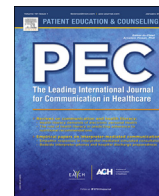




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Review article

The efficacy of telehealth delivered educational approaches for patients with chronic diseases: A systematic review

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ABSTRACT

Objective: The virtual delivery of patient education and other forms of telehealth have been proposed as alternatives to providing needed care for patients with chronic diseases. The purpose of this systematic review was to compare the efficacy of virtual education delivery on patient outcomes compared with usual care.

Methods: The review examined citations from 3 databases, MEDLINE, CINAHL, and EMBASE using the search words telehealth, chronic disease, patient education, and related concepts. From 2447 records published between 2006 and 2017, 16 high to moderate quality studies were selected for review. Eligible papers compared virtual education to usual care using designs allowing for assessment of causality.

Results: Telehealth modalities included the web, telephone, videoconference, and television delivered to patients with diabetes, chronic obstructive pulmonary disease, irritable bowel syndrome and heart failure. In 11 of 16 studies, virtually delivered interventions significantly improved outcomes compared to control conditions. In the remaining 5 studies, virtual education showed comparable outcomes to the control conditions.

Conclusions: Findings demonstrated that virtual education delivered to patients with chronic diseases was comparable, or more effective, than usual care.

Research implications: Despite its benefits, there is potential for further research into the individual components which improve effectiveness of virtually delivered interventions

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1. Introduction

Self-management and educational support are essential for those with chronic diseases [1]. Traditionally this support has occurred in face-to-face encounters but such access can be challenging due to competing demands, time, distance, and costs [2]. Barriers to accessing education for chronic disease management may lead patients to seek information from sources that are not always reliable. A study in the United Kingdom (UK), found that up to 75% of the population goes online for health information [3]. Seventy percent of Canadians go online to search for medical or health-related information [4] and it has been reported that the Internet, rather than physicians, is the first source of information for many people [5,6]. One study reported that more than two-thirds of patients did not receive information about their illness while they were in their doctor's office, and many people did not receive information about their medications [7,8]. Clearly, ensuring adequate access to education for all patients is a challenge.

Virtual health care and telehealth options generally offer populations with chronic disease unprecedented access to services [9]. Virtual health care has become a burgeoning section of the health care market due to the advancement and broad adoption of telecommunication technologies, demand for consumer-driven health care where convenience and access are an expectation, and need for cost containment [10]. According to a 2012 United States (US) Survey, 40–67% of patient consumers were interested in using innovative health information technologies such as videoconference and apps [11]. Education, core to chronic disease management, can be delivered through a range of virtual options, such as websites, apps, videos, and text messaging or some combination of these tools [9]. However, a strong evidence base is needed to guide healthcare professionals in selecting from among many options available for delivering virtual education.

Despite a plethora of systematic reviews of virtual-based interventions used in chronic disease prevention and control [12–14], only three previous systematic reviews could be found that specifically examined virtual educational interventions. Fredericks [9] found that web-based education, compared to printed education, significantly increased patients' self-care behaviors following post-operative cardiac surgery. Similarly, Kelly et al. [15] reported that compared to usual care, telehealth delivered diet education for adults with chronic disease, improved dietary adherence and lipid profiles. In another review, remotely delivered education did not reduce the 3-month average blood glucose (A1C) to the same magnitude as observed with individual, group, and combined individual/group diabetes self-management education [16]. Two of the three reviews [9,15] described virtual educational

interventions as one component of a larger intervention [15], or additionally included opportunities for accessing support (e.g., ask an expert) and functionalities (e.g., additional resources) [9]. These reviews were limited in addressing only a single virtual modality [9] not differentiating among collective modalities (e.g., telephone, online) [16], measuring only one patient outcome [9,16], targeting a specific educational focus (e.g., diet), [15], or including papers of moderate to low quality [9]. The current review expands on previous reviews by increasing the range of virtual modalities, outcomes, and educational foci under investigation and enhancing evidence quality.

2. Methods

2.1. Design

A systematic review was conducted, synthesizing findings from studies that compared the efficacy of virtually delivered education with usual care on patient outcomes.

2.2. Sample

The search strategy for this review was developed in cooperation with a Health Sciences Librarian, taking into account published strategies used in similar systematic reviews [17,18]. The following databases were searched: Medline, Embase, and CINAHL. Given the scope and nature of the topic under investigation it was felt that these databases would provide exhaustive exposure to high quality data. Following guidelines from the *Cochrane Handbook of Systematic Reviews*, a combination of keyword and database-specific subject headings were used in the search to maximize the sensitivity of the strategy [19]. Keywords, relevant synonyms; and associated truncations used in the search revolved around three concepts—telehealth; chronic disease; and patient education. A full copy of the search history for Medline is included in [Table A1](#) in Appendix A in accordance with the PRISMA guidelines [20]. The database searches were conducted from March 22nd to 24th, 2017 with results exported to RefWorks and organized into folders based on the names of the database searched. Duplicates were then removed before the citations were exported into Microsoft Excel for screening.

Initial search results yielded 4531 papers across all databases. After duplicate citations were removed, a total of 2447 relevant citations were screened. Title and abstract screening were undertaken by two trained Research Assistants (MF, MT) and quality checks completed by one member of the research team (KR). Disagreements about inclusion were discussed until

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