

TITLE: Computer-Based Delivery of Health Evidence: A Systematic Review of Randomised Controlled Trials and Systematic Reviews of the Effectiveness on the Process of Care and Patient Outcomes.

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OBJECTIVES

Over the past decade, health care professionals have been encouraged to “integrate the best research evidence (i.e., clinically relevant research) with clinical expertise and patient values” when making clinical decisions¹. That is, they have been encouraged to practice Evidence-Based Medicine. To maintain up-to-date and innovative clinical decision-making, health care professionals need to regularly search for, review, and appraise current evidence. This can be challenging, as providers often do not have the skills and/or time to successfully retrieve and appraise health evidence.

In an effort to assist health care providers with successfully searching for, translating, and integrating the best clinical evidence at the point-of-care, computer-based evidence delivery systems have been developed. These systems have been designed to assist providers with diagnosis, prescription, managing diseases, and preventing diseases. In addition to assisting health care providers, these systems have been designed to assist health care consumers by guiding them in their health behaviours, treatment options, and disease management.

As with any innovative health care intervention, computer-based evidence delivery systems need to be rigorously evaluated before their use becomes widespread². One method for providing an evaluation is to summarize the existing evidence in a systematic review. Systematic reviews use explicit and reproducible methods for identifying and selecting studies and assess the methodological quality of each study with respect to the strength of evidence it contains. This approach ensures that any conclusions drawn from the available literature are based on the highest quality evidence available and that gaps in the literature base are identified.

METHODS

We report a systematic review of published and unpublished randomised controlled trials and systematic reviews that assess the effectiveness of

computer-based evidence delivery systems. In this review, a comprehensive search of the literature identified 13,570 documents of which 525 were deemed potentially relevant. Two reviewers independently screened these articles for relevance using a predetermined set of inclusion criteria and identified 57 relevant randomised controlled trials and 10 relevant systematic reviews. The majority of these studies were rated as having low methodological quality and were therefore open to substantial bias. The majority of the randomised controlled trials were published between 1995-2001 (n=33) and were conducted in North America (n=46). Nine of the systematic reviews were published between 1995-2001 and six were published in North America.

RESULTS

Eighteen of the 57 randomised controlled trials investigated systems designed specifically for patient users, 37 studies investigated systems designed specifically for health care providers, and two studies investigated systems designed for use by both patients and health care providers. Five studies investigated diagnosis systems, 30 investigated management systems, one investigated a prediction system, four investigated prescription systems, nine investigated prevention systems, six investigated support systems, and two investigated treatment systems. The primary outcomes measured varied considerably from study to study and were categorized into one of three groups: process of care (e.g., compliance with medical guidelines), patient health (e.g., blood pressure), and other (e.g., knowledge).

When the data from these studies were pooled, use of these systems was found to enhance the process of care. However, some studies showed a positive effect of these systems on the process of care whereas other studies did not. The variability among the findings of these studies is likely a result of the various differences between the studies such as the intervention studied, the methodological quality, or the specific outcomes assessed. Overall, the use of computer-based evidence delivery systems was not found to have an impact on patient health outcomes. However, there were very few studies that investigated patient health outcomes and in most cases, the studies were too small to detect an effect. In addition, to have an effect on patient health outcomes, these systems must first have an effect on the process of care. Thus it may be too early to investigate patient health outcomes². The effect of these systems on the process of care needs to be enhanced prior to investigating their effect on patient health outcomes.

Six of the ten systematic reviews included studies with experimental designs other than randomised controlled trials and three of the ten assessed studies with designs other than controlled clinical trials. Two included investigations of non-computerized as well as computerized information systems. Eight reviews investigated the effects of these systems on the process of care and seven found a benefit. The effect of these systems on patient health

outcomes was tested in eight systematic reviews and four documented a benefit. These findings are consistent with the findings of our review of randomised controlled trials.

CONCLUSIONS AND RECOMMENDATIONS

Several implications and recommendations for future areas of research can be suggested from this review. First, there is considerable potential for improving the dissemination and use of medical evidence. Future studies employing a qualitative approach are required to identify the barriers to using medical evidence and, where these barrier are inappropriate, the methods to remove them. In addition, because the results of the included studies varied (i.e., some found a benefit of using a computer-based evidence delivery system others did not) further research needs to focus on identifying the specific aspects of a system that contribute to its success or failure. This information will prove key to developing and implementing computer-based evidence delivery systems in the future.