Using simulation technology in the professional coaching of novice's midwives in rural maternity in northern of Morocco

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Abstract. Simulation is a powerful educational tool for training future professionals and for continuous professional development coaching of novice healthcare professionals who should provide quality technical, educational and relational care with professionalism and humanism for patients. This paper examines the potential of using simulation technology into professional coaching of novice's midwives in a rural maternity in northern of Morocco. The purpose of this study is to evaluate the effectiveness of using simulation technology in continuing training programs for obstetrical emergencies to improve the professional skills of novice midwives

The study involved 19 novice's midwives working in rural maternity units in northern of Morocco who agreed to participate in the study and who are currently involved in the management of obstetric emergencies, particularly the management of pre-eclampsia and eclampsia. A simulation-based training course about how to manage pre-eclampsia and eclampsia was organized for them.

The findings showed that novice's midwives who participated in a simulation-based management of pre-eclampsia and eclampsia course were very satisfied with the training and rated their experience as very positive in terms of developing targeted skills.

Using simulation technology enables greater cohesion between theoretical learning and clinical practice, increases educational interest, self-esteem and motivation, and ensures successful integration into the work environment of novice midwives.

Keywords: Professional coaching, training, simulation technology, novice's midwives.

M. Khaldi et al. (eds.), *Proceedings of the E-Learning and Smart Engineering Systems (ELSES 2023)*, Atlantis Highlights in Social Sciences, Education and Humanities 14,
https://doi.org/10.2991/978-94-6463-360-3_47

1 Introduction

Simulation-based learning is a powerful educational tool for future professional development and continuing professional development because it places learners in situations where they can put their classroom knowledge into practice. In healthcare, simulation training has been part of curricula since the 18th century; it has been continually evolving as technology advances [1]. The increasing volume of information, the emergence of new treatment and diagnostic equipment, drugs, techniques and technologies in the health field, as well as the introduction of standards of medical and surgical care require the development of new practical and qualitatively new approaches to training of health care professionals [2]. Midwives require motivation, comprehension of their profession and awareness of all their responsibilities and the needs of their patients. The big disparity between the theoretical training and the reality of the work requires great reflections to accompany the professionals and to offer them the necessary training and support to succeed in their professional tasks to make this profession attractive for the new personnel [3].

Professional coaching of novice's midwives working in rural maternity care in Morocco combines online learning with face-to-face training aimed at promoting the professional integration of novice's midwives into the profession [3]. These training courses focus on improving previously learned knowledge and skills acquired in initial formation. In traditional training, introduction to obstetric patient management training typically started at the bedside of obstetric departments in public hospitals. Despite the undeniable benefits of teaching learners about real patients, this method has limitations. Patients can refuse examining. In some exceptional circumstances it is not always possible for a patient with a proper diagnosis to be in hospital at the time of the training cycle [4]. Complex cases and specific emergencies and iatrogenic diseases are particularly difficult to analyze in obstetrics [5]. However, integrating simulation technology into training that includes communication with real patients has been shown to reduce the number of medical errors without putting patients or learners at risk [6]. Simulation training can take many forms including the practice of individual skills such as cardiopulmonary resuscitation [7], work with the patient as a holistic whole (The standardized patient methodology, using robotic patient simulators, virtual patient simulators with advanced vital signs monitoring and feedback) [8]. An important positive factor in using simulation technology is the ability foreach participant to repeat several times, video recording and reporting (for real patients this is not possible due to the need to protect personal data and respect patient rights), ability to model exceptional pathologies as well as to model complications, including those of iatrogenic origin [9]. The transition from the simulator to the real patient will be much more confident, as all techniques will have been tested beforehand [10]. Thus, the use of simulation technology can significantly reduce trial and error in the learning of obstetric emergency management by each practitioner. In a study conducted by Walker et al (2014), the authors have shown that simulation is a highly effective teaching method for obstetrics training [11]. The use of simulation alone in healthcare training cannot adequately develop non-technical skills such as communication, responsibility and teamwork as Lopreiato and Sawyer (2016) explained, they have already indicated that simulation is not a substitute

for clinical practice in an authentic context [12]. Therefore, practical training combined at work in small groups at the interdisciplinary simulation center is required. The aim of this study was to evaluate the effectiveness of using simulation technology in continuing training programs for obstetrical emergencies particularly the management of pre-eclampsia and eclampsia to improve the professional skills of novice midwives.

2 Materiel and method

2.1 Study Area

This study was conducted at the simulation center of the Higher Institute of Nursing and Health Techniques of Tetouan in northern Morocco, which is equipped with a mannequin simulator with monitoring of vital signs and feedback, medical equipment, consumables and drugs.

2.2 Population and sample

This study involved 19 novice's midwives working in rural maternity units in northern of Morocco, who participated in a practical course entitled "Management of obstetric emergencies: Chapter 1 Pre-eclampsia and Eclampsia" of 40 hours which took place in July 2022.

As this is a pilot study, the sample size has not been calculated Data collection.

2.3 Inclusion criteria

Criteria for inclusion in this study were novice's midwives who consented to participate in this study and had no experience in the management of pre-eclampsia and eclampsia.

2.4 Research design and data collection

Scenario Planning.

In the first stage, participants reviewed the algorithm for the management of pre-eclampsia and eclampsia in small groups (4-5) and developed mind maps synthesizing the algorithm.

In the second stage, each participant performed a task on the mannequin to place the patient in the correct position and insert the peripheral venous catheter and drugs recommended by the management algorithm.

This included direct assessment of the participants' behavior (ability to work as a team, use of question-and-answer mode and monologues on specific topics), as well as the ergonomics of the hands and body when handling the equipment and interacting with the patient, etc.

Data collection

To evaluate the effectiveness of using simulation technology in continuing training programs for obstetrical emergencies, the following tools were used

- Assessment grid with a scale of 1 to 5 used by the facilitator for the subjective evaluation of the participants' actions.
- Participants' perceptions during the debriefing meeting.
- A self-administered questionnaire to participants at the end of the course to collect feedback on their use of simulation technology, quality of course materials, and achievement of training objectives.

2.5 Data analysis

The data were analyzed using Excel version 2016.

2.6 Ethical aspects

Before beginning the study, the participants were informed that their participation was voluntary and that the results would be treated as confidential and anonymous.

3 Results

3.1 Direct assessment of participants' behavior

Direct assessment of participants' behavior was based on teamwork skills and also focused on a 'question-and-answer' mode and 'monologues on specific topics. Adequate theoretical training, poor integration of existing knowledge, and need for support in complex clinical situations. These weaknesses were emphasized to varying degrees by 100% of the participants. It was also noted that participants had established hierarchies of rigid attitudes to changes in management of pre-eclampsia and eclampsia.

The results of the facilitator's subjective evaluation of the quality of the interventions through the participants' hand and body ergonomics when manipulating the equipment and interacting with the patient are presented in the following table.

Table 1. Facilitator 's subjective assessment of the quality of the intervention of study participants (n=19)

Items.	Excellent . 5.	Very good . 4.	Good . 3.	Fair. 2	Poor.1.
Ergonomic body and hand position.			x		

Correct manipula-tion of materials.		x			
Precision of the ges-tures.		x			
Safety of manipula-tion.	x				
Interaction with patient.			x		
Team interactions			x		

The data in the table indicate that the facilitator 's subjective assessment of the quality of the intervention in the study participants was positive.

3.2 Debriefing

During debriefing, participants indicated that they found it emotionally difficult to perceive the mannequin as a living patient requiring urgent care.

Thus, sufficient theoretical base, participants provided inadequate support in incoherent sequence. Viewing simulators as real patients leads to inappropriate treatment decisions that can lead to iatrogenic accidents. In one example of severe pre-eclampsia, magnesium sulfate was recommended. The advantage of simulation training in this case was the ability to show clearly the occurrence of complications. At debriefing sessions, participants reported that they were aware of the beneficial effects of magnesium sulfate supplementation in preventing eclampsia, but had overlooked it in emergencies.

3.3 Participants' feedback

For participants' feedback on using simulation technology to manage pre-eclampsia and eclampsia, the following figure illustrates the data collected from a self-administered questionnaire

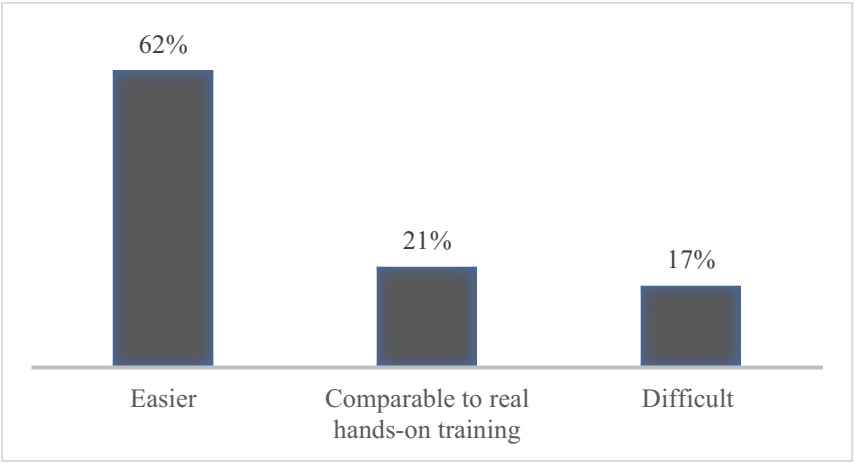

Fig. 1. Use of simulation technology by study participants (n=19)

21% of participants said using simulation technology for training was comparable to real hands-on training, 59% said it was easier, and 17% said it was more difficult due to relationship and emotional issues.

All participants were satisfied with the quality of the course material, the majority of them (90%) felt that the exercises and tasks were not too difficult compared to authentic practical training, and they all reported that the course objectives were achieved.

4 Discussion and Conclusions

The limitations of traditional learning mentioned in our study are well documented and have contributed to the development of simulation-based training [13]. We have developed a literature describing the success of simulation-based training in professional practice development. The combination of direct practice in authentic situations and simulation on a mannequin with monitoring of vital signs and feedback on complications can focus on the team interactions and therapeutic decisions that happen in real situations, including those of iatrogenic origin [14]. Simulators also provide an integrated model that can perform not only manipulation and healthcare procedures, but also coordination and interaction between team members [15]. According to the results of our study, subjectively, novice midwives evaluated the experience positively and expressed a desire to learn techniques for managing other frequent obstetric emergencies in their workplace. They expressed confidence that the skills they acquired would provide a solid base for their future professional careers. Therefore, it is appropriate to organize additional training to strengthen technical and non-technical skills, as training is ineffective without integrating other clinical disciplines [16]. It is also important to create a favorable psychological environment for training [17], especially with the

emotional difficulty of perceiving a simulation mannequin as a live patient, as we have observed in our study. We found that integrating simulation technology into training reduced the negative impact of limited population attendance in the maternity units where novice's midwives work, also, due to the distance of the work place of novice's midwives from maternity hospitals with powerful technical equipment and multidisciplinary teams dedicated to obstetrics. So, simulation training had to be integrated in their supporting process and professional coaching as it has been shown that professional coaching contributes to their self-esteem and motivation. These actions are necessary for professional development [18].

In our view, the integration of simulation technology in the professional coaching of novice's midwives is a good complement to the initial formation, and thought must be given to the introduction of online simulation training, it provides a safe, reproducible learning space for the acquisition of technical and non-technical skills [19].

The introduction of specific exercises in the simulation training course, designed to improve the management of pre-eclampsia and eclampsia, provide novice midwives with the professional skills they need. Applying this training method creates greater cohesion between theoretical learning and clinical practice, increases educational interest and self-esteem and motivation, and promotes better professional development and integration into the work environment of novice's midwives. This is presumed to improve the quality of preeclampsia and eclampsia management and reduce the incidence of prenatal and postnatal complications.

Limitations.

The limitations of this study are mainly related to the sample size and the setting of the study in a single institution. In addition, there was no pretest/posttest or control group to evaluate the impact of the simulation. Therefore, the results cannot be more widely generalized. Additional research with multiple participants and settings is needed to evaluate the effectiveness of the simulation.

Acknowledgement.

We would like to thank the novice's midwives from the north of Morocco who participated in this study. We thank the professors and managers of the Higher Institute of Nursing and Health Techniques and the Higher Normal School of Abdelmalek Essaadi University in Tetouan, Morocco.

Conflict of interest.

Authors declares no conflict of interest.

References

1. A. H. Al-Elq, “Simulation-based medical teaching and learning,” J. Fam. Community Med., vol. 17, no. 1, pp. 35–40, 2010, doi: 10.4103/1319-1683.68787
2. S. T. Walker et al., “Unannounced in situ simulations: Integrating training and clinical practice,” BMJ Qual. Saf., vol. 22, no. 6, pp. 453–458, 2013, doi: 10.1136/bmjqs-2012-000986
3. N. Rouahi, N. Boucetta, and S. Boussaa, “Exploratory study of an e-mentoring professional coaching model of novice midwives in Morocco,” Pan Afr. Med. J., vol. 41, 2022, doi: 10.11604/pamj.2022.41.253.29226
4. K. Manninen, E. W. Henriksson, M. Scheja, and C. Silén, “Patients’ approaches to students’ learning at a clinical education ward-an ethnographic study,” BMC Med. Educ., vol. 14, no. 1, pp. 1–8, 2014, doi: 10.1186/1472-6920-14-131
5. G. Zanconato et al., “Severe maternal morbidity in a tertiary care centre of northern Italy: A 5-year review,” J. Matern. Neonatal Med., vol. 25, no. 7, pp. 1025–1028, 2012, doi: 10.3109/14767058.2011.614655
6. R. Datta, K. K. Upadhyay, and C. N. Jaideep, “Simulation and its role in medical education,” Med. J. Armed Forces India, vol. 68, no. 2, pp. 167–172, 2012, doi: 10.1016/S0377-1237(12)60040-9
7. S. Sahu and I. Lata, “Simulation in resuscitation teaching and training, an evidence based practice review,” J. Emergencies, Trauma Shock, vol. 3, no. 4, pp. 378–384, 2010, doi: 10.4103/0974-2700.70758
8. I. Badash, K. Burtt, C. A. Solorzano, and J. N. Carey, “Innovations in surgery simulation: A review of past, current and future techniques,” Ann. Transl. Med., vol. 4, no. 23, pp. 1–10, 2016, doi: 10.21037/atm.2016.12.24
9. J. Dyer et al., “Video Monitoring a Simulation-Based Quality Improvement Program in Bihar, India,” Clin. Simul. Nurs., vol. 17, pp. 19–27, 2018, doi: 10.1016/j.ecns.2017.11.007
10. C. F. Durham and K. R. Alden, “Enhancing Patient Safety in Nursing Education Through Patient Simulation,” Patient Saf. Qual. An Evidence-Based Handb. Nurses, 2008, [Online]. Available: http://www.ncbi.nlm.nih.gov/pubmed/21328731
11. D. Walker et al., “Team training in obstetric and neonatal emergencies using highly realistic simulation in Mexico: Impact on process indicators,” BMC Pregnancy Childbirth, vol. 14, no. 1, pp. 1–11, 2014, doi: 10.1186/s12884-014-0367-1
12. J. O. Lopreiato and T. Sawyer, “Simulation-based medical education in pediatrics,” Acad. Pediatr., vol. 15, no. 2, pp. 134–142, 2015, doi: 10.1016/j.acap.2014.10.010
13. M. H. Alamrani, K. A. Alammar, S. S. Alqahtani, and O. A. Salem, “Comparing the Effects of Simulation-Based and Traditional Teaching Methods on the Critical Thinking Abilities and Self-Confidence of Nursing Students,” J. Nurs. Res., vol. 26, no. 3, pp. 152–157, 2018, doi: 10.1097/jnr.0000000000000231
14. B. Mahoney and E. Luebbert, “Updates on Simulation in Obstetrical Anesthesiology Through the COVID-19 Pandemic,” Anesthesiol. Clin., vol. 39, no. 4, pp. 649–665, 2021, doi: 10.1016/j.anclin.2021.08.001
15. K. Dayanand and and R. W. R. Olivia E. Atherton1, Jennifer L. Tackett2, Emilio Ferrer1, “乳鼠心肌提取 HHS Public Access,” Physiol. Behav., vol. 176, no. 5, pp. 139–148, 2018, doi: 10.1097/SIH.0000000000000200.Developing
16. G. Alinier and D. Oriot, “Simulation-based education: deceiving learners with good intent,” Adv. Simul., vol. 7, no. 1, pp. 1–13, 2022, doi: 10.1186/s41077-022-00206-3
17. G. Casali, G. Lock, and N. M. Novoa, “Teaching non-technical skills: The patient centered approach,” J. Thorac. Dis., vol. 13, no. 3, pp. 2044–2053, 2021, doi: 10.21037/jtd.2019.01.48

18. B. Mash and J. Edwards, “Creating a learning environment in your practice or facility,” South African Fam. Pract., vol. 62, no. 1, pp. 1–5, 2020, doi: 10.4102/safp.v62i1.5166
19. Abuhamad et al., “Obstetric and gynecologic ultrasound curriculum and competency assessment in residency training programs: consensus report,” Ultrasound