Educational interventions for prevention of healthcare-associated infection: a systematic review

Safdar N, Abad C

CRD summary
This review assessed the effect of educational strategies for healthcare providers to reduce healthcare-associated infections and concluded that their implementation may reduce such infections considerably. Further research was needed. The authors' cautious conclusions reflected the evidence, but potential for selection and language bias and some shortcomings in the quality of the included studies should be borne in mind.

Authors' objectives
To assess the effect of educational strategies for healthcare providers to reduce healthcare-associated infections (HCAIs).

Searching
MEDLINE, CINAHL and The Cochrane Library were searched for English-language studies from 1966 to November 2006; search terms were reported. Reference lists of retrieved articles were checked for further studies.

Study selection
Randomised controlled studies (RCTs), controlled before-and-after studies and interrupted time series analyses that included an educational intervention for healthcare personnel for prevention of HCAIs were eligible for inclusion. Three HCAIs were considered: catheter-related bloodstream infections (CRBSI); ventilator-associated pneumonia (VAP); and catheter associated urinary tract infections (CAUTIs). The primary outcome was the incidence of at least one of these HCAIs; studies that did not report incidence of infection as an outcome were excluded.

Most of the included studies were conducted in intensive care units; studies were also undertaken in hospital wards, long-term care facilities or hospital-wide. Personnel who received interventions included nurses, nursing staff, respiratory therapy nursing staff and physicians as well as staff or healthcare workers who were not identified. The most commonly used educational interventions comprised lectures, classes, video presentations, posters, questionnaires, fact sheets and practical demonstrations; for most studies the duration of interventions ranged from one day to eight months. Most studies assessed adult patient populations; a fifth of the studies included a paediatric population. Most studies were undertaken in USA; studies were also conducted in Canada, Switzerland, Argentina, Brazil, Taiwan, Pakistan and Thailand.

The authors stated neither how studies were selected for the review nor how many reviewers performed the selection.

Assessment of study quality
Study quality was assessed using previously published criteria: question, rationale, objectives, study design, intervention, evaluation and results.

It appeared that two reviewers independently assessed validity.

Data extraction
Two reviewers independently extracted or calculated relative risk or risk ratios, and 95% confidence intervals, for dichotomous outcomes.

Methods of synthesis
Studies were combined in a narrative synthesis.

Results of the review
A total of 26 studies was included in the review (n unknown): one cluster randomised trial; one pre-intervention and post-intervention design with concurrent controls; one nonrandomised trial; and 23 pre-intervention and post-intervention observational studies. Study rationale and study question was appropriate for all studies, 73% described the design in adequate detail, 43% chose a similar comparison group, 39% undertook a long-term assessment, 60% provided a detailed description of the educational methods and outcomes corresponded with the underlying objective in 75%. Most of the post-intervention follow-ups were between six months and two years.

Risk ratios ranged from 0 to 1.20 (26 studies). A statistically significant decrease in infection rates after intervention was reported in 21 studies. The educational intervention resulted in greater compliance with hand hygiene (12 studies) and better adherence to evidence-based guidelines (three studies).

**Cost information**
Ten studies assessed cost savings associated with the intervention, but none of the included studies undertook a formal cost-effectiveness or cost-benefit analysis.

**Authors' conclusions**
Implementation of educational interventions may reduce HCAI considerably. Cluster randomised trials that used validated educational interventions and costing methods were recommended to determine the independent effect of education on reduced HCAI and cost-savings that may be realised with this approach.

**CRD commentary**
The review question and inclusion criteria were clear. The authors searched some relevant sources. There was no indication that unpublished material was sought and limiting the search to studies published in English implied a risk of language bias; some studies may have been missed. Data extraction and validity assessment was carried out with sufficient attempts to minimise error and bias; the process for trial selection was not reported. Study quality was assessed using suitable criteria. The decision to combine studies by narrative synthesis was appropriate given their heterogeneity. The authors acknowledged a lack of similar comparison groups and study details and stated that a causal association between educational interventions and reduced HCAI rates could not be made due to limitations of the included studies.

The authors' cautious conclusions reflected the evidence presented and their recommendation for further research appeared appropriate, but the potential for selection and language bias and some shortcomings in the quality of the included studies should be borne in mind when interpreting the conclusions.

**Implications of the review for practice and research**
**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that cluster randomised trials that used validated organisational and educational interventions to assess costs were recommended to determine the independent effect of education on reducing HCAI and the potential for cost savings.

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**Bibliographic details**

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.