Internet Health Promotion and Behavior Change Theory: an Integrated Model Applied to Internet Interventions to Enhance Prevention and Early Detection

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Abstract

This paper is the study of the theoretical models of mental health promotion and behavior change. It presents the Integrated Model of Health Promotion and Behavior Change theory as it applies to Internet Self-Help to show how the Internet by Case Identification through the screening recruitment strategy enhances prevention and early intervention in mild to moderate depression in the high-prevalence target group of 18-24 year University students. It found that early detection can be facilitated most cost-effectively through case identification by targeted population screening of at-risk groups. It shows, using the conceptual and transtheoretical models of behavior change, how such strategies lead to a decrease in the incidence, severity and longevity of depression. Early detection through case identification gives help that is personalized, widely accessible, can help a large proportion of the community and may lead to a decrease in health care costs.

1. Introduction

This paper is the study of the theoretical models of mental health promotion and behavior change as they apply to CyberPsychiatry. CyberPsychiatry is defined as Internet-delivered Cognitive Behavioral Therapy for treatment of mild to moderate depression. It presents the Integrated Model of Health Promotion and Behavior Change by firstly, describing how the Internet influences behavior change [1]. It then shows how behavior change theory aligns with health promotion and the Mental Health Intervention Spectrum, and using this integrated model, describes how health promotion through population screening influences early detection.

2. Objectives

The objectives of this paper are to:

1. describe the characteristics of the Internet and how it can influence behavior change
2. show how the Culjak and Spranca Conceptual Model of Behavior Change facilitates change in health behavior, as it aligns to the transtheoretical model of behavior change
3. illustrate how the Behavior Change Theory aligns with the Mental Health Intervention Spectrum and Health Promotion
4. describe the Mental Health Intervention Spectrum, and how it applies, using CyberPsychiatry as a model
5. present the Kowalenko, Culjak and Spranca Integrated Model of Health Promotion and Behavior Change theory as it applies to Internet Self-Help to show how the Internet by Case Identification through the screening recruitment strategy enhances prevention and early intervention in mild to moderate depression in the high-prevalence target group of 18-24 year University students.

In order to show how the Internet can lead to improved health outcomes using the theoretical models of mental health promotion and behavior change as it applies to CyberPsychiatry, it is necessary to work through each of the above objectives.

3. How the Internet influences behavior change

Internet based self-help tools may particularly benefit the young adult population (18-24 year olds) because of the age-related prevalence of depression. Additionally, this group may be more receptive to changes in their behavior patterns as they are more likely to be aware of and use Information Technology. The characteristics of the internet compared to traditional media which will potentially lead to help-seeking behavior include:

- Anonymity
- Convenience
4. How the conceptual model aligns to the transtheoretical model of behavior change

Due to the factors described above, it can be seen that increasing numbers of people access and use Internet resources to search for health information on depression [3]. Access to information leads to greater awareness [4] of depression and related disorders. Greater awareness in turn, leads to an increase in motivation [5] to seek help. Therefore, the Internet can help people reach the first steps of obtaining information and motivation prior to taking action in a social forum, as described in the conceptual model of behavior change, illustrated below (Figure 1).

Convenience, Currency   Access to Information
Access               Greater Awareness
Personalization       Increase in Motivation
Anonymity, Stigma, Interactivity   More People Seeking Help

Figure 2. Conceptual model aligned to transtheoretical model

5. How behavior change theory aligns with the mental health intervention spectrum and health promotion

This section explains how the Behavior Change Theory and the Mental Health Intervention Spectrum align in order to then show how they apply to CyberPsychiatry. The adapted version of the Mental Health Intervention Spectrum is used within this paper as it emphasizes the broadest definition of mental health promotion – including prevention, treatment and maintenance, and as such, does not include promotion as a component prior to prevention, but rather as an overarching framework (Figure 3).

The Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions advocates a classification system which uses the term “prevention” to define interventions that occur before the onset of a disorder (Figure 3) [9].
Treatment interventions include “Case Identification” and “Standard Treatment for Known Disorder”. The treatment protocol aims to reduce, among other factors, longevity, severity and recurrence. Continuing Care incorporates self-management (through Internet Self-Help, for example), relapse prevention, and rehabilitation.

In the Mental Health Intervention Spectrum, universal preventive interventions are aimed at populations that have not been identified on the basis of individual risk. That is to say, the intervention is desirable for the population as a whole. These are advantageous when the intervention is inexpensive per person, effective, acceptable and of low risk. Examples include immunization, wearing seat belts and smoking cessation programs [10, 12]. This theory therefore directly applies to mild to moderate depression as it is desirable to decrease the prevalence of depression for the population as a whole, and it fulfills the criteria of being inexpensive, effective, acceptable and of low risk.

Selective preventive interventions (Figure 3) are aimed at individuals or population subgroups that are at higher than average risk of mental disorder. These are most appropriate when cost is low to moderate, with minimal or no negative effects. One example is pre-school programs for all children living in poor neighborhoods. The current study applies this to University aged students in the 18-24 year higher risk group. Indicated preventive measures for mental disorders are aimed at high-risk individuals who show symptoms, but who do not currently meet DSM-III-R criteria. An example is screening in young adults for mild to moderate depression.

6. Mental health intervention spectrum applied to CyberPsychiatry

Figure 4 shows how the mental health intervention spectrum applies to CyberPsychiatry. Access to information widely accessed through the Internet aids promotion which leads to screening and thereby Case Identification. Case Identification leads to early detection which facilitates access to interventions and in decreasing the disease burden and health care costs.

![Mental Health Intervention Spectrum](image)

**Figure 4: Mental health intervention spectrum applied to CyberPsychiatry**

The next section will describe how the Integrated Model of Health Promotion and Behavior Change Theory as applied to CyberPsychiatry, through population screening, enhances prevention and early detection to enable improved health outcomes.

7. Integrated model of health promotion and behavior change

Figure 5 shows the Kowalenko, Culjak and Spranca Integrated Model of Health Promotion and Behavior Change theory as it applies to CyberPsychiatry (Internet Self-Help). When integrating the Behavior Change Theory and the Mental Health Intervention Spectrum (Figure 5), the model shows how the Internet provides access which begins the precontemplation and contemplation stages of the behavior change theory (Figure 5) (prior to treatment) which, on the Mental Health Intervention Spectrum are part of health promotion. With the Internet enhancing access to information, this increases awareness (Figure 5). This awareness through behavior change theory gives access to screening (Mental Health Intervention Spectrum segment; Figure 5). Assessing how people feel about a problem and reflecting on it is part of screening, particularly when self-reported measures are
used. This is an important stage within the theoretical models of health promotion and behavior change, as screening ties in with early detection (Figure 5). Early detection leads to an intervention, which in turn leads to a decrease in the incidence, severity and longevity of depression. As can be seen from the high prevalence of depression, this may lead to a decrease in healthcare costs. The stages of preparation, action and maintenance within the behavior change theory (Figure 5) align with treatment and continuing care (Intervention) within the Mental Health Intervention Spectrum (Figure 5).

Figure 5. Kowalenko, Culjak and Spranca Integrated model of health promotion and behavior change applied to Internet self-help
The next section will show through this Integrated Model how the Internet enhances prevention and early detection to improve health outcomes.

8. Integrated model through population screening enhances prevention and early detection to improve health outcomes as applied to CyberPsychiatry

Depression can be detected by screening, and as effective interventions do exist, if detected early, it decreases health care cost (Figure 3). In order to maximize screening cost-benefit, selection of the population to be screened needs to be targeted to high risk groups [13]. This section describes how the Internet by Case Identification (Figure 5) through population screening of an at-risk group enhances prevention and early detection in mild to moderate depression in University students.

The authors conducted a separate study evaluating the effectiveness of Internet self-help web sites for depression and related problems in the 18-24 year old age group[14]. This study used a screening instrument in the form of a depression questionnaire (CESD) to identify students who had symptoms of mild to moderate depression (Case identification, Figure 5). After cases were identified, they were then randomized to a web-based intervention of Cognitive Behavioral Therapy or to a Psycho-educational literature control group. Details of this study are published elsewhere [14]. In brief, Internet-delivered Cognitive Behavioral Therapy was used as the treatment of the study, compared with a psycho-educational control group. The control group was used as psycho-education has been shown to improve subjects’ understanding of effective evidence based treatments [15] and has shown to be effective in other studies [16]. The Internet-delivered Cognitive Behavioral Therapy program used in this study was MoodGym [17] which is an interactive web program that was designed to prevent depression. The five modules that make up MoodGym include:

1. an interactive game
2. anxiety and depression assessments
3. downloadable relaxation audio
4. a workbook, and;
5. feedback assessment.

Details of this program can be found at https://moodgym.anu.edu.au/welcome. MoodGym was developed at the National Institute for Mental Health Research at the Australian National University, through a collaborative effort between a team of researchers, mental health experts, web and graphic designers and software engineers. It has since been translated into Norwegian, Chinese, Dutch and Finnish [17].

Case identification in the CyberPsychiatry study was done through a questionnaire (Community Epidemiology Study – Depression; CESD). Such screening self-assessment questionnaires are freely available online. Eligible students who scored above a certain cut-off on the questionnaire, indicating mild to moderate depression, were notified by email that they had scored above a certain cut-off on the CESD, and to which group they had been randomized, either MoodGym [17] or to the Psycho-educational Information Package [18], with the relevant hyperlink to their assigned activity. Subjects were then followed through time to assess changes in depression scores [14].

In brief, that study showed that Internet-based self-help programmes delivering Cognitive Behavioral Therapy to the individual provide an effective intervention for depression and related disorders. It showed that the more modules the subject completed, the clearer their results were for better health outcomes. It could therefore be seen, using the Integrated Model of Health Promotion and Behavior Change as it applies to Internet self-help, that the Internet through Health Promotion, Screening, Early Detection and Intervention, showed an improved health outcome in a high-prevalence population.

Furthermore, it has been shown that subjects who complete more modules of the online CBT program demonstrate Compliance with Long-Term Treatment (self-management and relapse prevention in the mental Health Intervention Spectrum; Figure 3) with the goal of reduction in relapse and recurrence (decreased disease burden in the Integrated Model; Figure 5). The literature has shown that the more modules a subject completes, the better their depression scores [19].

9. Conclusion

The characteristics of the Internet which include convenience, currency, wide accessibility, personalization, anonymity and interactivity, are demonstrated in the literature through the conceptual and transtheoretical models of behavior change, to influence health behavior in a positive direction. These behavior change theories align with the mental health intervention spectrum to demonstrate how, when applied to Internet self-help, through screening and
case identification of an at-risk group early on in the mental health intervention spectrum; it leads to early detection, early intervention and therefore also decreased disease burden and health care costs. This has been demonstrated by applying the Integrated Model of Health Promotion and Behavior Change to Internet Self-help to show how the Internet enhances prevention and early intervention in mild to moderate depression in the high-prevalence target age group of 18-24 year University students. With such a high disease burden of treatable diseases such as depression, especially at the early onset stage, Internet interventions have the ability to cost-effectively change health behavior, health outcomes and health care costs.

10. References

[14] Culjak, G., Cyberpsychiatry: A Randomised Controlled Trial Evaluating the Effectiveness of Internet Self-Help Websites for Depression and Related Problems in University Students, University of Sydney 2011.