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e-Mental health interventions in the treatment of emotional distress in cancer patients and survivors: A systematic review

Eindwerk neergelegd tot het behalen van het getuigschrift van de opleiding 'psycho-oncologie' door Roosmarijn Vande Kerckhove

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Abstract

Objectives: This systematic review aims to (1) investigate existing e-Mental health interventions developed to help manage cancer-related emotional distress; and (2) summarize the best available evidence on their effectiveness

Methods: A comprehensive literature search of Web Of Science and PubMed up to May 2018 was conducted. Study outcomes were extracted, tabulated and summarized.

Results: A total of six studies met inclusion criteria. All studies were randomized controlled trials (RCT). In two studies there was a level of professional facilitation and four studies were self-guided. Clinically significant improvement in emotional distress was reported in the intervention versus the control group in four studies. However, no significant improvements were observed for emotional distress in the long term.

Conclusions: This systematic review has shown that web-based interventions might be beneficial at reducing emotional distress in cancer patients and survivors. However, evidence for their long-term effectiveness in reducing emotional distress is lacking. The small number of available studies illustrates how the application of e-Mental health interventions in the care of cancer patients and survivors is still in its early stage. This review highlights the need for future research on the effectiveness of additional functionalities to the existing (guided) self-help interventions.

Keywords

Cancer-related emotional distress, cancer patients, cancer survivors, e-mental health, psycho-oncology

1. INTRODUCTION

According to Mehnert et al. (2014), there is convincing evidence indicating that patients with cancer suffer from high emotional distress and also meet criteria for threshold mental disorders. Despite improvements in treatment and survival rates, a cancer diagnosis continues to elicit greater distress than any other medical diagnosis (Turner et al., as cited in Beatty, Kemp, Wade, & Koczwara, 2015). Psychological distress encompasses emotional lability, rearranging of roles and responsibilities, changing of future plans, fear of recurrence, depression and anxiety and is associated with decreased quality of life (Rehse & Pukrop, 2003; Wu & Harden, 2015; Penedo et al., 2013). In addition, high levels of distress lead to reduced compliance with treatment and more side effects (Chambers, Meng, Youl, Aitken, Dunn, & Baade, 2012; Park & Gaffey, 2007). Conversely, side effects of cancer treatment like fatigue, nausea and pain may trigger distress and, therefore, impact psychological adjustment (Grossert et al., 2016).

Research has consistently found that 30 to 40 percent of recently diagnosed patients experience clinically significant depressive or anxiety symptoms (Carlson et al., 2004; Zabora, Brintzenhofeszoc, Curbow, & Lecathelinais, 2009). According to Boyes, Girgis, Zucca and Lecathelinais (2009), distress is most acute during the first 12 months after diagnosis, when a range of medical treatments take place. Consequently, distress management within the first 12 months after diagnosis has been recognized as an integral component of a patient's clinical treatment (Bultz & Carlson, 2005).

After cancer treatment, many survivors face new challenges that affect their quality of life (QoL), in particularly anxiety, depression, and fatigue (Harrington, Hansen, Moskowitz, Todd & Feuerstein, 2010). In the first 2 years following diagnosis, approximately one in five survivors shows symptoms of anxiety or depression (Mitchell, Ferguson, Gill, Paul, & Symonds, 2013). Cancer survivors are expected to adopt an active role in managing their health and wellbeing.

However, they often feel neither confident (Foster & Fenlon, 2005), nor prepared by health professionals to effectively manage life after cancer treatment, with prominent information needs as a consequence (Stanton, 2012).

According to Osborn, Demoncada, and Feuerstein (2006), the largest evidence base treatment for cancer related emotional distress to date is cognitive behavioral therapy (CBT). Cognitive behavioural techniques, including relaxation techniques (Luebbert, Dahme, & Hasenbring, 2001) and mindfulness based stress reduction (Zainal, Booth, & Huppert, 2013), significantly reduce distress, depression and fatigue and increase quality of life in cancer patients. However, Duijts, Faber, Oldenburg, van Beurden, and Aaronson (2011) found small to medium effect sizes in randomized controlled trials. Psycho-oncological interventions may also reduce side effects of cancer treatment (Luebbert et al., 2001; Kwekkeboom et al., 2012).

The internet has the potential to reach patients and to overcome barriers towards using psycho-oncologic support (e.g. stigma and privacy concerns, geographical distance from providers, time constraints to adhere to additional appointments during office hours) (Leykin et al., 2012). Online, or web-based, interventions are defined as predominantly self-guided interactive programs that can be categorized into educational, self-guided therapeutic, or human-supported therapeutic subtypes. Both self-guided and human-supported therapeutic web-based interventions have the deliberate aim of producing cognitive, affective, and behavioral changes; are typically based on empirically supported face-to-face treatments; and require active engagement from participants (through the completion of web-based worksheets and activities), while the educational subtype typically contains information-only and is considered therapeutically inactive (Barak, Klein, and Proudfoot, 2009) .
The American Psychiatric Association (APA) has noted an intensifying commitment to using eMental Health technologies to deliver care (APA, in Wozney al. 2017). According to Lustria, Cortese, Noar, and Glueckauf (2009), a great advantage of such interventions is their potentially wide reach, easy accessibility, 24/7 availability, and anonymity.

In addition, personalized information on reaching the desired health outcome can be provided by means of computer tailoring (Lustria et al., 2009), facilitating behaviour change and/or maintenance (Brug, Oenema, & Campbell, 2003). Online interventions addressing anxiety and depression in the general population have demonstrated similar levels of efficacy to face-to-face intervention in both the general population and cancer patients (Griffiths, Farrer, & Christensen, 2010).

A recent analysis of uptake and adherence to an online intervention to reduce cancer-related distress indicates that uptake of the online intervention varies according to age, gender and cancer type, with older age being associated with lower uptake but higher adherence (Beatty et al., 2017). Another interesting finding of this study is that no psychological variables predicted adherence in multivariate analyses; however, within the intervention group only, high adherers had less difficulty regulating emotions, and better emotional and cognitive functioning. This may indicate a minimum level of emotion regulation and emotional functioning is required in order to appropriately process the psycho-oncological content of the intervention (Beatty et al., 2017).

The findings of Beatty et. al (2017) may suggest utility of online interventions as part of a stepped care model, in accordance with existing guidelines for stepped care. Here, low-intensity interventions including self-help CBT are recommended for patients with a chronic health condition an persistent subthreshold symptoms or mild to moderate depression, while patients with moderate to severe depression are escalated to higher-intensity treatments such as group or individual CBT (National Institute for Health and Care Excellence, as cited in Beatty, Koczwara, & Bade, 2016).

In order to implement low-intensity (guided) self-help interventions in the treatment of cancer related emotional distress, it's important to get an overview of the existing research evidence for such interventions. Therefore, this paper has the aim to (1) investigate existing e-Mental health interventions developed to help manage cancer-related emotional distress; and (2) summarize the best available evidence on their effectiveness.

2. METHODS

2.1 Search strategy

A comprehensive literature search was conducted to identify scientific articles that included e-Mental health interventions to manage emotional distress among cancer patients and survivors.

Search terms were used in various combinations, including the following key words: cancer* OR cancer patients OR cancer survivors AND mobile* OR smartphone* OR web * OR Internet* OR online* OR e-health OR m-health OR e-mental* AND stress* OR distress OR emotional* OR psych* OR mental* OR coping* OR quality of life OR anxiety OR depression

2.2 Eligible criteria

To be considered for inclusion, articles were required to meet the following criteria:

1. Reviewed and published in English language.
2. Involved adult cancer patients in a treatment setting or cancer survivors (aged 18 years or over).
3. Offered one or more online interventions or smartphone applications tailored to manage emotional distress in cancer patients or survivors.
4. Had emotional distress as the primary outcome, measured by means of a standardized, scientifically validated and reliable psychometric instrument.
5. Had the following study design: RCT or pilot study.

The criteria for exclusion from the review were as follows:

1. Interventions offered to a population other than cancer patients.
2. Pediatric cancer patients (aged below 18 years).
3. Intervention not an online psychological intervention.
4. Reporting issues (e.g., only the abstract available, book chapters, systematic reviews, meta-analysis, and no data report).
5. Emotional distress as a secondary, versus primary, outcome.

2.3 Data selection and extraction

The literature search identified 240 potential eligible articles (Figure 1). Screening titles and abstracts resulted in 32 citations potentially meeting eligibility criteria. In accordance with the criteria listed above, we screened a full-text copy of every paper to determine its eligibility for inclusion. The total number of articles was reduced to 6 after completely reviewing the corresponding full-text articles.

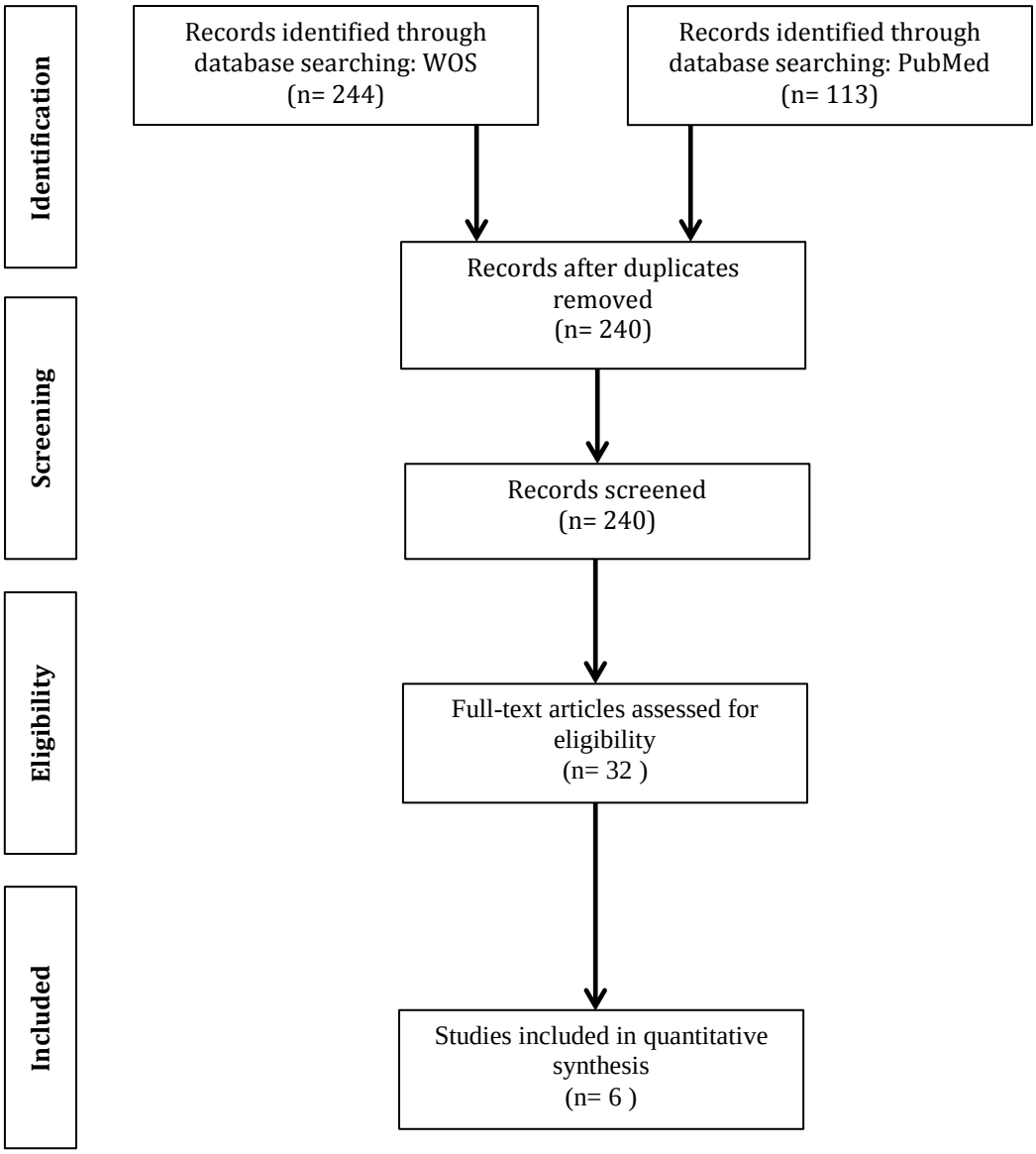

Figure 1. Search retrieval process

3. RESULTS

3.1 Study characteristics

Eligible studies were published between 2012 and 2017 (Table 1) and were predominantly based in the Netherlands (three studies), with one study conducted in Australia, one in Germany and one in Switzerland. All studies were RCTs. Out of the six studies, three interventions were developed for cancer patients and three interventions were developed for cancer survivors. The mean duration of the intervention was 11,6 weeks (range: 4 to 24 weeks). The mean number of participants was 187,7 (range: 60-462). One intervention was designed specifically for hematologic cancer patients, two for female breast cancer patients and three for any type of cancer. Out of the six studies, one intervention was developed on the basis of problem-solving therapy (PST), three interventions were developed on the basis of cognitive behavior therapy (CBT), one intervention combined cognitive behavioral- and mindfulness-based stress reduction techniques and one intervention combined principles of cognitive behavioral therapy and problem-solving therapy. In two studies there was a level of professional facilitation and four studies were self-guided.

3.3 Study outcomes

The six eligible studies used standardized, scientifically validated and reliable psychometric instruments to assess primary and secondary outcomes (Table 1). Clinical significant improvement in emotional distress in the intervention versus the control group was reported in four studies. However, no significant improvements were observed for emotional distress in the long term.

Admiraal et al. (2017) found no differences between the intervention group and the control group for primary and secondary outcomes. Several patients reported that they did not feel supported by the intervention, because they did not experience high distress for which they needed additional support. However, an unplanned subgroup analyses showed that in clinically distressed patients (n = 57), use of the intervention increased optimism and control over the future at 12 weeks more than in patients of the control group.

Beatty, Koczwara, & Wade (2015) found significant main effects for time for six of the ten outcomes evaluated: cancer distress, global QOL, physical function, role function, social function, and anxious preoccupation. Post hoc between group comparisons showed intervention participants had statistically significantly higher physical functioning compared to controls at three months of follow-up. Furthermore, compared to controls, post-hoc comparisons found moderate between-group effect sizes for cancer distress and anxious preoccupation and at six months of follow-up for global QOL.

In the study of David, Schlenker, Prudlo, and Larbig (2011) the intervention group displayed a significant increase in fighting spirit.

Urech et al. (2018) found significant main effects for quality of life and distress.

In the study of van den Berg et al. (2015) participants of the intervention group reported significantly less distress than participants of the control group with a small-to-medium effect size. More participants of the intervention group (39 of 70) than participants of the control group (32 of 80) showed clinically significant improvement. This clinical effect was most prominent in low-distress breast cancer survivors (BCSs).

Willems, Mesters, Lechner, and Kanera (2017) found significant main effects at 6 months for social functioning for men, fatigue for participants ≤56 years, and depression for participants who received chemotherapy. At 12 months, participants with a medium educational level reported higher social functioning, while participants with a low educational level reported lower social functioning than participants with a similar educational level in the control group. At 12 months from baseline, the intervention group no longer differed from the control group in emotional and social functioning, depression and fatigue.

Tabel 1. Summary of studies on e-Mental health interventions in the treatment of emotional distress in cancer patients and survivors

Author & Year	Intervention & participants	Study design	Outcome measures	Results
Admiraal et al. (2017)	Problem-solving therapy ENCOURAGE: self-guided web-based psychoeducational program for breast cancer patients NEG =70 NCG = 69 Female breast cancer patients who recently completed (neo)adjuvant chemotherapy	RCT EG= 12-wk intervention CG= 12-wk standard care	Optimism and Control over the future Distress QoL Acceptance of the illness Feelings of being informed	No differences between CG and EG for primary and secondary outcomes Clinically distressed patients N = 57 (unplanned subgroup) Optimism and control over the future: EG > CG, *d* = 0.65, *p* = .017
Beatty et al. (2015)	CBT Cancer Coping Online (CCO): self-guided, web-based intervention NEG = 30 NCG = 30 Patients with any type of cancer diagnosed in the previous 6 months and receiving treatment with curative intent	RCT EG = 6-wk intervention CG = 6-wk web-based attention control	Cancer distress (Posttraumatic Stress Scale) General distress (Depression Anxiety Stress Scale) QoL (EORTC QLQ-C30), Coping (mini-MAC)	Main effects of time for Cancer distress Global QoL Physical function Role function Social function Anxious preoccupation POST cancer distress: EG < CG, *d* = 0.43, *p* = .10 POST anxious preoccupation: EG < CG , *d* = 0.38, *p* = .002 FU (3m) physical functioning: EG > CG, *d* = -0.52, *p* = .02 FU (6m) global QoL EG > CG, *d* = −0.43, *p* = .10

David et al. (2012)	CBT Psychological Selfhelp Leukemia: self-guided web-based intervention + e-mail support NEG = 105 NCG = 81 Hematologic cancer patients	RCT EG = 4-wk intervention CG = participation postponed until after 4-wk	Mental adjustment to cancer (German version of the MAC scale) Psychological distress (BSI) Client satisfaction (ZUF-8)	Fighting Spirit (FS): EG > CG,, d = 0.42, p = .03
Urech et al. (2018)	CBT and Mindfulness-based stress reduction techniques Stress-Aktiv-Mindern (STREAM): therapist-guided web-based stress management intervention NEG = 65 NCG = 64 Patients with any type of cancer who had started first-line treatment within the previous 12 weeks	RCT EG = 8-wk intervention CG = intervention postponed until after 8-wk	QoL (validated German version of FACIT-F) Psychological distress and anxiety or depression (German versions of the National Comprehensive Cancer Network DT2 and HADS)	POST QoL: EG > CG, p = .007 POST distress: EG < CG, p = .03 POST anxiety and depression: No significant difference between EG and CG

van den Berg et al. (2015)	CBT BREATH (Breast Cancer E-Health): web-based self-management intervention NEG = 70 NCG = 80 Female breast cancer patients who had completed curative-intent primary treatment 2 to 4 months before the baseline assessment	RCT EG = 4 mo CAU + intervention CG = 4 mo CAU	Distress (SCL-90) Empowerment (Cancer Empowerment Questionnaire) Both assessed before random assignment (baseline, T0) and after 4 (T1), 6 (T2) and 10 months (T3) of follow-up	POST CANCER Distress: EG < CG, d= 0.33, p = .02 POST CANCER Empowerment: No clinically significant improvement Clinically significant improvement most prominent in low-distress BCS's No between-group differences in primary outcomes during follow-up

Willems et al. (2017)	CBT and Problem solving therapy (PST) Kanker Nazorg Wijzer (Cancer aftercare Guide): web-based intervention NEG = 231 NCG = 231 Patients with any type of cancer; their primary treatment had been completed successfully for at least 4-weeks but no more than 56-weeks	RCT EG = 6 mo intervention CG = intervention postponed until after 12 mo measurement	Emotional and social functioning (EORTC QLQ-C30) Depression (HADS) Fatigue (CIS)	POST Social functioning: EG > CG, (d = 0.34, p = .009) for men POST Fatigue: EG < CG (d = 0.44, p = < .000) for participants ≤56 years POST Depression: EG < CG (d = 0.36, p =.008) for participants who received chemotherapy FU (12m) Social functioning: EG > CG (d = 0.19, p = .035) for participants with a medium educational level FU (12m) Social functioning: EG < CG (d = 0.22, p = .043) for participants with a low educational level

Notes. N = number, CG = Control group, EG = Experimental group, mo = months, wk = weeks, QoL = Quality of Life, CAU = Care as Usual

4. DISCUSSION

The aim of our review was to (1) investigate existing e-Mental health interventions developed to help manage cancer-related emotional distress and; (2) to summarize the best available evidence on their effectiveness. We included six RCTs in this review. All of the eligible studies evaluated web-based interventions. In two studies there was a level of professional facilitation and four studies were self-guided. Clinical significant improvement in emotional distress in the intervention versus the control group was reported in four studies. However, no significant improvements were observed for emotional distress at the long term. The small number of available studies illustrates how the application of e-Mental health interventions in the care of cancer patients and survivors is still in its early stage.

The current review has several limitations. First, publication bias, the phenomenon by which studies with significant (positive) findings are more likely to be published than those without, is always a risk when trying to draw conclusions from systematic reviews. In addition, we also excluded articles not published in English, which may have biased our results. Also our search failed to identify any published RCT on mobile interventions for managing emotional distress in cancer patients and survivors. However, Smith et al. (2016) found support for the acceptability and preliminary efficacy of a mobile application, Cancer Distress Coach (CDC), as a self-management tool for cancer-related Posttraumatic stress disorder (PTSD) symptoms.

There is some evidence from this review that online interventions could be more effective when targeted to those with the greatest level of need such as higher distressed patient groups. Further research into the optimal patient group, including exploration of whether distressed samples benefit from web-based interventions, is therefore warranted. Interventions tailored to cancer types are likely to be more desirable, and qualitative research suggests that more personalized interventions may also yield higher levels of adherence (Andersson, Stromgren, Strom & Lyttkens,2002; Gerdhards et al., 2011; Scott & Beatty, 2013).

Further research is also needed to determine how the intervention mode, therapist versus self-guided, affects the effectiveness of e-Mental health interventions to help manage cancer-related emotional distress.
Ebert et al. (2008) found that therapist-guided standalone Internet- and mobile-basedpsychological interventions (IMIs) can result in meaningful benefits for a range of indications including, for example, depression, anxiety, insomnia, or posttraumatic stress disorders. The clinical significance of results of purely self-guided interventions is for many disorders less clear, especially with regard to effects under routine care conditions. Furthermore, Ebert et al. (2018) state that it remains unclear what dose of contact may be optimal at what stadium of treatment (i.e., linear doses of contact throughout the intervention, decreasing support over time, support on demand).

Feijt, de Kort, Bongers, and Ijsselsteijn (2018) found that eMental health comprises a new way of working for psychologists, as they have to integrate new tools into their existing clinical practice. This requires psychologists to change their current behavior and adopt new behaviors. According to Lovejoy, Demireva, Grayson & McNamara (2009) a barrier frequently reported by therapists pertains to the lack of the full range of nonverbal cues during mediated communication, as they feel this heightens the risk of misunderstanding and does not allow for the development of a strong therapeutic relationship. Compen et al. (2017) found that new Internet-based Mindfulness-based cognitive therapy (eMCT) therapists should understand the importance of flexible availability and the dynamics of asynchronous interaction to pick up early signs of patient withdrawal.

Ecological momentary assessment, also known as in the moment assessment or experience sampling, is widely accepted as important means of eliciting information about a person's physical and mental state in the moment as opposed to retrospective assessment (van de Ven et al., 2017). According to Kristin, Heron, and Smyth (2010), mobile technology-based ecological momentary interventions (EMIs) can be effectively implemented as interventions for a variety of health behaviours and psychological and physical symptoms.

By integrating the assessment and intervention capacities of mobile technology, EMIs can be developed, which are sensitive to participants' internal states (e.g. mood, cravings, physiological responses) and external cues and contexts (e.g. social interaction, location). Future research is needed to investigate the potential they have to improve the effectiveness of mobile mental health interventions in the treatment of cancer related emotional distress.

5. CONCLUSION

This systematic review has shown that web-based interventions might be beneficial at reducing emotional distress in cancer patients and survivors. However evidence for their long-term effectiveness in reducing emotional distress is lacking. The small number of available studies illustrates how the application of e-Mental health interventions in the care of cancer patients and survivors is still in its early stage. Future research should not only try to expand the evidence-base for existing (guided) self-help interventions, but could also explore to what extent additional functionalities to these interventions, like adding a smartphone application, or even solely relying on a smartphone application, could help to further improve the impact of these novel treatments of cancer-related emotional distress.

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