
Study: Handheld Computers Enhance Clinical Decision Making



Use of smartphones and tablets among health professionals has been on the rise in recent years. These handheld devices offer easy access to vast amounts of information via the internet and healthcare applications (apps). Today's clinicians use handheld computers to search the internet for evidence and guidance on drugs and clinical conditions, use clinical decision support systems (CDSS) and access highly detailed patient information from clinical and laboratory investigations.

Contemporary research suggests that handheld computers may support aspects of clinical diagnosis and management. Most published studies to date describe the design, development and implementation of handheld computers using observational study designs. In order to determine the benefits of integrating handheld computer use in healthcare practice, it is important to summarise and quantify results from the highest quality randomised controlled trials (RCTs) of effectiveness studies. This systematic review was designed to answer the question: "Does healthcare professionals' use of handheld computers improve their access to information and support clinical decision making at the point of care?"

Method

A detailed search was conducted using Cochrane, MEDLINE, EMBASE, PsycINFO, Science and Social Science Citation Indices since 2001. Interventions promoting healthcare professionals seeking information or making clinical decisions using handheld computers were included.

Classroom learning and the use of laptop computers were excluded. The review, restricted to the English language, searched from 2001 onwards to account for the changing nature of technology. Two authors independently selected studies, assessed quality using the Cochrane Risk of Bias tool and extracted data. High levels of data heterogeneity and mixed data quality negated statistical synthesis. Instead, evidence for effectiveness was summarised narratively, according to each study's aim for assessing the impact of handheld computer use.

Results

The study included seven randomised trials investigating medical or nursing staff's use of Personal Digital Assistants (PDAs). Although the authors intended to include studies investigating smartphones and tablets, to represent the most current forms of handheld computers, all included studies investigated the use of PDAs. Effectiveness was demonstrated across three distinct functions that emerged from the data: accessing information for clinical knowledge, adherence to guidelines and diagnostic decision making.

Key findings are as follows:

- When doctors and nurses used a handheld computer to access information in clinical environments, their clinical knowledge improved more than that of their peers, who used traditional paper resources. For example, fellows allocated to use a PDA in hospital intensive care units increased their mean knowledge of infectious disease management more than those who used paper resources at both 3 months ($p < 0.05$) and 6 months ($p < 0.01$). PDA use also increased fellows' antibiotic selection accuracy, a secondary aim of this project.
- When clinical guideline recommendations were presented on handheld computers, clinicians made significantly safer prescribing decisions and adhered more closely to recommendations than peers using paper resources. In one study, 59 internal medicine residents received a PDA which included software supporting the use of a prediction rule for assessing gastro-intestinal risk when prescribing non-steroidal anti-inflammatory drugs (NSAIDs). Residents using PDA with the prediction rule made fewer unsafe NSAID prescriptions (23% vs 45%, $p < 0.05$) and the mean proportion of cases per physician with unsafe prescriptions was significantly lower (0 vs 50%, $p < 0.001$).
- Finally, healthcare professionals made significantly more appropriate diagnostic decisions using clinical decision making tools on handheld computers compared to colleagues who did not have access to these tools. For these clinical decisions, the numbers need to test/screen were all less than 11.

Conclusion

This review provides evidence that healthcare professionals' use of handheld computers can improve their clinical decision making through improved information seeking and adherence to clinical guidelines. Handheld computers can provide real time access to and analysis of clinical information. The integration of clinical decision support systems within handheld computers offers clinicians the highest level of synthesised evidence at the point of care. Future research is needed to replicate these early results and to demonstrate direct improvements in patient outcomes.

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