International Journal of Gynecology and Obstetrics 132 (2016) 240–243

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

EDUCATION AND TRAINING

Improvement and retention of emergency obstetrics and neonatal care knowledge and skills in a hospital mentorship program in Lilongwe, Malawi☆

Jennifer H. Tang [a,b,*], Charlotte Kaliti [a,c], Angela Bengtson [b,d], Sumera Hayat [a], Eveles Chimala [c], Rachel MacLeod [c,e], Stephen Kaliti [a,c], Fanny Sisya [c], Mwawi Mwale [c,f], Jeffrey Wilkinson [a,b]

[a] Department of Obstetrics and Gynecology, University of North Carolina, Chapel Hill, NC, USA
[b] University of North Carolina Project-Malawi, Lilongwe, Malawi
[c] Maternity Unit, Bwaila Hospital, Lilongwe, Malawi
[d] Department of Epidemiology, University of North Carolina, Chapel Hill, NC, USA
[e] The Rose Project, Dublin, Ireland
[f] Lilongwe District Health Office, Lilongwe, Malawi

ARTICLE INFO

Article history:
Received 21 February 2015
Received in revised form 19 June 2015
Accepted 23 October 2015

Keywords:
Emergency obstetrics
Malawi
Mentoring
Sub-Saharan Africa
Training

ABSTRACT

Objective: To evaluate whether a hospital-based mentoring program could significantly increase short- and longer-term emergency obstetrics and neonatal care (EmONC) knowledge and skills among health providers. *Methods:* In a prospective before-and-after study, 20 mentors were trained using a specially-created EmONC mentoring and training program at Bwaila Hospital in Lilongwe, Malawi. The mentors then trained an additional 114 providers as mentees in the curriculum. Mentors and mentees were asked to complete a test before initiation of the training (Pre-Test), immediately after training (Post-Test 1), and at least 6 months after training (Post-Test 2) to assess written and practical EmONC knowledge and skills. Mean scores were then compared. *Results:* Scores increased significantly between the Pre-Test and Post-Test 1 for both written (n = 134; difference 22.9%, $P < 0.001$) and practical (n = 125; difference 29.5%, $P < 0.001$) tests. Scores were still significantly higher in Post-Test 2 than in the Pre-Test for written (n = 111; difference 21.0%, $P < 0.001$) and practical (n = 103; difference 29.3%, $P < 0.001$) tests. *Conclusion:* A hospital-based mentoring program can result in both short- and longer-term improvement in EmONC knowledge and skills. Further research is required to assess whether this leads to behavioral changes that improve maternal and neonatal outcomes.

1. Introduction

Annually, more than 273 000 maternal deaths and 2 million neonatal deaths occur worldwide [1]. Improvement of maternal and neonatal health is associated with increased access to high-quality emergency obstetric and neonatal care (EmONC) services [2–4]. Therefore, improving the quality of EmONC training has been suggested as a strategy to improve maternal and neonatal health outcomes. However, studies on the effectiveness of such training programs have had varied results, with few examining the long-term outcomes [5–11].

Malawi has a maternal mortality ratio of 510 maternal deaths per 100 000 live births and a neonatal mortality rate of 24 deaths per 1000 live births [12]. A recent qualitative study among healthcare providers in Malawi revealed that inadequate knowledge and supervision were key contributors to poor-quality obstetric services [13]. In 2005, the Government of Malawi undertook a national assessment of EmONC services, which indicated poor access and utilization [14]. Consequently, and on the basis of WHO recommendations, a Malawi "Road Map for Accelerating the Attainment of the Millennium Development Goals related to Maternal and Neonatal Health Outcomes" was produced in 2007 [15]. Nevertheless, a follow-up EmONC assessment in 2010 showed slow progress and, therefore, a new Malawi Road Map was published in October 2012 [16]. Two key interventions of the new Road Map involved the development of providers' capacity to competently provide maternal and neonatal healthcare services and supportive supervision, including clinical coaching and mentoring to enhance the quality of care.

Recent studies have found improved clinical documentation, quality-of-care indicators, and even clinical outcomes following mentorship programs related to HIV care [17–20]. However, the impact of training programs that offer ongoing clinical mentoring to improve EmONC knowledge and clinical skills has not been well described [21]. Therefore,

☆ Presented at the 4th Consortium of Universities for Global Health Annual Conference (March 14–16, 2013; Washington, DC, USA) and the Fogarty Global Health Fellowship Orientation Meeting (July 8–12, 2013; Bethesda, MD, USA).

* Corresponding author at: UNC Project-Malawi, Private Bag A104, Lilongwe 3, Malawi. Tel.: +1 265 99 640 2662; fax: +1 919 843 9546.
E-mail address: jennifer_tang@med.unc.edu (J.H. Tang).

http://dx.doi.org/10.1016/j.ijgo.2015.06.062
0020-7292/

the aim of the present study was to describe the development, implementation, and results of an EmONC mentorship program at a large hospital in Malawi, with the primary objective being the determination of improvement of EmONC knowledge and practical skills among mentors and mentees in the short term. The secondary objective was to determine the maintenance of a longer-term increase in EmONC knowledge and skills 6 months following completion of the initial program.

2. Materials and methods

For this prospective, before-and-after study, a needs assessment was conducted at Bwaila Hospital—a center in Lilongwe, Malawi, with more than 16 000 deliveries per year—from January to March 2012 by interviewing the Lilongwe District Health Officer, hospital midwifery leadership, and 10 practicing midwives. Development and implementation of the EmONC program was then performed by consultants from the University of North Carolina (Chapel Hill, NC, USA) and the Rose Project (Dublin, Ireland) as well as senior nurse midwives and the Head of Obstetrics and Gynecology at Bwaila Hospital from April 2012 to April 2013. All providers involved in obstetric care at Bwaila Hospital were invited and eligible to participate in the program. The program received an exemption for ethics approval by the Malawi National Health Sciences Research Committee Institutional Review Board, which also determined that informed consent was not needed for participation in the program.

A two-phase mentoring and training program was developed as a continuous quality improvement measure for EmONC services. During the first phase, 20 providers were trained to become mentors between April and June 2012. The mentors were selected by the program consultants and hospital management on the basis of their strong clinical performance and leadership skills. In addition to receiving training in EmONC knowledge and skills, the mentors attended a 1-day "Training of the Trainers" workshop, during which they received instruction on adult learning, providing feedback to learners, and role-playing in the clinical environment. During the second phase, these mentors then each trained an additional 4–10 providers (mentees) on the EmONC curriculum between July and September 2012. An EmONC skills lab with pelvic and neonatal models was set up at Bwaila Hospital for mentors and mentees to discuss and practice their clinical skills.

All mentors and mentees completed a written and practical EmONC skills Pre-Test before commencing the training program. Mentees then completed a minimum of four individual or small-group mentoring sessions in the skills laboratory with either their mentor or one of the consultants. All the mentors and mentees retook the same written and practical tests immediately following completion of their mentoring session (Post-Test 1) and once again at least 6 months after (Post-Test 2). Before taking Post-Test 2, the mentees were asked to complete at least one "refresher" session with their mentor or a consultant.

The written and practical tests were consistent with the Malawi Ministry of Health's EmONC guidelines and field-tested by providers working at Bwaila Hospital. Five questions were revised after the initial field testing. The written test consisted of 80 questions and covered eight topics: hemorrhage, obstetric complications, infection, labor management, neonatal resuscitation, pre-eclampsia, surgical management, and ultrasonography. The practical test consisted of modules on five topics: pre-eclampsia, vacuum delivery, shoulder dystocia, postpartum hemorrhage, and neonatal resuscitation.

All participants received approximately US$30 for their time and transport costs after completing Post-Test 1 and $12.50 for completing Post-Test 2, because they were advised to perform their mentoring sessions and tests outside working hours to prevent staff shortages at the hospital. Mentors were given an additional $20 for the guiding of each mentee through Post-Test 1.

The Wilcoxon signed rank-sum test was used to compare mean scores for each individual topic and for the overall written (total written test) and practical tests (total practical test). For the comparison between Post-Test 1 and Post-Test 2, two stratified analyses were performed. The results were first stratified by excluding mentors and mentees who had worked in the labor ward between Post-Test 1 and Post-Test 2, and then further stratified by excluding mentors from the analysis. All analyses were performed using Stata 11 (StataCorp, College Station, TX). A difference in scores was considered significant at $P < 0.05$.

3. Results

The 20 mentors trained a total of 114 mentees. All 134 mentors and mentees completed both the Pre-Test and Post-Test 1, although nine participants did not complete all five modules of the practical during their Pre-Test. Post-Test 2 was administered to 10 (50.0%) of the 20 original mentors in February 2013 and 101 (88.6%) of the 114 original mentees from February to April 2013; 23 mentors and mentees were unable to complete Post-Test 2 because they had been transferred to other health facilities (n = 10), had moved to a private clinic (n = 2), had migrated abroad for further education (n = 3), were on maternity leave (n = 2), or other reasons (n = 6).

The scores for both the total written test and total practical test were significantly better in Post-Test 1 compared to the Pre-Test, as were the scores for each individual topic ($P < 0.001$ for all) (Table 1). For the written test, the greatest difference in scores was observed for the topics of ultrasonography (34.5%) and pre-eclampsia (27.4%). For the practical test, the greatest difference in scores was observed for the topics of shoulder dystocia (51.8%) and vacuum delivery (32.7%).

The scores for both the total written and total practical tests as well as for each individual topic were still significantly increased when comparing the Post-Test 2 and Pre-Test scores ($P < 0.001$ for all) (Table 2). However, a significant drop in scores was recorded between Post-Test 1 and Post-Test 2 for the total written test ($P = 0.001$), as well as for infection ($P = 0.017$), labor ($P = 0.011$), pre-eclampsia ($P = 0.028$), surgery ($P = 0.001$), ultrasonography ($P = 0.032$), shoulder dystocia ($P < 0.001$), and neonatal resuscitation ($P = 0.033$). The greatest drop in score was observed for ultrasonography (5.8%) and shoulder dystocia (5.7%).

Stratified analysis revealed that 44 (39.6%) of the 111 participants available for Post-Test 2 had not rotated through the labor ward since taking Post-Test 1. Their total written and total practical test scores decreased significantly between Post-Test 1 and Post-Test 2 (Table 3). By contrast, no significant differences were found for the 67 participants who had practiced in the labor ward. Analysis following the further exclusion of the 10 mentors, all of whom had worked in the labor ward since taking Post-Test 1, still revealed no significant decrease in mentee scores between Post-Tests 1 and 2 (Table 3).

Table 1
Pre-Test and Post-Test 1 scores for mentors and mentees.

Test	Pre-Test score, %	Post-Test 1 score, %	Difference, %	*P* value[a]
Total written (n = 134)	58.8	81.7	22.9	<0.001
Bleeding (n = 134)	67.3	87.6	20.3	<0.001
Complications (n = 134)	55.0	76.3	21.3	<0.001
Infection (n = 134)	63.7	88.7	25.0	<0.001
Labor (n = 134)	63.3	82.6	19.3	<0.001
Neonatal resuscitation (n = 134)	66.2	83.2	17.0	<0.001
Pre-eclampsia (n = 134)	54.3	81.7	27.4	<0.001
Surgery (n = 134)	60.5	84.9	24.4	<0.001
Ultrasonography (n = 134)	24.9	59.4	34.5	<0.001
Total practical (n = 125)[b]	61.4	90.9	29.5	<0.001
Pre-eclampsia (n = 134)	69.8	91.3	21.5	<0.001
Vacuum delivery (n = 132)	56.3	89.0	32.7	<0.001
Shoulder dystocia (n = 127)	37.3	89.1	51.8	<0.001
Postpartum hemorrhage (n = 134)	71.9	91.9	20.0	<0.001
Neonatal resuscitation (n = 134)	66.4	92.9	26.5	<0.001

[a] Wilcoxon signed rank-sum test.
[b] Nine providers did not complete all five modules of the practical during the Pre-Test, so comparisons for the excluded modules could not be made for these providers.