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Delivering a sustainable trauma management training programme tailored for low-resource settings in East, Central and Southern African countries using a cascading course model

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ABSTRACT

Background: Injuries cause five million deaths and 279 Disability Adjusted Life Years (DALYS) each year worldwide. The COSECSA Oxford Orthopaedic Link (COOL) is a multi-country partnership programme that has delivered training in trauma management to nine sub-Saharan countries across a wide-cadre of health-workers using a model of "primary" courses delivered by UK instructors, followed by "cascading" courses led by local faculty. This study examines the impact on knowledge and clinical confidence among health-workers, and compares the performance of "cascading" and "primary" courses delivered in low-resource settings.

Methods: Data was collated from 1030 candidates (119 Clinical Officers, 540 Doctors, 260 Nurses and 111 Medical Students) trained over 28 courses (9 "primary" and 19 "cascading" courses) in nine sub-Saharan countries between 2012 and 2013. Knowledge and clinical confidence of candidates were assessed using pre- and post-course MCQs and confidence matrix rating of clinical scenarios. Changes were measured in relation to co-variants of gender, job roles and primary versus cascading courses. Multivariate regression modelling and cost analysis was performed to examine the impact of primary versus cascading courses on candidates' performance.

Findings: There was a significant improvement in knowledge (58% to 77%, $p < 0.05$) and clinical confidence (68% to 90%, $p < 0.05$) post-course. "Non-doctors" demonstrated a greater improvement in knowledge (22%) and confidence (24%) following the course ($p < 0.05$). The degree of improvement of MCQ scores differed significantly, with the cascading courses (21%) outperforming primary courses (15%) ($p < 0.002$). This is further supported by multivariate regression modelling where cascading courses are a strong predictor for improvement in MCQ scores (Coef = 4.83, $p < 0.05$).

Interpretation: Trauma management training of health-workers plays a pivotal role in tackling the ever-growing trauma burden in Africa. Our study suggests cascading PTC courses may be an effective model in delivering trauma training in low-resource settings, however further studies are required to determine its efficacy in improving clinical competence and retention of knowledge and skills in the long term.

Introduction

Traumatic injuries are a neglected epidemic in developing countries [1,2]. More than five million deaths/per year are related to injury, and 90% of this burden is borne by low and middle income countries (LMICs) [3–5]. This burden is expected to grow and current projections estimate that it will overtake HIV/AIDS and TB as a cause of world mortality by 2020 [1,6].

Although Africa is home to only 2% of the world's vehicles, it has one the highest road traffic related mortality rates, reaching unprecedented epidemic proportions at 28 per 100,000 population [6–8]. This equates to an approximately 14-fold higher risk of dying in a road traffic accident in Africa than in the United Kingdom [7]. Despite this, many frontline health workers in sub-Saharan African countries manage multiply injured patients with minimal formal training in trauma management, and often work with limited medical resources [9–13].

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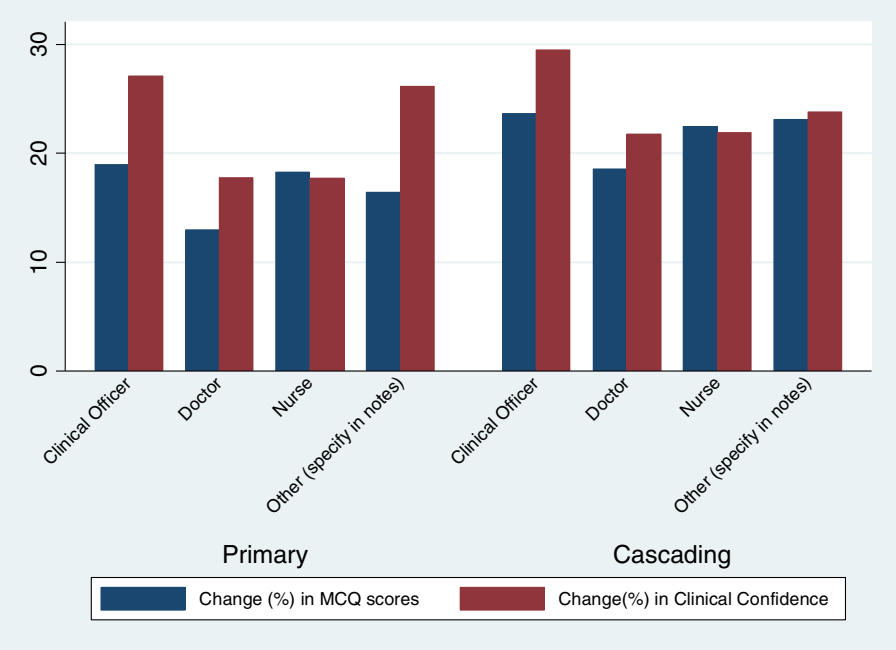

Fig. 1. Percentage of improvement in MCQ and clinical confidence scores between different job roles in primary versus cascading courses.

This remains a stark contrast to clinicians in high-income countries (HICs), where trauma management training are commonly founded on principles from the Advanced Trauma Life Support (ATLS)® system. The ATLS® system, produced by the American College of Surgeons [14], is a well-established protocol-based system for treating severely injured trauma patients. However the implementation of this system has not been as widely adopted in sub-Saharan Africa as in Europe and North America [15,16]. A relative lack of basic medical resources, limited funding and insufficient skilled staff are among the key reasons [17]. Furthermore, many of the limited resource settings in LMICs are unable to support the specialised resource-dependent and technology-driven protocols advocated by the ATLS system [18] (Fig. 1).

It was with this premise in mind that the Primary Trauma Care (PTC) course was developed in 1997 to address this challenge [19]. The PTC course aims to train doctors, nurses, paramedics and other clinical personnel in the management of severely injured patients in low-resource settings. In 2003, the PTC manual was published by the World Health Organisation (WHO) and to date the course has been delivered in over 60 countries, in at least 14 different languages [19]. Though the course was originally designed for use in low-resource settings in Africa, previous efforts to establish a sustainable programme have met limited success [20,21]. As a result, trauma training among frontline health workers in sub-Saharan Africa remains sporadic and sparse [11,20,22].

In response to this ever-growing need, the College of Surgeons of East, Central and Southern Africa (COSECSA) has collaborated with the University of Oxford in establishing a multi-country partnership programme to improve trauma management training within the region. The COSECSA-Oxford-Orthopaedic Link (COOL) [23] programme was established in 2012 through the support of the Health Partnership Scheme by the UK Department for International Development (DFID) and the Tropical Health Education Trust (THET). One of the goals of the programme is to address the critical need of training more frontline health workers in trauma management. The project seeks to achieve this by running 45 PTC courses over a three year period (2012–2015), training around 1800 new PTC providers across the ten sub-Saharan countries in the COSECSA region (Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe) (Fig. 2).

The framework of the programme, is based on PTC courses being delivered in each of our partner countries applying a "2:1:2" format. This in simple terms, equates to a standard two day provider training course, followed by a one day instructor's course and finally ending with a further two day provider training course. The first PTC course ("primary") in each country is delivered by a team of four UK National Health Service (NHS) instructors. On completion of the first PTC course ("primary") in the country, subsequent "2:1:2" PTC ("cascading") courses are led by a team of local instructors with a UK instructor present to offer mentorship to the new instructors. This format allows for a quick and effective dissemination of trauma management training to health-workers, particularly those working in rural parts of the country, where often the need is greatest (Table 1).

Although the concept of cascading PTC courses is appealing, its efficacy is not proven. Ultimately, if cascading courses fail to deliver training to a high standard, then their introduction in LMICs will be counter-productive and costly in the long-run. We addresses the question of how effective the "cascading" training model is in delivering adequate and appropriate training to health workers in low resource settings.

Methodology

Ethics & role of the funding source

Written informed consent was obtained from all the participants. No identifiable information was collected. No personal or identifiable data has been reported in the manuscript. Ethics approval for the study was by the Medical Sciences Inter Divisional Research Ethics Committee Research Services, University of Oxford. The sponsors of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication (Table 2).