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EDUCATION & TRAINING

An innovative approach to in-service training of maternal health staff in Cambodian hospitals

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ABSTRACT

Objective: To demonstrate the feasibility of implementing evidence-based continuing medical education (CME) to improve key skills among maternity staff in Cambodia. *Methods:* A skills-based CME program was implemented in 33 Cambodian hospitals. Each clinical skills practice (CSP) module consisted of a 1-day practice session, focusing on three maternal and newborn interventions, followed by support visits to participating hospitals. Skills were assessed at 27 intervention hospitals and five control hospitals 7–11 months after the practice sessions through observation of neonatal resuscitation, magnesium sulfate dilution, and aortic compression simulations. *Results:* A total of 559 healthcare workers attended at least one CSP practice session. The skills assessment included 47 doctors and 210 midwives. Hospital staff who participated in CSP performed significantly better than did those from control hospitals on neonatal resuscitation (mean score 31.22 vs 17.00; $P < 0.001$), magnesium sulfate dilution (mean score 11.01 vs 8.47; $P < 0.001$), and aortic compression (mean score 13.87 vs 4.33; $P < 0.001$). CSP participants were also significantly more likely to score higher than the 70% cutoff for neonatal resuscitation and magnesium sulfate dilution than were those from control hospitals, after adjustment for hospital level and profession ($P \leq 0.05$). *Conclusion:* Key clinical skills in low-resource settings can be improved by implementing CME using simulations and supportive follow-up.

1. Introduction

Although maternal and newborn mortality rates are falling in many low- and middle-income countries [1], childbirth is still unnecessarily dangerous for many women and newborns. As access to both skilled birth attendance and emergency obstetric care improves, there is a need to address the quality of this care [2–6].

Cambodia has shown impressive decreases in the maternal mortality ratio, from 472 (95% confidence interval [CI] 338–605) deaths per 100 000 live births in 2005 [7] to 206 (95% CI 124–288) in 2010 [8]. Estimates put the maternal mortality ratio for 2013 at 170 [1], setting the country on track to reach the Millennium Development Goal of reducing the maternal mortality ratio by 75% between 1990 and 2015. However, this maternal mortality ratio is higher than the regional average [1], and newborn mortality has stagnated at 27 deaths per 1000 live births over the past decade [8].

Health financing strategies to provide services to the poor and supply-side policies have led to increases in access to reproductive and maternal health services in Cambodia in the past decade, with increasing equity in service use [9]. Births in public facilities have increased dramatically, from 11% in 2000 to 61% in 2011. Although more than 20% of births take place in government hospitals [10,11], the quality of hospital maternity care needs to improve [10,12,13]. This improvement is critical because most severe complications are treated at hospitals and because hospitals have a leading role in spreading appropriate, evidence-based care to health centers, where nearly half of all births take place.

Quality of care depends on many factors, one of which is the competence of the providers. Maternity care providers need knowledge and skills in key interventions to address the major causes of maternal and neonatal mortality. Continuing medical education (CME) can be an important tool for updating and improving the knowledge and skills of maternity care providers and improving patient outcomes [14–17].

In Cambodia, as elsewhere, CME usually consists of one-off lecture-based sessions, held separately for doctors, midwives, and nurses. Often only one or two staff per facility are invited, with the assumption that they will share what they learn with their colleagues. With limited

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skills practice, teamwork training, or follow-up support, there is widespread agreement that this type of training does not lead to significant impact on clinical practice. Instead, CME should be competency-based [3], use practice-based small group work and interdisciplinary teamwork, and involve multiple exposures to improve competence and performance [15–19]. However, there is little evidence from such CME programs in low- and middle-income countries [15,18,20,21].

The aim of the present study was to describe an innovative method for training and support designed to improve the impact of hospital-based CME on the quality of maternal/newborn care in Cambodia.

2. Materials and methods

To improve clinical practices related to delivery care, the University Research Co. (Bethesda, MD, USA) Better Health Services project (URC BHS) and the Cambodia Ministry of Health (MoH) developed, delivered, and assessed a training model based on national guidelines and policies. This clinical skills practice (CSP) model employs simulation exercises, competency-based team training, and structured on-site follow-up visits. Implementation and assessment of the CSP model were done as part of a memorandum of understanding between the Cambodian MoH and the URC BHS. No institutional review board approval or informed consent was required because the present work was one element of the larger, approved project; the analysis was part of the overall project monitoring process; and no patient information was collected.

Initially, four CSP modules covering 12 topics (Box 1) were developed to address key interventions related to maternal and newborn health in Cambodia. The first two modules were delivered to maternity care providers in 8 provinces at 33 provincial and district government hospitals—representing 33% of hospitals in the country—between February 4, 2012, and August 30, 2013. Delivery was facilitated by teams made up of University Research Co. staff and leading physicians and midwifes at the provincial hospitals.

For each CSP module, practice sessions and follow-up visits were completed (Box 2). Each CSP module (1-day practice session and at least two follow-up visits) was conducted within a 3-month period, allowing the four modules to be completed over the course of 1 year.

The 1-day practice sessions for each module were held at a central provincial hospital, with doctors and midwives from referral hospitals attending. Sessions were held for nine groups of hospitals, with each one held at least twice for each group to ensure that all maternity staff could attend while hospital coverage was maintained.

Box 1
Clinical skills practice case scenarios.

Module 1
- a. Eclampsia
- b. Postpartum hemorrhage
- c. Nonhormonal contraception

Module 2
- a. Labor monitoring
- b. Newborn resuscitation
- c. Infection control

Module 3
- a. Breech delivery
- b. Hormonal contraception
- c. Essential newborn care

Module 4
- a. Prepartum bleeding
- b. Prelabor rupture of membranes
- c. Alternative birthing positions

Box 2
Outline of training for one clinical skills practice module.

Practice session (1 day)
- Short introduction of topics
- Teamwork on simulation case 1
- Facilitated discussion among team, with experts available to answer questions
- Repeat the case
- Simulation case 2, as above
- Simulation case 3, as above
- Short wrap-up

Follow-up visits (two per module)
- Sharing experiences, answering questions
- Simulation case, as above, on one of three topics, decided by the participants

During each practice session, the participants worked in teams to respond to three case scenarios, each addressing one of the module topics (Box 2). The participants used locally produced maternal mannequins (Fig. 1), NeoNatalie (Laerdal Global Health, Stavanger, Norway) newborn simulators, and basic, readily available medical supplies. The focus was on sharing knowledge, with guidance from trained facilitators. Following each simulation scenario, the teams briefly assessed their teamwork and ability to keep the mother and her family informed, as well as their clinical responses and the outcomes.

Within 8 weeks of the practice day, two members of the facilitation teams visited each hospital twice. The follow-up support sessions were designed to monitor whether and how the newly practiced skills had been used, answer any outstanding questions, and run another simulated practice based on one of the topics from the most recent module. The follow-up visits were conducted on the maternity ward of each participating hospital.

Fig. 1. A simple mannequin with intravenous access made from locally available materials (used as training material for clinical skills practice).