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Evidence Assessment: Summary of a Systematic Review

Who is this summary for?
For Health Personal, decision makers and the hospitals managers.

Interventions to improve professional adherence to guidelines for prevention of device-related infections

Key findings

- Healthcare-associated infections (HAIs) are caused by invasive use of medical devices such as central lines, urinary catheters, mechanical ventilators, and poor adherence to aseptic techniques during insertion and care of the device, as well as the duration of use of the device
- Guidelines focusing on the prevention of HAIs are often not respected
- Educational interventions involving more than one active element and that are repeatedly administered overtime, and interventions employing specialised personnel, who are focused on an aspect of care can be effective in changing medical staff behaviour to avoid patients' deaths cased by HAIs.

Background

Healthcare-associated infections (HAIs) are defined as "infections that occur during a hospital admission, for which there is no evidence that it was present or incubating at admission, and that meets body site-specific criteria". They are the cause of costly infections with a mortality rate varying from 5% to 35%. Recommendations have been issued from professional and national agencies to focus on the prevention of HAIs however, healthcare professional do not always adhere to guidelines, or to quality improvement interventions to prevent device related infections in these vulnerable patients.

Question

Are the different interventions, alone or in combination, which target healthcare professionals or healthcare organizations effective in improving professional adherence to infection control guidelines on device-related infection rates and measures of adherence?

Interventions to improve professional adherence to guidelines for prevention of device-related infections in Cameroon: Device related infection is a major health issue in health facilities in Cameroon. It is usually caused by poor hygiene in medical settings and and among health professionals and patients themselves. The environment and hands are some of the disease vectors observed, with a prevalence of 10 to 20%.

Table 1: Summary of the systematic review

	What the review authors searched for	What the review authors found
Studies	Randomized controlled trials (RCTs), non-randomized controlled trials (NRCTs), controlled before-after (CBA) studies and interrupted time series (ITS) studies	One cluster randomized controlled trial (CRCT) and 12 interrupted time series (ITS) studies
Participants	Healthcare professionals involved with the insertion or the maintenance of invasive devices, or both.	40 hospitals, 51 intensive care units (ICUs), 27 wards and more than 1406 healthcare professionals and 3504 patients
Interventions	Any intervention to avoid the use, or decrease the length of use of invasive medical devices (i.e. urinary catheters, central line catheters, mechanical ventilators), or interventions to improve adoption of measures to prevent device-related infections. • Professional interventions: distribution of educational materials, educational meetings, local consensus processes, educational outreach visits, local opinion leaders, patient mediated interventions, audit and feedback, reminders, marketing, and mass media. • Organisational interventions: revision of professional roles, clinical multidisciplinary teams, formal integration of services, and skill mix changes. • Financial interventions. • Regulatory interventions	All of the included studies implemented a clinical practice guideline, a protocol or a care bundle for the prevention of device-related hospital acquired and all used some type of core educational intervention targeted at the healthcare professional to support its adoption.
Controls	Standard care	The comparative groups received no intervention or different interventions compared to the experimental group.
Outcomes	Any objective measure of provider performance or patient outcomes. **Primary outcomes** • Compliance with infection control recommendations for the insertion and maintenance of invasive medical devices, and the prevention of device-related infections (for example, observed increases in adoption of device-related infection control recommendations) • Proportion/rate of invasive device-related infections **Secondary outcomes** • Number of patients in which the device was inserted • Length of device use • Length of hospital stay • Mortality • Costs.	**Primary outcomes** • The four datasets and five others reported measures of compliance with their different infection control recommendations; • In three of the six studies pre-intervention as well as post-intervention adherence scores were presented; • Thirteen studies reported the rate of invasive device-related infections: the four datasets and five other studies reported the VAP rate. The follow-up time for the VAP studies ranged from three to 12 months. **Secondary outcomes** The device utilization rate (the percentage of patients in which the device was inserted) was presented graphically in one study in a manner that allowed reanalysis; • The four datasets and seven other studies reported data on the duration of invasive device use; • The four datasets and three other studies reported on cost savings secondary to the (inappropriately analyzed) decreased infection rate; therefore they did not include these results in the review. The results for both CLABSI and VAP studies were mixed, with half of the studies showing a beneficial effect of the intervention, and the other half showing no effect or an increased infection rate.
Date of the most recent search: June 2012		
Limitations: This is a moderate quality systematic review with limitations, the quality of evidence for the outcomes was rated as very low according to GRADE. Amstar 9/11		
Citation: Flodgren G, Conterno LO, Mayhew A, Omar O, Pereira CR, Shepperd S. Interventions to improve professional adherence to guidelines for prevention of device-related infections. Cochrane Database of Systematic Reviews 2013, Issue 3. Art. No.: CD006559. DOI: 10.1002/14651858.CD006559.pub2.		

Table 2: Summary of findings

Outcomes	Change in level effect (step change) Median infection rate per quarter (range) per 1000 device days	Number of sites (number of studies) *	Change in trend (slope) Median change in infection rate between pre- and post-intervention trends (range)	Quality of the evidence (GRADE)
CLABSI* rate up to 12 months	-0.6 to +0.06 cases per 1000 central line days	7 to 36 sites (5 to 6)	+0.21 (0.43) cases per 1000 central line days Number of pre-intervention data points (range): 3 to 11 Number of post-intervention data points (range): 4 to 8	very low
CLABSI* rate more than 12 months	+0.65 to 2.6 cases per 1000 central line days	4 to 6 sites (2 to 4)		very low
VAP* rate up to 12 months	-2.55 to -7.36	10 to 15 sites (3 to 6)	-0.14 (5.8) cases per 1000 ventilator days Number of pre-intervention data points (range): 3 to 9 Number of post-intervention data points (range): 3 to 6	very low

Abbreviations :
CLABSI: central line-associated blood stream infection
VAP: ventilator-associated pneumonia

Applicability

Almost all the included studies were conducted in high-income countries (10/13 in the United States), and one study was performed in a lower-middle-income country (Pakistan). More rigorous research is required before implementation of these interventions in LMICs like Cameroon.

Conclusions

There is a great need to undertake further rigorous research to evaluate interventions to reduce HAIs and especially the effectiveness of interventions aimed explicitly to reduce the use of indwelling medical devices, or to prompt reassessment and discontinuation of device use. Care should be taken to ensure that future interventions are designed in a way that makes appropriate analysis possible.

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