Best Evidence Medical Education (BEME) Systematic Review: What features of educational interventions improve compliance in aseptic insertion and maintenance of central venous catheters in acute care? Gemma Cherry, Jeremy Brown, Tim Neal and Nigel Shaw.

Layman's Summary

Background and context: Many patients within hospitals have central venous catheters (CVCs) inserted and maintained to aid their recovery. Research suggests that poor hygiene behaviour from healthcare professionals is the most preventable cause of hospital infections. If staff were to follow infection control guidelines, hospital acquired infections would fall by about a third, saving the NHS approximately £1 billion a year. More importantly this would save millions of lives worldwide. Guidelines are available describing the best methods of inserting and maintaining CVCs, and hospitals regularly provide education to staff in regards to this**.** Despite this, aseptic procedures are not carried out consistently enough to significantly reduce infections. More needs to be known about what education works in order to increase compliance by healthcare professionals with regards to their infection control behaviour. We investigated this problem using a systematic review.The aim of the review was to focus on how staff may be educated to have better CVC insertion and maintenance behaviour using Best Evidence Medical Education (BEME) guidelines in order to find out what works, for whom and in what way.

Review Methodology: An educational intervention was defined as a structured process intended to improve healthcare professional's performance relating to the health of their patients. Due to the large amount of literature relating to this subject, some inclusion criteria were devised as a means of narrowing the focus of the review. The inclusion criteria were that the participants must be healthcare professionals responsible for maintaining and inserting CVCs as part of their job, that the outcomes measured in studies must be related to insertion or maintenance of CVCs, that the studies must have taken place in acute care and that the studies must not be general review articles or editorials. 16 relevant health and educational databases were searched electronically, using multiple search terms to ensure that all relevant material was captured. High yield journals and reference lists of included papers were hand searched. 14,413 studies were retrieved, producing 9964 once de-duplicated. The abstract of each study was obtained, and looked at for relevance by 2 members of the team. Full-text papers were obtained for 270 studies, of which 47 studies were identified as fulfilling all inclusion criteria and were suitable for inclusion in review. Due to the variety in outcome measures reported, the studies were grouped by outcome according to a modified Kirkpatrick's 1967 model of hierarchical outcomes at four levels. In order to assess the quality of the studies, a tool based on that by *Shaw et al (in press)* and adapted from *Downs & Black (1998)* and *Kmet et al (2004)* was adapted for use in this review. No study was excluded based solely on quality score, although this was considered in the analysis of studies. Relevant information was extracted from each paper by a member of the review team, using a tailored coding sheet.

Implications for practice: Following this systematic review, several implications for practice have been proposed.Educational interventions appear to have the most prolonged and profound effect when used in conjunction with audit, feedback and availability of new clinical supplies consistent with the content of the education provided. Educational interventions will have a greater impact if baseline compliance to best-practice is low. Repeated sessions, fed into daily practice, using practical participation (such as the use of demonstrations, video education, use of simulator or self study materials) appears to have a small, additional effect on practice change when compared to education alone. Active involvement from healthcare staff, in conjunction with provision of formal responsibilities and motivation for change, may change healthcare worker practice. Dissemination of information through peers or higher management may have a small effect on practice change.