Potential of e-health in relation to depression: short survey of previous research

S. STJERNSWÄRD¹ RN & M. ÖSTMAN² Dr Med Sc

¹PhD Student, ²Assistant Professor, Faculty of Health and Society, Malmö University, Malmö, Sweden

Correspondence:

S. Stjernswärd

Malmö University

Faculty of Health and Society

SE-205 06 Malmö

Sweden

E-mail:

sigrid.stjernsward@hs.mah.se

STJERNSWÄRD S. & ÖSTMAN M. (2006) *Journal of Psychiatric and Mental Health Nursing* 13, 698–703

Potential of e-health in relation to depression: short survey of previous research

E-health is developing at a high rate and represents an opportunity for the development and spreading of information and communication channels to interested parties. The aim of this study was to get an overview and comprehension of the e-health field, with special focus on depression. A survey of initiatives and studies regarding e-health and depression was carried out. Relevant articles were found through searches on databases, search engines and reference lists. This paper shows that many different initiators with differing goals and motives are active within the e-health field. In the field of e-health and depression, the following areas show interesting results: studies mapping users' profile and habits, the quality of health-related information and the effectiveness of online therapies and supportive communities. Numerous initiators have launched different kinds of e-health initiatives. The potential of the Internet to be used constructively by health-care professionals and health-care consumers for health-enhancing purposes still needs to be mapped, evaluated and developed.

Keywords: depression, e-health, Internet, support

Accepted for publication: 17 May 2006

Background

The vast expansion and use of the Internet over the past decade have led to extensive research in the Internet field. As a growing number of the worldwide population is able to access the Internet, it represents an information tool with great potential to reach large audiences at relatively low costs. Further studies of the Internet's potential and pitfalls are necessary to map future benefit from this technology. In this study, special focus has been dedicated to e-health and depression.

Depression is a global health problem, affecting approximately 121 million people worldwide, representing one of the leading causes of disability (WHO 2006). Depression can be treated in primary care, but according to the World Health Organization, fewer than 25% of people affected by the disorder have access to effective treatment. Depres-

sive episodes are estimated to occur in 5.8% of men and 9.5% of women in any given year. The presence of depression affects the concerned person's relationship to the family, friends and colleagues, thereby influencing a broader network. Pharmacological treatment, different types of therapy and support can improve the person's health status and overall quality of life.

One of the main goals of e-health is to provide health-enhancing products and services to its users, thereby attending to questions that may improve quality of life. Eysenbach (2001) defines e-health as follows: 'e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment

for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology' (p. e20).

Increased information and knowledge are well-known to reinforce coping (Steptoe 2000). The Internet offers an opportunity to empower its users by providing useful information; consequently increasing their chance to discover, diagnose and treat depression. The development of clinically useful health-enhancing solutions with the help of the Internet should be seriously considered and introduced to nurses and other health-care personnel, as this technology possibly can complement and enhance the quality of regular health-care services. In order to gain an understanding of the e-health field with focus on depression and to get an insight into the potential implementations of e-health within the regular health-care system, a survey of previous research within the named field was undertaken.

Procedure

The e-health landscape is rapidly changing and suggests the presence of many different parties, who lay behind varied e-health initiatives. The e-health market is therefore fragmented and entails initiatives from people with different levels of scientific background. The aim of this study was to gain a good understanding of the current trends within e-health with focus on depression, including an insight into initiatives without scientific character. A systematic study of the named field was therefore undertaken, with focus on breadth rather than depth of data. There was hence no ambition to map all previously undertaken studies in this field.

Searches were performed on databases (Medscape, PubMed) and search engines (<http://www.yahoo.com>, <http://www.alltheweb.com>). Articles were also found through reference lists. A search with the terms 'Internet + Depression' led to 53 hits in the Medscape database (29 October 2004), whereas the search terms 'Internet health depression' led to 150 hits on PubMed (19 October 2004), where 'Internet and Depression' also resulted in 138 hits (29 October 2004). Moreover, three items were found through Pew Internet and American Life Project's website.

Articles and abstracts that were relevant to the subject of study were screened in order to get an orientation to the subject. However, only peer-reviewed articles representative of ongoing trends in the field of e-health and depression were chosen to illustrate the named field.

Results

The overview of previous research within e-health suggests that many different initiators with different goals and

ambitions can be found on the e-health market. Studies have been made from different perspectives, focusing on different aspects of the technology (e.g. Griffiths & Christensen 2000, Eisdorfer *et al.* 2003, Fox & Fallows 2003). The results of these studies illustrate Internet and online communities' users' profile and habits, quality and reliability issues, as well as online therapeutic initiatives.

User profile

Health seekers

The total number of people among a population aged 2+ in all households with Internet access via Home PC equals 580 millions globally (Nielsen/Netratings 2003). According to the same source, Sweden, Hong Kong, the Netherlands and Australia appear to be the most mature Internet markets where a high percentage of people have access to both a computer and Internet connection.

A national survey of American Internet users (Fox & Fallows 2003) shows that about 80% of adult Internet users, or 93 million Americans, have searched for at least one of 16 major health topics online, of which 17% men and 25% women have searched specific information about 'depression, anxiety, stress, or mental health issues'. Health seekers are defined as 'Internet users who search online information on health topics, whether they are acting as consumers, caregivers, or e-patients' (Fox & Fallows 2003, p. 1). Another national survey shows that 39% of health seekers, estimated to be 73 million Americans in 2002, have searched for information about mental health, which was an increase from August 2000, when the figure was 26% (Fox & Rainie 2002). This increase may be explained by the 11 September terrorist attack against the World Trade Centre in New York City, which generated a 50% increase of website traffic on destinations such as 'Coping with Disaster' (Fox & Rainie 2002).

The typical health seeker

Fox & Rainie (2002) indicate that 72% of women who go online have searched for health information, compared with 51% of men online. The majority of health seekers are middle-aged, whereas people under 30 or over 65 years are less likely to seek health information and help online (Fox & Rainie 2002). They also showed that people reporting to be in 'excellent' or 'good' health are less likely to search health information online as compared with people reporting a 'fair' or 'poor' health condition. Moreover, highly educated and Internet-experienced people seem to be more frequent health seekers than people with lower education and/or Internet experience (Burrows *et al.* 2000, Fox & Rainie 2002). The main motivating factor for health seekers to go online is 'worrying about someone else's health',

followed by 'being diagnosed with a medical condition', 'being prescribed a new medication or course of treatment' and 'being a caregiver to someone else' (Fox & Rainie 2002).

In 2005, user figures proportionally similar to Fox & Fallow's (2003) findings were observed with the likeliest health seekers being: women, Internet users younger than 65 years, college graduates, individuals with more online experience and broadband access (Fox 2005). Online experience and broadband access may reinforce the habit of seeking health information online (Fox 2005).

Reliability and quality issues

Reliability

Internet users show a certain awareness about qualitative and trustworthiness issues related to health information online (Nettleton *et al.* 2005). The majority of health seekers do however, not use systematic quality assessment strategies when going online (Fox & Fallows 2003). Reasons that make Internet users leave health sites are: the site being too commercial, unable to determine source and last update of information and the site lacking endorsement of a trusted independent organization (Fox & Rainie 2002). Further reasons are unprofessional design, the site containing obviously wrong information and information differing from the own doctor's advice. Nineteen per cent of Internet users thought that a seal of approval was 'very important' in the decision to either visit a site or not (Princeton Survey Research Associates 2002).

Quality

The quality of web-based information about depression has been the object of a few studies (e.g. Griffiths & Christensen 2000, Lissman & Boehnlein 2001). The number of mentioned criteria/symptoms of depression and of treatment alternatives and the assessment of facts by a competent specialist have been used as criteria to evaluate the quality of information online.

Griffiths & Christensen (2000) suggest that the quality of online information related to depression can be of varying character and that the overall quality was generally poor. Lissman & Boehnlein (2001) reached similar conclusions: the quality of such information was generally poor; for-profits websites appeared much more frequently than not-for-profit sites among the first 20 sites generated by each search engine and contained poorer information. Griffiths & Christensen (2000) further suggest that ownership by an organization and the involvement of a professional editorial board may be useful indicators of quality. They also concluded that there was a need for better evidence-based information about depression information on the

web, and that quality indicators needed to be reassessed and developed.

Belcher & Holdcraft (2001) studied the quality of web-based information about depression for depressed people and their families. This evaluation led to a five-level classification system of websites, with levels ranging from extremely helpful to extremely hazardous information. This study is further suggestive of the variety of the quality of online information and the need for Internet users to always be encouraged to bear this in mind when accessing any and all information on the Net.

Online communities

An online community can be described as a group of people who interact in a virtual environment; people with a purpose, supported by technology and guided by norms and policies (Preece 2000).

User profile

A cross-sectional survey of users of Internet depression communities showed high levels of untreated and undiagnosed depression among them, thus representing a target for intervention (Powell *et al.* 2003). They also observed that the overall prevalence of depression was 52.6% for male community users and 51.4% for female community users, with statistically significant differences between countries in respondent age and sex and diagnosis of major depression. Major depression was most common among respondents in the UK (64%, 339/529) and Sweden (57%, 257/453) and least common in Denmark (40%, 153/382) and Norway (42%, 121/291). They concluded that Internet communities can provide information and support for stigmatizing conditions that inhibit more traditional modes of information seeking.

Among Internet users who have searched information about depression, and/or have looked for supportive communities online, the number of people suffering from severe depression was high (Powell *et al.* 2003). Eisdorfer *et al.* (2003) found that depressed people who have participated in a supportive group online during a period of 6–18 months have found comfort and support through information about the disease and treatment alternatives, and through the access to a space to ventilate feelings.

Frequency of use

Only 3% of health seekers communicated with members of an online support group at some point during their last online search, and only one in 10 has ever participated in an online support group or email list dedicated to a special medical or health issue according to Fox & Rainie (2002). They observed that frequent health seekers and members

with a poorer health status were more likely to have joined or participated in a support group as compared with less frequent and healthier health seekers. They believe that possible hindrances to joining online support groups can be privacy concerns and the need for face-to-face support. Lorig *et al.* (2002) concluded that there was evidence for peer support improving feelings of well-being and for cutting costs by minimizing visits to the doctors'.

Participation in health-related online groups and communities is steadily rising: users who have visited health-related websites for information or support on a specific medical condition have gone from 36% of Internet users in May–June 2001 to 47% in September 2002, and to 54% in December 2002, that is, approximately 63 million Americans (Fox & Fallows 2003). Fox & Fallows (2003) also observed that approximately 32 million Americans seek support in the form of emails from/to family, friends and health professionals. Women, better-educated and more experienced Internet users are more likely to exchange health-related emails.

Drawbacks

Feldman (2000) acknowledges the dangers associated with the use of Internet groups. He presents four cases of misuse of virtual support groups (chat groups and newsgroups), where individuals offer false stories of personal illness or crisis in order to get attention, sympathy, to act out anger or in order to control others. He mentions indicators of factitious Internet claims (e.g. fantastic, disproved and contradictory health claims, threats, resistance to telephone contact) and the reactions of participants when misuse is recognized. Observed reactions were: abrupt disappearance from the newsgroup, protesting innocence or admitting to the inappropriate behaviour and 'scapegoating' group members. Among individuals who have been misled, Feldman (2000) noticed the following reactions: leaving the group in disgust, feelings of anger, sadness or shame, amusement at the audacity of the ruse and thoughts of retribution.

Online therapy

A number of websites, such as MoodGYM (2005), offer cognitive therapy over the Net. A randomized controlled trial (RCT) of Internet-based cognitive behavioural therapy (CBT) showed a reduction of depressive symptoms among its participants (Andersson *et al.* 2005). However, further RCTs of Internet-delivered depression prevention programmes are needed to prove their effectiveness (Christensen & Griffiths 2002).

Interventions in form of coping skills training, CBT and relaxation have shown to be effective as prevention interventions in people undergoing divorce or bereavement,

unemployment, pregnancy or for caregivers/supporters and could therefore be provided to target groups through the means of the Web (Griffiths & Christensen 2002). They also found that the Internet offers an opportunity to deliver tailored prevention-based CBT to a large audience in a cost-effective way, while intervention fidelity and anonymity are preserved.

Christensen *et al.* (2002) have documented site usage, visitor characteristics and changes in depression and anxiety symptoms among users of MoodGYM. They showed that the server recorded 817 284 hits and 17 646 separate sessions, of which 20% lasted more than 16 min, over the first 6 months of its operation. They also observed that registrants on the MoodGYM site showed higher scores of initial depression and anxiety symptoms than control groups and also decreased scores as individuals progressed through the modules.

Conclusion

A growing number of the global population is able to access the Internet and uses it as a daily tool. The Internet offers an opportunity to reach large audiences at relatively low costs, as well as specific target groups in need of information and support. It is a potential tool to bridge the gap between knowledge and action, by increasing people's knowledge base, and thereby empowering them.

The Internet is being used not only as an instrument to spread and collect information by different groups of people, but also as a space where people can interact online, offer and receive support. As understood, different originators with different goals and motives lay behind online initiatives. Private people, commercial units such as pharmaceutical companies, as well as organizational and governmental initiatives are the originators of health-related websites. This contributes to the diversity of online material.

Further reports about the quality and effects of online initiatives are still needed to assess their overall benefits and disadvantages, both health wise and economically. The Internet cannot replace traditional face-to-face meetings, but should be seen as a complement to regular health care. Studies of CBT online (e.g. Christensen *et al.* 2002, Andersson *et al.* 2005) show that the Internet has good potential for delivering treatment to depressed people, although more RCTs are needed to support this hypothesis.

Not everyone has access to a computer and an Internet connection, or has the necessary online practice to benefit from online experiences. As acknowledged by Feldman (2000), misuse of virtual support groups can also be a problem. Reliability and quality issues, including the risk for misinformation, should also be remembered.

A broad approach was used for this study, its aim being to gain an understanding of the e-health field, with a focus on depression. Articles were located through searches on relevant databases and search engines, and through reference lists. The value of the articles as such was not a primary concern, as the aim was not to assess the quality of the undertaken research, but more to examine the scope of present research in the field. However, the majority of chosen articles were published in peer-reviewed journals. There were also national surveys by Pew Internet and the American Life Project, of which the goal was to examine the impact of the Internet on society.

Ethical considerations

No ethical hindrances were seen to the undertaking of this paper.

Limitations

This study does not claim to be a review of all previously undertaken research in the field or to cover all its aspects. This paper contributes to illustrate the potential of the Internet as a health-care tool. Additional studies are needed to get a complete overview of this field, as well as of further possibilities to fruitfully benefit from the technology. A systematic review, with searches on additional databases, may have resulted in a larger number of relevant articles. The search terms used were thus broad and thought to lead to relevant matches.

Future value

This paper brings on a number of questions related to the use of the Internet within the regular health-care system. One important question concerns the responsibility related to the mapping and development of new solutions based on this technology. Is the health-care system prepared to move towards and implement new health-enhancing strategies adapted to the e-health trends in society? Is it the mental health care's responsibility to adapt its treatment alternatives to the prevailing technological trends in society? What ambitions does mental health care have when it comes to responding to the potential benefit of this technology and breaking new grounds within the health-care system? As understood, a growing amount of the worldwide population uses the Internet as a source of information and support. This represents an opportunity for empowerment among its users, but also entails, as seen, both positive and negative consequences, such as misuse of virtual communities (Feldman 2000) or access to misguiding and perhaps even harmful information.

The popular usage of the Internet among patients is a sign that it satisfies needs unfulfilled by the regular health-care system (Johnson & Ambrose 2006). Vulnerable groups, sometimes without the appropriate tools and knowledge to assess the quality of accessed information, utilize the Web and seek help through, for instance, online communities and CBT programmes. Do health-care providers handle this situation, including its effects on patients, health-care personnel and the health-care system? More well-informed patients can increase pressure on their physicians and make specific requests for alternative treatments. Patients' enhanced knowledge may also facilitate their dialogue with health-care personnel. Can health professionals help Internet users find reliable health-related information and benefit from online experiences, which, for a growing amount of the population, already represent a customary practice with health-enhancing purposes? The potential of this technology to alleviate the burden on both ends of the consumer chain, and to facilitate the dialogue with patients and their families, for instance through referral to reputable websites, should be seriously evaluated.

References

- Andersson G., Bergström J., Holländare F., *et al.* (2005) Internet-based self-help for depression: randomised controlled trial. *British Journal of Psychiatry* 187, 456–461.
- Belcher J.V.R. & Holdcraft C. (2001) Web-based information of depression: helpful or hazardous? *Journal of the American Psychiatric Nurses Association* 7, 61–66.
- Burrows R., Nettleton S., Pleace N., *et al.* (2000) Virtual community care? Social policy and the emergence of computer mediated social support. *Information, Communication and Society* 3, 95–121.
- Christensen H. & Griffiths K.M. (2002) The prevention of depression using the internet. *Medical Journal of Australia* 177, 122–125.
- Christensen H., Griffiths K.M. & Korten A. (2002) Web-based cognitive behaviour therapy: analysis of site usage and changes in depression and anxiety scores. *Journal of Medical Internet Research* 4, e3.
- Eisdorfer C., Czaja S.J., Loewenstein D.A., *et al.* (2003) The effect of family therapy and technology-based intervention on caregiver depression. *Gerontologist* 43, 521–531.
- Eysenbach G. (2001) What is e-health? *Journal of Medical Internet Research* 3, e20. Available at: <http://www.jmir.org/2001/2/e20/> (accessed 20 September 2005).
- Feldman M.D. (2000) Munchausen by Internet. *Southern Medical Journal* 93, 669–672.
- Fox S. (2005) *Health Information Online. Eight in Ten Internet Users Have Looked for Health Information Online, with Increased Interest in Diet, Fitness, Drugs, Health Insurance, Experimental Treatments, and Particular Doctors and Hospitals.* Pew Internet and American Life Project, Washington, DC.
- Fox S. & Fallows D. (2003) *Internet Health Resources.* Pew Internet and American Life Project, Washington, DC.

- Fox S. & Rainie L. (2002) *Vital Decisions. How Internet Users Decide What Information to Trust When They or Their Loved Ones Are Sick*. Pew Internet and American Life Project, Washington, DC.
- Griffiths K.M. & Christensen H. (2000) Quality of web based information on treatment of depression: cross sectional survey. *British Medical Journal* **321**, 1511–1515.
- Griffiths K.M. & Christensen H. (2002) Depression and the community. The quality and accessibility of Australian depression sites on the world wide web. *Medical Journal of Australia* **176** (10 Suppl.), 97–104.
- Johnson G.J. & Ambrose P.J. (2006) Neo-Tribes: the power and potential of online communities in health care. *Communications of the ACM* **49**, 107–113.
- Lissman T.L. & Boehnlein J.K. (2001) A critical review of Internet information about depression. *Psychiatric Services* **52**, 1046–1050.
- Lorig K.R., Laurent D.D., Deyo R.A., *et al.* (2002) Can a back pain e-mail discussion group improve health status and lower health care costs? *Archives of Internal Medicine* **162**, 792–796.
- MoodGYM; The Australian National University (ANU) (2005) [online] Available at: <http://moodgym.anu.edu.au/> (accessed 19 January 2005).
- Nettleton S., Burrows R. & O'Malley L. (2005) The mundane realities of the everyday lay use of the Internet for health, and their consequences for media convergence. *Sociology of Health and Illness* ISSN 0141-9889, **27**, 972–992.
- Nielsen/Netratings (2003) *Global Internet Population Grows an Average of Four Percent Year-Over-Year*. [online] 20 February 2003. Available at: http://www.netratings.com/pr/pr_030220_hk.pdf (accessed 19 October 2004).
- Powell J., McCarthy N. & Eysenbach G. (2003) Cross-sectional survey of users of Internet depression communities. *BMC Psychiatry* **3**, 19.
- Preece J. (2000) *Online Communities: Designing Sociability, Supporting Usability*. John Wiley and Sons, Chichester, UK.
- Princeton Survey Research Associates (2002) *A Matter of Trust: What Users Want from Web Sites*. 16 April 2002. Available at: http://www.consumerwebwatch.org/news/1_abstract.htm (accessed 30 March 2006).
- Stephoe A. (2000) Control and stress. In: *Encyclopedia of Stress*, Vol. 1 A-D (ed Fink, G.), pp. 526–532. Academic Press, London.
- World Health Organization (2006) *Depression*. [online] Available at: <http://www.who.int/topics/depression/en/> (accessed 30 March 2006).