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Practical aspects of setting up obstetric skills laboratories – A literature review and proposed model

Bettina Utz, MD (Clinical Lecturer, Centre for Maternal and Newborn Health), Theresa Kana, MSc, RGN, RM (Lecturer, Centre for Maternal and Newborn Health)*, Nynke van den Broek, MBBS, FRCOG, PhD (Head, Centre for Maternal and Newborn Health)

Maternal and Newborn Health Unit, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, UK

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ABSTRACT

Objective: the use of simulation training in obstetrics is an important strategy to improve health-care providers' competence to manage obstetric cases. As an increasing number of international programmes focus on simulation training, more information is needed about the practical aspects of planning for and organising skills laboratories.
Methods: systematic review of peer reviewed literature published between January 2000 and June 2014. Thematic summary of 31 papers meeting inclusion criteria.
Findings: skills laboratories need to reflect the clinical working environment and are ideally located at or near a health-care facility. A mix of low and high fidelity manikins combined with patient actors is recommended to be used with clear instructions, scenario setting and short lectures including audio-visual teaching aids. Motivated trainers are vital and a focus on 'team training' in smaller groups is beneficial. Practical information needed to set up and run a skills laboratory is provided with a proposed outline of a skills laboratory for obstetric simulation training.
Conclusions and implications for practice: obstetric skills laboratories can play a substantial role in increasing competency and confidence of staff via 'skills and drills' type training. When considering setting up skills laboratories, this can be simply done using low fidelity manikins in the first instance with training facilitated by motivated trainers using realistic clinical scenarios. Overall, the review findings highlight the need for better documentation of factors that promote and/or are barriers to the effective use of skills laboratories.
Synopsis: 31 papers detailing the planning and organisation of skills laboratories were reviewed in order to assess the factors necessary for their effectiveness and the vital role they play in increasing staff competencies. Setting up obstetric skills laboratories is worthwhile but requires in-depth planning.

Contents

* Corresponding author.
E-mail address: Terry.Kana@lstmed.ac.uk (T. Kana).

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Introduction

Training in a skills laboratory or simulation centre enables health-care providers both pre- and in-service to practise their skills in a controlled environment. The use of simulation training in obstetrics has been shown to improve health-care providers' knowledge, skills and confidence to manage obstetric cases (Crofts et al., 2007; Cooper et al., 2011; Grady et al., 2011).

During simulation, students or practitioners can repeat practicing a skill until they are familiar with it. This can be particularly useful for clinical presentations that occur infrequently in the workplace. Group training in a skills laboratory setting can be an important tool to strengthen interdisciplinary team building (Andreatta et al., 2010). In addition, the availability of a simulation training site and equipment provides scope for standardised assessments of skills.

Simulation training can be implemented at different levels. Two common levels are described in the literature: task level simulation and clinical contextual simulation (Andreatta et al., 2010). Task level simulation focuses on skills required to perform a particular task, e.g. suturing episiotomies or manual removal of the placenta. Clinical contextual simulation is used to teach participants to make a number of decisions and carry out tasks based on clinical assessment and judgement of a patient e.g. management of a collapsed or unconscious patient. Historically, simulation training started using cadavers and animals but patient actors have also been used (Andreatta et al., 2010; Clark et al., 2010; Grable and Ochoa, 2011). Currently, there is a wide range of different obstetric simulation models or manikins available for either task or clinical context simulation. Low fidelity (LF) simulators in the form of non-computerised manikins or models are used alongside high fidelity (HF) simulators that are more sophisticated computer-driven simulators able to adapt to different situations and levels of practice.

Access to a dedicated skills practice room or skills laboratory with a range of equipment available for use is already an accepted standard for both pre-service and in-service training of health-care providers in high resource settings and such a 'skills and drills' based approach to training and setting up of skills laboratories is gradually being scaled up in many low and middle income settings. A review by Nyamtema et al. (2011) illustrated that training in emergency obstetric care was a component of up to 65% of programs to improve maternal and newborn health outcomes in resource poor settings. A number of development programmes are currently directed towards the provision of skills laboratories and simulation based training in such settings (Grady et al., 2011; Raven et al., 2011; Ameh et al., 2012). The purpose of this review was to explore the literature to assess the practical implications associated with planning and establishing skills laboratories and to collate this information to help inform programmes that include simulation training. In addition, this information has been used to design a proposed layout and plan the content of a simple obstetric skills laboratory.

Methods

Four databases (Academic Search Complete, Science Citation Index, Medline and PubMed) were searched using the following search terms: 'Simulation training' and 'Obstetrics'; 'Simulation centre' and 'Obstetrics' and 'Skills laboratory' and 'Obstetrics'. All full text electronic journals, peer reviewed and academic journals with articles published in English between January 2000 and June 2014 were included. In addition, the bibliographies of relevant articles were hand-searched for publications that had not been identified through the electronic search.

The search terms resulted in 490 hits. Two researchers independently screened articles by title and abstract. After eliminating duplicates, 143 articles were considered relevant and were reviewed in full. Where no consensus was reached regarding in- or exclusion a third researcher was consulted.

Publications were included if they contained information on practical aspects of simulation training such as location of skills laboratory, content, training approach, resource requirements including financial and sustainability. We excluded all articles that focused on measuring effectiveness of training that did not contain information relevant to the planning or setting up of skills laboratories, selection of manikins or other teaching resources. We identified 31 papers that met the inclusion criteria (Fig. 1).

All included papers were summarised using a pre-designed format summary table highlighting type of publication (review, commentary, report or research study), setting, the main findings and, for research studies, strengths and weaknesses (Table 1). Main themes were then identified and summarised using a narrative approach.

Findings

A total of 31 articles met the inclusion criteria. The vast majority of publications (25) refer to high resource settings. The majority of papers are reviews (16), commentaries (5) or reports (2) with eight studies reporting on primary research or secondary data analysis.

The included papers covered a range of themes with main themes identified as (a) the location of skills laboratories, (b) skills that can be taught, (c) the types of manikins available and used, (d) the role of both trainers and trainees in establishing skill laboratories, (e) training approaches and (f) aspects of funding and sustainability of skills laboratories.

Four papers acknowledged that the authors were consultants to equipment manufacturers in the 'conflicts of interest' sections (Draycott et al., 2008; Siassakos et al., 2009; Ayres-de-Campos et al., 2011; Crofts et al., 2011).

Five of the research studies included a description of recognised weaknesses within the study methodology. These included having too few participants (Cohen et al., 2012) and/or study not having sufficient statistical power (Birch et al., 2007), being health facility focused (Gundry et al., 2010), limitations of the use of multiple choice questions to assess knowledge and only reaching level 2 in the Kirkpatrick Model for evaluation of learning (Crofts et al., 2007) and inability to show whether improved team working could be replicated within new teams (Ellis et al., 2008).

(a) Location of obstetric skills laboratory

It is importance that the location of a skills laboratory is agreed before the purchase of training equipment (Ennen and Satin, 2010). A number of authors recommended that skills laboratories should be representative of and reflect the clinical working environment (such as a labour ward) and thus should endeavour to have all necessary equipment in place in the training setting (Johannsson et al., 2005). However, studies that have examined this, show that, with regard to the ideal place for conducting training, there was no difference between running simulation training in a hospital-based skills laboratory setting or in a stand-alone simulation centre (Crofts et al., 2007). Similar findings were published by Cass et al. (2011) who reported that there was no difference in outcomes observed between training health-care providers in the management of eclampsia in an externally based simulation centre or in a hospital environment. The success in observed outcomes was not considered to be associated with the location of the training but rather determined by the training content and delivery itself.

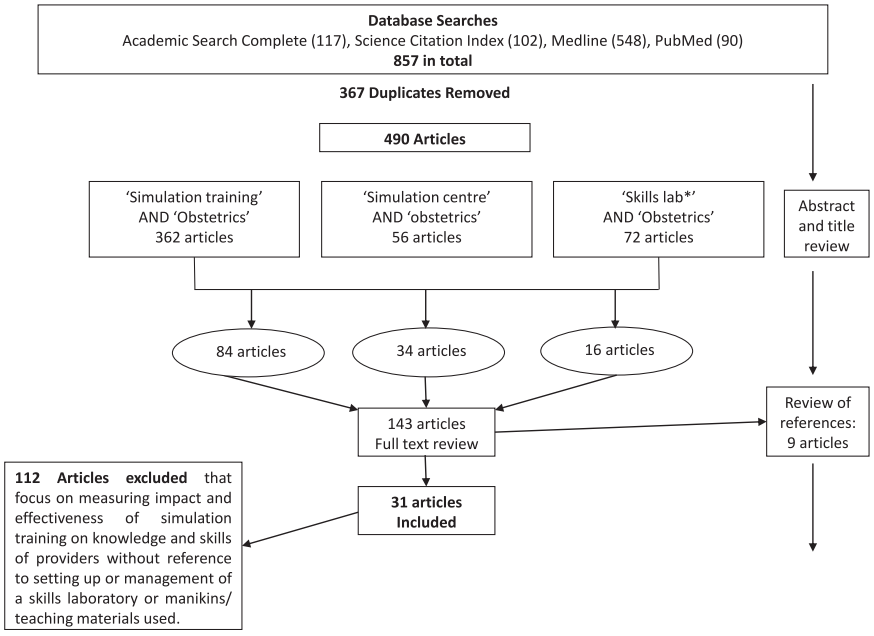

Fig. 1. Search strategy and number of papers identified.

Although there appears to be no difference in outcome when training staff either in a hospital setting or external simulation centre, training in a hospital setting is often found to be more economical than training in an external skills laboratory or training centre (Siassakos et al., 2009; Strachan, 2010; Cass et al., 2011) and a hospital setting was reported to be more likely to ensure that locally available and relevant protocols for clinical management are used (Ayres-de-Campos et al., 2011). Ellis et al. (2008) suggest that courses in regional simulation centres are suitable for training of trainers with further 'cascade' training subsequently conducted in the local hospital setting. However, other authors point out that it might be difficult to accommodate in-house training in busy clinical settings (Siassakos et al., 2009). In some UK sites, a so-called 'hub and satellite' model exists. This comprises a main skills laboratory that has all equipment and resources available which is then linked with smaller satellite skills laboratories located in peripheral facilities with a smaller selection of equipment reflecting the needs and clinical practice in a more peripheral health-care facility (du Boulay and Medway, 1999). The setting up and organising of a skills laboratory may simply depend on available space (Ennen and Satin, 2010). A flexible design such as a large room with (moveable) wall dividers that enables adaptation is described by some authors as useful (du Boulay and Medway, 1999; Bradley and Postlethwaite, 2003). However, smaller rooms are considered to be better for training that aims to improve communication (Bradley and Postlethwaite, 2003). Training materials (including manikins) need to be accessible but at the same time stored safely to avoid theft or damage (du Boulay and Medway, 1999; Bradley and Postlethwaite, 2003).

(b) **Skills taught in skills laboratories**

The location and content of a skills laboratory should be informed by the simulation training programme and curriculum that will be used. Learners and their training requirements must be considered at the outset (Rizk and Elzubeir, 2000; Bradley and Postlethwaite, 2003). On the basis of this information, relevant skills to be covered in the simulation training can be identified. The literature review revealed a range of obstetric skills that are currently taught in simulation centres as part of in-service training including the management of eclampsia, shoulder dystocia, postpartum haemorrhage, vaginal breech delivery, cord prolapse, instrumental delivery, cardio pulmonary resuscitation (CPR), neonatal resuscitation, perineal repair (vaginal tears and episiotomy) and, basic surgical techniques, as well as diagnostic techniques e.g. amniocentesis (Rizk and Elzubeir, 2000; Macedonia et al., 2003; Crofts et al., 2011).

Skills laboratories are also considered beneficial for the practice of case scenarios which can be used for the training of multiple skills simultaneously as well for as improving teamwork (Ennen and Satin, 2010). Examples of skills taught using a skills laboratory approach during undergraduate or pre-service training include: vaginal examination, monitoring of the progress of labour, conducting normal vaginal delivery, episiotomy repair, giving intravenous and intramuscular injections, transurethral catheterisation and counselling skills (Rizk and Elzubeir, 2000). Ennen and Satin (2010) consider that it is important to cover basic skills first before proceeding to more complex scenarios meaning that equipment in standard obstetric skills laboratories may need to be expanded to provide the opportunity to learn or revise these basic clinical skills. Other authors highlight the need to ensure that when using case scenarios in training, it is essential to be able to adapt these to the level of the participants (Ramsey-Marcelle et al., 2011) as well as to include a broad variety of clinical scenarios in training (Bradley and Postlethwaite, 2003).

Skills laboratories are a perfect setting to conduct objective structured clinical examinations (OSCE) and can also be used to integrate information technology learning resources that focus on self-directed learning (du Boulay and Medway, 1999). However, the opening hours of a skills laboratory need to reflect the needs of students engaged in self-directed learning and may need to include hours outside of the regular or planned teaching sessions (Bradley and Postlethwaite, 2003).

(c) **Type of manikins**

A mix of low fidelity (LF) and high fidelity (HF) manikins is considered ideal for obstetric training (Ennen and Satin, 2010). The inclusion of patient actors is reported to be of additional benefit for improving health-care provider–patient communication (Crofts et al., 2008). There are different models of manikins available that enable training in simultaneous or multiple skills e.g. Mama Nathalie (Laerdal, Norway) or

Table 1
Summary table of papers included in review on skills laboratories for obstetric simulation training.

Authors	Type of study	Setting	Content	Main findings
Al-Kadri et al. (2014)	Research – Non-randomised observational study	Saudi Arabia	Assesses the effect of health-care provider education on the accuracy of postpartum blood loss estimation	• Use of simple simulated-blood quantities to assess blood loss increases health-care providers' accuracy in correct estimation • Combining this technique with clinical information on the patient's condition leads to better results
Akaike et al. (2012)	Review	Japan	Historical background and practical information of skills lab	• Clinical skills labs need to be integrated into medical education to support continuing professional development for both under and post-graduates • Self-directed learning in skills labs is effective for experts or those with some skills however it is difficult for beginners to master a technique by self-training only
Cohen et al. (2012)	Research – Intervention study with before and after comparison	Mexico	Three weeks simulation based training and four months follow up of post-training changes in participants' self-efficacy	• Use of low cost manikins are appropriate and can reflect real life situation • Use of manikins useful for training in multiple or simultaneous skills
Ikeyama et al. (2012)	Report	Japan	Compares results of on-site versus remote-facilitated simulation-based learning	• Remote-facilitated simulation using low-cost, pre-existing equipment is feasible • Relies on good internet speed connections
Maagaard et al. (2012)	Report	Denmark	Current practice of EOC skills training in Denmark	• Advocates the development of validated national or international standards for obstetric training • Highlights possible benefits of locally held training rather than external centres, as staff trained in their daily environment with relevant members of staff may have an impact on working procedures and guidelines • Requires motivated trainers
Ayres-de-Campos et al. (2011)	Review	UK/USA	Characteristics of sustainable simulation training programmes	• No differences (improved knowledge/performance) detected between in-house training using low fidelity simulators/patient actors and simulation centres using high fidelity manikins.
Barrott and Hope (2011)	Report	UK	Description of development of regional equipment library.	• Describes the experiences in the development of regional equipment libraries with a SWOT analysis • Promotes concept of clinical skills passport for individuals which would be valid in other work locations • For equipment on loan, there needs to be a robust audit system to keep track of it and methods to recuperate costs if equipment is damaged
Cass et al. (2011)	Review	Not specified	Use of simulation for training of obstetric emergencies	• Teaching management of eclampsia via drills showed no difference between using patient actors in clinical settings or high fidelity manikins/simulator in teaching centre.
Crofts et al. (2011)	Review	Not specified	Summary of effectiveness of specific obstetric emergency simulation trainings	• In low resource settings suggests success of in-service training dependent upon appropriately skilled instructors in sufficient numbers and locally adapted training materials • Regardless of the setting, all trainings need to be cost and clinically effective and sustainable
Grable and Ochoa (2011)	Review	Not specified	General review on simulation training in Obstetrics and future developments	• Careful planning is needed to ensure positive results from using simulation • Need local champions/excellent trainers to produce the necessary realism • In situ training helps to identify errors/changes needed in work practices in order to improve clinical outcomes
Ramsey-Marcelle et al. (2011)	Review	UK	Practical paper on how to organise a simulation workshop	• Provides a very comprehensive and practical overview of all aspects of skills and drills training including curriculum, facilitators, participants, venue and practical organisations • Important to have enthusiastic and committed facilitators that have been specifically trained
Stitely et al. (2011)	Research	USA	Presents results on use of inexpensive simulation model to train midwives in how manage PPH effectively.	• Promotes idea of adapting manikins to extend use e.g. using a half-pelvis simulator with a hollowed out canta-loupe melon for midwives to practice placement of uterine tamponade.
van Lonkhuijzen et al. (2011)	Brief communication	Low resource setting	Information on two low cost simulation models	• Most commercially available models may not be affordable in low resource settings • Discusses using locally produced models for venous cut down and episiotomy repair

Table 1 (*continued*)

Authors	Type of study	Setting	Content	Main findings
Andreatta et al. (2010)	Review	UK/US	General information on different aspects of simulation trainings	• Simulation centres are a completely controlled environment and skills can be repeated until competency gained • Ideal for rare or infrequently occurring clinical situations • Some studies show no difference between in-house drills and using a simulation centre in multidisciplinary team training
Clark et al. (2010)	Review	UK	Overview of simulation training with particular focus on PPH scenario training	• Emphasises importance of debriefing after a simulation-based training/drill • Recommends further research to determine the impact of patient safety initiatives and simulation-based training on outcomes of obstetric haemorrhage
Ennen and Satin (2010)	Review	Not specified	General review on role of simulation in obstetrics	• High fidelity models can be attractive; they are not always appropriate nor do they provide better results when compared with low fidelity models • Important to debrief and have skilled interested trainers
Gundry et al. (2010)	Review	Not specified	Review on specific obstetric skills to be trained, their outcomes and the role of manikins for specific skills	• A mix of simulation with role play, case studies and feedback maximises its utility and value for money • Success of simulation training is dependent upon increased staff participation, multidisciplinary training groups and simplification of teaching of internal manoeuvres for shoulder dystocia
Qayumi (2010)	Discussion	Canada	Raises awareness of simulation training and the process of building a skills lab and curriculum development.	• For LRCs suggests having a main centre with satellite units and sharing curricula and having less sophisticated equipment and collaboration with a university in a developed country • Content must enable learning must enable learning as leadership and management, decision making and communication skills • Use hospital setting – lecture theatre and unused clinic rooms • Scenarios aid other context must be pitched at correct level for trainees • Advice on good organisation and need for timekeeper, clerical support
Strachan (2010)	Commentary	US	Comparison of low and high fidelity models for obstetric emergency training and effect on knowledge and teamwork	• Multiprofessional obstetric emergencies drills training improves knowledge, communication skills and simulated clinical skills • No difference found in competencies gained in high-tech simulation centres and local hospital settings • High fidelity manikins more effective in training for shoulder dystocia
Fuchs et al. (2009)	Review	US	Review on simulation training and protocols in obstetrics to improve outcomes especially haemorrhage	• The potential to foster teamwork in simulation-based learning may be one of critical components influencing favourable outcomes • Studies have yet to show whether the acquired proficiency gained by utilising simulation models translates into improved outcomes when dealing with actual patient emergencies • Haemorrhage drills and simulation-based training may help providers to achieve timely and co-ordinated responses in the treatment of postpartum haemorrhage
Siassakos et al. (2009)	Review	UK/US	Components of effective training in obstetric emergencies	• Assessment of safety and communication shown to be significantly improved when training is conducted in local hospitals using patient actors compared to training at simulation centre with computerised patient manikins • References more successful management of shoulder dystocia with use of high fidelity manikins compared to low fidelity ones
Crofts et al. (2008)	Research – Randomised Controlled Trial	UK	Comparison of local hospital, simulation training centre and team training.	• Location of training did not make a difference: in a simulation centre or in local hospital with regard to acquisition of knowledge and skills.
Ellis et al. (2008)	Research – Randomised Controlled Trial	UK	Comparison of training in local hospitals versus simulation centres	• No difference between training in a simulation centre compared to local hospital setting.

Table 1 (*continued*)

Authors	Type of study	Setting	Content	Main findings
Birch et al. (2007)	Research – Before and after comparison	UK	Comparison of three different training approaches and effect on performance and knowledge	• Combining lecture and hands-on skills training using manikins • Behaviour psychologists believe environment shapes behaviour therefore conduct simulation training in appropriate clinical area
Crofts et al. (2007)	Research – Sub-analysis from Randomised Controlled Trial	UK	Comparison between manikins and patient actors	• Multiprofessional training improved patient-actor perception of care • Training using a patient-actor may be better at improving perception of safety and communication than training with high fidelity manikins • Using low fidelity manikins may over-focus on task and lose focus of patient needs
Issenberg et al. (2005)	Systematic review	Not specified	Systematic review of the literature (1996-2003) on use of high fidelity medical simulations that lead to effective learning	• Review identifies 10 optimum or 'ideal' learning conditions for simulation training • Simulation exercises need to have a range of clinical variations with increasingly difficulty exercises • Need a controlled environment where learners can make, detect and correct errors without adverse consequences
Johannsson et al. (2005)	Review	UK	Use of simulation training in obstetrics and gynaecology	• Simple training models, drill training, high fidelity surgical skills simulators/manikins and whole-body patient simulators can promote learning, skills development and improved team working in routine practice and in emergencies • Skills labs should be representative of the clinical working environment
Bradley and Postlethwaite (2003)	Review	UK	Requirements and considerations before setting up a skills learning facility	• Need detailed planning to set up a clinical skills facility including stakeholder support • Large open spaces offer more flexibility with smaller rooms offset. Smaller rooms may be better for training in communication than larger rooms/open spaces • Need to consider storage space and access outside normal teaching time • Include a combination of training materials ; manikins, audio-visual, patient actors, etc
Macedonia et al. (2003)	Commentary	US	Simulation in Obstetrics with scenario presentation	• Simulators test both thinking and manual skills • Human actors provide realism and spontaneity • Proposes future assessment of competency for obstetrician/gynaecologists will be based on simulation exercises
Rizk and Elzubeir (2000)	Research – cross-sectional study	United Arab Emirates	Assessment of core obstetric skills using self-administered questionnaires	• Sets out core clinical skills needed in obstetrics for undergraduates and interns • Highlights problems that exist for male doctors due to cultural sensitivities and use of simulation models can help overcome this problem and help them to gain experience
du Boulay and Medway (1999)	Review	UK	Review of experiences from skills centres in the UK regarding role and requirements	• The successful setting up of a skills lab requires significant planning, organisation and resources; needs to be flexible; integral to the curriculum and relevant.

PartoPants™ (Pronto International, Seattle, WA, USA) (Cohen et al., 2012). In a study where the difference between training in a hospital setting was compared to training using an external skills laboratory or simulation centre, HF manikins were used in the simulation centre whereas LF manikins (Crofts et al., 2007) or patient actors (Cass et al., 2011) were used during simulation training in the hospital. No difference in outcome was observed between the two groups of trainees. Although high fidelity manikins are often the norm in high resource settings, simpler simulation models can be used to equal effect as long as the evidence supports their use and the chosen scenarios are realistic and context specific (Gundry et al., 2010).

Only two articles report specifically on the use of low cost simulation models. Cohen et al. (2012) demonstrated the effectiveness of simple models to manage a 'real life situation', whereas van Lonkhuijzen et al. (2011) introduce two simple models for episiotomy repair and venous cut-down and highlight the cost-effectiveness of such models in low resource settings.

(d) **The role of trainers and trainees**

Several authors report (from experience) that the successful use of a skills laboratory for simulation training requires motivated, committed and enthusiastic trainers as well as trainees (Ennen and Satin, 2010; Ramsey-Marcelle et al., 2011; Maagaard et al., 2012 Trainers need to be 'champions' and knowledgeable and able to provide realistic case scenarios for the trainees (Grable and Ochoa, 2011; Ramsey-Marcelle et al., 2011). Similarly, it is important from the outset that trainees recognise the value of 'skills and drills' or simulation training (Ramsey-Marcelle et al., 2011). To

help ensure this, it has been suggested that simulation training in obstetrics could be made mandatory, be delivered through standardised national programmes, form part of continuous professional development and is included in both the pre-service and in-service training curricula (Issenberg et al., 2005; Strachan, 2010; Grable and Ochoa, 2011). Ensuring that all levels of health-care providers are encouraged and supported to use the skills laboratory is important as in some studies it as noted that staff with fewer competencies were found to be less willing to regularly participate in simulation based training than those already considered competent (Strachan, 2010). It is also considered beneficial to divide trainees working in a skills laboratory setting into smaller groups (Ramsey-Marcelle et al., 2011). However, the groups should not be too small as a strong focus on 'team training' needs to be maintained (Ellis et al., 2008; Fuchs et al., 2009; Andreatta et al., 2010; Clark et al., 2010).

(e) **Training approaches**
Skills laboratories offer the opportunity to train individuals or groups. The current focus in the literature is on group or team training. Whether simulation training is undertaken as part of a group or as an individual, it is recommended that this should be adapted to the level of the trainee(s) (Issenberg et al., 2005; Ennen and Satin, 2010).. The benefits of training in/with multiprofessional groups are that this in itself improves teamwork and can do so as well as through separate (additional) training in team working only (Crofts et al., 2007; Siassakos et al., 2009). Training sessions can be conducted outside working hours or during clinical work with no evidence that either approach is more effective (Ayres-de-Campos et al., 2011). A combination of lectures in the morning and skills training in the afternoon revealed the best short term results. One study with 36 participants in a one-day training on postpartum haemorrhage showed a non-significant sustained improvement at three months in those trained via simulation compared to lecture only based training (Birch et al., 2007). Training methods could include role play, group work, skills training with manikins or patient actors, recording (audio/video) for feedback as well as individual self-directed learning (Bradley and Postlethwaite, 2003). It is very important that sessions should be non-threatening (Ayres-de-Campos et al., 2011). Debriefing and feedback after a training session (especially after scenario training) is considered important to improve the learning experience (Issenberg et al., 2005, Clark et al., 2010; Ennen and Satin, 2010; Maagaard et al., 2012). One of the papers recommends self-evaluation as a more useful tool than external assessment (Bradley and Postlethwaite, 2003). The use of cameras to document/film the trainees as they perform/participate in the scenarios is recommended by one group as this can be played back to trainees to illustrate what went well and highlight areas for improvement (Ennen and Satin, 2010).

(f) **Funding and sustainability of skills laboratories**
Du Boulay and Medway recommend that to ensure skills laboratories are sustainable once set up, funding should ideally come from a variety of sources and that this needs to cover both operational and capital expenses and include equipment, administration, salaries of technical and teaching personnel and costs of maintenance (du Boulay and Medway, 1999; Bradley and Postlethwaite, 2003). The ability to conduct training at the local level is considered more economical and setting up local skills laboratories may thus prove cost effective (Ayres-de-Campos et al., 2011). Sustainability was also noted to depend on the continuous commitment of the respective institutions to implement and maintain a programme of simulation training (Maagaard et al., 2012) as well as the encouragement of staff to participate and help in identifying committed trainers (Ayres-de-Campos et al., 2011). Two papers highlight the need for better evaluation of effectiveness and use of skills laboratories (du Boulay and Medway, 1999; Bradley and Postlethwaite, 2003). Training centres require guidelines and structured information based on national guidelines where these are available (Ennen and Satin, 2010; Ayres-de-Campos et al., 2011).

Discussion

Previous reviews have shown simulation training in obstetrics to be beneficial (van Lonkhuijzen et al., 2011; Draycott et al., 2008). In settings where such 'skills and drills' training has been embraced as part of pre-service training or for in-service training, consideration is increasingly being given to the setting up of 'skills laboratories'. We conducted a systematic narrative review to identify current best practice with regard to the setting up and management of obstetric skills laboratories.

Once the target participants have been identified and the curriculum or learning objectives that will match their needs have been developed, the location, content and organisation of the skills laboratory at which simulation or 'skills and drills' based training is to take place must be agreed. Previous experience as summarised in this review shows that ideally, such a skills laboratory should mimic the clinical environment and be located near or within the workplace. However although this means that health-care providers then easily have access and can engage in self-directed learning during breaks or times when the workplace is less busy, this also has the potential drawback that health-care providers can then easily be drawn back to the workplace during organised scheduled training sessions (Johannsson et al., 2005; Siassakos et al., 2009).

The majority of authors report that in their experience high fidelity manikins (which are generally defined as manikins which 'reproduce reality in greater detail, providing visual, audible and/or tactile cues, as a real patient would' whereas low-fidelity models 'attempt to reproduce a narrow portion of reality' and typically require the intervention of an instructor (Ennen and Satin, 2010). High fidelity manikins are not always necessary and almost all obstetric skills can be taught through the use of low fidelity, low cost manikins (Ennen and Satin, 2010; van Lonkhuijzen et al., 2011; Cohen et al., 2012). The addition of patient actors and use of the skills laboratory for training in multidisciplinary small groups serves to enhance communication skills and teamwork (Draycott and Crofts, 2006; Crofts et al., 2011). Both are important competencies and important aspects of improving quality of care (Lewis, 2011). The teaching equipment required in an obstetric skills laboratory depends on the needs of the learners and the curriculum and learning objectives and/or core clinical skills required. These will generally include normal labour and delivery, breech delivery, instrumental delivery and obstetric emergencies such as eclampsia, shoulder dystocia, postpartum haemorrhage, incomplete miscarriage or abortion and obstructed labour. Equipment and resources to practise basic surgical skills (e.g. for repair of an episiotomy) as well as neonatal and maternal resuscitation should be included. Whether training individuals or groups, training should be adapted to the level and need of the participant using diverse teaching methods and available teaching resources arranged in such a way that different methods can be applied. In Fig. 2, we provide an outline of a simple, one room obstetric skills laboratory which takes into account the important points raised in this review.

Several groups have emphasised that for a skills laboratory to be successful the need for dedicated and enthusiastic trainers cannot be overemphasised (Ennen and Satin, 2010; Ramsey-

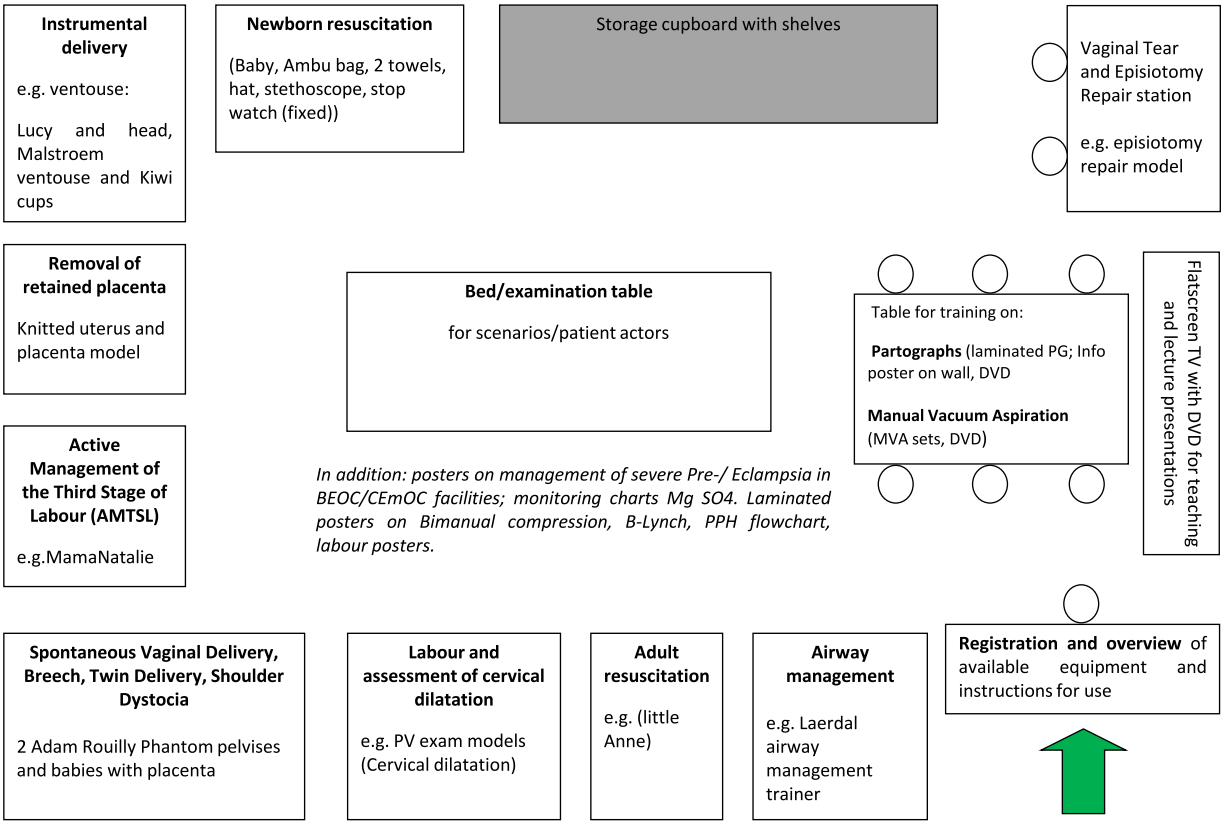

Fig. 2. Outline of a simple obstetric skills laboratory.

Marcelle et al., 2011; Maagaard et al., 2012). It is also clear that the sustainability of each skills laboratory needs to be assessed beforehand ensuring secure financial and managerial support for the running and maintenance of the skills laboratory (or centre) is in place. It is recommended that the functionality and impact of a skills laboratory need to be monitored and evaluated regularly (du Boulay and Medway, 1999; Bradley and Postlethwaite, 2003).

Finally, this review highlights the need for better documentation of the factors that promote and/or are barriers to the effective planning, development and use of obstetric skills laboratories. There is a clear lack of documented practical information or guidelines regarding what is needed for the set up and running of such skills laboratories.

Conclusion

Obstetric skills laboratories can play a substantial role in increasing the competency and confidence of staff through 'skills and drills' training without risk to patients. It is essential to consider the practical aspects of setting up a skills laboratory such as whether it is located within/adjacent to the workplace or as at a separate location, the choice of equipment to be used, training of facilitators and how to manage the skills laboratory or training centre administratively.

This review suggests that a skills laboratory cannot be an isolated 'project' and needs to be embedded in a wider training plan for pre- and in-service 'skills and drills' type training. As simulation training gains increasing acceptance worldwide, the setting up of skills laboratories near the workplace to facilitate training under conditions that are safe, locally adaptable, relevant and do not interfere with routine ongoing patient care should be seen as an important step towards improving the competence, enthusiasm and teamwork of health-care providers resulting in an improved quality of care.

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Conflict of interest

The author(s) declare no conflict of interest.

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