In-service training for health professionals to improve care of the seriously ill newborn or child in low- and middle-income countries

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An updated version of this systematic review has been published and can be found online at www.cochrane.org. We will soon update the below RHL summary to reflect the updated findings of the systematic review.

To improve the quality of clinical care for seriously ill newborns or children in low- and middle-income countries, several in-service training courses based primarily on in-service training models developed in high-income countries have been proposed. While some evidence was found of improved clinical care as a result of such in-service training, the data were insufficient to draw firm conclusions about the overall effectiveness of such training. The results of this review cannot be extrapolated to other area of in-service training for health-care professionals.

RHL commentary by Kawaguchi A and Mori R

1. INTRODUCTION

Each year, worldwide, there are nearly 11 million deaths among children below the age of five years, almost all of them in low- and middle-income countries (1). Between 70% and 90% of causes of these deaths are acute lower respiratory infections (mostly pneumonia), diarrhoea, malaria, measles, HIV/AIDS, and neonatal conditions. Almost all of these deaths are avoidable using existing interventions, but in under-resourced settings there is a lack of adequately trained health-care personnel to implement the available interventions.

In an effort to improve outcomes for children under age five years, several approaches have been attempted, including triage, emergency care, initial and follow-up assessment, improved in-patient management, and strengthening support services. However, it remains unclear which of these approaches is the best for improving health outcomes most efficiently at an affordable cost. In addition, in order to improve the quality of clinical care provided by health-care professionals, several in-service training courses (based primarily on training models developed in high-income countries) have also been proposed. In-service training refers to training of selected health-care professionals to help them develop specific clinical skills. Such training may include basic or advanced courses in neonatal and paediatric emergency health care as well as other courses dealing with care related to specific serious illnesses, including: trauma care; emergency triage, assessment and treatment; control of diarrhoeal diseases; and management of acute respiratory infections. The aim of this Cochrane review (2) was to determine the effectiveness of in-service training of health-care
professionals on the management and care of the seriously ill newborn or children in low- and middle-income countries.

2. METHODS OF THE REVIEW

The authors of the review planned to include all randomized controlled trials, cluster-randomized trials, controlled clinical trials, controlled before–after studies, and interrupted time series studies that had evaluated the effectiveness of in-service training. Trial participants included all qualified health-care professionals, including doctors, nurses, pharmacists and dieticians/nutritionists working in outpatient or hospital-based settings and responsible for the management and care of seriously ill neonates or children. Studies were not excluded based on the income level of the setting. The review authors included the following types of in-service training course: neonatal life support courses; paediatric life support courses; life support elements within the Integrated Management of Pregnancy and Childbirth; and other in-service newborn and child health training courses aimed at the identification and management of the seriously ill children. The authors excluded studies of complex interventions in which training was combined with, or was impossible to separate from, additional health system improvements. Two reviewers independently assessed the studies considered for inclusion. They extracted data on four primary outcomes (adherence to treatment guidelines, prescribing practices, clinical assessment and diagnosis, and recognition of management or referral of the seriously ill newborn/child) and four secondary outcomes (utilization of health service, utilization of health resource, ‘other markers’ of clinical performance, and cost of training). The authors excluded studies that reported only ‘other markers’ of performance.

3. RESULTS OF THE REVIEW

A total of 2480 studies were identified from both electronic and supplementary searches. The authors retrieved full texts of 146 papers, but only two randomized controlled trials met the inclusion criteria. Both of the included studies were set in the delivery room in low-income countries (Kenya and Sri Lanka). The targeted health-care professionals were nurses in one trial and mixed in the other. One study aimed at changing provider behaviour related to the process of initiating newborn resuscitation based on a 1-day newborn resuscitation course adapted from an approach developed by the United Kingdom Resuscitation Council. The second study was based on a 4-days training program on essential newborn care based on the WHO Training Modules on Essential Newborn Care and Breastfeeding. Both of the trials were adequately powered for the primary outcomes. In the first study, health-care workers were randomly allocated to receive early training (n=28) or late training (n=55). The study authors collected data on 97 and 115 resuscitation episodes over 7 weeks after early training in the intervention and control groups, respectively. In the second study, hospitals were randomized to either the intervention group (2 hospitals) or control group (3 hospitals). The data were collected by exit interviews and covered 446 mother–newborn pairs, pre-intervention and post-intervention, respectively. Direct observations of delivery practices were made on a subgroup consisting of 96 participants. Post-intervention data were collected three months after the intervention.

To evaluate the methodological quality of the two studies, the review authors considered bias in the trials. In the first study, allocation sequence generation, concealment, baseline measurement, reporting of the reliability of outcome measures, and protection against contamination were not clear. In the second study, allocation sequence generation was unclear, and there were baseline differences in appropriate essential newborn care practices, as well as in the characteristics of study and control providers.

In terms of the statistical analysis of the effects of these interventions, the review authors considered the statistical data separately for each study. In the first study, trained providers demonstrated a higher proportion of adequate initial resuscitation steps compared with the control group (trained 66% versus control 27%; risk ratio 2.45, 95% confidence interval (CI) 1.75–3.42, p <0.001, adjusted for clustering). They also indicated a statistically significant reduction in the frequency of inappropriate and potentially harmful practices per resuscitation in the trained group [trained 0.53 versus control 0.92, mean difference
In the second study, the authors reported improvement in the assessment of breathing of newborns at birth and in four out of the five components of the Essential Newborn Care (ENC) practices in the intervention group three months after the intervention. The review authors concluded that it was not possible to re-analyse the data for outcomes of interest other than preparedness for resuscitation. When the re-analysis was adjusted for the clustering, the ENC course was found to be associated with a significant improvement in resuscitation preparedness (MD 8.83; 95% CI 6.41–11.25).

4. DISCUSSION

Although some evidence of benefit was found in terms of improved care, from the limited data presented in this review it is not possible to draw firm conclusions about the effectiveness in low- and middle-income countries of in-service neonatal and paediatric training courses primarily based on models developed in high-income countries. It is not possible to generalize the findings of this review to the overall effectiveness of in-service training.

4.1 Applicability of the results

This review provides some important information regarding the effectiveness of in-service training health-care professional in neonatal resuscitation, especially in low-income settings. Both the included studies were conducted in low- or middle-income countries, although some important outcomes sought could not be evaluated from those studies.

4.2 Implementation of the intervention

Where in-service training can be provided at a low cost, it may be worthwhile to do so, given that some improvements in care process can be expected. However, in general such training may be associated with high cost and therefore for most settings it is difficult to justify the conduct of routine in-service neonatal and paediatric training courses primarily based on models developed in high-income countries. Success of in-service training of health-care professionals depends on a number of factors, but two are especially important: (i) appropriately skilled and required numbers of instructors; and (ii) suitable, locally adapted training materials. In low-income settings, resources are often inadequate to ensure both these factors.

In addition, it is important to ensure the sustainability of in-service courses. Continuing medical education and regular training have been shown to increase short-term knowledge and attitudes of health-care workers (3, 4, 5). The introduction of appropriate routines and protocols could also result in better management of patients and more efficient use of resources (5).

4.3. Implications for research

The benefits shown in the included studies were related to process measurements only, and there were no significant improvements in clinical outcomes, for which the trials were probably underpowered. Further research is needed on all types of training courses in various settings to measure clinical outcomes. Studies should focus on evaluating the costs of, and human resources needed for, conducting in-service training in low-income settings. There is also a need for additional research on appropriate routines and protocols for training in under-resourced settings.

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