



## An integrative review of supportive e-health programs in cancer care



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### A B S T R A C T

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**Purpose:** This integrative review aims to gather more knowledge of the design of supportive e-health interventions for patients diagnosed with cancer and subsequently analyze and synthesize that knowledge in a potential explanatory model for those interventions.

**Methods:** PubMed, CINAHL and PsycINFO were searched for abstracts dating from 2000 through to June 2012. Eligible articles concerned education or support for adult cancer patients, and were provided either on the Internet or using CD-ROM or DVD.

**Results:** Twenty-eight quantitative studies constituted the final sample, revealing that supportive e-health programs in the field of cancer are being used and are helpful to individuals despite their age, gender, literacy level and disease-stage. Each e-health program usually constitutes a single service with a variety of multimedia features, which leads to different designs yet with common outcomes. Some of these outcomes are theoretically explained, although a structure that links all aspects of the intervention is rarely found. Moreover, different designs have also been adopted for testing the interventions' effectiveness.

**Conclusion:** E-health interventions that allow supportive needs to be satisfied are leading to positive effects for individuals with different preferences and priorities. Even though several communalities could be found across interventions, methodological aspects of design, implementation and evaluation still vary, leading to some inconsistency. Models and applied theories are needed to clarify such issues, thus enhancing the credibility and applicability of supportive e-health programs across target populations.

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### Introduction

In the field of e-health, which is concerned with improving and enabling health and healthcare by resorting to information and communication technology (Lintonen et al., 2008), healthcare professionals have increasingly been developing tools for delivering information and support as a complement to standard healthcare (Gustafson et al., 2002; Roberts and Japuntich, 2009). These computer-based health communication resources have even facilitated the promotion of healthy behavior, informed decision-making, information exchange between peers and enhancement of self-care (Forkner-Dunn, 2003; Gustafson et al., 2002; Tate et al., 2009). Mostly constructed upon knowledge gathered from both individual and focus group interviews with patients, these services are tailored to the specific needs of a patient group and are usually delivered over the Internet or by other electronic means, such as

CD-ROM or DVD, which allows access to a selected service whenever the patients needs it and at their own pace (Gustafson et al., 2002; Lustria et al., 2009).

In the field of cancer care, where individuals are increasingly being cared for in outpatient settings (DeLisle, 2009), e-health communication tools are becoming especially important. The process of empowering the patient for health self-efficacy behaviors usually occurs during short encounters at the clinic with several days apart (Dedding et al., 2011; Kleeberg et al., 2008; McIlpatrick et al., 2007; Sandoval et al., 2006). Patients need health information and decisional, emotional and psychosocial support throughout the illness trajectory (Fincham et al., 2005; Harrison et al., 2009). In the satisfaction of these supportive needs, an e-health tool might be of assistance (Gustafson et al., 2002).

Several computer-based health communication systems have showed promising results both outside (Nguyen et al., 2004) and within the cancer field (Gysels and Higginson, 2007; Ryhänen et al., 2010), specifically regarding educational outcomes. However, these systems still encompassed diverse features and formats and did not

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seem to have a shared theoretical tailoring (Lustria et al., 2009). Moreover, information on how supportive systems were planned and carried out and who benefited from e-health approaches was still lacking (Ritterband et al., 2009). In 2010, the group of the Consolidated Standards of Reporting Trials (CONSORT) discussed the relevance of the existing guidelines in relation to e-health research and developed recommendations for the reporting and design of e-health interventions (Baker et al., 2010). How these recommendations came to shape supportive e-health intervention research is less understood.

An integrative review was thus carried out in order to gather more knowledge of the design of supportive e-health interventions for patients diagnosed with cancer and subsequently analyze and synthesize that knowledge in a potential explanatory model for those interventions. Specifically, this review asks the following: Who are the individuals that use supportive e-health systems? Which features should the intervention incorporate in order to lead to the satisfaction of supportive needs? What are the outcomes that truly measure the intervention's effectiveness? How should they be measured? Which individual- or system-related characteristics might mediate the outcomes? Is there a theoretical ground linking all these aspects? How are the various aspects related to each other?

## Method

This study followed the design of an integrative review (Polit and Beck, 2011; Whittemore, 2005), which allowed the inclusion of studies with diverse methodologies. Such a feature is especially important in the context of the current study as non-experimental designs are just as important as experimental for enhancing the understanding of supportive e-health interventions, their features and outcomes. Having identified the research problem, four stages were followed: literature search, data evaluation, data analysis and presentation (Whittemore and Knafl, 2005).

### Searching for and selecting the literature

The present review focuses on supportive e-health interventions for adult patients diagnosed with cancer. On the basis of the stated research questions, PubMed (1950–2012), CINAHL (1982–2012) and PsycINFO (1872–2012) were searched for abstracts matching the following keywords: cancer patients; patient education and/or support (psychosocial, psychological, social); intervention, program, system or model; and web\*, computer\*, interact\*, multimedia or Internet. The search was limited to journal articles written in English published from January 2000 to June 2012, when the search took place.

The initial search resulted in 652 articles, which were further examined by the first author for eligibility according to the inclusion and exclusion criteria. Dubious articles were discussed by the research team and were included in the final sample if there was a consensus. A total of 28 articles made up the final sample in the current review (Fig. 1).

Studies were eligible for review if the participants were over 18 years old, diagnosed with cancer and about to start, were undergoing or had completed treatment. Tools developed for the pre-disease period were excluded. The supportive e-health systems had to be designed and implemented or facilitated by health professionals, and thereby expected to account for sorted and accurate information and support. All interventions that used videos, CDs or DVDs were also included since they can constitute the precursor of interactive, computer-based interventions when access to computers/the Internet is not available (Ryhänen et al., 2010). Concerning the purpose, interventions were included if

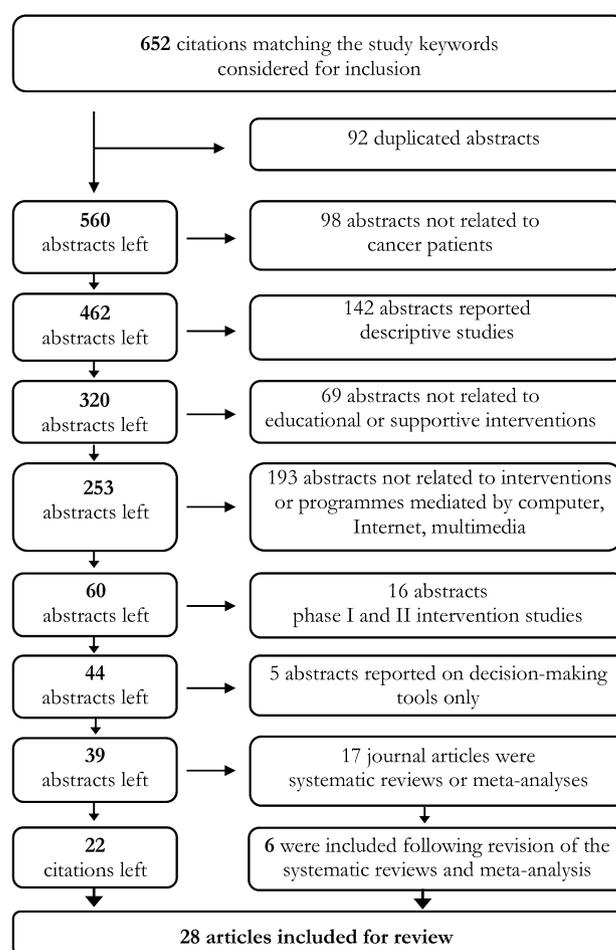


Fig. 1. Flowchart of the inclusion process.

they constituted educational and/or support tools. Studies were excluded if they descriptively analyzed health information websites, reported on the development (phase I) or exclusively on the usability, acceptability or feasibility (phase II) of interventions (Campbell et al., 2000). These studies did not elaborate on components (e.g. predictors of use, efficacy outcomes) considered important for enhancing the understanding of supportive e-health interventions.

Among the resulting articles, 17 research reviews (systematic reviews or meta-analysis) were found. These secondary sources were reviewed, resulting in the addition of six articles (primary sources) to the present review (Polit and Beck, 2011).

### Analysis and synthesis of the literature

All evidence retrieved came from quantitative empirical studies. When reviewing each of the journal articles included in the study, two main matrices were developed and used for the purpose of collecting structured data (Polit and Beck, 2011; Whittemore, 2005). A review matrix was kept containing a description of each study, covering author, year, country, aim, sample, instruments and outcomes, and conclusions. A similar register was kept for the characteristics of the interventions, covering the following domains: intervention designation, purpose, theoretical framework for the intervention, evidence at hand, intervention's duration, format and access, intervention/control group, presentation style and interveners, content source, subject and layout, utilization patterns and efficacy outcomes. Having concluded this process,

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