

Effects of the use of Active Video Games in Balance and Quality of Life Systematic Review



Baltazar, A., Vidigal, I., Ferreira, M., Salvador, P., Alves Lopes, A.¹
¹ Escola Superior de Saúde do Alcoitão, Santa Casa da Misericórdia de Lisboa, Portugal

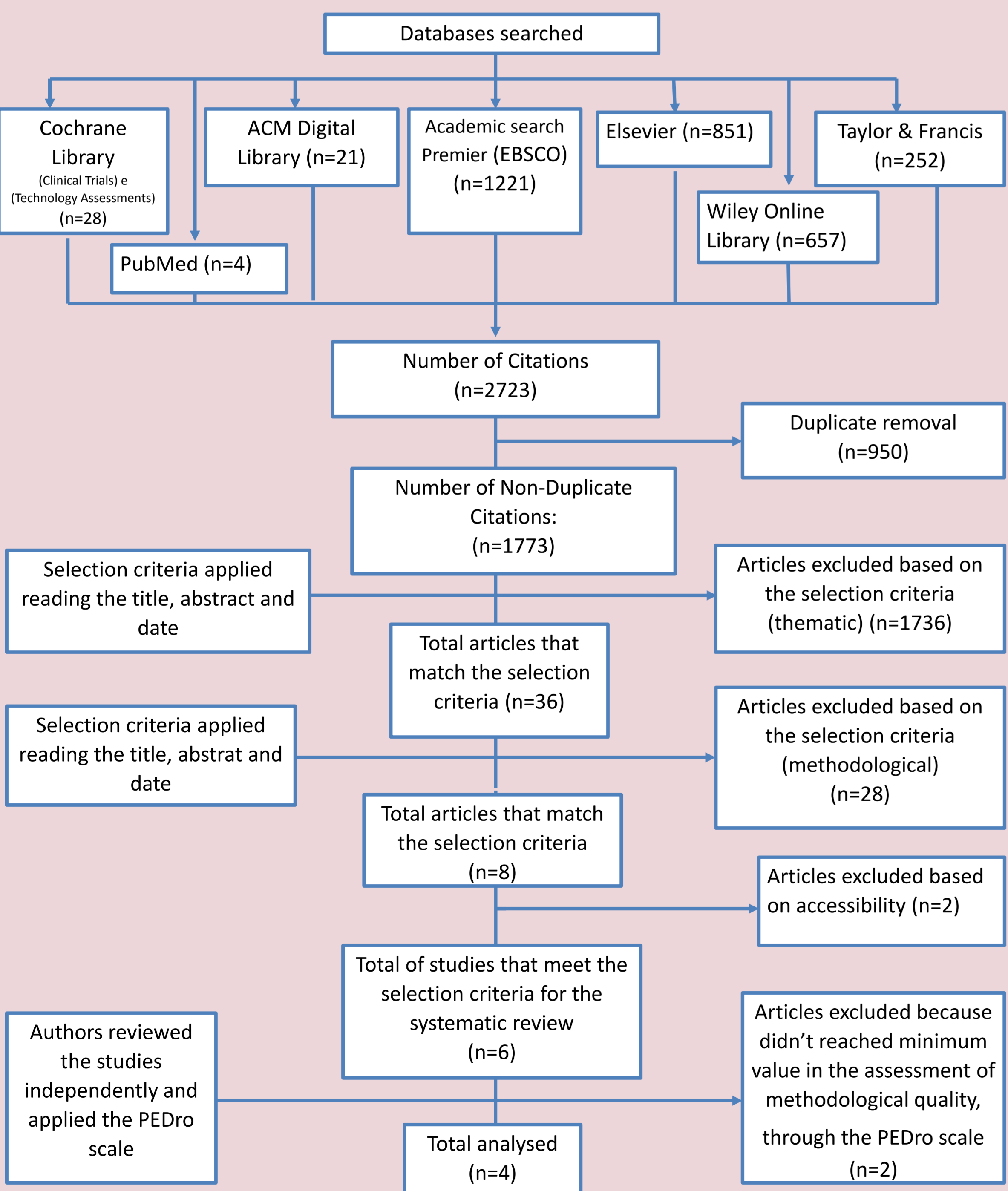
Introduction

The decline of balance, cognitive function and other aspects as neuromuscular and osteoarticular function is considered normal and associated with the aging process. There are also many factors that can contribute to these balance changes, such as decreased efficiency in the processing of sensory information, neurological injuries and musculoskeletal conditions, which inevitably end up interfering with the quality of life of individuals. In recent years there has been increasing involvement of information and communication technologies in society, in particular the use of Active Video Games in the area of health and wellness throughout the life cycle. The main concept of exergames is based on the idea of using physical activity (body movements) as input to interact with a digital game, hoping to replace the sedentary activity that qualifies the traditional video games. So it we considered important to study the effectiveness of it's use in some aspects like balance and quality of life.

Objective

To study (what is) the effectiveness of Active Video Games intervention programs on outcomes like balance and quality of life along the life cycle. With the following selection criteria: Period publication of the last ten years; Studies published in English, Spanish and Portuguese; Type of intervention used: Exergames; Video games; Active Video games, Wii, Playstation, Xbox. Outcomes: postural balance and quality of life; Human throughout the life cycle; RCT's that meet the criteria 2, 7 and 8 of the PEDro rating scale

Methodology



Research and analysis of the articles included in this systematic review were prepared according to the protocol for conducting a systematic review based on the guidelines set by **PRISMA Statement**.

The research expression was adapt for each database, according to the terms that produce results. Therefore, the final equation used to study the following was:

“video games” OR “active video games” OR Wii OR Playstation OR Xbox OR exergame) AND (“postural balance” OR “quality of life”)

All the results were imported into a reference manager (EndNote[®] X5).

After we obtained the final sample, we analyzed the methodological quality of the selected study's using the **PEDro scale** and completed the analysis grid for each item. In all the steps each article was analyzed independently by two members of the group. The study was completed in June 2011.

Results

Title	Objective	Main Results	Conclusions	PEDro Score
Virtual reality training for stroke rehabilitation	To evaluate the effectiveness of a 2-D virtual reality (2DVR) programme in the training of people with stroke on how to access and use the station facilities of the Mass Transit Railway (MTR)	Twenty and sixteen subjects respectively received 10 training sessions using the 2DVR strategy and a video-based psycho-educational programme. An additional 22 subjects formed the control group. They were assessed by using a behavioural checklist of MTR skills and a newly validated MTR self-efficacy scale. The subjects of both training groups showed a significant improvement in their knowledge, skills and self-efficacy in using the MTR ($p < 0.01$), whereas, the MTR skills and self-efficacy of the control group remained stable over a four-week interval.	Though both training programme were effective in training the patients with stroke, they demonstrated differential improvements in MTR skills and related self-efficacy. Additional studies are recommended to identify the most effective training procedures for maintaining these skills and the best transfer ratio in the training of VR-based community living skills of people with stroke.	10/11
Changes in balance in older adults based on use of physical therapy vs the WiiFit gaming system: a preliminary study	To determine the effectiveness of Wii Fit training on balance control in older adults compared with physical therapy training.	All subjects showed improvement in the Berg Balance Scale and Bubble Test scores. The PT and PW groups tended to perform better than the WI group on the Berg Balance Scale following treatment. Although the differences in the Bubble Test score were not substantial between the PW and WI groups, the PW group performed slightly better than the WI group on the Berg Balance Scale.	Wii Fit training appears to improve balance. However, physical therapy training on its own or in addition to Wii Fit training appears to improve balance to a greater extent than Wii Fit training alone.	8/11
Effects of a Wobble Board-Based Therapeutic Exergaming System for Balance Training on Dynamic Postural Stability and Intrinsic Motivation Levels	To compare the effects of wobble board exercises with and without feedback provided through integrating the wobble board movement into a computer game system, by comparing changes in postural stability and motivation.	Star excursion balance test scores showed a statistically significant ($P < .008$) improvement in the posteromedial and posterolateral direction for both groups. No within-group change for the dynamic postural stability index or between-group difference for star excursion balance test or dynamic postural stability index scores were observed. The “interest and enjoyment” category of the Intrinsic Motivation Inventory showed significantly higher scores ($p < .001$) in the exergaming group at follow-up, which was 1 of the 5 Intrinsic Motivation Inventory categories evaluated.	The findings suggest that exercising with the therapeutic exergaming system showed similar improvements in dynamic postural stability and showed a greater level of interest and enjoyment when compared to a group doing similar balance training without the game system.	9/11
eBaViR, Easy Balance Virtual Rehabilitation System: a Study with Patients	The aim of the study is to determine whether this setup could be applied as a Virtual Rehabilitation System for balance rehabilitation in Acquired Brain Injury	The results obtained in the clinical study show significant improvement of static balance in patients trained with the eBaViR system over the control group. However, there was no difference in the dynamic balance tests between the trial group and the control group.	Another point that must be studied further is whether the use of eBaViR system would improve the dynamic balance of patients when executing more dynamic exercises than those already tested. Furthermore, physiotherapists have shown a great interest in testing the system for improving static equilibrium in earlier stages of rehabilitation.	10/11

- There is no consensus among the studies analysed as to the true relation between balance gains and the utilization of the different Active Video Games .
- However that relation has been verified in the outcome quality of life. It was shown relation ofn the motivation levels and interest in therapy. Those could contribute to a better adhesion to the therapeutic treatment and consequently increase functional gains.

Conclusions

According to the studies in this systematic review, it was possible to verify that the utilization of active video games could be option as an instrument in the rehabilitation process of patients who have balance disturbance and decreased levels of quality of life, since the system promotes motor control and motor learning. This systematic review has a some impact in Physiotherapy profession because it allows to share the main results of studies performed in the topic so far and promote the usage of Active Video Games in the physiotherapy practice.

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Contacts

Email: aalopes@essa.pt
 Escola Superior de Saúde do Alcoitão
 Rua Conde Barão. Alcoitão
 2649-506 Alcabideche. Portugal

