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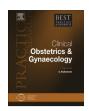
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What is the impact of multi-professional emergency obstetric and neonatal care training?

Anne-Marie Bergh, PhD, Senior Researcher, Shisana Baloyi, MBChB, CML (Law), CRIA (Theol.), Dip.Obst, F.MAS, Dip.MAS, PGDip.FamMed, MMed (O et G), FCOG (SA), Consultant Obstetrician and Gynaecologist, Robert C. Pattinson, MD, FRCOG, FCOG (SA), Director *

MRC Maternal and Infant Health Care Strategies Unit, Obstetrics and Gynaecology Department, University of Pretoria, Pretoria, South Africa

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This paper reviews evidence regarding change in health-care provider behaviour and maternal and neonatal outcomes as a result of emergency obstetric and neonatal care (EmONC) training. A refined version of the Kirkpatrick classification for programme evaluation was used to focus on change in efficiency and impact of training (levels 3 and 4). Twenty-three studies were reviewed — five randomised controlled trials, two quasi-experimental studies and 16 before-and-after observational studies. Training programmes had all been developed in high-income countries and adapted for use in low- and middle-income countries. Nine studies reported on behaviour change and 13 on process and patient outcomes. Most showed positive results. Every maternity unit

Abbreviations: ACNM, American College of Nurse-Midwives; AGOTA, Association of Gynaecologists and Obstetricians of Tanzania; AIP, ALARM International Program; ALARM, Advances in Labour and Risk Management; ALSO®, Advanced Life Support in Obstetrics; AOI, Adverse Outcomes Index; BEMONC, Basic emergency obstetric and neonatal care; CEMONC, Comprehensive emergency obstetric and neonatal care; CRIM, Crew resource management; EmONC, Emergency obstetric and neonatal care; HIC, High-income country; HIE, Hypoxic—ischaemic encephalopathy; LMIC, Low- and middle-income country; LSS, Life-saving skills; LSS-EOC and NC, Life Saving Skills — Essential Obstetric and Newborn Care Training; LSTM, Liverpool School of Tropical Medicine; MOET, Managing Obstetric Emergencies and Trauma; NVOG, Dutch Society of Obstetrics and Gynaecology; OBCTT, Obstetric Crisis Team Training Program; PROMPT, Practical Obstetric Multi-Professional Training; PRONTO, Programa de Rescate Obstétrico y Neonatal: Tratamiento Óptimo y Oportuno; QUARITE, Quality of care, risk management, and technology in obstetrics; RCOG, Royal College of Obstetrics and Gynaecology; RCT, Randomised controlled trial; SaFE, Simulation and Fire-drill Evaluation; TeamSTEPPS, Team Strategies and Tools to Enhance Performance & Patient Safety; UK, United Kingdom; US, United States; WHO, World Health Organization.

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^{*} Corresponding author. MRC Maternal and Infant Health Care Strategies Research Unit, Department of Obstetrics and Gynaecology, University of Pretoria, Private Bag X323, Arcadia 0007, Pretoria, South Africa.

E-mail addresses: anne-marie.bergh@up.ac.za (A.-M. Bergh), shisana.baloyi@gmail.com (S. Baloyi), robert.pattinson@up.ac. za (R.C. Pattinson).

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should provide EmONC teamwork training, mandatory for all health-care providers. The challenges are as follows: scaling up such training to all institutions, sustaining regular in-service training, integrating training into institutional and health-system patient safety initiatives and 'thinking out of the box' in evaluation research.

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Introduction

Maternal and perinatal mortality remain major challenges to health systems globally, especially in low- and middle-income countries (LMICs) [1–3]. The Millennium Development Goals 4 and 5 called for the reduction of under-five mortality rates (which include neonatal deaths) and maternal mortality ratios by three-quarters by the year 2015. Many Countdown countries have been unable to make sufficient progress [3,4], with the sub-Saharan region faring the worst with maternal morbidities and mortalities [5]. Where under-five mortality has been reduced, the rate of decrease in neonatal mortality is much slower [6].

In high-income countries (HICs), reports such as the United Kingdom's (UK's) Confidential Enquiry into Maternal and Child Health and the Joint Commission on Accreditation of Healthcare Organizations in the United States (US) identified substandard care and a high incidence of medical errors as the cause of a significant proportion of preventable patient morbidity and mortality [7,8]. The uniqueness of challenges in obstetric emergencies demands 'excellent teamwork and superior communication skills between multiple medical teams' (p. 40) [9]. One of the root causes cited for substandard care is a threatening organisational culture that undermines teamwork and communication, leading to the following: confusion in roles and responsibilities, lack of cross-monitoring, failure to prioritise and perform clinical tasks in a structured coordinated manner and lack of support for health-care providers [7,8]. These failures necessitated a shift in training away from individual technical perfection only to better team coordination for patient safety through error management and improved processes [10–13]. Numerous health authorities, labour wards and institutions involved in maternal, neonatal and child health have developed or are developing emergency obstetric and neonatal care (EmONC) training packages to address the changed training needs.

Studies on EmONC training have proliferated in the past decade, and the challenge of evaluating the impact of these programmes is the large variation in the descriptions of training with regard to content, design, delivery style and duration [10,14,15]. The aim of this paper is to map the landscape regarding training in EmONC skills and to give an overview of the different training programmes, packages and approaches discussed in peer-reviewed research reports. Of particular importance are the kinds of training results available on post-training change in (a) provider disposition or behaviour or (b) organisational impact and patient outcomes with respect to morbidity and/or mortality.

Methods

A search of peer-reviewed articles written in English and pertaining to systematic *multi-professional training* was conducted for the period between 1994 and October 2014. The rationale for the choice of the starting date was as follows: an initial PubMed search did not yield any publication before 1994; the publication on the Advanced Life Support in Obstetrics (ALSO®) course by Beasley et al. appeared in 1994 [16]; and the first publications included in the systematic review of the effectiveness of training in emergency obstetric care in low-resource environments by Van Lonkhuijzen et al. appeared in 1995 [14]. The databases consulted included PubMed/MEDLINE, CINAHL, Web of Science, Science Direct, Cochrane Controlled Trials Register, Popline, African Journals Online, Directory of Open Access Journals, Google Scholar, TOC Premier and Health Source: Nursing/Academic Edition. Various Boolean combinations of the following search terms were used according to the combination possibilities allowed in each database: 'obstetric*', 'emergenc*', 'basic emergency obstetric*', 'comprehensive emergency

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