

Nintendo Wii as a Training Tool on Quality of Life in Elderly

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1 OBJECTIVES

The aim of this study was to assess the quality of life data of non-institutionalized and functionally independent elderly submitted to an exercise training protocol using virtual interactive games generated by Nintendo Wii.

2 METHODS

This is an interventional and self-controlled study. Participated in the study, 10 elderly (58 ± 6.4 years, 63.8 ± 13.6 kg, 152 ± 6 cm and BMI 27.4 ± 4.7), members of the Family Health Program (PSF) of the Muzambinho city, Minas Gerais, Brazil.

Experimental Routine. The experimental procedures were performed at the Laboratory of Physical Activity in Virtual Environment (LAFAV, IFSULDEMINAS, Câmpus Muzambinho, Minas Gerais, Brazil). This laboratory has six Nintendo Wii consoles with their accessories and let the training was conducted in a group. Each volunteer had a physical area to carry out the training of approximately 25 m^2 and was 1.5 meters in front of to the television set that reproduced the virtual environment. The experimental routine consisted of: (a) a preliminary assessment of the parameters of quality of life, (b) training protocol with virtual reality (VR) promoted by interaction with the Nintendo Wii console (Nintendo, Kyoto, Japan) and (c) final evaluation of same parameters previously evaluated. In addition, all training was monitored individually by a researcher.

Assessment of Quality of Life. The quality of life was assessed with the questionnaire SF-36 (Medical Outcomes Study 36 - Item Short Form Health Survey). The SF-36 consists of 36 items grouped into eight domains: 1 - Functional Capacity (FC) 2 - Physical Aspects (PA), 3 - Emotional Aspects (EA) 4 - Pain (P), 5 - General Health Status (GHS) 6 -

Vitality (V) 7 - Social Aspects (SA) and 8 - Mental Health (MH). Each of these domains has received scores from 0 to 100, where zero corresponds to the worst score and 100, the best score. Moreover, it was evaluated the dimensions related to general mental health (SA + EA + MH; maximum 300 points) and physical health (FC + PA + P + V + GHS; maximum 500 points). The SF-36 was administered through individual interviews (Ware et al., 1993).

Environment and Virtual Training. The virtual environment was simulated by the console Nintendo Wii. The input devices that allowed the interaction process Wii-elderly were: (a) Wii Remote, which is equipped with an accelerometer capable of detecting motion in three dimensions and communicates via wireless (Bluetooth) with the Sensor Bar, which is responsible for detecting and transmitting to the console infrared signals generated by the Wii Remote, (b) Wii Motion Plus adapted to Wii Remote. Thus, the movements are reproduced more accurately, in real time (1:1) and faithful reproduction of the player's movements on the projection screen virtual environment (Wii, 2011), (c) balance board, which is a validated clinical instrument and high reliability when compared with the force platform (Clark and Kraemer, 2009), (d) software Wii Fit Plus, which has about 50 different exercises grouped into five categories: yoga, balance exercises, aerobic exercises, muscle strength exercises and training plus. The VR training consisted of 8 sessions lasting 60 minutes each and frequency of 2 times per week. All exercise training had 4 weeks. Each session was structured with the application of 16 virtual games in three stages: warm up, training and cool down, necessarily in that order. The training was performed in groups of five volunteers each.

Statistical Analysis. Statistical analysis was performed using paired *T-Student test*. Data were expressed as mean \pm standard deviation and were considered statistically significant those with a value

of $p < 0.05$.

3 RESULTS

Table 1 shows the results of assessment of quality of life prior and post the VR training. Post After training with VR, it was observed a significant improvement in the pain (77.8%) and general health (16.7%) domains ($p < 0.05$). Although the remaining domains showed improvements, it were with no statistical significance ($p > 0.05$). By analyzing the dimensions of SF-36 questionnaire, it was identified significant improvement in physical health dimension (16.19%) ($p < 0.05$).

Table 1: Assessment of life of quality.

Variables	Experimental Time	
	Prior	Post
Domains		
Functional Capacity	75 ± 21,0	81,6 ± 13,0
Physical Aspects	88,8 ± 13,2	86,1 ± 33,3
Pain	45,6 ± 24,2	81,1 ± 20,0*
General health status	59,7 ± 15	69,7 ± 16,6*
Vitality	66,6 ± 20,9	71,6 ± 17,7
Social Aspects	93,1 ± 16,7	88,8 ± 19,2
Social Aspects	93,1 ± 16,7	88,8 ± 19,2
Emotional Aspects	74,1 ± 43,4	74,1 ± 36,4
Mental health	71,5 ± 20,0	71,1 ± 20,3
Dimensions		
Physical Health	335,9 ± 58,1	390,3 ± 99,1*
General Mental Health	238,7 ± 68,4	234,1 ± 63,4

* Indicates $p < 0.05$ (Post vs. Prior)

4 DISCUSSION

The aging favours the onset of functional limitations and reduces the availability and motivation for physical activity (Elward and Larson, 1992). Several studies attribute to regular physical activity, as a positive factor that favours longevity, reduction of prescription drugs, prevention of cognitive decline, maintain functional status, reducing the frequency of falls and the incidence of fractures, in addition to the psychological benefits such as improved self-esteem (Elward and Larson, 1992). Moreover, it is justified the inclusion of tools that seek to promote physical activity by the elderly. Thus, the purpose of this study was to investigate the effects of a exercise training protocol in a virtual environment with the Nintendo Wii games, on quality of life in elderly healthy and not institutionalized.

The main findings of the present study are associated with a better perception of the elderly as their quality of life after use of the Nintendo Wii. It was observed after the protocol with the Wii, a significant improvement in the pain (ie, the elderly reported less pain after study) and general health domains and physical health dimension. Similarly, Sposito et al., (2013) observed favourable results in the quality of life of elderly women undergoing training with the Nintendo Wii. Moreover, it has been reported the possible benefit of Nintendo Wii on physical and vitality (Cindy, 2008); (Graves et al., 2008).

In summary, the results of this study support the hypothesis that training with Nintendo Wii is beneficial to improve the quality of life of elderly healthy and functionally independent.

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