The prevention of depression using the Internet

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ABSTRACT

- Efficacy trials suggest that depression is preventable in children and adults. However, current depression prevention interventions are not deliverable to the community *en masse*.
- The Internet offers an opportunity to deliver tailored prevention interventions such as those based on cognitive behavioural therapy (CBT) to a large audience, cost-effectively, while preserving intervention fidelity and anonymity.
- The Internet offers distinct advantages for data collection, which can be used to help refine intervention programs.
- There are no published randomised controlled trials of the effectiveness of the Internet in delivering depression prevention programs.
- The feasibility and potential effectiveness of the Internet is indicated by research demonstrating the successful delivery of CBT by computer, the use of the Internet in the delivery of CBT treatment, and the effective prevention of obesity and the promotion of exercise using Internet technologies.
- Possible limitations to public health interventions using the Internet include selective access, the inability to promote the sites to potential users and the issue of uptake once users access the sites.
- Randomised controlled trials of CBT delivered by the Internet are required.

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THERE IS NOW EVIDENCE that psychological interventions involving cognitive behavioural therapy (CBT) may be effective in the prevention of depression. A recent review of nine randomised controlled trials (RCTs) of prevention interventions in young people reported that CBT can reduce depressive symptoms and the incidence of depression.[1] Positive outcomes in this age group have been reported for a variety of interventions. For example, Clarke and colleagues investigated the effectiveness of a CBT prevention intervention for a selected group of adolescent children with depressed parents.[2] Participants were adolescents with depressive symptoms who did not meet the diagnostic criteria for depression. The subsequent incidence of depressive episodes in adolescents randomly assigned to the intervention group was significantly lower than in the control group. In a similar study,[3] a CBT intervention successfully prevented the development of depressive episodes among adolescents suffering from depressive symptoms without depressive disorder. Interventions aimed at preventing depression in adults have also reported successful outcomes. A comprehensive review of RCTs of prevention intervention programs indicated that specific interventions, such as coping skills training, CBT and relaxation, are effective for people undergoing divorce or bereavement, unemployment, pregnancy, or for those who have a role in caring for others.[4]

However, there may be limitations to these findings. It is clear that the circumstances under which these prevention programs work are restricted. Although the factors that are important in producing effective prevention have yet to be identified, it has been suggested that interventions with young people may need to be "nested" in the whole-school approach, delivered in small groups by psychologists rather than teachers, and specifically involve CBT or cognitive therapy.[5] For adults, a similar picture emerges: successful interventions have generally involved individual or small-group sessions led by trained professionals. For some studies, group psychosocial interventions show weaker effects than individual interventions.[4]

These findings raise the question of whether it is feasible to attempt community-based or public health preventive interventions for depression. Here, we explore the relevance to the public health domain of these efficacy trials for the prevention of depression. The possible advantages and limitations of using Internet-based technologies to deliver depression prevention programs are examined.

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Are findings from efficacy studies of prevention relevant to public mental health?

In public health, successful prevention interventions need to be deliverable to large numbers of individuals, need to be cost-effective, and need to deliver the information or training directly so that intervention fidelity (accurate and consistent reproduction) is maintained. Many public health prevention programs have been implemented in the past two decades at work-sites, schools and within the general community to change risk factors (such as smoking and high-fat diets) and thus prevent diseases (such as cardiovascular disease and cancer). In one review of outcomes of these trials, the authors noted that the "next generation of community-based intervention" should be tailored to the needs of individuals, and involve the community in the planning process.[6]

In addiction research, successful interventions require that messages be customised to a person's motivational stage.[7] The model describes five stages of change (pre-

contemplation, contemplation, preparation, action, and maintenance), with each stage requiring a different type of message to be conveyed. This model is now widely incorporated into studies of health treatment and prevention.[6]

So far, prevention intervention trials for depression have involved intensive programs, delivered by trained mental health professionals to small groups of individuals over eight or more sessions. These interventions do not seem to be readily translated into large-scale public health depression interventions.[6] First, the current depression prevention programs may not be suitable for a mass audience. The participants in many prevention trials have been recruited actively, from non-diverse samples, and only participate if they are willing to be randomised to specific interventions.[2] Most research has targeted captured audiences of young people in schools.[5] Secondly, the reported interventions are too expensive to be delivered widely.[1] Thirdly, if the programs are modified in their content or form of delivery, there is a real risk that the interventions will no longer be effective. In particular:

- aspects of the intervention unique to the small-group interaction may not be preserved, including the tailoring of messages to the needs of the group or to individuals within the group;
- there is as yet little detailed knowledge of the active components involved in the interventions, making it unlikely that we can proceed with a truncated form of the intervention;
- the effects fade, and it is not clear whether booster sessions are effective; and
- in general health (compared with mental health) education, the translation from a small-group psychoeducational intervention to a public health intervention through conventional mass media (such as television) is fairly straightforward and does not require major modification of content. In contrast, the small-group format may be a crucial feature of the success of mental health interventions because it promotes psychological engagement.

In summary, reported depression prevention interventions are not feasible *en masse* and alternative methods need to be sought. One possible tool is the Internet.

The potential of the Internet for the delivery of CBT

Various features of the Internet make it suitable for public health interventions.

- ***The Internet can reach a mass audience:*** The Internet offers the opportunity for widely available, updatable, 24-hour, self-paced access to CBT. Recent Australian Bureau of Statistics figures indicate that 56% of Australian homes have access to a computer and that 37% (2.7 million) have access to the Internet.[8] Healthcare is one of the most common reasons for using the Internet.[9]
- ***Internet-based interventions are likely to be cost-effective:*** For large-scale program delivery, procedures that can be delivered by computer technologies are likely to be less expensive than services delivered conventionally. Computer-assisted assessment is cheaper and more efficient than clinical interviews or paper-and-pencil questionnaire.[10] Telemedicine[11] and technology-based disease management systems have proven financial advantages over conventional medical delivery.[12]
- ***The Internet is capable of supporting individually tailored prevention programs:*** The Internet has the potential to support software applications that can be tailored to individual needs.[13] For example, it is possible to tailor individual messages according to a participant's particular risk profile, such as whether they are undergoing divorce or experiencing bereavement or unemployment.
- ***The Internet is capable of supporting automated applications that guarantee intervention fidelity:*** Intervention fidelity is a significant issue in both clinical intervention research[10,14,15] and in prevention. The Internet permits a large number of simultaneous users to receive a prevention program without it being "washed down" by poor transfer.
- ***The Internet provides a convenient platform for delivering booster sessions:*** Booster sessions designed to maintain intervention effects can be automated and delivered at appropriate times.
- ***Because of its anonymity, users may prefer the Internet to other methods of delivering mental health programs:*** There is evidence that people are more willing to admit vulnerabilities to a computer,[16] and the development of Web-based prevention programs and information sites may reduce the embarrassment and shame that prevents some people from obtaining information by more traditional means.
- ***The Internet can facilitate the refinement and appropriate targeting of prevention programs:*** Because data can be collected from the Web server, and because Web pages can be modified relatively easily, information about the effectiveness of the interventions for specific user groups, and for specific interventional components, can be collected readily by researchers. Information collected from users can be used to investigate the generalisability of the CBT prevention interventions. Information about age, sex, life circumstances and other factors makes it possible to determine the applicability of CBT prevention programs. The effectiveness of shortened versions of the prevention intervention programs can be tested by modifying the website. This ability to examine the consumer's behaviour on the site becomes a source of valuable data itself (see below). Although interventions can be modified in conventional school and adult prevention programs, this is both more difficult and more time and resource intensive.
- ***The delivery of Internet programs can be informed and improved by medical informatics research:*** Another advantage of Internet technologies in prevention is that consumer uptake of such programs can be monitored. Research into consumer uptake and interest in medical information directly through computers and telecommunications systems is a rapidly expanding area of research.[17] Research suggests that individuals prefer tailored health information.[18]

Would depression prevention interventions work using Internet technologies and delivered *en masse*?

To date, there have been no published RCTs of the efficacy of depression prevention interventions using the Internet. Nevertheless, there is evidence pointing to the feasibility and potential effectiveness of such interventions.

First, it is known that CBT can be delivered by computer effectively, and the Internet is now able to deliver online many of the features available in a computerised CBT package. Examples of successful computer-assisted psychotherapy include COPE[19,20] and FearFighter.[21,22] A recent study reported that a computer-based intervention using the Therapeutic Learning Program (representing an integration of psychodynamic and cognitive-behavioural strategies) is as effective as short-term, traditional individual psychotherapy.[23] Individuals in the trial had a variety of mental health problems, including depression, anxiety and adjustment disorders.

Secondly, CBT can be delivered successfully to patients with depression and anxiety using the Internet. Australian research groups have developed computer- and Internet-based interventions for the treatment of depression and anxiety. Such programs illustrate the feasibility of extending behavioural therapy clinical interventions to prevention interventions. Examples include Panic Online Resource[24,25] and the use of virtual reality tools to provide exposure treatments for anxiety disorders.[26] The latter technologies are available on CD-ROM and could be readily translated to the Web.

Delivery of programs through the Internet has been effective for prevention of obesity, and in exercise[27] and dietary interventions, including the prevention of eating disorders,[28] supporting its potential in mental health prevention. Moreover, there is evidence that Internet delivery might be as effective as classroom delivery for these interventions. Highly sophisticated behavioural change programs offering tailored interventions are feasible. For example, Internet-based tailored behavioural change programs directed at exercise and nutrition have been developed, although they await full evaluation.[29,30] One program is PACE+ (Patient-centered Assessment and Counseling for Exercise plus Nutrition), an interactive health communication program designed to promote physical activity and improved health nutrition in adolescents and adults.[29] Other tailored programs have been developed for exercise.[13,30]

We have published preliminary data which show that the Internet can be used to deliver CBT designed to prevent depression. Six-month usage data from MoodGYM, a site offering CBT-based prevention for depression, indicates that the site is popular, with more than 1000 people visiting each week.[31] This has since increased to more than 2000 visitors per week. Visitors to the site have higher depression scores than the general population. Evidence from the site indicates that depression and anxiety scores reduce significantly with training. Nevertheless, an RCT of this intervention is required to convince us of its effectiveness.

Possible limitations to public health interventions using the Internet

- ***Lack of access to the Internet:*** Although in Australia access to the Internet is increasing more rapidly than the uptake of any other technology, there are inequities in its use.[32,33] Higher-income families, families with children and people living in cities rather than rural areas are more likely to have computer and Internet access.[34] Internet use is much less frequent among people older than 55 years. Although access may generally be lower in these groups, Internet consultation may bring significant benefits to "groups that are arguably disadvantaged in traditional medical health care".[35]
- ***Individuals might not use prevention programs on the Internet:*** One distinct disadvantage of Internet delivery may be that the user is not captured in the same way as users in school prevention programs. Although the Internet facilitates dissemination of programs, it does not necessarily ensure program uptake. Potential users may be unaware of a website intervention, lack the motivation to access the site, or readily exit to one of the many competing sites on the Web. Uptake will therefore be heavily dependent on effective marketing strategies, and on the degree to which the site is able to engage and motivate users. Research into website intervention uptake is important in evaluating the degree to which the Internet is able to realise its potential as a medium for delivering health communication programs. In this context, it is relevant that the communication potential of the Internet has been taken up by mental health users. Caregivers,[36] teenage smokers[37] and problem drinkers[38] use the medium for support groups, thus providing evidence that the Internet is acceptable to many people seeking help.

Conclusions

The prevention of depression using public programs is in its infancy compared with its use for disorders such as diabetes, heart disease and cancer. There is evidence to support school-based prevention. However, we have argued that prevention might be best delivered by the Internet. The advantages of this strategy are the capacity for better evaluation, greater hypothesis testing, delivery to a mass audience, and cost-effectiveness while maintaining intervention fidelity.

What is now required are RCTs of CBT delivered through the Internet. CBT delivered over the Internet needs to be compared with standard small-group prevention approaches and with placebo. We also need to encourage a community-level approach to prevention that will, like depression awareness programs, facilitate and promote Internet depression prevention activities among members of community groups.

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