



Computer-Based Programs as Suitable Intervention Tools for Older People with Mental Disorders

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Abstract. Currently, there is no reliable cure for mental disorder such as depression. However, there are a few strategies which can help in the treatment of their symptoms. These comprise both pharmacological and non-pharmacological approaches. The purpose of this article is to discuss the role of the Internet and computer-based programs as an appropriate intervention tool for older adults with depression. This is done by conducting a literature search in the databases Web of Science, Scopus, MEDLINE and Springer, and consequently by evaluating the findings of the relevant studies. Based on the findings, computer-based programs targeted at older people with depression may be beneficial in several ways: they are non-invasive treatments, they can be tailored-made to older people's needs, they are cost-effective and can be made widely available, and they appear to be an effective intervention tool, especially as far as the short-term effects are concerned. Nevertheless, it is important to pay close attention to the methodological standards in future clinical studies, as well as to the efficacy of these computer-based programs aimed at older individuals with depression.

Keywords: Depression · Computer-based programs · The internet
Older people · Intervention · Review

1 Introduction

Current trends indicate that there is an increasing number of older population groups. In fact, in the year of 2000, older people aged 65+ represented 12.4% of the entire population. In 2030 this number is expected to rise to 19% and by the year of 2050 it should reach 22% [1]. Over 20% of adults aged 60+ suffer from a mental or neurological disorder (excluding headache disorders) [2]. One of the most common neuropsychiatric disorders among older people is depression.

Depression is usually defined as a mood disorder that causes a constant feeling of sadness and loss of interest and pleasure. Other main symptoms comprise feelings of guilt or low self-esteem, disturbed sleep or appetite, feelings of tiredness and poor concentration. Depression can affect patient's life persistently or just in waves. In severe cases, it can result in suicide [3]. In case of older people, these symptoms are often overlooked and untreated because they coincide with other problems older people

may have. Moreover, this mental disorder is quite serious since it can lead to great suffering and impaired functioning in daily life, especially cognitive functioning.

At present, however, there is no reliable cure for this disorder, but there are a few strategies which can help in the treatment of its symptoms. These comprise both pharmacological and non-pharmacological approaches [4]. Most recently, with the emergence of information and communication technologies (ICT), especially the Internet and computer-based programs started to be used as suitable intervention tools among older people with depression. This is also caused by the fact that older people have relatively easy access to computers [5]. In addition, the generation of the so-called baby boomers approaching retirement is fairly comfortable using ICT [6] although research shows that these older adults are higher-income and more educated seniors [7]. Recent research studies also reveal that there is a significant increase in the use of ICT, especially the Internet and computer-based programs, for health purposes [8–11].

The aim of this article is to discuss the role of the Internet and computer-based programs as an appropriate intervention tool for older adults with depression.

2 Methods

The methodology of this review article follows Moher et al. [12] and Kurz and Baelen [13]. The main method was a systematic review whose aim was to find the research studies on the basis of the key words in four databases: Web of Science, Springer, Scopus, and MEDLINE. This review was conducted in the period from 2010 to 2015 for the following key words: *computer AND mental disorder AND aging*; and *computer AND depression AND aging*. Altogether 423 studies were found via the database search and 22 studies via other sources, which included conference proceedings and books outside the scope of the databases described above. After a thorough review of the titles, duplication and abstracts of the selected studies, only 23 studies remained for the full-text analysis. After that, only five clinical studies were detected. The study was included if it matched the corresponding period, i.e., from 2010 up to 2015. The selection period starts with the year of 2010 since this is the year when the clinical trials conducted among older adults started to appear due to the fact that older individuals began to be more digitally literate and able to use the Internet on a daily basis [14]. Thus, the study was included if it matched the corresponding period, i.e., from 2010 up to 2015; if it involved older people with depression (mild to moderate depression), and focused on the use of the Internet, and/or computer-based programs. The remaining selected theoretical articles, review articles and book chapters were used in the part on discussion and in the introduction for the exploration of the research topic and comparison of findings.

3 Findings

Altogether five clinical studies are described in the following Table 1. Out of these five clinical studies, three are randomized controlled trials, one is a clinical trial and one is a pilot study. All of them deal with older people who suffer from mild to moderate

depression. Therefore the research studies which were not exclusively focused on the research topic, were reviews, or concentrated on healthy older individuals, e.g., [15, 16] were excluded. All five clinical studies are summarized in alphabetical order of their first author in Table 1 below.

Table 1. Overview of the clinical studies on the use of computer-based programs for older people with depression.

Study	Type of intervention	No. of subjects	Intervention period	Findings	Limitations
Dear et al. [17] CT	iCBT	20 subjects (elevated symptoms of depression)	5 educational lessons and homework summaries within 8 weeks and 3 weeks of follow-up	Participants improved significantly on the PHQ-9 and Geriatric Depression Scale (GDS), with large within-group effect sizes (Cohen's d) at follow-up of 1.41 and 2.04, respectively	Small sample size; short period; no control group
Khatri et al. [18] PS	Online CBT	18 subjects with diagnostic mental disorders	13 weeks	The findings show that the online CBT could be delivered in a technology-supported environment (on-line video conferencing) and can meet the same professional practice standards and outcomes as face-to-face delivery	Small sample size; short period
Lagana, Garcia [19] RCT	One-to-one computer and Internet training	60 older people with depression	6 weeks	There were significant improvements in favor of the experimental group in computer self-efficacy; there was a decreased percentage of significantly depressed experimental subjects from 36.7% at baseline to 16.7% at the end of intervention	Short period; a lack of sample representation

(continued)

Table 1. (continued)

Study	Type of intervention	No. of subjects	Intervention period	Findings	Limitations
Preschl et al. [20] RCT	Life-review therapy with computer supplements	36 older people with elevated depressive symptoms	6 weeks	The results indicate that depressive symptoms decreased significantly over time until the three-month follow-up in the intervention group compared to the control group (pre to post: $d = 1.13$; pre to follow-up: $d = 1.27$; and group \times time effect pre to post: $d = 0.72$)	Small sample size; short period
Titov et al. [21] RCT	iCBT	27 subjects in the intervention group and 25 subjects in the control group, all older than 60 years	8 weeks	The findings show considerably lower scores on the PHQ-9 (Cohen's $d = 2.08$; 95% CI: 1.38 – 2.72) and on a measure of anxiety (Generalized Anxiety Disorder-7 Item) (Cohen's $d = 1.22$; 95% CI: 0.61–1.79) in the intervention group compared to the control group at posttreatment	Small sample size; short period

Source: author's own processing

Explanation: CBT - Cognitive Behavior Therapy; CS – cohort study; CT – clinical trial; iCBT - Internet-delivered Cognitive Behavior Therapy; PS – pilot study; RCT – randomized controlled trial

4 Discussion

The results of the clinical studies described above indicate that computer-based programs appear to be good intervention tools for older people with depression. Generally, the Internet or web-based interventions have been shown to deliver efficacious psychological intervention programs for depression on a large scale [22]. Especially the online cognitive behavior therapist programs, which are evidence-based, time-limited collaborative forms of psychotherapy, seem to be effective [17, 18, 21] and they seem to meet at least the same professional practice standards and outcomes as face-to-face delivery [18]. In addition, these therapist programs are cost-effective and particularly

suitable for those having difficulties accessing such services in person [18]. Furthermore, Cotton et al. [23] argue that the Internet use may not only contribute to the reduction of symptoms of depression, but also to the decrease of social isolation and loneliness of older people. The decreased loneliness is also supported by the meta-analytic study [24] whose authors examined the effectiveness of computer and Internet training interventions intended to reduce loneliness and depression in older adults. The effect size for loneliness from their five analyzed studies was statistically significant ($Z = 2.085$, $p = 0.037$).

Nevertheless, the last described study [24] and other research studies [25] indicate that there is no efficacy of computer-based programs on depressive symptomatology among older individuals. This is connected with the fact that there are important differences in methodologies used in the clinical trials. Methodological issues such as the use of passive control groups or the failure to consider baseline differences between the groups may lead to overestimation of the training effects, seriously threatening the validity of the findings [26–28].

5 Conclusion

Based on the findings of this review article, computer-based programs targeted at older people with depression may be beneficial in several ways: they are non-invasive treatments, they can be tailored-made to older people's needs, they are cost-effective and can be made widely available, and they appear to be an effective intervention tool, especially as far as the short-term effects are concerned. Nevertheless, it is important to pay close attention to the methodological standards in future clinical studies, as well as the efficacy of these computer-based programs aimed at older individuals with depression.

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