E-Mental Health: A Rapid Review of the Literature

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Objective: **The authors conducted a review of the literature on e-mental health, including its applications, strengths, limitations, and evidence base.** ***Methods:*** **The rapid review approach, an emerging type of knowledge synthesis, was used in response to a request for information from policy makers. MEDLINE was searched from 2005 to 2010 by using relevant terms. The search was supplemented with a general Internet search and a search focused on key authors.** ***Results:*** **A total of 115 documents were reviewed: 94% were peer-reviewed articles, and 51% described primary research. Most of the research (76%) originated in the United States, Australia, or the Netherlands. The review identified e-mental health applications addressing four areas of mental health service delivery: information provision; screening, assessment, and monitoring; intervention; and social support. Currently, applications are most frequently aimed at adults with depression or anxiety disorders. Some interventions have demonstrated effectiveness in early trials. Many believe that e-mental health has enormous potential to address the gap between the identified need for services and the limited capacity and resources to provide conventional treatment. Strengths of e-mental health initiatives noted in the literature include improved accessibility, reduced costs (although start-up and research and development costs are necessary), flexibility in terms of standardization and personalization, interactivity, and consumer engagement.** ***Conclusions:*** **E-mental health applications are proliferating and hold promise to expand access to care. Further discussion and research are needed on how to effectively incorporate e-mental health into service systems and to apply it to diverse populations. (*Psychiatric Services* 65:24–32, 2014; doi: 10.1176/appi.ps.201300009)**

Innovations in information and communication technology (ICT) are transforming the landscape of health service delivery. This emerging field, often referred to as "e-health," includes key features, such as electronic, efficient, enhancing quality, evidence based, empowering, encouraging, education, enabling, extending, ethics, and equity (1). E-health is a broader concept than telehealth (and telemedicine), which involves the use of ICT to connect patients and providers in real time across geographical distances (2) for the delivery of typical care and where the use of real-time video is the main modality (3).

Interest is also increasing in the application of ICT in mental health care. For example, the first international e-mental health summit was held in 2009 in Amsterdam, and a summit-specific issue of the Journal of Medical Internet Research was published (4). Christensen and colleagues (5) defined e-mental health as "mental health services and information delivered or enhanced through the Internet and related technologies." However, there is no agreement on a field-specific definition. Some scholars consider e-mental health to include only initiatives delivered directly to mental health service users (6) and only on the Internet (6,7) (as opposed to, for example, delivery via stand-alone computers or video seminars). Others adopt a wider definition that includes frontline delivery activities related to screening, mental health promotion and prevention, provision of treatment, staff training, administrative support (for example, patient records), and research (4).

Because of the growth of the e-mental health field, it is difficult for policy makers and practitioners to stay abreast of available applications and the evidence for their effectiveness. In response to a request from a Canadian executive-level policy maker, we conducted a rapid review of the literature on e-mental health. In this article, we report briefly on the review methods and summarize key findings.

Methods

Rapid reviews are an emerging type of knowledge synthesis used to inform health-related policy decisions and discussions, especially when information needs are immediate (8–11). Rapid reviews streamline systematic review methods—for example, by focusing the literature search (8) while still aiming to produce valid conclusions. The requirements for the review, which was undertaken with

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a two-week deadline, were for a short (maximum eight pages) but in-depth synthesis of the current state of the science on the topic. The personnel available was one senior (doctoral-level) mental health services researcher (CEA). Later, a second (doctoral-level) mental health services researcher (SL) validated the conclusions by screening all titles and abstracts, extracting and synthesizing additional data, and reviewing the findings.

The overarching review question was: What is currently known on the topic of e-mental health? (Even though telepsychiatry is typically included in e-mental health definitions, we did not include this subtopic because its literature is already well developed with several systematic reviews and reviews of reviews.)

Several secondary questions were developed and refined as the review progressed: What types of e-mental health initiatives have been developed? What are the strengths and benefits of e-mental health? What are the concerns with and barriers to use of e-mental health? What is the state of the evidence for the effectiveness of e-mental health? How has e-mental health been integrated in service systems and policy?

The rapid review method used is similar to Khangura and colleagues' (10) seven-step process. Briefly, the search focused on English, peer-reviewed full abstracts in MEDLINE from 2005 to 2010 and used the MESH terms mental disorders and internet and the following non-MESH key words: e-mental health, e-therapy, computer, computer-based therapy, computer-based treatment, web-based therapy, web-based treatment. We excluded search terms related to telehealth because that is a distinct, and well-established subset of the e-health field that mainly considers the use of telecommunications to connect service providers and patients across geographical distances (3) (as opposed to delivering automated, self-management interventions, for example). The search was run in MEDLINE because of time constraints and because it is the most widely searched database for health-related topics, has comprehensive coverage (more than 5,500 journals), and has substantial capture of the content of health services research and overlap with similar sources.

The initial search (December 2010) yielded 158 titles or abstracts. Similar keywords were also used in a brief online grey literature search, which retrieved additional relevant documents, such as a list of in-progress trials, a policy report, and recent conference proceedings. Two experts on e-mental health were also contacted by e-mail for comment on the appropriateness of the identified literature and additional articles. Final searches focused on the work of prominent authors (for example, Christensen, Hickie, and Titov). These searches yielded an additional 50 titles and abstracts, resulting in 208 titles and abstracts screened for duplicates and relevancy.

Further details on the rapid review method and our search and selection strategy are provided in an online data supplement to this article.

Results

General description of the literature

The screening process resulted in 115 documents, which were reviewed. Of these, 108 (94%) had been peer reviewed. Publication dates were from 2000 to 2010, with most (N=91, 79%) published between 2007 and 2010, which confirmed an expected increase in the volume of literature on the topic over time. Of the 115 documents, 59 (51%) reported primary empirical studies, of which 25 (42%) were conducted in the United States, 13 (22%) in Australia, and seven (12%) in the Netherlands.

Types of e-mental health initiatives

The review identified e-mental health applications addressing four areas of mental health service delivery: information provision (6,12); screening, assessment, and monitoring (13–20); intervention (21–24); and social support (25). Many applications addressed several areas of mental health service delivery concurrently (26–29). [A table listing examples of these e-mental health programs and initiatives is provided in the online data supplement. It summarizes information on the purpose of the application, the health conditions and populations targeted, and the components and technologies used.]

With respect to information provision, there is an identified need to ensure the quality of information about mental health. Therefore, tools such as the Brief DISCERN (13) have been developed to help users assess the quality of mental health–related content on Web sites.

Screening and assessment tools have been available for many years on stand-alone computers, but more recent developments are Internet-based screening tools to provide broader access to individuals for self-assessment (particularly to underserved or hard-to-reach groups) or for use by professionals in specific settings (for example, primary care) (30). For example, Diamond and colleagues (16) described an Internet-based behavioral health screening tool for adolescents and young adults in primary care. It requires minimal time to complete; addresses a broad spectrum of psychiatric symptoms, risk behaviors, and patient strengths; is automatically scored online; and allows results to be integrated into the patient's electronic medical record and into system-level performance measurement.

Social support in e-mental health occurs through several types of Web-based formats, including discussion groups, bulletin boards, chat rooms, blogs, and social media. For example, Scharer (25) reported on a pilot study that examined the effectiveness of an online electronic bulletin board to provide social support to parents of children with mental illness. Parents made use of the bulletin board over a four-month period, actively posting messages to each other about their children's illness or about the group.

E-mental health interventions were classified in our review by stage (promotion, prevention, early intervention, active treatment, maintenance, and relapse prevention), type of relationship (for example, between a professional and a consumer, between consumers, and between professionals), and treatment or therapy modality (for example, cognitive-behavioral therapy [CBT] and psychoeducation). Treatments identified

were self-led or led by a therapist or were a combination (for example, self-led and therapist guided). Interventions were provided as the primary therapy or adjunct to conventional in-person therapy and were delivered to individuals or groups or both. For example, MoodGYM is an exemplary Web-based, interactive intervention that has been developed and evaluated in several randomized controlled trials (27,31–33). Its purpose is to enhance coping skills in relation to depression, and it includes assessments, workbooks, games, online exercises, and feedback. MoodGYM is freely available to the public and has been translated into several languages.

Most of the interventions studied were situated on a specific point of the continuum of care (for example, prevention, mental health promotion, or intervention) and used a single format; however, a few incorporated several types of approaches. For example, Tillfors and colleagues (34) investigated whether an Internet-delivered self-help intervention in conjunction with minimal e-mail contact was as effective as adding in-person group sessions to the Internet intervention. They found that adding in-person group sessions did not result in significant differences in outcomes.

Typically, e-mental health interventions mimicked traditional treatment approaches in that they often addressed single disorders; none were designed for individuals with comorbid mental and substances use disorders. The most frequent disorders addressed by the 59 empirical studies were depression or anxiety (18 studies, 31%). Several interventions focused on mental health promotion or prevention, including early identification (eight studies, 14%). Most interventions were developed specifically for adults (40 studies, 68%), followed by interventions targeting adolescents or young adults (11 studies, 19%). Recent e-mental health initiatives reflect the shift in the mid-2000s to Web 2.0 technologies (that is, more interactive, multimedia, and user-driven technologies) (35).

Strengths and benefits

Many authors believe that e-mental health has enormous potential to address the gap between the identified need for mental health services in the population and the limited capacity and resources to provide conventional treatment services (13,30). Strengths of e-mental health initiatives noted in the literature include improved accessibility, reduced costs (although start-up and research and development costs are necessary), flexibility in terms of standardization and personalization, interactivity, and consumer engagement (5,30,34–38). E-health technologies are considered to be particularly promising for rural and remote populations. They are also promising for subpopulations that have other barriers to access (attitudinal, financial, or temporal) or that avoid treatment because of stigma. For example, by using Internet-based social support, individuals can share their perspectives freely while preserving their anonymity. Further details and examples of benefits are summarized in a box on the next page.

Concerns and barriers

Some concerns and barriers are associated with using e-mental health. There are concerns that e-mental health will replace important and needed conventional services; divert attention away from improvements to or funding for conventional services; and be costly to develop, deploy, and evaluate (5). Another issue raised in the literature is related to the financial interests of developers and researchers, which may produce a risk of publication bias (39). Others have highlighted the limited evidence base for interventions, lack of quality control and care standards, and slow uptake by or reluctance among health care professionals (39,40). Some question the ability of professionals to establish therapeutic relationships on line and the feasibility of online treatment for certain population groups (for example, patients with severe depression) (39). Emmelkamp (39) described "technological phobia," whereby professionals may be unfamiliar with technology and anxious about its use in professional care. Concerns have also been expressed about the potential to further marginalize individuals who have physical, financial, or cognitive barriers in terms of access to conventional services. Finally, some are concerned that the availability of e-mental health services may lead some individuals to postpone seeking needed conventional care or that some will receive inappropriate or harmful care when there is insufficient quality control over content (7).

Ethical and liability concerns have been cited. For example, when participants are from outside the regulatory jurisdiction, ethical responsibilities cannot be met; other concerns are that participants cannot be reliably identified and that privacy cannot be guaranteed for typed or recorded communications (5,34,37,38,41). To address these issues, several professional organizations (for example, the American Psychological Association) have developed guidelines (38), and an international organization to set standards has been established—the International Society for Mental Health Online. Even so, adherence has been found to be lacking, and concerns remain (7,39,42,43). At the same time, remedies for the above-mentioned concerns are emerging. Technology for the protection of security and confidentiality has improved, and some efforts are being made to review Web site content for quality (35,44,45). In Australia, a Web portal called Beacon has been set up that provides quality ratings for mental health Web sites and recommends evidence-based interventions (46).

Consumer engagement, reach, and response

A handful of recent studies have shed some light on the role of e-mental health providing prevention or intervention programming for particular groups of individuals, such as youths, socioeconomically diverse populations, rural and remote populations, the general public, and patients. One study investigated the preferences for e-mental health services in an online Australian sample (N=218) (47). Among individuals in the general population who were already using the Internet, a large majority (77%) expressed a preference for face-to-face services, but less than 10% indicated that they would not use e-mental health services. The

authors highlighted the importance of raising public awareness, knowledge, and understanding about e-mental health services. More than 50% of the sample expressed the need to learn more about e-mental health services and about issues related to confidentiality.

More than 90% of youths now use the Internet, and it is seen as a promising medium for reaching that age group (28,48). In a large population-based sample of 2,000 young people aged 12 to 25 in Australia, 77% reported seeking information about mental health problems whether or not they had the problem themselves (49). In another study among military personnel, who are predominantly younger males, one-third of 352 respondents who reported that they were not willing to talk to a counselor in person indicated that they would be willing to use technology to address their concerns (50).

Preliminary research has also indicated that mental health service users value the use of e-mental health. A qualitative study of 36 participants found that their primary motive for Internet use was to access social support and their secondary motive was for information (51). Respondents noted that hearing about other individuals' experiences helped them to feel less isolated and more hopeful. Respondents also liked the convenience, privacy, and anonymity of the Internet. On the other hand, several authors have documented low access to and use of the Internet among persons with more serious mental illnesses, such as those with co-occurring substance use and serious mental illness (52,53). Cost, lack of training, and impairment (in cognition, concentration, executive function, and motor control) can present barriers for individuals with serious mental illness, further disenfranchising them from services (54). However, evidence is emerging that with a user-friendly interface, high levels of engagement and positive outcomes can be obtained in online interventions for individuals with serious mental illnesses such as schizophrenia and their families (26). Nonetheless, access to and attitudes toward technology, as well as socioeconomic factors, need to be taken into account in planning Internet-based interventions for specific population groups (55).

Strengths and benefits associated with e-mental health initiatives

Improved accessibility
- For geographically hard-to-reach populations
- For populations with other types of barriers, such as lack of child care, transportation, insurance coverage, and time off work
- For populations desiring anonymity or persons who feel stigma or who are dissatisfied with conventional services
- From multiple locations, such as schools, workplaces, clinics, and hospitals
- In terms of convenience and timing; for example, can be available at any time of day and in private, and the user can control the pace

Reduced costs
- In terms of operating cost (although start-up and research and development costs are necessary)
- In relation to reaching large numbers simultaneously (for example, can be broad scale or stand alone)
- In terms of therapist time optimization and communication efficiencies

Flexibility in terms of standardization and personalization
- Can be implemented with high fidelity and also tailored to individual needs
- Can be developed according to the best research and design evidence
- Can be designed for virtually any mental health issue or topic

Interactivity and consumer engagement
- Through incorporation of multimedia
- Through consumer empowerment
- Can improve continuity of care (for example, can be integrated within a set of services across the service continuum)

Evidence base for e-mental health

Although evaluation of some interventions is limited, an encouraging amount of rigorous research is available, depending on the developmental stage of the intervention. Research on Web-based interventions has both opportunities and challenges. Studies are relatively inexpensive to conduct, and large samples can be used. Interventions are easily standardized, randomized or controlled designs are feasible (often with wait list controls), and data are easily collected. Challenges include low rates of completion because of the relative ease with which participants can drop out of studies. In addition, it is difficult to study both the intervention and the mode of delivery; contamination of the control group is possible because participants can access similar services elsewhere on the Web; the ability to conduct double-blind studies is limited; and biases related to using self-report measures are a problem (56–58). Increasingly, resources for optimizing practice and evaluation are available; for example, guidelines for program design and for study methods have been published (36,59).

In the past five years, several reviews, including systematic reviews and meta-analyses of randomized controlled trials, have documented the progress made; effectiveness has been demonstrated in particular for interventions (both therapist assisted and self-directed) addressing depression and anxiety disorders (57,59,60). For example, a systematic review of meta-analyses of the efficacy of Internet-based self-help for depression and anxiety disorders reported that these interventions are effective and that effect sizes are comparable to those observed in similar interventions delivered in person (60). Systematic reviews of Internet-based CBT interventions (prevention and treatment) for anxiety and depression among adults have found that they are as effective as or more effective than treatment as usual (57). Preliminary evidence has also been reported for the effectiveness of Internet-based interventions to address issues such as stress, insomnia, and substance abuse (61). There are still some interventions for which evidence is

weak or contrary, such as one CBT-based program for individuals with obsessive-compulsive disorder (62), and not all studies evaluating the effectiveness of Internet-based interventions for depression and anxiety have found positive results (62,63). Lower effect sizes have generally been found for interventions targeting alcohol and smoking cessation compared with those for anxiety and depression (61). There are some indications that programs work best for individuals with mild to moderate disorders; however, this group has been the focus of most research. Despite the popularity of online support groups, concerns about the encouragement of maladaptive behaviors, or support for continuing such behaviors, have surfaced—for example, in a recent survey of members of an eating disorders forum (64).

Systematic reviews are also beginning to appear that address e-health interventions for children and youths. For example, Stinson and colleagues (65) found that symptoms improved in seven of nine identified self-management interventions. A recent narrative review of Internet-based prevention and treatment programs for anxiety and depression among children and adolescents concluded that there was early support for effectiveness but a need for more rigorous research as well as interventions specifically targeting children (66). Recent innovations, such as those that embed prevention and early-intervention content in online games, need more evaluation. A study of one such program found a nonsignificant worsening effect on support seeking, avoidance, and resilience outcomes, especially among males (29). An interactive fantasy gaming approach has also been developed by Sally Merry, M.D., of Auckland, New Zealand (personal communication, Merry S, Dec. 2010). A recently published randomized controlled trial demonstrated its effectiveness among adolescents seeking help for depression in primary care settings (67).

In the area of substance use and abuse, a systematic review of Internet-based interventions for young people found small positive effects for programs aimed at alcohol abuse; the effects were of similar magnitude to those of brief in-person interventions, but the Internet-based interventions had the advantage of much broader delivery (68). However, programs aimed at preventing subsequent development of alcohol-related problems among those who were nondrinkers at baseline were generally not effective.

More research is needed on individual or subgroup predictors of differential outcomes of e-mental health interventions (21,69). Moreover, even though there is some preliminary evidence supporting the lower cost of using e-mental health approaches, true cost-effectiveness studies are just beginning to appear in the literature (70).

E-mental health, systems, and policy

Most of the literature reviewed described the development, implementation, and evaluation of single interventions in isolation. One very important question that has been given limited attention is how e-mental health interventions might best be situated in relation to an array of related services for a broad population. In a rare exception, van Straten and colleagues (71) discussed a stepped-care approach for depression in primary care wherein interventions advance from watchful waiting through self-guided but supported intervention (including Web-based formats), brief face-to-face psychotherapy, and finally longer-term face-to-face psychotherapy with consideration of antidepressant medication. To ensure continuity of care, a care manager monitors patient status at all levels and makes decisions about necessary transitions. Treatments at all levels are evidence based. These authors described trials of two different e-mental health interventions, including one for younger adults, and most important, how they fit within the full stepped-care model. Data on cost-effectiveness of the full model are unavailable, but the authors suggested that the incidence of new cases of depression and anxiety could be halved by introducing this model.

Andrews and Titov (72) described the promotion of Internet-based treatment programs (a virtual clinic) connected to a hospital in Sydney, Australia. The programs are considered to be cost-effective alternatives to medication or face-to-face CBT treatment. Programs are offered for major depression, social phobia, panic disorder, and generalized anxiety disorder. Programs are available free or at very low cost directly to the public; general practitioners and other mental health professionals can use these programs in addition to or instead of conventional care. Trial results show high levels of patient adherence and strong reductions in symptoms with very little investment of clinician time. The authors discuss how e-mental health programs might fit in a broader health service delivery context (for example, in U.S. health maintenance organizations, health care trusts in the United Kingdom, and regional health authorities in Canada). They suggest that the programs could be the first level of treatment for the proportion of the population that desires Internet-based treatment; however, with the support of a small team, individuals who need more support could be identified and referred for more intensive intervention.

An approach that reaches out to the total population but that is not fully connected to conventional services has been described by Bennett and colleagues (27). At its center is "e-hub," which is an online self-help mental health service available free to the public. The service provides automated Web interventions for several needs, such as symptoms of depression, anxiety, and social anxiety, and an online bulletin board. Programs focus on the prevention and early-intervention end of the spectrum. There is no therapist involvement in the interventions, and the bulletin board is moderated by trained consumers under the supervision of a clinical psychologist. Interested individuals can contact the e-hub by e-mail. The organizers report a high volume of use by individuals with and without mental disorders, some over a lengthy period. The service is considered most suitable for those who prefer to receive help anonymously, prefer self-help, or reside in rural or remote areas. Quality control processes are included.

No peer-reviewed articles had a central focus on policy-level discussions about e-mental health. However, the gray literature search yielded one major report on the topic from Australia, *E-Mental Health in Australia: Implications of the Internet and Related Technologies for Policy* (5). Although the report was published in 2004, much of the content is relevant for other countries, because many are only at the beginning stages of e-mental health implementation. The report describes the advantages of e-mental health initiatives and barriers to implementation (as described above). Five major recommendations for moving forward are included related to access, ethical issues, quality and effectiveness, technology, and funding.

Articles and studies identified by the rapid review but not discussed here are listed in References (73–103).

Discussion

The purpose of this rapid review was to synthesize and describe what is currently known on the topic of e-mental health. On the basis of the findings, several considerations for future research and practice in the field of e-mental health are evident. First, it is important to consider the fit of e-mental health initiatives within the context of the existing service system and to ensure that they complement—and not detract from—needs for direct care. Second, it is important to select interventions and initiatives on the basis of available evidence regarding both design features and effectiveness and to build research and evaluation into any new initiatives. Third, it is important to consider the needs of the population as well as the greatest potential for benefit when choosing or investing in e-mental health initiatives—for example, the intervention's suitability for a diverse group of participants (in age, ethnocultural status, literacy, and disability) should be considered. Fourth, it is important to ensure that ethical and quality issues are addressed. Fifth, the extent to which interventions have or can be applied in cross-cultural and international contexts is an important consideration. Sixth, the involvement of consumers, as well as other relevant key stakeholder groups (such as families and caregivers, service providers, and policy makers), in the development and deployment of initiatives is paramount. Seventh, further research is needed in relation to conditions other than common disorders, such as psychotic disorders. Eighth, more rigorously conducted research is needed, such as randomized controlled trials, and it is important to understand which groups of individuals will benefit the most from such interventions and to take into account cross-cultural and international factors (for example, cultural adaptations).

It is important to acknowledge the limits of rapid review. They include focusing the search on one electronic database source (although we used the database that contains by far the largest number of health and medical journals). The search was also complemented by gray literature searches on the Internet, focused author searches, and brief key-informant consultations. A second limitation of our review is that only one author (CEA) initially screened the titles and abstracts from the total set of documents retrieved, although this author is knowledgeable about the content area and has experience conducting systematic reviews. However, the second author (SL) rescreened all extracted titles and abstracts from the total set. This rescreening uncovered additional nuances in various content areas, identified further studies for review, and provided the opportunity for incorporating more detailed information in this article (for example, technologies and components of e-mental health initiatives described in the online data supplement). Some minor errors in the initial review were also uncovered. Although the initial review was well received by its sponsors and was reported to inform key policy discussions, the effectiveness of rapid reviews in terms of their ultimate impact on health policy decisions and service outcomes remains to be systematically considered.

Conclusions

This rapid review identified a small but rich set of information on the topic of e-mental health, which was found to be highly useful for its specific intended policy discussion. The apparent promise and pitfalls of e-mental health and the increasing interest of policy makers in its potential for service system transformation indicate that careful monitoring of the evidence base is warranted.

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Datapoints columns must include one figure or table, and because the column is limited to one printed page, it is therefore limited to 350–400 words. Submissions with multiple authors are discouraged because of space constraints; submissions with more than four authors should include justification for additional authors.

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