

Virtual Electronic Environments to Facilitate Exercise Participation and Adherence

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Objective: To develop and evaluate virtual reality technology to be used with cardiovascular exercise equipment during five phases in order to increase adherence, enjoyment and satisfaction of a cardiovascular exercise program, specifically for people with a developmental disability (DD) or spinal cord injury (SCI).

Design: Quasi-experimental study for Phases I and II completed.

Setting: The greater Denver metropolitan area.

Participants: A total of 42 male and female adult/adolescents between the ages of 16 and 65 were recruited for Phases I and II. These participants were sedentary (no consistent exercise in the last six months). Eighteen individuals participated in Phase I (12 without disability, 2 with SCI, and 4 with DD), and 24 in Phase II (14 without disability, 4 with SCI, and 6 with DD).

Intervention: Participants were trained on the use of standard, cardiovascular exercise equipment consisting of treadmills, stationary bicycles and an upper body ergometer. They were also educated on benefits of exercise, appropriate exercise intensity and heart rate monitoring. Exercise equipment without addition of entertainment was used in Phase I, and equipment with individual flat screen monitor display of programmed television with audio was used in Phase II.

Main Outcome Measures: The participants were prescribed a 3 times per week, 12-week exercise program with the opportunity to continue for an additional 6-week period. Attendance during the 12-week and 6-week exercise program was recorded; additional measures included resting heart rate, blood pressure, exercise heart rate, calories exerted and the amount of time spent on the exercise machines. Information was collected using questionnaires on motivation, enjoyment, quality of life, environmental barriers to exercise and past physical activity history. The most pertinent results are discussed below.

Results:

Phase 1

Participation and dropout. In this phase, three of the 11 individuals without disabilities did not attend any exercise sessions during the 12-week program, while five completed the program. On average, these individuals dropped out between the 4th and 9th weeks of the program. One person with SCI completed the program; the other dropped out between the 4th and 6th week. All four people with DD completed the 12-week program.

Adherence and adoption. Adherence was calculated as the percentage of exercise sessions attended. Each participant was asked to attend three sessions per week for 12 weeks. On average, the participants without disabilities attended 37% of their sessions during the 12-week program and three of them attended the additional 6-week session; participants with SCI attended 58% of their sessions and one of the participants attended the 6-week session; and participants with DD attended 72% of their sessions and all of them attended the additional 6-week session.

Phase 2

Participation and dropout. Two of the participants without disabilities attended every exercise session, while two did not attend any. Nine of these participants completed the study. Two of the four people with SCI completed the study. All of the participants with DD completed the program.

Adherence and adoption. On average, the participants without disabilities attended 55% of their sessions during the 12-week program and seven of them attended the additional 6-week session; participants with SCI attended 48% of their sessions and two of them attended the 6-week session; and participants with DD attended 71% of their sessions and all but two participated in the 6-week session.

Conclusion: When barriers to exercise were removed or modified, people with disabilities demonstrated better adherence and adoption than individuals without a disability.

Discussion: Sample sizes were too small to detect any statistically meaningful differences. A list of considerations when developing exercise programs for individuals with a DD and SCI was compiled.

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