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The multimedia computer for office-based patient education: a systematic review

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Abstract

Use of the multimedia computer for education is widespread in schools and businesses, and yet computer-assisted patient education is rare. In order to explore the potential use of computer-assisted patient education in the office setting, we performed a systematic review of randomized controlled trials (search date April 2004 using MEDLINE and Cochrane databases). Of the 26 trials identified, outcome measures included clinical indicators (12/26, 46.1%), knowledge retention (12/26, 46.1%), health attitudes (15/26, 57.7%), level of shared decision-making (5/26, 19.2%), health services utilization (4/26, 17.6%), and costs (5/26, 19.2%), respectively. Four trials targeted patients with breast cancer, but the clinical issues were otherwise diverse. Reporting of the testing of randomization (76.9%) and appropriate analysis of main effect variables (70.6%) were more common than reporting of a reliable randomization process (35.3%), blinding of outcomes assessment (17.6%), or sample size definition (29.4%). We concluded that the potential for improving the efficiency of the office through computer-assisted patient education has been demonstrated, but better proof of the impact on clinical outcomes is warranted before this strategy is accepted in the office setting.

Keywords: Patient education; MEDLINE; Computer-assisted instruction

1. Introduction

Patient education is a core component of every office visit. Whether it involves a complex discussion about cancer screening options, or a simple orientation to the clinic's operations, the physician is usually a participant in the educational process. How much and how well the physician contributes to patient education is a factor in determining the level of patient satisfaction and the quality of the physician–patient relationship [1–3].

However, accomplishing patient education tasks is an increasing challenge for office-based physicians. Not only is the amount of time allotted to an office visit inadequate [4]. Office-based physicians are asked to participate in a growing number of educational tasks [5–8]. As a result, physicians are often resigned to offering a brochure, handing off the educational task to an equally busy nurse, referring to off-site health counselors, or simply leaving the educational task undone.

New strategies are needed to accomplish the educational tasks demanded of the office-based physician. The multimedia computer offers a promising and practical alternative for improving the efficiency of office-based patient education [9,10]. With the increasing acceptability of computers to both physicians and patients [11], the multimedia computer can serve as a physician extender for patient education activities. The potential advantages of such a strategy include reducing literacy and language barriers, and extending the educational process beyond the allotted time for the usual clinical visit [12,13].

The few published efforts of computer-assisted patient education represent a striking contrast to the ubiquity of computer-based educational programs in schools and businesses [14,15]. With this paper, we explore the potential role of the multimedia computer in office-based patient education. A systematic review of the literature precedes a

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discussion of strategies for increasing office efficiency in patient education through use of the multimedia computer.

2. Methods

We sought studies that examined the usefulness of delivering an educational message directly to patients through multimedia computer techniques. We defined multimedia as the use of graphics (animation, video) and/or audio, with or without the use of supporting text. This contrasts with older computer techniques that were able to present only text-based information to the computer user. The relevant spectrum of settings and technologies we sought focused on the patient receiving an educational message from a multimedia computer, either in the office setting or at home, from stand-alone computer-based software or from the World Wide Web. This strategy excluded studies examining the use of the computer for generating letters, handouts, or posters, as well as those examining the use of handheld computers. Although the purpose of the review was to examine the usefulness of computer-based interventions for the outpatient setting, studies from inpatient settings were included if the interventions were appropriate and relevant to contemporary clinical settings.

In April 2004, we searched all MEDLINE abstracts with PUBMED using the keyword "patient education". Articles related to computers were searched using the text word MESH heading ''computer systems'', and text words computer-assisted instruction, computerized, computers, and computer. After crossing the search strategy for patient education with that for computers, we limited studies to randomized controlled trials and English language. Because we were interested in interventions for adult patients, we excluded trials of study participants less than 18 years of age. Additionally, we reviewed the references of the identified manuscripts and the Cochrane database of systematic reviews for additional qualified studies.

Using the electronic abstract, consensus of two investigators (J.L.W., D.P.M.) determined eligibility for inclusion and further analysis. For abstracts that did not provide adequate information for determining eligibility, the full text version of the article was reviewed by two of the three investigators. A study was ultimately determined eligible if two out of three investigators agreed to its inclusion.

We further characterized each qualified study by the clinical topic, number of trial participants, nature of the study population and clinical setting, and type of outcomes measures (clinical indicators, knowledge retention, health attitudes, shared decision-making, health service utilization, costs). In addition, for each study we examined the nature of the intervention, the nature of the comparison intervention or control, and the results of the trial. Because of the variability in outcomes measures used, it was not possible to combine results across studies, and meta-analysis was not attempted. Additionally, for each study we collected information on the timing and duration of the computer intervention (before, during, or after the office encounter), characteristics and positioning of the computer in the office (clinic-based versus other), and interaction required of the end-user (touch screen, mouse, other). Trial duration was defined as the length of time between the time of randomization and that of the last data collection on any outcome measure.

Two investigators (E.A.S., J.L.W.) reviewed each eligible trial using five quality criteria adapted from an instrument for judging the quality of clinical trials in health services research [16]. Reflecting domains that seemed to us most appropriate for reviewing randomized controlled trials of computer-assisted patient education, these five criteria included: (1) whether definition of sample size with exact power and anticipated difference was specified, (2) whether randomization was centralized, computerized, or by another reliable mechanism, (3) whether the measurement of effect was blinded to the intervention, (4) whether randomization (baseline comparison of control versus intervention groups) was tested, and (5) whether analysis of main effect variable contained statistical estimation with confidence limits and hypothesis testing [17–42].

3. Results

Our MEDLINE search strategy identified 116 citations for potential inclusion. Sixty-one citations were rejected on the basis of the abstract alone. Another 29 citations were excluded on the basis of the full text version of the citation. In total, 80 trials were excluded from further analysis, because they either involved pediatric patients (age < 18) (15), were not related to patient education (15), were not randomized controlled trials (6), had incomplete data (5), used computers only to generate paper-based educational materials (15), did not involve desktop computers at all (21), were not multimedia, according to our definition (9), were duplicate publications (5), had an inadequate description of the intervention (5), or did not relate to clinical medicine (1). No other trials that met our inclusion criteria were identified in the Cochrane database.

Of the 26 eligible trials remaining after exclusions, the number of trials published each year ranged from two in year 1995 to eight in year 2001 (see Table 1). Four trials targeted patients with breast cancer, but the educational domains were otherwise diverse. The total number of patients enrolled in each trial ranged from 40 to 525. Two of the 17 trials reported external funding, and seven trials used more than one clinical center. Fig. 1 shows that most trials examined patient's health attitudes (15/26, 57.7%) and that only 12 of the 26 trials (46.1%) used at least one clinical indicator as an outcome. Trial duration was at least 6 months for seven trials and consisted of a single session in six trials.

With regard to quality of the identified trials, definition of sample size with power calculations and anticipated difference was specified in five trials (11/26, 42.3%)