Does shortening the training on Integrated Management of Childhood Illness guidelines reduce effectiveness? Results of a systematic review

Final Report

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RELATED PRESENTATIONS AND PUBLICATIONS

Preliminary methods and results were presented at a WHO meeting.

A review of the effectiveness of shortening IMCI training. Presented by Alexander Rowe at the: Technical consultation on IMCI training approaches and review of pre-service training. Geneva, Switzerland, 19–23 November 2007.

Report of technical consultation on IMCI training approaches and pre service IMCI. Geneva, Switzerland, 19–23 November 2007. Available at Internet address: http://www.who.int/child_adolescent_health/documents/imci/en/index.html

Final methods and results in this report have been submitted for publication.

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EXECUTIVE SUMMARY

Background

The Integrated Management of Childhood Illness (IMCI) strategy has been shown to improve care for ill children in outpatient settings in developing countries. A central component of the strategy is an 11-day in-service training course for health workers on IMCI clinical guidelines. The 11-day course duration is recommended by the World Health Organization, which developed IMCI. In some countries, the course has been shortened to reduce training costs and the time health workers are away from their clinics during training. However, it not known whether shortening IMCI training reduces its effectiveness.

Methods

We conducted a systematic review to compare the effectiveness of the IMCI strategy that used standard in-service training (duration $\geq$11 days) versus shortened training (5–10 days). Studies were identified from a search of MEDLINE, two existing systematic reviews, and by contacting investigators and content experts. We included published or unpublished studies that: 1) compared standard versus short training (direct comparison studies) or compared IMCI-trained health workers versus health workers without IMCI training (indirect comparison studies), 2) reported quantitative measures of health worker practices related to managing ill children less than five years old in either public or private facilities, and 3) were conducted in low- or middle-income countries. As we found very few studies that directly compared standard with short training approaches, we also performed an indirect comparison by contrasting the effects of "standard training versus no IMCI" in one group of studies and "short training versus no IMCI" in a different group of studies. We also examined the effect of other interventions to support IMCI (e.g., extra supervision), the effect of IMCI over time for the two training approaches, the overall effect of IMCI training, and the absolute level of healthcare quality delivered to ill children after IMCI training. Outcomes abstracted from studies included direct measures of health worker behavior (e.g., tasks related to treatment or counseling) and patient knowledge of how to administer therapy at home. Two summary measures were analyzed: the median of effect sizes (MES) for all outcomes from a given study, and the percent of patients needing an oral antimicrobial or oral rehydration solution (ORS) who received these treatments according to IMCI guidelines ("patient treated according to IMCI guidelines", or PTIG). Studies were classified as having either a "first-tier" design (randomized controlled trials, pre-post studies with a control, or interrupted time series) or a "second-tier" design (pre-post studies without a control, post-only studies with a non-randomized control, or case-control studies). A main analysis included only studies with a first-tier design, and a sensitivity analysis included studies with either a first- or second-tier design. We focused on studies with at least one effect size based on $\geq$20 consultations per study group and time point.

Results

The search strategy identified 232 reports, 59 of which were included. The 59 reports presented results from 31 distinct studies. Of these, our primary analysis focused on the 29 studies with at least one effect size based on $\geq$20 consultations per study group and time point. A secondary analysis included all 31 studies.

Five (17%) of these 29 studies had a first-tier study design, including two direct comparison studies (standard versus short IMCI training) and three indirect comparison studies (three studies comparing standard IMCI training to no IMCI). Twenty-four (83%) of the 29 studies had a second-tier design, including one direct comparison and 23 indirect comparisons (16 studies of standard training and seven studies of short training).

Direct comparisons revealed little difference between standard and short training, with median effects from different analyses ranging from a small advantage of standard training (by 5 percentage points [%-points]) to a small advantage of short training (by 3 %-points) (median result was a 2 %-point advantage of standard training). In all indirect comparisons, effect sizes for standard training versus no IMCI were greater than short training versus no IMCI, with differences ranging from 9 to 23 %-points (median result was 16 %-points). Our best estimate, which was a range bounded by the median results of direct comparisons and indirect comparisons, was a 2 to 16 %-point advantage for standard training. Analyses of training duration as a continuous variable generally showed that IMCI's effect increased with longer duration (by 2 to 6 %-points per additional day of training), although at best these associations were of borderline statistical significance.

Results for IMCI's effect over time revealed no evidence of deteriorating performance after training. The influence of other interventions on IMCI's effect varied substantially, ranging from –9 to 42 %-points. None of these results was statistically significant.

As a broad summary of the effect of IMCI training (standard and short combined), an analysis of the 26 indirect comparison studies showed that IMCI training generally had a moderate effect (median MES increase of 19 %-points, and median PTIG increase of 27 %-points). Performance levels after training from direct and indirect comparison studies usually revealed considerable room for improvement. The median of study-specific medians of post-training outcome measures (for all outcomes) was 75%, and the median of post-training PTIG measures was 66%. The latter result means that, in general, even after IMCI training (and sometimes other supports), 34% of ill children needing an antimicrobial or ORS were not receiving these treatments according to IMCI guidelines.

Conclusions

There were too few direct comparisons of standard and short training with first-tier study designs to conclude firmly whether, and to what degree, shortening IMCI training reduces its effectiveness. A review across all comparisons suggested that the standard in-service IMCI training course is somewhat more effective than short training; although the magnitude of the difference is unclear, ranging from –3 to +23 %-points. Our best estimate was a difference of 2 to 16 %-points. Given that a sizable performance gap often exists after IMCI training, countries should consider implementing other interventions to support health workers after IMCI training, regardless of training duration. Such complementary interventions, however, should be selected with care, as some appear to be highly effective while others seem to confer little or no benefit.

INTRODUCTION

To reduce child mortality and improve child development in developing countries, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and other technical partners developed the Integrated Management of Childhood Illness (IMCI) strategy [Gove et al., 1997]. IMCI has three components: improving case-management practices of health workers (especially in outpatient health facilities), strengthening health systems, and promoting community and family health practices. Seventy-six countries have reportedly scaled-up IMCI training beyond a few pilot districts [WHO, 2010]. Studies have demonstrated the strategy can improve healthcare quality at health facilities [Armstrong Schellenberg et al., 2004a; Amaral and Victora, 2008; Arifeen et al., 2009; Rowe et al., 2009a], although its effect on mortality is uncertain [Armstrong Schellenberg et al., 2004b; Arifeen et al., 2009; Rowe et al., in press].

To improve healthcare quality at outpatient health facilities, IMCI includes a set of evidence-based guidelines [Gove et al., 1997; WHO, 2005] for managing the leading causes of child deaths (pneumonia, diarrhea, and malaria) [Black et al., 2010]. WHO recommends implementing the guidelines through an 11-day in-service training course for health workers, a follow-up visit to health workers' facilities 1 month later to reinforce new practices, and job-aids (e.g., a chart booklet and wall chart of clinical algorithms, and a 1-page form for recording patient assessments, disease classifications, and treatments). WHO also recommends the following quality criteria for IMCI training: a ratio of participants to facilitators no more than 4 to 1; completion of all training modules; distribution of the IMCI chart booklet to each trainee to keep as a reference; a minimum of 30% clinical practice and 20 sick children managed by each trainee; and no more than 24 participants [Lambrechts et al., 1999].

Despite favorable results from IMCI evaluations and evidence from two countries that training costs in districts implementing IMCI are similar to districts without IMCI [Adam et al., 2005; Adam et al., 2008], concerns have been raised that the 11-day in-service training is too expensive and that it takes health workers away from their clinics for too long [Goga et al., 2009; WHO, 2003a]. In many countries, the response has been to shorten the course. A recent survey of 24 countries found that all offered shortened courses, typically lasting 5–8 days [Goga et al., 2009]. It is not known, however, whether shortening IMCI training reduces its effectiveness. As part of WHO's efforts to re-examine IMCI training strategies to identify ways to scale-up IMCI coverage rapidly, we conducted a systematic review to compare the effectiveness of the IMCI strategy that used the 11-day in-service training course (or courses that lasted slightly longer) versus shortened training. A secondary objective was to use the opportunity of the review to examine: 1) the effect of other interventions (in addition to IMCI in-service training) to strengthen health systems and support health worker adherence to IMCI guidelines, 2) the effect of IMCI over time for the two training approaches, 3) the overall effect of IMCI training, and 4) the absolute level of healthcare quality delivered to ill children after IMCI training.

METHODS

In preparing this report, Preferred Reporting Items for Systematic Reviews and Meta-Analyses [Moher et al., 2009] guidelines were followed. No formal protocol was prepared, although a short guidance document was written that described the methods.

Definitions

IMCI training was defined as in-service training that used IMCI materials, lasted ≥5 days, and covered enough of the standardized IMCI training content so that one could reasonably expect that health workers would be able to follow all IMCI guidelines as adapted to the country in which the study was conducted. Courses less than 5 days were considered too short to be of practical value, and the shortest courses that countries typically offer are 5 days long [Goga et al., 2009]. "Standard training" was defined as an in-service IMCI course with a duration of 11 days or more, and "short training" was an in-service IMCI course with a duration between 5 and 10 days. Definitions of the adequacy of study designs and several analysis-related terms are shown in Box 1. Study identification numbers (Study IDs) are labels representing all reports for a given study (see reference list organized by Study ID and Annex 1A).

Inclusion criteria

We included studies that: 1) investigated the effectiveness of the health facility component of the IMCI strategy by comparing standard versus short training (direct comparison studies) or compared IMCI-trained health workers versus health workers without IMCI training (indirect comparison studies); 2) reported quantitative results on measures of health worker practices related to managing ill children less than five years old, in either public or private health facilities; and 3) were conducted in a low- or middle-income country [World Bank 2005]. Published and unpublished studies were eligible for inclusion. No studies were excluded based on adequacy of statistical analysis or data collection method. Restrictions on the timing of studies and the language of study reports depended on the source (Table 1).

As outcomes measured on extremely small samples might be unreliable, we excluded outcome measures for a study group at a particular time point if they were based on <15 ill child consultations; and thus we excluded any study in which all outcomes had a measure based on <15 consultations. Studies of data collected from IMCI follow-up visits were excluded, as the IMCI trainers or supervisors who conducted the follow-up visits were present during data collection and presumably were actively trying to improve health worker practices. Post-only studies (i.e., performance only measured after IMCI implementation) without controls were excluded, as effect sizes cannot be directly estimated with this design.

Sources and search strategies

We searched five sources to identify relevant reports. The sources and search strategies are listed in Table 1. Although the searches were conducted in 2006 and 2007, several included reports were published after these years because our search had identified the study reports while still in draft form, and we followed-up with investigators to obtain final versions.

Data collection methods

Data on study outcomes and attributes of the IMCI courses were collected using slightly different methods. Regarding study outcomes, we focused on direct measures of health worker behavior (e.g., tasks related to treatment or counseling) and patient knowledge of how to administer treatments at home. Health outcomes (e.g., mortality rates) were not considered, as few studies reported them and it was too difficult to attribute changes in health outcomes to IMCI training. Outcome data for most studies were imported from a pre-existing database on medicine use that is supported by WHO and the International Network for Rational Use of Drugs (INRUD) (source 3 in Table 1) [WHO, 2009] and coordinated by an investigator of this review (KAH). For this database, one investigator (VI) abstracted information from study reports and entered it into a database (Microsoft Access, Microsoft, Inc., Redmond, Washington), and another investigator (KAH) reviewed the abstraction for accuracy. Before data from the WHO/INRUD database were imported, one investigator (SYR) checked the data against the original reports. For a small number of reports, discrepancies were identified; and in these cases, discrepancies were resolved through a consultative process.

For studies in the WHO/INRUD database, after the consultative process described above, results from the WHO/INRUD database were used, with five exceptions [Study IDs 5, 9, 11, 29, 30]. In four of these exceptions [Study IDs 5, 9, 29, 30], study groups, study areas, or outcomes were defined differently from what this review required because the purpose of our review was different from that of the WHO/INRUD database. In the remaining exception [Study ID 11], the measures for one outcome were slightly different between our review and the WHO/INRUD database because different publications were used. For studies not in the WHO/INRUD database, one investigator (SYR) abstracted the outcomes from study reports; and results from these studies were added to the WHO/INRUD database. Outcome definitions varied by study; however, most studies defined their outcomes according to WHO standard IMCI indicators [WHO, 2003b]. Details on the outcomes are available in Annex 1A.

Regarding the attributes of IMCI training courses, we collected information on: training quality; course duration; administrative level of country at which trainings occurred; types of health workers trained; proportion of children managed by an IMCI-trained health worker in geographic areas where IMCI was implemented[1]; time between IMCI training and evaluation; sample sizes of health facilities, health workers, and patients involved in the evaluation; and additional interventions that were used to strengthen IMCI implementation (e.g., extra supervision or job aids). Whenever possible, we collected sample size information on the data