



## Review

# A systematic review of types and efficacy of online interventions for cancer patients



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## ABSTRACT

**Objective:** This review examines the evidence-based literature surrounding the use of online resources for adult cancer patients. The focus is online resources that connect patients with their healthcare clinician and with supportive and educational resources, their efficacy and the outcome measures used to assess them.

**Methods:** The following databases were systematically searched for relevant literature: MEDLINE, PsychINFO, Cochrane Central Register of Controlled Trials, CINAHL, Inspec and Computers and Applied Science. Included were studies conducted in an outpatient setting, and reporting a measurable, clinically relevant outcome. Fourteen studies satisfied the inclusion criteria.

**Results:** The efficacy of online interventions was varied, with some demonstrating positive effects on quality of life and related measures, and two demonstrating poorer outcomes for intervention participants. The majority of interventions reported mixed results. Included interventions were too heterogeneous for meta-analysis.

**Conclusions:** The overall benefit of online interventions for cancer patients is unclear. Although there is a plethora of interventions reported without analysis, current interventions demonstrate mixed efficacy of limited duration when rigorously evaluated.

**Practice implications:** The efficacy of on-line interventions for cancer patients is unclear. All on-line interventions should be developed using the available evidence-base and rigorously evaluated to expand our understanding of this area.

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## 1. Introduction

Recent advances in the detection and treatment of cancer have lead to an increase in the number of patients living with this burden of disease [1]. Currently, more than 60% of people diagnosed with cancer in Australia will live more than 5 years after diagnosis, and this figure is expected to rise [2]. Optimal management involves a multidisciplinary team, commonly accessed through an outpatient setting within a hospital system [3]. Increasing subspecialization of cancer care leads to centralization of services for specialized surgery and radiotherapy and access to clinical trials. However, centralized outpatient care is an episodic approach to assessment and treatment, and does not meet the fluctuating care needs of those living with cancer.

The Internet, and in particular various types of social media, provide new communication possibilities, with the potential to change the organization of health care [4,5]. There are many online health care options with possible benefits, especially for cancer patients, where an increasing number of survivors are requiring long-term care. Aside from the practical benefits, including avoiding the waiting room and scheduling appointments around other activities [6], online resources may be used to connect patients with their healthcare professionals, connect with others in a similar situation or to provide educational resources.

The desire or willingness for cancer patients to receive interventions online is currently unknown. However, given the increasing use of the Internet and social media for health-related searches and discussion, online interventions have the potential to be powerful tools in patient management [7–9]. Patients who would benefit most from the implementation of online interventions in a practical sense are those who have difficulty attending outpatient appointments (due to distance, lack of transport, deformity or disability) [5] and those with uncommon conditions, where expert management teams and support networks of peers with similar conditions may be hard to access [10]. The geography of Australia, with its highly concentrated populations and large landmass, raises problems for both the government in providing, and the regional population in accessing, the full range of healthcare services [11,12]. This is reflected in the decline in availability of cancer and oncology services in Australia as geographical distance from a major city increases [13]. Regional patients must therefore travel to access the necessarily centralized healthcare services. This carries a significant burden, both physically with regards to travel, and emotionally in terms of leaving support networks [12,14].

Access to healthcare is a significant contributor to the poorer health status of regional patients [15]. A significant and unacceptable health gradient exists between patients in major cities and those in rural and remote areas, with health outcomes generally worsening with distance from the capital cities [15]. Although this trend is exemplified in the Australian population due to the nation's geography, cancer patients have demonstrated poorer health outcomes due to distance from treatment in many populations worldwide [16,17]. Innovative solutions are needed to provide specialist healthcare and support for these patients. The Australian Government has recognized the potential for online

interventions to overcome health status disparities, naming health as a major objective of implementation of the National Broadband Network [18], recognizing that online interventions can remove the distance, time and cost barriers which make access to centralized healthcare services in rural and remote settings difficult [18]. Online interventions providing healthcare and support have the potential to transform quality of life for these patients.

The use of the Internet for health-related applications is widespread, with up to 80% of Internet users having searched for health information [7–9]. Although direct Internet search has been the mainstay, social media is emerging as a popular source of online health information [7,19,20]. Social media provides a platform for interactions around health topics relating to education and access to healthcare [21]. This ability for patients to engage and interact around their health, gives social media the potential to be used as a therapeutic measure. However, in order for social media to form an important part of disease management, it needs to be tailored to the individualized needs of patients [22]. This will involve further research into the affordances of social media and other online platforms, that is, their perceived and preferred uses and actions [22]. Affordances may differ with the user and the variety of online platforms that exist, which include real-time interactive groups, asynchronous bulletin boards and blogs with the opportunity for peer comment.

An increasing emphasis has been placed on the importance of QoL in the assessment of patients with cancer over the past two decades. This trend demonstrates understanding of the cancer experience that takes into account the physical aspects of cancer and treatment, as well as the psychological and emotional. Outcomes related to QoL were the focus of this review, and included both direct measures of QoL, and measures of outcome directly related to QoL, such as mood or symptom burden.

This review examines the evidence-based, outcome-focused literature surrounding interactive online resources for cancer patients within the healthcare system. We review (1) the types of interventions that have been trialled in cancer patients, (2) the outcome measures used to assess efficacy, with a focus on QoL measures, and (3) the efficacy of these online interventions.

## 2. Methods

### 2.1. Identification and selection criteria

The databases of MEDLINE, PsychINFO, Cochrane Central Register of Controlled Trials, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) were searched for publications of interest via a series of set headings and key terminology (searched Jan 2013). A further search of the databases Inspec and Computers and Applied Science was undertaken for completeness (June 2013). The search was updated in February 2014 and one additional article satisfying the inclusion criteria was identified and included in the analysis. No date limits were employed for these searches. The search strategies employed are available in Appendix A. Studies were excluded from the analysis if they reported only descriptive outcomes (such as feasibility or basic user satisfaction), if the focus was not on the cancer patient or

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