

Author	Title	Year	Type of Study	Primary Intervention	Major Findings
Abbasinazari	The effect of information provision on reduction of errors in intravenous drug preparation and administration by nurses in ICU and surgical wards	2012	Quasi-experimental	Educational pamphlets and wall posters on the correct preparation and administration of IV drugs.	Short term follow-up showed impact of intervention, but long-term follow-up is needed. Ongoing education and competency assessment for nurses may lead to less error in the form of short continuing educational programs.
Abdalrahim	The effect of postoperative pain management program on improving nurses' knowledge and attitudes toward pain	2011	Quasi-experimental	2-days of in-service educational program on postoperative pain assessment, treatment, and pain documentation. Role playing, case methodology, scenario analysis. Pocket sized guide for pain management. Compact disk of recent research articles.	Statistically significant increase of pre/post scores and improvement of documentation. Of note, the authors involved hospital administration in planning and organizing the educational program and conducted it during working hours. They emphasized the importance of multi-modal training, pre-, intra-, and post-training periods, as well as an objective measure of outcomes post-intervention.
Abedian	The effect of an education-based intervention on self-reported awareness and practice of Iranian nurses in observing patients' rights	2014	Quasi-experimental	Two in-person education sessions, each lasting 50 minutes, were scheduled for groups of 8-12 people. Question and answer sessions were included using powerpoint presentation, as well as educational pamphlet distribution.	Significant difference in mean scores of 2 and 4 weeks after intervention in both knowledge and practice. The study emphasized multi-modal methods of assessment and the importance of tracking retention of knowledge longitudinally.
AbuAlRub	The impact of educational interventions on enhancing perceptions of patient safety culture among Jordanian senior nurses	2014	Quasi-experimental	Online courses were made available followed by in-person lectures based on the online modules were given.	There was a significant improvement in senior nurses' composite scores and a significant decline in the rate of adverse events.
Aghaei	Bioterrorism education effect on knowledge and attitudes of nurses	2013	Quasi-experimental	Two educational session were conducted for 2 hours each. Materials were provided in the format of lectures, slides with Q and A, and printed handouts.	Knowledge and attitude scores improved post-training.
Al-Ali	The impact of training program on nurses' attitudes toward workplace violence in Jordan	2016	Quasi-experimental	Educational sessions were implemented once a week for 7 hours each for 3 months. Materials included from an interactive CD Rom, powerpoints, and worksheets. In-person training was given as group discussions and case scenarios.	Findings showed a significant impact of the training program on nurses' attitudes toward workplace violence.

Al-Faouri	The impact of educational interventions for nurses on mechanically ventilated patients' outcomes in a Jordanian university hospital	2014	Quasi-experimental	This intervention was conducted for 1 month with in-service education, bedside education, and hands-on learning.	The findings showed a behavior change resulting in a decreased rate of reintubation incidence and failed trials of extubation.
Al-Hussami	Evaluating the effectiveness of a clinical preceptorship program for registered nurses in Jordan	2011	Quasi-experimental	Each day for one week, a four hour session was conducted in a lecture-based manner that used powerpoint, group discussions, and printed materials.	Post-training scores showed significant improvement in participant's knowledge.
Al-Rafay	Educational outcomes associated with providing a comprehensive guidelines program about nursing care of preterm neonates receiving Total Parenteral Nutrition	2012	Quasi-experimental	This education program was developed by researchers who used a comprehensive literature review about nursing care for patients on total parenteral nutrition to guide the modules. The training was administered over 4 days for a total of 10 hours.	Statistically significant improvements were revealed overall and in most knowledge domains of interest.
Altun	The efficacy of workshop on body fluids in health and disease and its impact on nurses training	2010	Quasi-experimental	The intervention was a series of interactive, lecture-based workshops administered on one day.	Mean scores were higher in the intervention group when compared with controls.
Altun, Cinar	Best practice techniques for administration of injections: Impact of lecture based interactive workshops on training of nurses	2010	Quasi-experimental	The intervention was a series of interactive, lecture-based workshops administered on one day.	There was a significant improvement in participant post-lecture scores compared with controls.
Altun, Karakoc	Management of hypothermia: impact of lecture-based interactive workshops on training of pediatric nurses	2012	Quasi-experimental	The intervention was a series of interactive, lecture-based workshops administered on one day.	There was significant improvement in immediate recall knowledge followign the training.
Ameh	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	2016	Quasi-experimental	Derived from the WHO, a standardized training package was delivered on the topic of maternal and newborn resuscitation. The training was conducted over 3-5 days and used interactive learning sessions comprising of short lectures, simulation training using low fidelity obstetric, newborn and resuscitation mannequins, role play and workshop, mentoring, and in-course monitoring and evaluation.	The majority of healthcare providers improved their overall scores for knowledge and skill outcome measures.

Anowar	Using nursing practice guidelines for the prevention of multidrug-resistant tuberculosis among hospitalized adult patients in Bangladesh	2013	Quasi-experimental	The authors conducted a half-day workshop which was followed up with a one-on-one conversation. The outcome measures included questionnaires designed to assess cases instead of rote facts. `	Significant improvements in post-test mean scores of nursing practice was found.
Arab	Effects of training programs on knowledge and attitudes of nurses about postoperative pain	2016	Quasi-experimental	A 2 day training workshop was implemented.	Scores improved in the post-training period when compared with controls.
Asgary	MHealth to Train Community Health Nurses in Visual Inspection with Acetic Acid for Cervical Cancer Screening in Ghana	2016	Quasi-experimental	An on-site two week introductory training course was conducted by nurse practitioners. During this time, participants were taught how to take digital photographs and use SMS. This was followed by 2 days of field training on visual imaging of cervical cancer screening. Then, a 3 month mHealth training was conducted where nurses sent pictures and diagnosis to expert.	The primary outcome measure was accuracy of diagnosis, and thus agreement between the nurses' diagnosis and that of the experts. After the field training, the total agreement rate between diagnoses made by nurses and the expert reviewer for the patient images was 95.0%.
Ashwini	Effectiveness of structured teaching programme on prevention of ICU delirium among nurses	2015	Quasi-experimental	A structured teaching program was implemented for 8 days.	Post-test scores improved significantly.

Bahreini	Improvement of Iranian nurses' competence through professional portfolio: a quasi-experimental study	2013	Quasi-experimental	Workshops were conducted by a trainer team for 2 days. The intervention group received a portfolio which was a ring binder that allowed material to be removed or added as the individual chose. Each portfolio contained special sections in order to collect evidence and documentation regarding continuous learning, personal résumés, professional training, self-assessment, and structured reflection. The nurses were given practical training in the workshops to be able to complete the portfolios, and during teamwork activities they practiced the structured reflection. Control received standard training for the hospital, including lectures, and no portfolio.	The intervention group improved significantly in all categories of competence whereas the control did not improve significantly.
Brennan	Paediatric resuscitation for nurses working in Ghana: An educational intervention	2013	Quasi-experimental	A 1 day WHO emergency triage and assessment training was implemented. Modules within the training covered the following: (a) overview of the theory or verbal persuasion, (b) role modelling the activity or vicarious experience, (c) practice of the resuscitative activity or enactive attainment, and (d) physiologic feedback or the state of enhanced arousal while performing the activity in a simulated environment.	There was a statistically significant increase in the nurses' perceived self-efficacy of pediatric resuscitation in general, perceived self-efficacy of bag and mask ventilation, and knowledge of pediatric resuscitation.
Bull	Developing nurse medication safety training in a health partnership in Mozambique using behavioural science	2017	Quasi-experimental	The researchers conducted two rounds of teaching workshops. The first was based on powerpoint, and the second was revised based on feedback from the participants of the first workshop.	Individuals reported feeling more confident in their abilities after the training and feedback was generally positive.
Carlo	Educational Impact of the Neonatal Resuscitation Program in Low-Risk Delivery Centers in a Developing Country	2009	Quasi-experimental	This Neonatal Resuscitation Program train the trainer model used textbooks and scenario-based hands-on practice with mentorship from trained instructors.	After training, post-test written scores improved significantly as did performance scores (skills evaluation) and self-efficacy scores. Written and performance scores decreased significantly 6 months after training, but self-efficacy scores remained high.

Chakravarty	Blended training for frontline health functionaries: Is this the way ahead?	2016	Quasi-experimental	This study utilized blended learning techniques such as e-learning aids, as well as classroom-based learning.	The findings showed significant differences in pre-/post-training scores with the blended learning approach.
Charafeddine	Strategic assessment of implementation of neonatal resuscitation training at a national level	2016	Quasi-experimental	The authors conducted train-the-trainer workshops where a lecture was given followed by hands on training using mannequins on neonatal resuscitation. Doctors, midwives, and nurses were included as participants in the study.	Overall, pre-training scores were significantly lower than post-training scores. Nurses had highest mean difference in before/after scores and midwives had the highest percent improvement.
Choure	The effectiveness of self-instructional module on cardiac rehabilitation	2015	Quasi-experimental	This intervention utilized a self-guided module that incorporated the definition, objectives, principles and components of cardiac rehabilitation in post-MI patients.	The mean post-test significantly improved following administration of the self-instructional module.
Collins	Effect of continuing nursing education on nurses' attitude toward and accuracy of nursing diagnosis	2013	Quasi-experimental	The intervention was a 12 hour educational course on nursing diagnosis, critical thinking, and clinical reasoning.	Using the Positions on Nursing Diagnosis scale and the Lunney scoring method, there was a significant improvement in the mean attitude between control and experimental groups and increase in the accuracy of nursing diagnosis.
Conroy	Skills retention 3 months after neonatal resuscitation training in a cohort of healthcare workers in Sierra Leone	2015	Quasi-experimental	The Newborn Basic Life Support training course was conducted with a mixture of didactic and practical methods and an emphasis on hands-on training scenarios. This training was delivered as a one day course.	Nurses performed very well in the structured competency assessment. However, their skills had significantly deteriorated when reassessed 12 weeks after the initial training.
Crofts	Onsite training of doctors, midwives and nurses in obstetric emergencies, Zimbabwe	2015	Quasi-experimental	Practical Obstetric Multi-Professional Training is a program developed by midwives, obstetricians and anesthetists that comprises an evidence-based skills development and training course, teamwork training incorporated in the clinical training, and a collection of tested local tools, checklists and local standardization techniques. The intervention emphasizes clinical practice over theory.	Staff reported more confidence in their management of emergencies and a perception that emergency management has improved overall. There was also a reduction in maternal mortality reported after the training took place.
Darban	Effect of communication skills training on the burnout of nurses: A cross-sectional study	2016	Quasi-experimental	This training on communication skills was carried out for the intervention group as a 2-day workshop for 8 hours within a week compared to a control group that received no intervention.	The findings showed that the mean score of frequency and intensity of burnout in the intervention group significantly decreased over time. Mean scores of burnout in the control group showed no significant difference over time.

Das	Evaluation of the mobile nurse training (MNT) intervention - a step towards improvement in intrapartum practices in Bihar, India	2017	Quasi-experimental	The mobile nurse training intervention aimed to identify and address the gaps in the quality of intrapartum care at the facilities. Approximately six rounds of week-long trainings were conducted. The mixed methods employed included trainees performing various obstetric procedures on mannequins and hands-on training sessions, during which the trainers supervised the quality of care provided by the facility nurses at different stages.	The intervention was found to be significantly associated with improvement in positive practice score in the short-term. One year after the intervention, negative practices continued to decrease, positive labor practices, and overall labor practice remained higher than the baseline but with some decline over time.
David	Effectiveness of 'palliative care information booklet' in enhancing nurses' knowledge	2010	Quasi-experimental	An information booklet was developed pertaining to the general concepts of palliative care, care components (physical, social, emotional and spiritual) and role of the nurse in palliative care.	The post test scores were significantly higher than the pretest knowledge scores four days after the booklet was given. The authors suggest that this indicates that the developed information booklet regarding palliative care was highly effective in enhancing the knowledge levels of the nurses.
De Silva	Nursing intensive care skills training: A nurse led, short, structured, and practical training program, developed and tested in a resource-limited setting	2015	Quasi-experimental	This 3 day training workshop on ICU practice was a partnership between overseas experts and local tutors. In a short, repeated manner, trainees were taught by overseas experts and then the training was reinforced by local tutors which allowed continuous training and independent teaching even after the overseas experts had left.	Post-training scores were significantly higher when compared with the pre-training baseline. More than 95% passed the post-course Objective Structured Clinical Assessment (patient assessment) and SOE 1 (arterial blood gas analysis). The course was highly rated by participants in terms of usefulness.
Diedhiou	Successful mLearning Pilot in Senegal: Delivering Family Planning Refresher Training Using Interactive Voice Response and SMS	2015	Quasi-experimental	The investigators developed a prototype mLearning system that used interactive voice response (IVR) and text messaging on simple mobile phones to provide in-service training without interrupting health services. There were 17 multiple choice questions and 3 true/false questions along with accompanying detailed explanations spaced and repeated over time. IVR allows trainees to respond to audio recordings using their telephone keypad. The intervention lasted 8 weeks and was on the topic of contraception.	The majority of participant prompts to interact with the mobile course were made outside normal working hours. Participants reported positive experiences related to the ability to determine the pace of the course and convenience. The largest criticism was poor network reception and reported dropped calls. Almost all participants thought they learned the same or more compared with a conventional course. Knowledge of contraceptive side effects increased significantly after the training and remained high 10 months after the end of training.

Dongara	An Educational Intervention to Improve Nurses' Understanding of Pain in Children in Western India	2017	Quasi-experimental	A 3-hour workshop session was designed to educate the nursing staff regarding the physiology of pain, its assessment, and management strategies.	Per the Knowledge and Attitudes Survey Regarding Pain, significant improvement was observed between pretest and post-test total scores as well as the pretest and retention score 3 months after the intervention.
Duygulu	Transformational leadership training programme for charge nurses	2011	Quasi-experimental	The program comprised of 14 hours of leadership training and 14 hours of individual study on the following topics: management and leadership, process of influencing: power, motivation, exemplary leadership practices, and becoming an effective leader.	As measured by the Leadership Practices Inventory - Self and Observer ratings, leadership practices increased statistically significantly with the implementation of the program. Unit charge nurses reported Leadership Practices Inventory self-ratings significantly higher than those of the observers.
Edomwonyi	A survey of the knowledge of cardiopulmonary resuscitation and the impact of training on nurses at the University of Benin teaching hospital, Nigeria	2013	Quasi-experimental	The intervention was multi-modal and included a film, in-person demonstration and hand-on practice on teaching aids alongside trainers.	The mean post- test score was significantly higher than the mean pre-test score.
Egenberg	Impact of multi-professional, scenario-based training on postpartum hemorrhage in Tanzania: A quasi-experimental, pre- vs. post-intervention study	2017	Quasi-experimental	The training was a 4 week technical skill training on a birthing simulator that reproduced realistic clinical scenarios of postpartum hemorrhage. Each scenario was followed by a debrief and discussion, as well as a repeated run of the scenario.	Using registry data of blood transfusion rates, post-training patients required significantly less blood transfusion, and experienced a significant increase in cesarean section rates, birth weights, and vacuum deliveries. Regression analysis showed that transfusion rates were significantly associated with the time period (pre- vs. post-training).
Ekama Ilesanmi	A Quasi-experimental Study to Assess an Interactive Educational Intervention on Nurses' Knowledge of Pressure Ulcer Prevention in Nigeria	2016	Quasi-experimental	The intervention group received a 5 day, face-to-face interactive lecture and the control group received a 1-day, 4-hour discussion. Knowledge retention was evaluated using the pressure ulcer knowledge tool.	In the short-term, knowledge scores were comparable between the intervention and control groups. At the second and third post-training evaluation, knowledge scores increased significantly only in the intervention group.
El-Bahnasawy	A Training Program for Nursing Staff on Health Hazards of Chemical Insecticides Exposure in a Practical Field	2015	Quasi-experimental	The training involved a short, repeated trainings on the effect of chemical insecticide exposure at a military hospital with repeated outcome measures at intervals post-training.	All nurses obtained a satisfactory level of knowledge after the first and second post-tests.

Ellard	The impact of training non-physician clinicians in Malawi on maternal and perinatal mortality: a cluster randomized controlled evaluation of the enhancing training and appropriate technologies for mothers and babies in Africa (ETATMBA) project	2012	Randomized Controlled Trial	Enhancing Training and Appropriate Technologies for Mothers and Babies in Africa (ETATMBA) was implemented as an 18 month training program to teach nurses advanced leadership skills and knowledge in advanced neonatal and obstetric care. It was delivered over three week-long intensive training modules in year 1 and a six month in-service training period to apply enhanced teaching, training, and perform a clinical audit.	While the results of the trial are still pending, primary outcome measures include maternal and perinatal mortality (see Ellard et al., 2016) with a train-the-trainer framework.
Ellard	A qualitative process evaluation of training for non-physician clinicians/associate clinicians (NPCs/ACs) in emergency maternal, neonatal care and clinical leadership, impact on clinical services improvements in rural Tanzania: the ETATMBA project	2016	Qualitative	The Enhancing Human Resources and Use of Appropriate Training for Maternal and Perinatal Survival in sub-Saharan Africa (ETATMBA) was evaluated for challenges and reception by trainees during implementation.	Trainees were interviewed at their health facilities and reported that the training was well received with notable increase in knowledge and skills. In terms of challenges, trainees reported their new skills could not be practiced because the facilities they returned to lacked necessary resources (including appropriate facilities, electricity, water, basic supplies, and drugs).
Ellard	Can training non-physician clinicians/associate clinicians (NPCs/ACs) in emergency obstetric, neonatal care and clinical leadership make a difference to practice and help towards reductions in maternal and neonatal mortality in rural Tanzania? The ETATMBA project	2016	Quasi-experimental	The Enhancing Human Resources and Use of Appropriate Training for Maternal and Perinatal Survival in sub-Saharan Africa (ETATMBA) was evaluated in clinical practice at 16 institutions and its effect was measured with maternal/neonatal health indicators and surveys.	Maternal deaths showed a non-significant downward trend over the 2 years. There was no significant difference in maternal, neonatal and birth complication variables across the time-points. Prior studies of ETATMBA training implementation demonstrated enhanced knowledge, practical skills, and clinical leadership of trainees, but clinical impact was be confounded by the significant challenges in delivering a service in terms of resources.

Enweronu-Laryea	Evaluating the effectiveness of a strategy for teaching neonatal resuscitation in West Africa	2009	Quasi-experimental	Train-the-trainer model of workshops (2-3 days) were conducted on obstetric anticipatory care, basic neonatal care modules from the World Health Organization, and neonatal resuscitation. Training comprised of didactic lectures, interactive and hands-on practical sessions, and train-the-trainer model for neonatal resuscitation module.	Evidence-based neonatal resuscitation training adapted to local resources significantly improved cognitive knowledge of all groups of health professionals with the exception of midwives. Further modification of training for midwives working at primary level health facilities and incorporation of neonatal resuscitation in continuing education and professional training programs was recommended by the authors.
Ersdal	A one-day "Helping Babies Breathe" course improves simulated performance but not clinical management of neonates	2013	Quasi-experimental	Helping Babies Breathe (HBB) training is a one-day course that focuses on hands-on practice using a simulator mannequin, emphasizing the very first basic steps; drying, stimulation, suction, warmth, and initiation of face mask ventilation within the "Golden Minute" [®] after birth. The teaching tools are developed for efficient dissemination, and the educational kit contents a set of flip-over illustrations, an action plan, a neonatal simulator, a handbook, a manual resuscitator, and a suction device. The materials and equipment were left at the site to facilitate re-training and dissemination.	This training resulted in significantly improved provider performance seven months later when tested in a simulated setting. However, this improvement was not translated into delivery room management.
Fernandes	Effectiveness of an information booklet on knowledge among staff nurses regarding prevention and management of perineal tear during normal delivery	2013	Quasi-experimental	An information booklet on prevention and management of perineal tear during normal delivery was provided to staff nurses.	The study findings showed that the information booklet was effective in improving knowledge of staff nurses regarding prevention and management of perineal tear during labor.

Galal	Impact of an infection-control program on nurses' knowledge and attitude in pediatric intensive care units at Cairo University hospitals	2014	Quasi-experimental	Health education sessions in the form of powerpoint and video presentations on infection control measures and used an observation checklist to monitor behavior change.	A significantly higher level of knowledge was revealed in the postintervention phase as compared with the preintervention phase with regards to the types of nosocomial infections, the at-risk groups for acquiring infection, and the measures applied to control nosocomial infections. Educational training programs should be multidisciplinary interventions which teach to a variety of learning styles.
Goucke	Essential pain management: an educational program for health care workers	2015	Quasi-experimental	This 8 hour educational program aimed to improve pain knowledge by providing a simple pain management framework with a teach-the-teacher component. Following personal contact between the program providers and members of the local anesthesia or pain societies, a local in-country coordinator is identified. The coordinator then recruits participants for the courses with encouragement of multidisciplinary participation (doctors, nurses, and other health workers) to improve group discussions and emphasizes the importance of teamwork in pain management.	The program has been run in 30 countries, delivered to 1,600 participants, and 340 instructors have been trained, thus demonstrating the scalability of train-the-trainer programs. Pre/post testing in 27 sites showed a significant increase in post-test scores. A subanalysis demonstrates doctors and nurses improving by similar degrees. Moreover, when local instructors delivered the program after attending the trainer's session the participant test results were comparable to the results seen when the overseas instructors taught the course.
Goudar	Stillbirth and newborn mortality in India after helping babies breathe training	2013	Quasi-experimental	Using a train-the-trainer cascade, this 2-day trainer workshop included discussion, practice, and simulation using the HBB (Helping Babies Breathe) Learner's Workbook, the HBB Flipchart, and NeoNatalie simulators.	Provider knowledge and performance systematically improved with HBB training. HBB training reduced resuscitation but increased assisted bag and mask ventilation incidence. HBB training reduced stillbirths without increasing neonatal mortality, indicating that resuscitated infants survived the neonatal period. Monitoring and community-based assessment are recommended.

Gyamfi	Training nurses in task-shifting strategies for the management and control of hypertension in Ghana: a mixed-methods study	2017	Quasi-experimental	This study tested task-shifting strategies for hypertension control. All participants received training on the study protocol, including the WHO CVD risk assessment package, techniques for collecting anthropometric data, BP measurements, questionnaire administration, blood draw, urine collection, and processing techniques, which were standardized between health facilities.	The findings of the pre- and post-training assessments showed a marked improvement in nurses' knowledge and practice related to hypertension detection and treatment. Improvement of interpersonal skills and patient education were also mentioned by the nurses as positive outcomes of participation in the intervention.
Harerimana	Effect of shortened Integrated Management of Childhood Illness training on classification and treatment of under-five children seeking care in Rwanda	2014	Quasi-experimental	This study observed the difference between long and short versions of the Integrated Management of Childhood Illness training in affecting changes in nurses.	The only significant differences detected between nurses in the long and short training was the classification of fever and treatment of pneumonia. Nurses in the short training had lower odds of inappropriate misclassification and treatment conditions.
Hassona	Evaluation of an educational program: a report from the hemodialysis unit in Zagaxig University hospitals, Egypt	2012	Quasi-experimental	The nurses were divided into groups of three members each. Each group attended 10 hours of classroom instruction divided into three sections. All participants attended all sessions. Each participant received a handbook that had the adapted standard and the CPGs.	There were statistically significant gains in the number of nurses who achieved a satisfactory total knowledge score immediately post-intervention and three months after the intervention. There was a significant, strong, positive correlation between the number of participants achieving satisfactory knowledge scores and the number of the participants achieving satisfactory performance scores.
Hirschhorn	Learning before leaping: integration of an adaptive study design process prior to initiation of BetterBirth, a large-scale randomized controlled trial in Uttar Pradesh, India	2015	Quasi-experimental	Implementation of the World Health Organization Safe Childbirth Checklist (SCC) was observed in multiple facilities for behavioral changes. Revisions included change to peer-to-peer coaching (nurse to nurse, physician to physician); strengthened coach training on behavior and system change; adapted strategy for effective leadership engagement; and an explicit motivation strategy to enhance professional pride and effectiveness.	These modifications resulted in improvement in multiple EBPs from baseline including taking maternal blood pressure, post-partum oxytocin, early breastfeeding initiation, as well as checklist use. Further adaptations were implemented to increase the effectiveness prior to full trial launch.

Hirst	Application of evidence-based teaching in maternal and child health in remote Vietnam	2009	Quasi-experimental	Needs assessments identified prevention of infection, neonatal resuscitation, and prevention of postpartum hemorrhage as primary targets. A 3-day workshop based on the small group, interactive, skills-based SCORPIO method was developed.	All participants demonstrated skills acquisition to an adequate standard on completion. The workshops were rated as good or excellent overall by all of the participants, who reported that the content would help with their clinical work and that the teaching method was acceptable and easy to understand.
Hojat	Improving nursing performance quality in CPR: A cooperative action research study	2016	Quasi-experimental	Workshops of 6 nurses/10 groups for 70 sessions (2-4 hours) every group 6-8 sessions.	Pre- and post- test results revealed improvement with intervention
Holm	Implementation of a phased medical educational approach in a developing country	2015	Quasi-experimental	The approach contained three phases: direct patient care, targeted education, and utilization of the train-the-trainer model, as well as the sharing of resources post-training via electronic database.	Pre- and post-lecture evaluations were administered, showing higher scores in the post-lecture exams. Individuals utilized online resources for continued learning. Qualitative data suggest that these methods improved communication between healthcare staff, promoted better ways of triaging patients, and improved job satisfaction.
Jain	Tele-education vs classroom training of neonatal resuscitation: A randomized trial	2010	Randomized Controlled Trial	Training for neonatal resuscitation was conducted as a single-day workshop by two instructors on the pattern outlined in Textbook of Neonatal Resuscitation by American Academy of Pediatrics. In TI group, trainees and the instructors interacted through a 53-inch color television screen. In the CT group, teaching was carried out in a classroom where computer and LCD projector were used for projection of teaching aids that consisted of the PowerPoint presentations.	Training resulted in a significant and comparable gain in knowledge scores and skills scores in both the groups. Satisfaction scores among trainees and instructors were comparable in the two groups.

Jayanna	Effectiveness of onsite nurse mentoring in improving quality of institutional births in the primary health centres of high priority Districts of Karnataka, South India: A cluster randomized trial	2016	Randomized Controlled Trial	Six onsite mentoring visits, along with an initial training update and specially designed case sheets for providers; the control arm received just the initial training update and the case sheets.	A higher number of facilities in the intervention arm had all appropriate drugs, equipment and supplies to deal with gestational hypertension, postpartum hemorrhage; and obstructed labor. The providers in the intervention arm had better knowledge of active management of the third stage of labor, management of maternal sepsis, and more. The cost analysis showed that the intervention cost an additional \$5.60 overall per delivery.
Kankaka	Efficacy of knowledge and competence-based training of non-physicians in the provision of early infant male circumcision using the Mogen clamp in Rakai, Uganda	2017	Quasi-experimental	Didactic training was conducted over 5 working days and training included: good clinical practice, informed consent, screening and enrolment, surgical anatomy, basic surgical skills including hemostasis and suturing, postoperative instructions and care, infection control, AE management, and emergency resuscitation. Interactive sessions, role plays, and case scenarios were used.	In all, 100 EIMCs were assessed for gain in competency. The greatest improvement in competency was between the first and third procedures, and all trainees achieved competency and retention of skills by the seventh procedure.
Kapil	Hand hygiene in reducing transient flora on the hands of healthcare workers: An educational intervention	2015	Quasi-experimental	Each person included in the study was demonstrated the correct steps of hand hygiene using alcohol-based hand rub available in the hospital at the time. All the subjects were also given a questionnaire to assess their perception on hand hygiene. The WHO posters on proper hand hygiene were displayed in the appropriate areas of the hospital in addition, as an educational tool.	After use of alcohol hand rub with a proper hand hygiene technique, it was found that the percentage reduction was 95-99% among doctors and nurses, 70% among hospital attendants and 50% among sanitary attendants.
Kapoor	Regional scale-up of an Emergency Triage Assessment and Treatment (ETAT) training programme from a referral hospital to primary care health centres in Guatemala	2016	Quasi-experimental	16 h ETAT training module, evaluated immediately after and at 3, 6, and 12 months.	Test scores show significant acquisition of clinical knowledge initially, which was retained over time when tested at 3, 6 and 12 months. Hands-on clinical skills scores demonstrated retention at 3, 6 and 12 months. Although participants were more confident about acute care pediatrics immediately after training, this decreased with time, though not to pre-intervention levels.

Karahan	Effectiveness of an education program to prevent nurses' low back pain: an interventional study in Turkey	2013	Quasi-experimental	The program was designed to parallel the investigator-designed booklet about basic concepts, rules, and behaviors to prevent low back pain among nurses. Arrangements were made to prepare an effective learning environment before the training program began. The topics in the training booklet were presented with interactive discussion techniques using PowerPoint slides.	The researchers did not find a statistically significant difference between the scores before the training and the scores immediately and 3 months after the training regarding clinic, duration of employment, and incidence of low back pain.
Karayurt	Evaluation of the breast cancer train the trainer program for nurses in Turkey	2010	Quasi-experimental	All three Breast Cancer Train-The-Trainer programs lasted 3 days. Interactive learning methods were used throughout the course. Video/video power point presentations, and skill practice on breast mannequins were also used to facilitate learning. Participants were encouraged to ask questions and group work was incorporated. All nurses who attended the programs were given written materials including the program's purpose, content, and all issues mentioned in the program.	The mean knowledge scores on breast cancer increased significantly. Trainees rated the training favorably. Some freely and openly expressed opinions by the nurses as to how the training had benefited them.
Kohi	The Tanzania HIV/AIDS Nursing Education (THANE) Preservice Curriculum	2010	Qualitative	THANE developed a 12-module curriculum and trained a cadre of master trainers. The resulting curriculum included 12 modules that provided an overview of the many issues related to HIV from the nursing care perspective. The master trainers, supported by UCSF-MUHAS representatives, conducted training workshops for nurse educators at the nursing institutions in their zones.	To date, the master trainers have trained 300 educators from all 62 nursing schools, with an expected completion date of March 2009.

Kumar	To assess the effectiveness of video assisted teaching (VAT) on needle stick injury regarding knowledge and attitude of staff nurses working in selected hospitals of Karnataka	2010	Quasi-experimental	Video assisted teaching (VAT) was utilized to train staff nurses on needle stick injuries, and resulting changes in attitude and knowledge levels were measured.	VAT was significantly effective in increasing the knowledge and attitude level of staff nurses.
Marchira	Impact of an educational pain management programme on nurses' pain knowledge and attitudes in Kenya	2013	Quasi-experimental	Nine randomly selected nurses then received 7 hours of focused education. This group completed the assessment again both immediately after and 2 weeks after the intervention.	A deficit in knowledge and attitudes related to pain management was prominent at baseline. The nurses who received the PMP scored significantly higher at baseline, first follow-up, and second follow-up assessment.
Mbachu	Effect of on-site training on the accuracy of blood loss estimation in a simulated obstetrics environment	2017	Quasi-experimental	The study involved an objective structured clinical examination. Seven everyday blood loss scenarios during which the routine estimation of blood loss is required were created. Digital photographs of the stations were taken to create an algorithm for teaching and training after the first stage of the study. There was a discussion on the volume capacities. The study was repeated after 3 weeks using different blood volumes.	There were significant differences in the mean error of blood loss estimation before and after the training session for the following stations.
Msidi	The Zambian HIV Nurse Practitioner Diploma Program: Preliminary Outcomes from First Cohort of Zambian Nurses	2011	Quasi-experimental	Nurses travelled to Lusaka for six weeks to complete the first two components of the program, and then returned to their clinical sites for the third component which was offered over 10 months. Component A was a 2-week didactic component. Component B was a 4-week intensive clinical mentoring component offered in Lusaka. During Component C, nurses returned to their home clinics and received clinical mentoring by mentors.	Students were able to achieve the identified competencies and that their supervisors perceived that they would be able to implement their expanded skills to improve care for patients with HIV and AIDS in Zambia.
Neyrinck	Apheresis training for nurses and physicians around the world	2015	Quasi-experimental	The curriculum was a modular program with theoretical and practical information and knowledge. Lectures were given through slides, and a set of questions based on the learning objectives for each topic of the course was composed.	With this course, 38 apheresis nurses/operators proved a significant increase of knowledge in the theory behind apheresis.

Nilsson	Comparing hands-on and video training for postpartum hemorrhage management	2014	Quasi-experimental	The material included one PowerPoint presentation with pre-recorded vocal instructions and one training video demonstrating the role-play for prevention and management of PPH. The interactive hands-on training lasted 90 min, consisting of a 30-min PowerPoint lecture on prevention and management of PPH followed by a 60-min workshop consisting of a hands-on role-play scenario with a teamwork approach. The non-interactive video training lasted 35 min.	Both intervention groups significantly increased in performance scores after receiving hands-on training and video training. No significant differences in performance score or pass rates were found between the two methods.
Nyamathi	HIV Knowledge Improvement Among Nurses in India: Using a Train-the-Trainer Program	2008	Quasi-experimental	A total of 10 master trainers were first trained over a 3-day period by College of Nursing faculty with expertise in HIV. The sessions included extensive modules on HIV/AIDS as well as train-the-trainer delivery content related to principles of adult learning. The teaching strategies included lectures with discussion, role play, and small group sessions. They reviewed and role-played counseling and communication techniques, issues pertaining to stigma, maintaining confidentiality, and ethical principles. Posttest evaluation was performed immediately following the final session with the trainees.	Each of the 10 master trainers subsequently trained a cohort of 10 trainees (a total of 100 trainees) over a 2-day period. Paired t-tests indicated that both measures of HIV knowledge improved significantly from pretest to posttest.
O'Sullivan	Global emergency care skills. Does it work? Global emergency care skills. Cela fonctionne-t-il?	2012	Quasi-experimental	Global Emergency Care Skills (GECS) is a non-profit voluntary organization founded in 2008 with a core objective of providing emergency care and trauma skills training to doctors and nurses in countries where Emergency Medicine is a developing specialty. This is accomplished through the provision of skills-based courses in trauma care, resuscitation skills and major incident management.	There was significant improvement in post-test evaluation across the nations studied in this study.

Odutayo	Impact of an educational program on the use of standardized nursing languages for nursing documentation among public health nurses in Nigeria	2013	Quasi-experimental	A 5-day training workshop was held with the public health nurses in the intervention group. During the workshop, the modules were used for teaching, and client studies were presented at practical sessions. The use of nursing languages was monitored by the first author on a monthly basis.	There was a significant improvement on documentation of care.
Out	Using a mHealth tutorial application to change knowledge and attitude of frontline health workers to Ebola virus disease in Nigeria: a before-and-after study	2016	Quasi-experimental	This study had two components: (i) pilot testing a tablet computer tutorial application for improving diagnostic and management responses to Ebola virus and (ii) conducting before and after surveys to assess changes in the knowledge and attitude of frontline workers. Participants were subsequently provided with instructions on completing a pre-tutorial survey, reviewing the electronic Ebola tutorial and completing a post-tutorial survey.	11% improvement in average knowledge levels between pre- and post-intervention scores with statistically significant differences. Additionally, there was reinforcement of positive attitudes. Moreover, more participants reported a willingness to practice frequent hand washing and disinfecting surfaces and equipment following the intervention, and more health workers were willing to use personal protective equipment to prevent the transmission of Ebola.
Ozdemir	Nurse education regarding agitated patients and its effects on clinical practice	2009	Quasi-experimental	2-day training program on caring for agitated patients.	The findings indicated that instead of pre-test nurses' use of physical restraints for controlling agitated patients without a physician order, none of post-test nurses applied them.
Ozyazicioglu	The effect of nurse training on the improvement of intravenous applications	2008	Quasi-experimental	Training consisted of lecture and Question & Answer sessions and lasted 45 min. Special emphasis was placed on application errors seen in different hospitals and clinics and issues regarding these errors were discussed in depth. After the training, nurses were provided with education booklets prepared by the investigator.	Results indicate that after the nurse training there has been a noticeable improvement in the following practices: intravenous peripheral catheter application skills, handwashing, glove wearing, antiseptic use, collaboration with the child, choice of cannula appropriate for the treatment, etc
Peter	A multicountry health partnership programme to establish sustainable trauma training in east, central, and southern African countries using a cascading trauma management course model	2015	Quasi-experimental	Primary Trauma Care Programme including a provide and training the trainer course (cascading model) to prevent to decrease deaths due to injury.	Improvement in knowledge across all cadres and clinical confidence. Cascading course was shown to be more effective than primary course.

Pisal	Nurses' health education program in India increases HIV knowledge and reduces fear	2007	Quasi-experimental	4 day HIV/AIDS Health Education Program using 21 trainers trained through a separate 6 day train the trainer program.	Percentage increases of nurse showing high level of knowledge in transmission, care and treatment, precautions, etc; overall increases in consent and confidentiality ratings, decrease in stigma and discrimination were observed.
Prager	Feasibility of training Zambian nurse-midwives to perform postplacental and postpartum insertions of intrauterine devices	2012	Quasi-experimental	10 day PPIUD insertion training course.	All obtained competency in pelvic model after 3 simulations.
Rajkumari	Effectiveness of intensive interactive classes and hands on practice to increase awareness about sharps injuries and splashes among health care workers	2015	Quasi-experimental	Interactive classes and hands on practice (2 rounds) to increase awareness of effect and correct practice of sharp injuries and splashes as well as exposure reporting practices.	Doctors and nurses showed improvement in voluntary reporting and all groups showed significant improvement in knowledge.
Rangrez	Impact of training in the level of awareness among Nursing and Laboratory Staff about Hospital Waste Management in a Tertiary Care Hospital-SKIMS	2008	Quasi-experimental	Knowledge and awareness training.	Improvement seen in knowing need for color coded separation, who is responsible, which waste is most generated, number of bins, which is used for sharps, which polythene bag, when to empty, and use of biohazard symbols.
Rao	Evaluative study on effectiveness of maternal and child health care participatory training program among staff nurses, auxiliary nurse midwives and lady health visitors	2012	Quasi-experimental	Maternal and child health training with self-learning material, role play, demonstration, simulation, discussions.	Postnatal and newborn knowledge increased for all, although for aux nurses not significant improvement, Assessment of antenatal exam improved for all as well as for conduction of delivery, intranatal care also improved significantly.
Salehi	The effect of education and implementation of evidence-based nursing guidelines on infants' weight gaining in NICU	2015	Quasi-experimental	Evidence based instruction on effective and economical method regarding infant weight gain.	Mean weight on admission and discharge in control was significantly higher.
Saramma	Assessment of long-term impact of formal certified cardiopulmonary resuscitation training program among nurses	2016	Quasi-experimental	Formal certified CPR training program (12 courses, 20h over 10 days).	Test passing improved from in pretest and retest.
Sarayani	A 3-armed randomized controlled trial of nurses' continuing education meetings on adverse drug reactions	2015	Randomized Controlled Trial	Didactic lecture, brainstorming workshop, or delayed education was given for continuing medical education.	Participation was increased for lecture vs. workshop, workshop were more satisfied, immediately after knowledge was higher in lecture.
Senarath	Effect of training for care providers on practice of essential newborn care in hospitals in Sri Lanka	2007	Quasi-experimental	4 day training program (32 h) on essential newborn care with lecture, demonstrations, hands-on, practicals, small group discussions.	Intervention group showed improvement in cleanliness, thermal protection, neonatal assessment, improved skin to skin contact.

Shrestha	Newborn care in Nepal: The effects of an educational intervention on nurses' knowledge and practice	2013	Quasi-experimental	Educational program (1 h discussion, self-directed learning with reading material) to improve knowledge and practice of procedures in care of newborns to reduce mortality and morbidity.	Knowledge scores were significantly higher post-intervention up to 1 month after.
Stephens	Capacity building for critical care training delivery: Development and evaluation of the Network for Improving Critical care Skills Training (NICST) programme in Sri Lanka	2017	Quasi-experimental	Critical care nurse training courses (3 over 3 months) with a train the trainer program and multiple training blocks and graded hand over of responsibility for course delivery from overseas to local faculty; course included lectures, small group workshops, cases, practicals, online platform for pre reading and supplemental education, and limit of 6-8 participants for each station.	Pre and post MCQ results were significantly higher post course with no difference in oversea vs. local faculty led.
Strother	Building cancer nursing skills in a resource-constrained government hospital	2012	Quasi-experimental	Safe chemotherapy administration educational programme of lectures, small group discussion, and hands on competency exercises.	Mean differences in performance were general cancer (18%), cancer bio (37%), pharmacology (26%), general cancer nursing (8%), practical aspects (-2%), and drugs (27%).
Swapna	Effect of Structured Teaching Programme on Levels of Knowledge regarding Narcotic Policy among Staff Nurses in Selected Hospitals of Bangalore	2014	Quasi-experimental	Structured teaching programme related to narcotic policy.	Knowledge scores significantly improved.
Taniyan	Effect of computer assisted instructions on central venous catheter care in knowledge and practice of staff nurses in a selected hospital in Uttar Pradesh	2013	Quasi-experimental	Computer assisted instructions on central venous catheter care.	Knowledge and practice both increased after giving intervention and they were correlated to indicate that better knowledge led to better practice.
Thukral	Evaluation of an educational program for essential newborn care in resource-limited settings: Essential Care for Every Baby	2015	Quasi-experimental	Essential Care for Every Baby program (12 h) in classroom with train the trainer cascade; neonatal stimulator, facilitator demonstration, small group, case exercises, role play; action plan, facilitator flip chart, provider guide are supplemental materials.	Confidence increased; exam scores improved.

Thukral	Online neonatal training and orientation programme in india (ONTOP-IN)-the way forward for distance education in developing countries	2012	Quasi-experimental	Online training program with local tutors focused on newborn care using web-based didactic lectures, self-reading material, video demonstrations of skills, and case studies; course was 5 weeks with 2 new lessons each week (3h) with group discussions of case study after each lesson with tutor monitoring. In last 2 weeks, skill learning.	Exam scores and clinical evaluation both increased.
Toubasi	Impact of simulation training on Jordanian nurses' performance of basic life support skills: A pilot study	2015	Quasi-experimental	BLS stimulation training.	Test results increased significantly.
Tran	Teacher-made models: the answer for medical skills training in developing countries?	2012	Quasi-experimental	Teacher made models for simulation of IV injection skills compared to more expensive commercial model.	There was no difference in mean scores of students trained with commercial model to those trained with teacher made models as well as no difference when practicing on patients.
Varghese	Delirium in older people in hospital: an education programme	2014	Quasi-experimental	Educational program on identification and management of delirium.	Significant improvement in knowledge with program and practice.
Vasudevaiah	Effectiveness of CME on "pediatric emergencies and management" among the health personnels in community health centre, Karikalampakkam, Puducherry	2014	Quasi-experimental	CME program (2 days) on pediatric emergencies and management.	Post-test scores showed significantly more students with higher proficiency.
Walker	A process evaluation of PRONTO simulation training for obstetric and neonatal emergency response teams in Guatemala	2015	Randomized Controlled Trial	Simulation low cost obstetric and neonatal emergency and team training.	Decrease in incidence of C-sections at 4 months, 8 months, and 12 months, but no significant impact on incidence of maternal complications.
Williams	Effectiveness of train-the-trainer HIV education: A model from Vietnam	2014	Quasi-experimental	HIV continuing education workshops of 2-4 days via nurse led training of health care workers; didactic including teaching pedagogical theory and practice to improve teaching skills for trainers.	Mean scores improved significantly.
Woods	An innovative approach to in-service training of maternal health staff in Cambodian hospitals	2015	Quasi-experimental	Clinical skills practice module (1 day) with support visits to hospitals.	Scores in intervention for neonatal resuscitation, magnesium sulfate dilution resuscitation, and aortic compression were significantly increased.