder, 2010). Harder (2010) argues that there are difficulties in determining the differences between simulation and traditional teaching modalities due to the lack of, or poorly structured, assessment tools for evaluation (Harder, 2010). Using the simulator as both an intervention and an evaluation tool is problematic. Tools, such as the objective, structured, clinical examination (OSCE), have been developed to assess and evaluate learners' abilities and are common in the simulation setting (Harder 2010).

Simulation offers students the opportunity to practise skills in a safe, non-threatening environment as a precursor to practice (Fox-Young et al., 2012). Assessment of competence through "... OSCE was identified as a potential essential precursor to clinical practice" (Fox-Young et al., 2012, p. 499), even though the OSCE has not been specifically designed for simulation situations (Harder, 2010). This suggests that simulation plays a potential gate-keeping role and raises interesting questions as to whether using simulation for both practice and assessment can be a non-threatening experience. *"I guess it is a stepping point for assessing the safety before you're allowed out there to do the real thing"* (Fox-Young et al., 2012, p. 499).

Some transfer of learning from simulation into the workplace was identified by Freeth et al. (2009) but the mechanisms to support this were also noted to be underdeveloped. Smith et al. (2011) also caution that while the midwifery students' satisfaction improved, their expansion of learning was less obvious. Further research into the impact of simulation on competence and reflective practice was recommended. Dow (2012b) also struggled to find transferability of targeted abilities to overall clinical performance, apart from confidence.

DISCUSSION

Simulation is now widely utilised within the undergraduate and ongoing midwifery education contexts (Bogossian et al., 2012; Laschinger et al., 2008; Skirton et al., 2011). This review has identified several issues, both positive and negative, related to the use of simulation for midwifery education.

Preparing for or "briefing" can set the tone of simulation activities and mitigate anxiety for the learner and therefore should be considered an essential part of simulation activities (Dow, 2012a; Smith et al., 2011). Additionally, being explicit about expectations with established and identified learning outcomes supports the participants to understand their role and responsibilities (Harder, 2010). Debriefing should be an integral part of simulation activities because, if done well, it has the potential to be a learning catalyst (Cooper, Bulle et al., 2012; Dow, 2012a, 2012c; Fox-Young et al., 2012; Freeth et al., 2009). The role, integration and timing

of debriefing should be considered, as should any assessments that may occur during the simulation, with clear communication to participants of expectations. The lack of, or resorting to adhoc, clinical assessment tools is a significant issue that requires addressing (Harder, 2010). More research is needed to explore the structure of simulation activities and discover what constitutes an optimal evaluation tool for practical simulation so that tensions can be managed appropriately. Simulation has the potential to "gate keep" access to clinical practice, with simulation seen as a replacement of clinical hours (Fox-Young et al., 2012). There is a need for more evidence to demonstrate whether simulation is a suitable, valid and reliable substitute for clinical practice hours within midwifery.

One of the benefits of simulation is the potential to ensure skill mastery via repetition or "scaffolding", with ongoing feedback and dialogue considered to be important to learning (Cooper, Bulle et al., 2012; Dow, 2012a, 2012b, 2012c; Freeth et al., 2009; McKenna et al., 2011; Norris, 2008; Smith et al., 2011). Poor performance may be reduced prior to practice by repetition, the recognition of mistakes and ongoing dialogue with facilitators and peers (Dow, 2012c; Fox-Young et al., 2012; Freeth et al., 2009). However, there is a need to consider how skills should be assessed during simulation and whether the simulation is the optimum method of assessing a particular skill development or skill competency. In order for simulation to work well, lecturers need expert support and advice to increase their confidence and capabilities in using simulation activities (Dow, 2012b; Fox-Young et al., 2012; McKenna et al., 2011). It helps if there are links to clinical practice to infuse "fidelity" and support realism during simulations. Further research into lecturer impact within simulated activities is warranted to understand their relationship to results. How credible are assessment results if a lecturer is not pedagogically prepared for this modality? Preparing for simulation, providing learning through simulation and debriefing following simulation all have a time impact which needs to be factored into tutors' workloads to ensure optimum participant involvement and enhance learning.

Similarly, fidelity has a major impact on the quality of the participant's experiences, particularly when there is cultural and "psychological" fidelity (Bogossian et al., 2012; Cooper, Bulle et al., 2012; Dow, 2012b; Fox-Young et al., 2012; Harder, 2010; McKenna et al., 2011; Skirton et al., 2011; Warland & Smith, 2012). The simulation experiences need to be believable, with consideration being given to using realistic situations and "live" models whenever practicable. Although somewhat intangible, the nature of midwifery was also found to be a barrier to fidelity, with midwifery care more often about support and observation rather than "doing" in the case of "well" women (Fox-Young et al., 2012; McKenna et al., 2011). This can be in contrast to the role of other health professions who are more commonly engaged in the treatment of pathology or complications. The ability to allow a situation to unfold, only stepping in with an intervention when a complication is likely or arises, is integral to midwifery. The physiological vagrancies of pregnancy and birth, and the time over which an assessment may need to be made and intervention considered, require the need to demonstrate a particular skill set which may not lend itself well to the constraints of simulation.

The distinction between the concepts of "mastery" and "confidence" is important (Harder, 2010). While simulation appears to have a clear impact on the participant's feelings of self-efficacy, this did not necessarily translate into increased skill acquisition and improved practice performance (Cohen et al., 2012). The role of the facilitator would appear to have an impact

Table 1: Summary of research papers relate to research question.

Author	Type of study	Aim	Participants
Birch et al., (2007). United Kingdom.	Questionnaire, simulation video analysis using quantitative OSCE tool and qualitative semi-structured interviews. Mixed methodology.	Determination of most effective method of delivering training to staff on the management of an obstetric emergency.	n = 36 Junior and senior medical staff. Midwifery staff.
Bogossian et al., (2012). Australia.	Electronic survey.	Describes the extent, nature and types of simulation used as a learning method in contemporary Australian midwifery curricula.	n =31 Midwifery academics.
Cohen et al., (2012). Mexico.	Prospective, descriptive study.	Examination of the relationship between low-tech, high-fidelity, simulation-based training and pre- and post-training changes in participant self-efficacy.	n =12 Obstetric nurses. Professional midwives.
Cooper, Bulle et al., (2012). Australia.	Exploratory quantitative analysis of student performance based upon performance ratings derived from knowledge tests and observational ratings.	Assess student midwives' ability to assess and manage maternal deterioration, using measures of knowledge, situational awareness and skill performance.	n = 35 Student midwives.
Cooper, Cant et al., (2012). Australia.	Systematic Review.	Critically examine evidence for simulation-based learning in midwifery education.	n =24 papers (all quantitative).
Dow (2012a), (2012b), (2012c).United Kingdom.	Instrumental Case Study.	Explore the application of clinical simulation in the maternity hospital practice setting.	n =13 Midwifery lecturers. First year midwifery students. Mentor midwives.
Dowie & Phillips, (2011). United Kingdom.	Informal review. Questionnaire.	Identification of lecturers' feelings about simulation in one faculty using high-fidelity simulated scenarios to inform a subsequent research study.	n = 20 Midwifery lecturers.
Fox-Young et al., (2012). Australia.	Thematic analysis. Outcomes of 11 focus group interviews.	To describe Australian midwifery academics' perceptions of the current barriers and enablers for simulation in midwifery education and the potential resources required for simulation to be increased.	n = 46 Midwifery academics.
Freeth et al., (2009). United Kingdom.	Analysis of telephone or e-mail interviews and video-recorded debriefing.	Examination participants' perceptions of multidisciplinary obstetric simulated emergency scenarios (MOSES) courses, their learning and the transfer of its principles to clinical practice.	n =55 Midwives. Obstetricians. Anaesthetists.
Harder, (2010). Canada.	Systematic Review.	Evaluate current literature on the use of clinical simulation in health care education.	n = 23 papers (Included obstetrics and student midwives).
McKenna et al., (2011). Australia.	Qualitative, Focus group interviews. Thematic analysis.	Identify relationships between the use of simulation, learning outcomes and subsequent clinical practice change.	n = 46 Midwifery academics.
Norris, (2008). United Kingdom.	Evaluation of a pilot study.	Evaluation of obstetric emergency study day. Reduction theory-practice gap.	n = 23 Undergraduate midwifery students.
Skirton et al, (2011).United Kingdom.	Prospective, longitudinal, qualitative study, using participant diaries to collect data.	Determine whether the student midwives' educational programme had equipped them to practise competently after entry to the professional register.	n = 35 Newly qualified midwives.
Smith et al., (2011). Australia.	Questionnaire (pre- and post-intervention questionnaire and online survey).	Analysis of integration of practice and theory through clinical simulation in order to improve student learning and satisfaction.	n = 45 Graduate diploma midwifery students.
Warland & Smith, (2012). Australia.	Survey student evaluation of online role play.	Evaluation of online role play to test effectiveness against other learning activities.	n = 12 Undergraduate midwifery students.

on skill acquisition and practice performance with good facilitators enhancing communication, and improving learning and skill acquisition (Dow, 2012c; Freeth et al., 2009). The opportunity for reflection and debriefing (Cooper, Bulle et al., 2012; Dow, 2012a, 2012c; Fox-Young et al., 2012; Freeth et al., 2009) and the use of a good benchmarking tool with which to measure efficacy are also important (Harder, 2010). As clinical opportunities diminish, alternative strategies need to be employed. If participants are unable to establish expectations, seek clarification, collaborate, assess against an accepted standard and have time to integrate their reflections into simulated activities, then successful learning via simulation will likely be problematic. Ongoing caution is warranted before considering simulation as substitutive to clinical practice without further evidence of its impact on clinical outcomes.

CONCLUSION

This literature review found that there were several pedagogical themes related to simulation, all of which supported the importance of active dialogue as a recurrent thread. The benefits of simulated activities for learning were dependent on the opportunities afforded to practise, discuss, work with peers, reflect and evaluate skill acquisition. Barriers to learning centred around establishing expectations, the ability to benchmark, opportunities for communication and reflection, feelings of safety and realism alongside responsive facilitation. There are important distinctions between practising and formal assessment via simulation with facilitators. Fidelity has a significant impact on both. The use of simulation as an assessment tool needs to be considered carefully, with awareness of the impact of communication, learning styles and performance stress, as well as the realism or fidelity of the situation and how each of these can impact on the individual's performance. While simulation clearly improves confidence, there is less evidence that it improves performance or clinical care provision. More research is needed to explore the responses to different facilitator styles, clinical context, and gender roles. There are challenges to using simulation within the uniquely expectant and observational nature of the midwifery context. This literature review is a first step in opening the conversation about simulation pedagogically within midwifery education.

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