

Review

A systematic review of active video games on rehabilitative outcomes among older patients

Nan Zeng^a, Zachary Pope^a, Jung Eun Lee^b, Zan Gao^{a,*}

^a School of Kinesiology, University of Minnesota, Minneapolis, MN 55455, USA

^b Department of Applied Human Sciences, University of Minnesota-Duluth, Duluth, MN 55812, USA

Received 4 July 2016; revised 2 September 2016; accepted 5 September 2016

Available online 5 December 2016

Abstract

Background: Although current research supports the use of active video games (AVGs) in rehabilitation, the evidence has yet to be systematically reviewed or synthesized. The current project systematically reviewed literature, summarized findings, and evaluated the effectiveness of AVGs as a therapeutic tool in improving physical, psychological, and cognitive rehabilitative outcomes among older adults with chronic diseases.

Methods: Seven databases (Academic Search Complete, Communication & Mass Media Complete, ERIC, PsycINFO, PubMed, SPORTDiscus, and Medline) were searched for studies that evaluated the effectiveness of AVG-based rehabilitation among older patients. The initial search yielded 946 articles; after evaluating against inclusion criteria and removing duplicates, 19 studies of AVG-based rehabilitation remained.

Results: Most studies were quasi-experimental in design, with physical functioning the primary outcome investigated with regard to the use of AVGs in rehabilitation. Overall, 9 studies found significant improvements for all study outcomes, whereas 9 studies were mixed, with significant improvements on several study outcomes but no effects observed on other outcomes after AVG-based treatments. One study failed to find any benefits of AVG-based rehabilitation.

Conclusion: Findings indicate AVGs have potential in rehabilitation for older patients, with several randomized clinical trials reporting positive effects on rehabilitative outcomes. However, existing evidence is insufficient to support the advantages of AVGs over standard therapy. Given the limited number of studies and concerns with study design quality, more research is warranted to make more definitive conclusions regarding the ability of AVGs to improve rehabilitative outcomes in older patients.

© 2017 Production and hosting by Elsevier B.V. on behalf of Shanghai University of Sport. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Keywords: Balance; Depression; Enjoyment; Exergaming; Physical functioning; Quality of life

1. Introduction

Active video games (AVGs; also known as exergames) require players to physically interact with on-screen avatars through various physical activities (PAs) such as dancing, jogging, and boxing.^{1,2} Given the fact that increased PA has been proven a viable approach to preventing or lessening risk of chronic diseases among a variety of populations,^{3,4} AVGs may represent an alternative means in promoting PA participation and improving quality of life (QoL) and life satisfaction. Indeed, the positive effects of AVGs on health-related outcomes have been reported among healthy children and youth.^{5–8} More recently, however, AVGs have received considerable

attention from researchers and health care professionals as a rehabilitative tool in clinical settings to promote individuals' physical, psychological, and cognitive functioning.^{9–13}

1.1. Rationale

Chronic diseases like obesity, Parkinson's disease, hypertension, arthritis, and diabetes, as well as poststroke symptoms, can force seniors to gradually abandon independent activities such as bathing, dressing, and transferring positions.¹⁴ According to the Centers for Disease Control and Prevention, chronic diseases are the leading causes of death among U.S. adults aged 65 years or older, and millions of older adults have chronic illnesses who are struggling to manage their daily symptoms.¹⁵ Additionally, approximately 80% of older adults in the USA are suffering from at least 1 chronic condition, and 50% have at least 2.¹⁶ As a result, chronic diseases place a significant burden on older adults because these diseases can affect an individual's

Peer review under responsibility of Shanghai University of Sport.

* Corresponding author.

E-mail address: gaoz@umn.edu (Z. Gao)

ability to perform daily activities, thereby diminishing QoL. Because many of the preceding diseases often require some form of rehabilitation, some researchers and health professionals believe that AVG-based rehabilitation may increase treatment adherence and reduce treatment burden (e.g., the need to travel to a clinic if an AVG system is set up at home) among older adults.^{10,11}

A number of reviews with regard to AVGs have been published recently. Yet most systematic reviews on the topic were mainly focused on PA promotion and obesity prevention among healthy children and young adults.^{1,17,18} Only a few review articles synthesized the rehabilitative effects of AVGs among rehabilitation patients and/or older adults. Specifically, these reviews evaluated evidence regarding the rehabilitative effects of AVGs on physical outcomes,¹⁹ Parkinson's disease,²⁰ and heart failure treatment²¹ while also investigating the safety and efficacy of AVG interventions among older adults²²—the population with the greatest need for rehabilitative services. Despite the need for an innovative and effective rehabilitation protocol among older adults, however, no known comprehensive review has specifically addressed the effectiveness of AVGs on rehabilitative outcomes in this population.

1.2. Objective

Because 29% of Americans older than 50 years of age play video games,²³ it is important for researchers to synthesize research findings regarding the potential use of AVGs in rehabilitation programs, with the goal of providing practical implications and recommendations for health care professionals. Therefore, the purpose of this review was to systematically examine the effectiveness of AVG-based rehabilitation among older adults (≥ 60 years)²⁴ with chronic illnesses and/or physical impairments and propose future directions in research and rehabilitation settings utilizing this PA modality.

2. Methods

The Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement was consulted and provided the structure for this review.²⁵

2.1. Eligibility criteria

The following inclusion criteria were used for each study: (1) published in English between January 2000 and August 2016 as peer-reviewed empirical research, (2) employed the use of at least 1 AVG (e.g., Xbox Kinect, Wii, Dance Dance Revolution, *etc.*), (3) composed of older adults (mean age ≥ 60 years) with chronic diseases and/or physical impairments (e.g., Parkinson's disease, impaired balance, poststroke status, *etc.*), (4) stated that the main purpose of AVG use was for patient rehabilitation, and (5) used quantitative measures in the assessment of health-related outcomes.

2.2. Information sources and search strategies

To ensure inclusion of relevant literature, a comprehensive electronic search was conducted. The following 2-step strategy

was adopted: (1) all studies relating to the topic were located using 7 databases: Academic Search Complete, Communication & Mass Media Complete, ERIC, PsycINFO, PubMed, SPORTDiscus, and Medline. Search terms used in combination were the following: “exergaming” or “active video gam*” or “wii*” and “rehabilitation” or “therapy” or “clinical” and physical” or “cognitive” or “psychological”. Relevant studies were further identified by means of cross-referencing the bibliographies of selected articles.

2.3. Data collection process

Three authors (NZ, ZP, ZG) screened the search results independently by evaluating the titles. If the researchers were unable to determine whether an article pertained to the topic, then the abstract was reviewed. All potential articles were downloaded as full text and stored in a shared folder, after which 3 authors (NZ, ZP, JEL) reviewed each article independently to ensure that only relevant entries were included. A list of published articles on the topic of AVGs and rehabilitation was then created in a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA). The following data were extracted: (1) year of publication and country of origin, (2) methodological details (e.g., study design, experimental context, sample characteristics, study duration, outcome measures, AVG types, and instruments), and (3) key findings with respect to clinical effectiveness and the potential for rehabilitative outcomes (e.g., improved functional abilities, reported changes in QoL, reduced fear of falling, *etc.*).

2.4. Risk of bias in individual studies

Based on previous literature,^{1,18} the risk of bias in each study was rated independently by 3 authors (NZ, ZP, JEL) using a 9-item quality assessment tool (Table 1). Items were assessed for each study as “yes” (explicitly described and present) or “no” (absent, inadequately described, or unclear). In particular, Items 1, 3, 4, and 8 in Table 1 were deemed the most important because these items had greater potential to significantly affect the research findings. Additionally, a design quality score ranging from 0 to 9 was computed by summing up the “yes” answers. A study was considered high quality when it scored above the median after the scoring of all studies. To ensure valid scoring of the quality assessment, 2 authors (NZ, JEL) independently scored each article. When incongruities occurred between the 2 authors, a third author (ZP) assessed any unresolved differences for scoring accuracy.

3. Results

3.1. Study selection

The initial search yielded 946 articles. After removing duplicates, titles and abstracts of the remaining papers were screened against the inclusion criteria. After a thorough review of the remaining papers, 19 studies were included in this review (Fig. 1). A high inter-rater agreement (i.e., 95%) was obtained between the authors for the articles included.

Download English Version:

<https://daneshyari.com/en/article/5122055>

Download Persian Version:

<https://daneshyari.com/article/5122055>

[Daneshyari.com](https://daneshyari.com)