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Efficacy of capacity building educational interventions in the management of obstetric complications: A systematic review

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Abstract:

BACKGROUND: Delay in the diagnosis and management of obstetric complications lead to raised mortality rate. This can be curtailed by appropriate implementation of the educational intervention among the health-care providers. Hence, this review aimed to identify the literature evidence of the efficacy of various educational interventions training in the management of obstetric complications.

MATERIALS AND METHODS: We searched PUBMED, Web of Science, SCOPUS, Google Scholar, Cochrane, and maternity care databases with studies published from 2011 to 2021 for identifying studies related to this educational intervention review using MeSH terms and free terms. The search process was also done on the websites of the World Health Organization and the reproductive health library in the English language. From the 1823 abstracts reviewed, 16 studies were included (15 quasi-experimental, 01 randomized clinical trial, and 01 exploratory research design). We identified studies that included skill assessment of nurses, midwives, auxilliary nurse-midwives (ANMs), medical students, interns, and doctors after implementing various educational interventions.

RESULTS: According to the findings of this literature, achieving enhanced nursing management of obstetric complications has been developed. Especially, it suggests through better nursing training and education and also by providing sufficient resources, time, and coordination with obstetric specialists, nurses and midwives will be able to implement their care roles, which include proper diagnosis, appropriate intervention, advanced care, client education, and psychological support. The efficacy of each educational intervention varies and depends on the participants' understanding, interest, and the advancement of the teaching-learning method used.

CONCLUSION: This systematic review reveals abroad and logical move towards the evaluation of various educational interventions in the field of obstetric complications. Among all the educational interventions implemented, mobile application, and simulation-based training play a major role in improving the knowledge and skills of health-care providers in the management of obstetric complications.

Keywords:

Educational intervention, mobile application, obstetric emergencies, simulation training

Introduction

Obstetric complications are the pregnancy and childbirth-related morbidity and mortality that occurs during the process of conception till childbirth. Obstetric complications are perceived as one of the

sober situations, which were assigned a huge percentage of the time, cost, and workforce of health-care systems.^[1]

In 2017, Worldwide, the death rate of women who die due to pregnancy and childbirth complications estimates to be 2,95,000, as per the World Health

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Organization (WHO).^[2] This estimate also reveals that most of these fatalities are found in under-developed and developing countries.^[3] India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of Congo are the six countries, which demonstrate about 50% of maternal deaths.^[4] The most important factor is about 70%–88% of all these deaths can be prevented or can be treated with proper intervention.^[5-8] As per the guidelines introduced by the WHO, United Nations Children Fund (UNICEF), and United National Fund for Population Activities (UNFPA), the main approach that helps in the impediment and handling of obstetric complications lies in the basic emergency obstetric and newborn care. This is very important for the nurses and midwives in low-resource settings.^[9]

However, unfortunately, the important cause for the increased fatality is considered as the unsatisfactory concert of nurses and midwives in the identification and handling of obstetric complications.^[10] Previous investigations show that the competence of nurses and midwives is not upto standard level irrespective of their prior education.^[11] The main strategy to increase the competency and skills of nurses and midwives will be to organize regular training courses on obstetric care and the management of complications.^[12] Consequently, midwives need to attend special training in managing labor to provide effective services to facilitate the endorsement of the wellbeing of the woman and her newborn.

WHO defines competency in nursing as the assessment of the level of performance of nurses which involves the effective use of knowledge, skills, and judgment with a set of learning domains.^[13] Recent studies involve in the modification and replacement of usual clinical education and assessment methods. Many studies have identified the strengths and weaknesses of clinical vignettes on different aspects of evaluation.^[14] Clinical vignettes emphasize multiple viewpoints on a single aspect and fasten better understanding. Clinical vignettes are widely used in the measurement of competence and quality of care provided by the nurses and midwives.^[15]

According to Bali and Reddy, the competency of 335 skilled birth attendants in Madhya Pradesh was assessed. They proposed that there is an increased need in the current investigation of the ability and competency scores to improve the proper implementation of obstetric care.^[16] Eftekhari Yazdi *et al.* states that teaching and support of midwifery staff can alter the approach and performance in providing obstetric care.^[17] Incidence of errors occurs in managing pregnancy and childbirth among midwifery students while providing clinical care. To avoid the errors in providing qualified services to the public, it is the appropriate moment to fetch

transformation in the components of clinical education by accentuating the utilization of dynamic instructive teaching-learning methods.^[18] The main objective of this review is to identify the literature evidence of the efficacy of various educational interventions in the management of obstetric complications.

Materials and Methods

Search strategy

The search stratagem was illustrated by means of PICO, with the Health Science Descriptors (DECS), and Medical Subject Heading (MeSH), with the Boolean operators OR and AND as shown below: [Table 1]

As the objective of this study was not insisting on comparing the interventions, component C of the PICO strategy was not concentrated. PUBMED, Web of Science, SCOPUS, Google Scholar, Cochrane, and maternity care databases were searched online for finding the appropriate research papers. Globally, Organizations that employ Emergency Obstetric Care (EmOC) training websites such as WHO, UNFPA, UNICEF, International confederation of Midwives, Royal College of Obstetrics and Gynaecology London were also searched for appropriate publications. Appropriate search terminologies were used for finding appropriate research studies. The core search terms and phrases were “competency” or “skills” or “ability” or “performance” or “educational intervention” or “training” or “information booklet” and “obstetric complications” or “obstetric danger signs” or “pregnancy danger signs” or “obstetric warning signs” or “childbirth complications” or “labor complications” or “emergency obstetric care” and “nurses” or “midwives” or “maternity staff” or “obstetricians” or “medical students” or “interns” or “health-care professionals”. A combination of terms was used to locate the appropriate research papers. These terms and phrases were “postpartum hemorrhage”, “severe vaginal bleeding”, “convulsions”, “obstructed labor”, “prolonged labor”, “retained placenta”, “manual removal of placenta”, “swelling of face”, “pedal edema”, “magnesium sulfate injection”, “emergency obstetric care,” and “prolonged labor.” The study period of the review was between January 2011 and August 2021.

Study selection

According to the flow chart of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, randomized controlled trials (RCTs), before and after studies, quasi-experimental studies were included. Grey literature, case reports, systematic reviews, and editorial views were excluded. Quasi-experimental studies were evaluated according to effectiveness and educational interventions of RCTs were evaluated as to efficacy.

Table 1: Elements of problem, intervention, comparison, and outcome strategy

Component	Definition	Descriptors	Keywords
P: Population of interest	Nurses Midwives, medical professionals other health care providers, interns, nursing students working in obstetric unit or community	Neither descriptors nor keywords were adopted. Filters for the workplace were used in the databases	
I: Intervention	Educational intervention and learning application	Education of nurses and midwives Staff education as topic	Education Skill training Educational intervention Mobile application Simulation method Workshop
C: Comparison	-	-	-
O: Result/outcome	Increase in the skills of managing obstetric complications	Obstetric complications Labor complications Early detection of perinatal risks Emergency obstetric care Knowledge Skills Ability level	Complications of labor Complications of childbirth Labor complications Obstetric complications Skill assessment Knowledge assessment

PICO=Problem, intervention, comparison, and outcome

Inclusion criteria and Exclusion criteria

This review was designed to include studies conducted with cohort, case-control, cross-sectional, and pretest-posttest design with one group and also pretest-post test design using control group designs. Observational studies conducted using quantitative methods were also included. The search was limited to only the English language. All articles that reported the level of competence about obstetric complications among nurses and midwives were considered for review. Irrespective of the year of publication, research articles were included for the review. Quantitative research studies done in hospitals, public sectors, and community areas were included for review. Studies done among health-careworkers were included. Commentaries, studies that failed to fulfill the quality criteria, anonymous reports, letters, and editorials were excluded from the review. Qualitative research and other non-English languages were not included in this review. [Figure 1]

Data Extraction

The study features of the review comprise the name of the first author, publication year, the area where the study was conducted, objectives of the study, study design, study population, sampling method, sample size, data collection procedure, and results were abstracted from all included articles. (Flow Chart 1)

Results

The review process yielded 1823 articles. Duplicates were excluded after checking the titles and irrelevant content to the aims of the review. Few studies were not included because it is not specific to obstetric

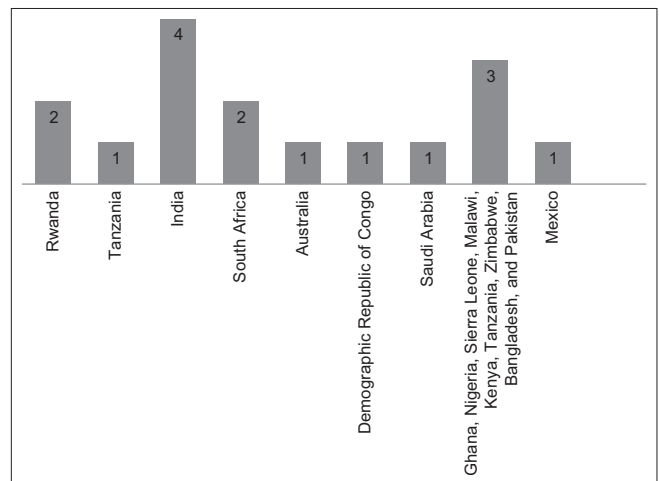


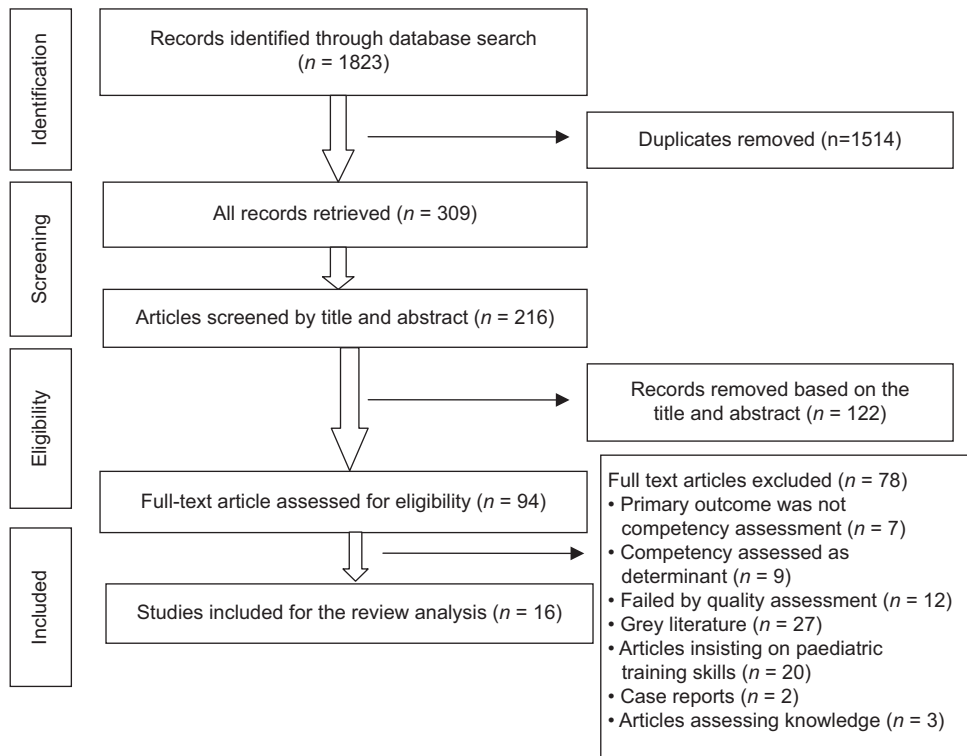
Figure 1: Country-wise inclusion of studies

complications. The full text of all abstracts was analyzed to check its relevance to there search topic and if they met the inclusion criteria. Sixteen articles were included which met the inclusion criteria. This review identified an important gap which is the insufficient number of studies specifically regarding the specific accurate educational intervention for nurses and midwives in diagnosis and management of obstetric complications [Table 2].

Discussion

Educational interventions in managing obstetric complications

Various educational interventions emerged from the review, including mobile applications, scenario-based training, station-based skill training, EmOC training program and short courses, simulation-based training,



Flowchart 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram showing the selection of the included articles

and skills and drills interventions. Each of these is discussed below.

Professionals who implemented the interventions

Nurses and midwives participation is significant in 90% of the research articles. Some studies involve multi-professional workers through the participation of the different health care providers in the interventions as doctors, medical attendants and nurses, doctors and nurses, interns, medical and nursing students, and maternity and newborn care providers.

Mobile applications

Various studies have explored the topic of nursing care using the mobile application and have found that nurses and midwives are effectively involved in diagnosing the obstetric complications immediately to manage it quickly. Some of the studies show the changing needs of midwives education in caring for obstetric complications. Out of 16 studies, two studies focused on the safe delivery application (SDA) intervention.^[11,19] This application helps to improve the knowledge and skills of nurses and midwives in the management of obstetric complications and newborn resuscitation immediately and after 6 months of SDA intervention. These results are highly applicable in low-resource settings. This RCT showed a significant increase in the skills and knowledge while comparing the intervention with controls after 3 months of introducing the intervention.

Effectiveness and efficacy of interventions in preventing obstetric complications

Out of 16 studies, one study focused on scenario-based training, one study concentrated on portfolio method of education, one study implemented station based skill training, one study focused on short-term courses for obstetric emergencies, five studies centered on EmOC training program, four articles axis on simulation-based training and two studies concentrated on skills and drills interventions on the management of obstetric complications. Of which 13 studies are quasi-experimental research designs and one exploratory research design. All quasi-experimental researches showed the effectiveness of interventions of managing obstetric complications. Most of these interventions were exclusively designed for nurses in managing obstetric complications. Most efficient or specialized interventions include skill-based training and simulation training.^[20-34]

In this systematic review, the effectiveness of the various educational interventions on the skill and knowledge of the health-care professionals on obstetric complications were evaluated. We considered 16 articles that evaluated the effect of educational intervention. In all these reviewed articles, different educational interventions were used to find out different outcomes. As per the objectives and design of the studies, the study participant varies. Out of 16 articles, 14 before-after studies, 01 RCT, and 01 exploratory research design were included. This systematic review revealed the following

Table 2: Summary of studies on the efficacy of capacity building educational interventions in the management of obstetric complications

First author name and year	Region	Study aim	Study design	Study population	Sampling method	Sample size	Data collection procedure	Outcome
Homatfar <i>et al.</i> , 2013 ^[19]	Rwanda	To establish the competency of medical students in the EmOC after a short training course	Pre-test post-test quasi-experimental crossover study	Medical students	Convenience sampling	65 final year medical students	The assessment score ranges from 0 to 100. The competency assessed in 5 areas of emergency obstetric and neonatal care. Hemorrhage/uterine rupture, hypertensive complications, dystocic labor, postpartum infection, and APGAR score are the areas assessed. The assessment was done before and immediately after and 3 to 9 months after the training course. It is a 2 days training course on obstetric emergencies	There was improvement in obstetric knowledge to 80% after training. 49.2% of the students have retained practical skills. Female students are having high competency rate while comparing to male students. The training course improved the knowledge and skills of the medical students
Mecheal, 2013 ^[16]	Ghana	To assess the use of mobile applications for obstetric emergencies and promotion of health	Quasi-experimental research design	Health workers, laboring women and volunteers	Convenience sampling	21 health workers, 30 women and 7 volunteers	There are four sessions for knowledge and eight sessions for practice. The period of every meeting was for 45–60 min for each set, which also included 10 min for treatise and responses. After implementing NCSs, post-tests were administered to assess nurses' knowledge and practice level using the same pre-test forms	There is statistically significant improvement in delivering health care to the laboring women during obstetric emergencies after introducing the mobile application
Evans <i>et al.</i> , 2014 ^[24]	Malawi, Zanzibar, and Tanzania	To validate the helping mothers Survive: Bleeding after birth training module	Before-after study	Health-care providers	Simple random sampling	155	Single-day facility-based training on the management of PPH. Skills were assessed using 3 OSCEs. The OSCEs assessed prevention of PPH, management of retained placenta, and management of severe hemorrhage from uterine atony	There was a significant increase in the knowledge scores to 10% in Malawi, 17% in India, and 11% in Zanzibar between the pre- and post-test scores respectively
Walker <i>et al.</i> , 2014 ^[25]	Mexico	Simulation-based obstetric and neonatal emergencies (PRONTO course)	Before-after study	Physicians and nurses	Simple random sampling	450	Significant increase in knowledge and self-efficacy were noted. Team scores were maintained over a 3 months period. There is no association between high goal achievement and knowledge, self-efficacy proportion of doctors or nurses in training, state or teamwork score	The knowledge score of pre-test (50.6) whereas post-test is 66.3 which are 15.7% more. Skills score of pre-test data is 79.4% whereas post-test is 92.6% which is 13.2% higher due to training
Moran <i>et al.</i> , 2015 ^[26]	South Africa	To describe the scale-up of Emergency Obstetric and Newborn	Before-after study	Midwives	Convenience sampling	45	ESMOE: Multi-disciplinary, simulation-based skills and drills using training of trainers approach	There was a significant increase in the knowledge score by

Table 2: Contd...

First author name and year	Region	Study aim	Study design	Study population	Sampling method	Sample size	Data collection procedure	Outcome
Ameh <i>et al.</i> , 2016 ^[23]	Ghana, Nigeria, Sierra Leone, Malawi, Kenya, Tanzania, Zimbabwe, Bangladesh, and Pakistan	care training in one province in South Africa To assess the knowledge and skills of maternity care providers after EmOC training	Before-after study	Maternity care providers	Purposive sampling	5757	Simulation-based training in Emergency obstetric and early newborn complications for 3-5 days Multiple choice questions and OSCE was used	38.8% when comparing with the pretest scores of the samples There was a significant difference in the knowledge acquired to more than 10% and skills to 30.6% among the pre- and post-test scores
Varghese <i>et al.</i> , 2016 ^[27]	India	To test the feasibility, acceptability, and effectiveness of a skills and drills intervention to improve EmOC	Quasi-experimental design with 4 interventional and 4 comparison facilities	Doctors and nurses	Simple random sampling	6452 in Intervention group and 6329 in comparison group	Emergency drills through role-play conducted every 2 months Delivery case sheet reviews, pre- and post-knowledge tests among providers, OSCEs, and qualitative in-depth interviews were used Primary outcomes were based on improved diagnosis and management of selected maternal and newborn complications	The knowledge and skills obtained from skills and drills intervention was not sufficient to translate into improved diagnosis and management of maternal and newborn complications
Bolan <i>et al.</i> , 2018 ^[29]	Demographic Republic of Congo	To establish the practicability of use of SDA in BEmONC	Pilot cluster randomized trial	Maternal and newborn health workers	Stratified random sampling	62 health workers	Among 8 health care facilities of central DRC, 4 were randomized an mLearning intervention and 4 to control group with standard practice The mLearning group were trained on the make use of smartphones and the SDA (French version) 12 BEmONC procedures were assessed on the knowledge of PPH and NR Self-confidence in performing each procedure was also assessed It was assessed before the intervention and at 3 months post intervention 18 qualitative interviews were conducted with app users	Knowledge scores increased significantly from baseline among intervention group compared with controls after 3 months of implementing intervention Results were unaffected by health worker cadre and prior Smartphone use The knowledge and self-confidence of the health workers were boosted by the use the SDA in the management of obstetric emergencies which was evaluated after 3 months of intervention
Sami <i>et al.</i> , 2019 ^[22]	Saudi Arabia	To estimate the effectiveness of	Quasi-experimental	Nurses and midwives	Convenience sampling	30 nurses and midwives	The gaining and retention of knowledge and confidence of	Sample size was small when compared

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First author name and year	Region	Study aim	Study design	Study population	Sampling method	Sample size	Data collection procedure	Outcome
		Simulation-based training program on the management of obstetric emergencies					participants was statistically significant (<0.001) after the simulated training In scientific settings, nurses were presenting from different backdrops Thus their skills, experience, and qualifications are highly variables and instances wherein midwives are anticipated to achieve increased clinical responsibilities Simulation-based training can be an alternative technique of choice for health care educators to increase the skills of their nursing staff	with requirement of quantitative designs The reassessment period was after two months which is considered as not enough to assess the knowledge retention
Kumar <i>et al.</i> , 2019 ^[32]	Australia	To investigate the use of a structured obstetric and neonatal emergency simulation training program	Pre-post workshop survey design	Medical doctors, midwifery staff, and students of 3 states	Convenience sampling	150	Mobile interprofessional workshops were piloted in three areas of India Samples were requested to express their responsibility and challenges in their birth training and the important knowledge gained by the program 8 workshops were carried out across three locations	The focal challenge was deficient in availability of medical back up, funds, planned education, and poor acquiescence from women Gaining knowledge and procedural skills, nontechnical skills, a systematic approach to obstetric and neonatal emergencies and learning in teams through simulation are considered as key learning concepts
Pattinson <i>et al.</i> , 2019 ^[30]	South Africa	To establish the impact of the EmOC training program on the skills of health-care professionals	A before and after observational study	Maternity and casualty Health-care professionals	Convenience sampling	3237 health-care professionals working in maternity and casualty (645 doctors, 303 advanced midwives, 2130 professional nurses, and 159 others)	This is a 6 years study This study compared maternal deaths and iMMRs in 12 districts which were given intensive training with the outcomes in the remaining 40 districts The EmOC training workshop includes the vital knowledge and expertise necessary for skilled birth attendants to identify and manage the major causes of maternal and newborn mortality in low- and middle-income countries Participants were investigated on knowledge and skills before and	During the period of study, 1248, 333 live births undergone in which 2212 maternal deaths were identified. The cause of death in study settings was reviewed. In other 40 districts, 5961 maternal deaths and 5,439,870 live births were recorded There is a significant reduction of 29.3% in the number of maternal deaths

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Table 2: Contd...

First author name and year	Region	Study aim	Study design	Study population	Sampling method	Sample size	Data collection procedure	Outcome
Mathew <i>et al.</i> , 2019 ^[20]	India	To assess the procedural skills of nursing students using OSCE scales when station-based expertise preparing and to evaluate the effectiveness of station-based skill training model for teaching procedural skills among nursing students	Pre-experimental one group pre- and post-test design	Nursing students	Simple random sampling	30 first-year BSc nursing students	after training 346 workshops were conducted More than 80% of the health-care professionals involved in maternity care was trained in 12 targeted districts Before and after giving station-based skill training, the clinical skills of the students were monitored	Station based skill training model is highly effective which was concluded by mean post-test scores in all three skill procedures. The students' clinical procedures skills were assessed and evaluated by OSCE
Goranila <i>et al.</i> , 2019 ^[21]	India (Uttarpradesh)	To assess the feasibility and benefit of the interprofessional skills training workshop	Exploratory research design	4 th -year medical students and final year of nursing training	Convenience sampling	67 medical students and 28 midwifery students	A skill station course was formed A group of 6 to 8 participants practiced for an hour at each station Participants were asked to fill a pre-survey questionnaire of 16 items Post-training assessment of 10 items using Likert's scale and three items with free-text responses	All the participants acknowledged that the training was useful, appropriate and helped to increase their self confidence in performing the skills
Pajai <i>et al.</i> , 2020 ^[31]	India (Maharashtra)	To compare the effectiveness of traditional video demonstration vs. simulation-based training on SimMomin regarding the management of normal labor	Quasi-experimental pilot study	Medical interns	Simple random sampling	100 trainees interns	Didactic lecture will be taken for 100 interns of the department of OBG Pre-OSCE will be taken then divided into 2 groups Group 1: Video lecture used as a teaching method Group 2: birthing simulator (SimMom) used as a learning tool Post training OSCE will be taken Tools Workplace-based assessment (OSCE) Self-efficiency assessment scale based on Badura Mode	Significant improvement in skill based competencies of trainees who undergo simulation based training compared to those who undergone video based learning for management of normal labor

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Table 2: Contd...

First author name and year	Region	Study aim	Study design	Study population	Sampling method	Sample size	Data collection procedure	Outcome
							<p>Pre-test and student's perception of management of normal labor will be taken before the intervention</p> <p>The training will be conducted as per the guidelines RCOG</p>	

PPH=Postpartum hemorrhage, NR=Neonatal resuscitation, EmOC=Emergency obstetric care, RCOG=Royal College of Obstetricians and Gynecologists, SDA=Safe delivery application, BEmONC: Basic emergency obstetric and newborn care, DRC=Democratic Republic of the Congo, OSCE=Objective structured clinical examinations, Nursing Care Standards, iMMFRs=International Maternal Mortality Rate, OBG=Obstetrics and Gynecology

important educational interventions in improving the diagnosis and management of obstetric complications such as mobile applications, scenario-based training, station-based skill training, EmOC training program and short courses, simulation-based training, and skills and drills interventions. Among all the educational interventions, the introduction of mobile applications and simulation-based training provides significant improvement in the knowledge and skills of the nurses and midwives in the management of obstetric complications.

There are different educational interventions that help to develop the knowledge, skills, and practice of the health professionals. Out of which mobile applications play a vital role in the development of knowledge and skills. One study established a strong association between the SDA and skills in the management of postpartum hemorrhage and neonatal resuscitation.^[11] This study was assessed among nurses and midwives. There were different skill scores for both pre-and post tests in managing postpartum hemorrhage which was influenced by years of experience of the participants. This health tool improves the opportunity in developing health care services in low resource settings by enhancing the knowledge of the health professionals. One more study focused on the assessment of knowledge and practice skills using mobile applications in the field of emergency obstetrics among health-care workers. The mobile application plays a vital role in the field of obstetrics for the development of problem-free labor process and the prevention of obstetric emergencies.^[19] Emerging attempts for continuing education in health care settings consider the amalgamation of mobile application as a loom for dropping down mortality and morbidity of woman. A cross-sectional communicative assessment revealed larger division of under-learning from the experimental and control group given optimistic censure about the objective structured clinical examination (OSCE) merits.^[21] The assessment motivated that OSCE is an exceptionally supportive and satisfactory approach for measuring nursing practices and clinical capacity. A quasi-experimental study explored the understanding of medical students by short-term emergency obstetrics courses and usual learning methods. The relationship of outcomes explained enhances in clinical ability scores among the experimental group which specifies the outcome of this type of education in escalating the clinical skill of the learners in clinical settings.^[20] The author concluded that this way of teaching promoted the cognitive education of learners significantly more than the collective approach. They also concluded that this method enhanced the understanding of the clinical setting additional than usual education. The impact of the course on all aspects of clinical ability designated that it is efficient in

improving the clinical ability of learners through their clinical experience.

For improving the knowledge and skills of nurses and midwives, majority of studies in this review used simulation training and EmOC training program. These sessions used individual teaching and learning process for strengthening the professionals' individual patient care management practices. On the other hand, station-based skill training and scenario-based training was implemented by three studies that were included in this review, provides acquisition of knowledge and skills and its reflection on the management of obstetric complications.^[21-24] About 30% of all studies assessed the participants' response to the particular teaching. This assessment is frequently completed while bringing in a new intervention or program and the participants' response was used to compose adjustments to the training schedule. 40% of the studies evaluated the knowledge and skills of the participants, by comparing the before and after training scores. Maximum studies reported improved knowledge and skills immediately after the training program. Almost 30% of all articles in the review assessed the effectiveness of the educational intervention in regard to change in the clinical practice. These articles measured the adherence to the standards, following the managing skills in obstetric complications, communication, and performance of skills in the immediate management of obstetric complications.^[25-27]

One study showed improved competency and skills immediately after training implementation but the diagnosis and management of EmOC did not improve.^[28] Multi-professional scenario-based training was formulated to improve the knowledge of health-care workers working in the obstetrics and gynecology department in Tanzania. About 3308 nurses, midwives, doctors, and medical attendants participated in the study. Two weeks of scenario-based training was given to the participants on postpartum hemorrhage in two sessions. The training has reduced the whole blood transfusion rate to 47% which helps to reduce the complications.^[29] The main hindrance in the implementation of the interventions was staff shortage and no supply of emergency drugs and supplies.^[28] An RCT was analyzed to study the feasibility and acceptability of the delivery application in the implementation of emergency obstetric and newborn care among health care workers.^[30] The attributes measured were postpartum hemorrhage and neonatal resuscitation which was significantly increased the knowledge in the intervention group irrespective of their cadre and previous smart phone use. Three studies contributed to simulation training program on obstetric complications among health-care professionals and interns. All these were before and after the study. The

post training scores were significantly high and showed an improved competency rate who had undergone training than the conventional method group.^[31-33]

Study limitations

The limitations of this review are most of the studies utilized convenience sampling which may lead to recruitment bias and also over estimate the effectiveness of the educational interventions on outcome measures. In most studies, power calculations were not pointed out. The articles which are available in the English language are only included. There should be significant progress in the field of educational interventions research that should take account of the health outcomes.

Conclusion

Obstetric complications are the most common cause for prolonged hospital stay after the delivery which acts as the biggest health system concern. Hence, attention should be paid off in the prevention and early diagnosis of obstetric complications. In this regard, nurses as members of the health-care team, need to pay their role not only in patient care but also should attend special training programs to update their knowledge and skills to use the latest techniques of obstetric complications. It identifies that developing short-term training courses for nurses, use of obstetric complications management guidelines in hospitals along with continuous training regarding novel approaches in managing obstetric complications. This systematic review reveals abroad and logical move towards the evaluation of various educational interventions in the field of obstetric complications.

Ethical considerations

Written informed consent was obtained from all the participants who are involved in this study listed in this review. Information furnishing the participants' identity was not included in any of the articles. Personal information of the participants has not been revealed in any of the articles included in this article.

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Conflicts of interest

There are no conflicts of interest.

References

- Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, *et al.* Global causes of maternal death: A WHO systematic analysis. *Lancet Glob Health* 2014;2:e323-33.
- World Health Organization, United Nations Children's Fund, United National Population Fund, World Bank Group, United Nations Population Division. Trends in Maternal Mortality: 2000 to 2017: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva, Switzerland: World Health Organization; 2019.
- Homer CS, Leisher SH, Aggarwal N, Akuze J, Babona D, Blencowe H, *et al.* Counting stillbirths and COVID 19-there has never been a more urgent time. *Lancet Glob Health* 2021;9:e10-1.
- Amenu G, Mulaw Z, Seyoum T, Bayu H. Knowledge about danger signs of obstetric complications and associated factors among postnatal mothers of Meckel district health centres, East Gojjam Zone, Northwest Ethiopia. *Scientifica* 2016;1-7.
- Hug L, Alexander M, You D, Alkema L; UN Inter-agency Group for Child Mortality Estimation. National, regional, and global levels and trends in neonatal mortality between 1990 and 2017, with scenario-based projections to 2030: A systematic analysis. *Lancet Glob Health* 2019;7:e710-20.
- Ameh C, Msuya S, Hofman J, Raven J, Mathai M, Vanden Broek N. Status of emergency obstetric care in six developing countries five years before the MDG targets for maternal and newborn health. *PLoS One* 2012;7:e49938.
- Otolorin E, Gomez P, Currie S, Thapa K, Dao B. Essential basic and emergency obstetric and newborn care: From education and training to service delivery and quality of care. *Int J Gynaecol Obstet* 2015;130 Suppl 2:S46-53.
- Costello A, Osrin D, Manandhar D. Reducing maternal and neonatal mortality in the poorest communities. *BMJ* 2004;329:1166-8.
- Kasine Y, Babenko-Mould Y, Regan S. Translating continuing professional development education to nursing practice in Rwanda: Enhancing maternal and newborn health. *Int J Africa Nurs Sci* 2018;8:75-81.
- Crofts JF, Fox R, Draycott TJ, Winter C, Hunt LP, Akande VA. Retention of factual knowledge after practical training for intrapartum emergencies. *Int J Gynaecol Obstet* 2013;123:81-5.
- Nishimwe A, Ibisomi L, Nyssen M, Conco DN. The effect of an mLearning application on nurses' and midwives' knowledge and skills for the management of postpartum hemorrhage and neonatal resuscitation: Pre-post intervention study. *Hum Resour Health* 2021;19:14.
- Hosey KN, Kalula A, Voss J. Establishing an online continuing and professional development library for nurses and midwives in east, central, and Southern Africa. *J Assoc Nurses AIDS Care* 2016;27:297-311.
- Bahreini M, Moattari M, Kaveh M, Ahmadi F. Self assessment of the clinical competence of nurses in a major educational hospital of Shiraz University of Medical Sciences. *J Jahrom Univ Med Sci* 2010;8:28-36.
- Arfaie K. Priorities of clinical education evaluation from nursing and midwifery students' perspective. *Iran J Nurs* 2012;25:71-7.
- Kathiresan J, Patro BK. Case vignette: A promising complement to clinical case presentations in teaching. *Educ Health (Abingdon)* 2013;26:21-4.
- Eftekhari Yazdi M, Rad M, Torkmannejad Sabzevari M. Effect of workshop training along with simulation and support of labour practitioners on their attitude and performance in conducting routine. *J Edu Health Promot* 2019;8:121.
- Asadi L, Dafei M, Mojahed S, Safinejad H. Clinical error management training for midwifery students in ShajidSadoughi University of Medical Sciences, Yazd. *J Edu Health Promot* 2021;10:33.
- Michael P. A mobile application for obstetric emergencies and health promotion in Ghana. *BMC Health Services Research* 2013;20:1-10.
- Homaifar N, Mwesigye D, Tchwneko S, Worjolah A, Joharifard S, Kyamanywa P, *et al.* Emergency obstetrics knowledge and practical skills retention among medical students in Rwanda following a short training course. *Int J Gynaecol Obstet* 2013;120:195-9.
- Mathew R, Regmi S, Dorothee E. Effectiveness of Station-based skill training model through objective structured clinical examination (OSCE): Nursing Students' skills in performing the clinical procedures. *Indian J Public Health Res Dev* 2019;7:1349-54.
- Gorantla S, Bansal U, Singh JV, Dwivedi AD, Malhotra A, Kumar A. Introduction of an undergraduate interprofessional simulation based skills training program in obstetrics and gynaecology in India. *AdvSimul (Lond)* 2019;4:6.
- Sami AY, Nabeel AY, Amatullah AF. Simulation based training to improve obstetric/perinatal nurses competency in managing obstetric emergencies in Saudi Arabia. *Int J Caring Sci* 2019;12:1788-95.
- Ameh CA, Kerr R, Madaj B, Mdegela M, Kana T, Jones S, *et al.* Knowledge and skills of healthcare providers in Sub-Saharan Africa and Asia before and after competency-based training in emergency obstetric and early newborn care. *PLoS One* 2016;11:e0167270.
- Evans CL, Johnson P, Bazant E, Bhatnagar N, Zgambo J, Khamis AR. Competency-based training "helping mothers survive: Bleeding after birth" for providers from central and remote facilities in three countries. *Int J Gynaecol Obstet* 2014;126:286-90.
- Walker D, Cohen S, Fritz J, Olvera M, Lamadrid-Figueroa H, Cowan JG, *et al.* Team training in obstetric and neonatal emergencies using highly realistic simulation in Mexico: Impact on process indicators. *BMC Pregnancy Childbirth* 2014;14:367.
- Moran NF, Naidoo M, Moodley J. Reducing maternal mortality on a countrywide scale: The role of emergency obstetric training. *Best Pract Res Clin Obstet Gynaecol* 2015;29:1102-18.
- Varghese B, Krishnamurthy J, Correia B, Panigrahi R, Washington M, Ponnuswamy V, *et al.* Limited effectiveness of a skills and drills intervention to improve emergency obstetric and newborn care in Karnataka, India: A proof-of-concept study. *Glob Health Sci Pract* 2016;4:582-93.
- Egenberg S, Masenga G, Bru LE, Eggebø TM, Mushi C, Massay D, *et al.* Impact of multi-professional, scenario-based training on postpartum hemorrhage in Tanzania: A quasi-experimental, pre- vs. post-intervention study. *BMC Pregnancy Childbirth* 2017;17:287.
- Bolan NE, Sthreshley L, Ngoy B, Ledy F, Ntayingi M, Makasy D, *et al.* mLearning in the democratic republic of the Congo: A mixed-methods feasibility and pilot cluster randomized trial using the safe delivery app. *Glob Health Sci Pract* 2018;6:693-710.
- Pattinson RC, Bergh AM, Ameh C, Makin J, Pillay Y, Vanden Broek N, *et al.* Reducing maternal deaths by skills-and-drills training in managing obstetric emergencies: A before-and-after observational study. *S Afr Med J* 2019;109:241-5.
- Pajai SS, Acharya N, Dound N, Patil A. Birthing simulator (SIMMOM) as a learning tool for skills development in management of normal labour. *Int J Curr Res Rev* 2020;12:S10-2.
- Kumar A, Wallace EM, Smith C, Nestel D. Effect of an in-situ simulation workshop on home birth practice in Australia. *Women Birth* 2019;32:346-55.
- Linda B. AACN Standards for Establishing and Sustaining Healthy Work Environment: A Journey to Excellence. 2nd ed. Canada. American Association of Critical Care Nurses; 2014.
- Bali S, Reddy VB. Evaluation of competency and skills of skilled birth attendants in Madhya Pradesh, central India. *Indian J Public Health* 2018;62:61-4.