Commentary: Computer-Based Interventions in Pediatric Psychology

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The study by Davis, Quittner, Stack, & Yang (this issue) details an exciting and innovative approach to providing psychoeducation to pediatric populations. These investigators employed a CD-ROM to deliver in-office education and illness-related coping skills to children and adolescents with cystic fibrosis. Findings demonstrated significant increases in both knowledge and coping competency after only 30 minutes exposure to the computer-based materials. These findings are noteworthy because they suggest that a brief, self-directed educational intervention can result in substantial improvements in outcomes that are the frequent target of psychoeducational interventions. Moreover, the intervention described can be delivered cost-effectively and with little professional involvement. This commentary seeks to examine Davis et al. (this issue) in the context of the broader field of computer-delivered interventions, variously referred to as e-health or tele-health, and to consider the opportunities and challenges that this emerging area poses for the field of pediatric psychology.

A review article (Lewis, 1999) of computer-based approaches to patient education found that 16 of 21 research-based studies had medium to high effect sizes, suggesting that computer-based education is an effective strategy for improving knowledge and skills in individuals from medical populations. However, only 7 of the 66 identified articles (10.6%) pertained to pediatric populations. Although the earliest study of pediatric telehealth or computer-based interventions dates back to Rubin et al., 1986, subsequent studies in this area have been rare and have focused primarily on education and improved knowledge (Gleuckauf et al., 2002; Homer et al., 2000; Ritterband et al., 2003). Reasons for pediatric psychologists’ later adoption of new technologies is unclear. However, a recent survey of pediatricians’ attitudes toward electronic communications indicated that 79% did not want to use e-mail to communicate with patients’ families because of concerns regarding confidentiality and increased workload (Kleiner, Akers, Burke, & Werner, 2002).

The following brief and noninclusive review of subsequent pediatric interventions provides a sense of the scope and nature of work in this area. Some investigators have followed Rubin et al.’s (1986) lead by translating standard asthma education materials into interactive office-based videogames (Bartholomew et al., 2000). In Homer et al. (2000), for example, an intervention had children’s responses determining whether the game character “spacer” was able to progress to higher levels—through effective asthma management—or lost power/speed due to ineffective management of his asthma symptoms. Homer and colleagues found significantly greater improvements in knowledge in the computer-based education group versus the standard-care face-to-face education group, whereas Bartholomew et al. (2000) reported both increases in knowledge and reductions in asthma morbidity. Evidence from the cognition and instruction literature suggests that educational games are most apt to be effective when they are intrinsically motivating and engage the player’s mental representation of the knowledge domain (Wolfe, 2001).

Other investigators have adopted an interactive multimedia education approach similar to the one reported by Davis et al. (Krishna et al., 2003). For example, Ritterband and colleagues (2003) reported findings from a Web-based family intervention for pediatric encopresis which demonstrated significant reductions in soiling accompanied by increased unprompted trips to the toilet and defecation in the toilet relative to a standard-care comparison group. Similar to the Davis et al. (in press) intervention, the encopresis website was self-guided and involved minimal additional input from health care professionals. However, it was home based and required an investment of approximately 6 hours of
the caregiver’s and child’s time over a period of several weeks. Unlike the educational games, however, the “U-Can-Poop-Too” website gathered information from the parent and child to construct an individualized behavioral contract for each child.

In a very different vein, Gleuckauf and colleagues (2002) compared videoconferencing with face-to-face family counseling for rural adolescents with epilepsy and their families and found comparable favorable reductions in problem behaviors in both groups. Both interventions in Gleuckauf et al.’s study involved real-time, synchronous meetings with a therapist over a period of months, but they differed in terms of site of treatment (home vs. office) and mode of delivery (face-to-face vs. videophone). Although examples in the pediatric literature are lacking, other forms of computer-mediated communications such as e-mail, electronic bulletin board postings, and interactive relay chat have been used to deliver information, support, and treatment to various populations (Castelnovo, Gaggioli, Mantovani, & Riva, 2003). The studies range from computer games and educational CDs to interactive websites and synchronous videoconferencing. The findings underscore the potential scope and diversity of telehealth applications for pediatric psychologists.

One could argue that almost any intervention that pediatric psychologists currently deliver to chronically ill children and their families can be adapted and delivered using emerging computer technology. Moreover, the unique aspects of telehealth technology and delivery may allow us to develop interventions that are more effective, cost-efficient, and accessible than those currently considered to be standard care. Although not detailed in their report, the cystic fibrosis CD-ROM developed by STARBRIGHT likely included hypermedia and interactive features not available in standard print or video materials. There is increasing evidence that such elements of websites and CD-ROMs may make them more effective than standard educational tools because they provide information in a variety of channels (auditory, print, interactive graphics) that appeal to different learning styles. In addition, websites and CD-ROMs can be designed to be interactive, directing users to additional materials based on their responses. For example, users in the Ritterband et al. (2003) study completed questions at each online follow-up session that were used to identify additional modules for completion on the family homepage.

For chronic illness populations such as adolescents with cystic fibrosis or epilepsy, access to care is a central issue and a major advantage of telehealth interventions. While it is feasible to deliver a 30-minute intervention during a routine follow-up visit, more comprehensive interventions (e.g., Quittner et al., 2000) that involve weekly or biweekly sessions may be untenable for families who live an hour or more from the medical center. However, provision of standard psychological treatments through videoconferencing has been shown to have high patient acceptability and satisfaction and ratings of efficacy and therapeutic alliance comparable to those of face-to-face treatment (Gleuckauf et al., 2002; Wade & Wolfe, 2003).

Interventions like those detailed in the accompanying study also offer potential cost savings over traditional face-to-face models. Depending on the intervention model employed, savings may include: the time of a professional educator or interventionist, the cost of reprinting materials as the knowledge base or best practices change, and family time spent in transit and waiting rooms. If, as some studies suggest (see Krishna et al., 2003; Ritterband et al., 2003), online treatments are more effective than traditional approaches, then savings in long-term health care costs and lost productivity may also be realized over time.

New technologies may also reduce the stigma and ambivalence associated with psychological interventions. In a recent pilot of an intervention for families of children with traumatic brain injury that combined self-guided Web activities with synchronous videoconferencing, both parents and siblings reported feeling more comfortable communicating via computer than face-to-face. As one 16-year-old sibling put it, “It’s more embarrassing to go into the office. People can see you. On the computer, no one else has to know about it” (Wade & Wolfe, 2003).

Despite these advantages and promising preliminary efficacy data, telehealth poses a number of significant challenges to individuals wishing to practice on this new frontier. There is a burgeoning literature on the ethics of online interventions (Fisher & Fried, 2003; Maheu, 2003; Ragusea & VandeCreek, 2003). Although the American Psychological Association has chosen not to develop different ethical standards for telehealth practice, several unique ethical considerations exist. Although competence to practice using these various new technologies has not been well defined, it has been suggested that psychologists wishing to practice online should have familiarity with how to troubleshoot technical problems, along with ready access to technical support through either the manufacturer or an outside
vendor (Ragusea & VandeCreek, 2003). Additionally, if they are going to use e-mail or interactive chat, providers need to be aware and experienced in the nuances of communicating electronically and the limitations of these media with clients who have limited written communication skills (Maheu, 2003; Ragusea & VandeCreek, 2003). Even experienced telehealth providers will be confronted with newly emerging threats, as revealed by the Blaster worm and the Sobig virus from the summer of 2003. Thus, the competent practice of telehealth interventions requires technical expertise, skilled backup, and the ability to continuously learn and adapt.

Even the best available technology limits the ability to assess psychological status through nonverbal channels, thereby making it more difficult to assess mental status and risk (Ragusea & VandeCreek, 2003). Additionally, since provider and patient may be separated by hundreds of miles, the therapist may need to identify backup or crisis intervention services in the patient’s home community. Although the issues of risk and crisis intervention are less germane to purely educational interventions, they rapidly assume greater import when addressing psychological factors such as depression that may contribute to nonadherence. Some of these difficulties can be obviated by meeting with the patient and family face-to-face initially prior to implementing the telehealth intervention and by advance planning regarding crisis services (Maheu, 2003).

The ability to ensure privacy and confidentiality constitutes another challenge to providing education and intervention via the Internet or World Wide Web. Although participating individuals have reported feelings of anonymity (Wade & Wolfe, 2003), electronic communications are potentially vulnerable to hackers. Security measures such as password protection, encryption programs for data transmission, firewalls, and virus protection software can significantly reduce, but not eliminate, privacy concerns (Fisher & Fried, 2003; Ragusea & VandeCreek, 2003).

Family members’ access to computers and their comfort with this technology pose an additional challenge to computer-based interventions. Data from the 2000 census indicate that 65% of children lived in a household with a computer. However, computer and Internet access varied widely by race and income, with 77% of white non-Hispanic children having home access compared with 43% of African American children and 37% of Hispanic children. This digital divide is wider in rural states and in those with a greater economic disparity between rich and poor (Bosman & Chakraborty, 2001). Technologies such as those reported here have bridged this divide by delivering the intervention in office. Other interventions have provided families with a home computer (see Ritterband et al., 2003). However, without research support, the latter option is not financially viable; and the former may be unacceptable to families for whom distance is an issue. Data from spring 2000 indicate that 92% of 11,456 first graders attending public school across the United States had access to a computer in the classroom, and 87% had Internet access (Rathburn & West, 2003). These data suggest that nearly all children, if not adults, have access to and familiarity with computers. Taken together, these statistics suggest that computer-based interventions are feasible for nearly all families provided that computer access is made available.

The Davis et al. (this issue) study underscores the potential promise of computer-based or telehealth interventions for pediatric psychology. With increasing numbers of empirically validated treatments for psychiatric conditions, we can begin to consider how these treatments can be adapted to take advantage of the unique strengths of electronic communication and hypermedia (Castelnuovo et al., 2003). Steps for moving into the new frontier include consulting with pioneers and constantly being aware of what is gained through the new technology (accessibility, interactivity, hypermedia presentation) and what is lost (immediacy, nonverbal cues, and possibly privacy). Hopefully, the work by Davis and colleagues is among the first in a series of pediatric psychology studies to explore this new frontier.

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References


