

Exergaming by Sedentary Middle-Aged Adults Did Not Alter Self-Reported Dietary Intake and Physical Activity

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Abstract

- Self-regulation and self-control is a critical consideration to ensure the cogency of the final result in long-term, exercise-related studies since they act as confounding variables that can impact the outcome.
- Although researchers informed subjects to maintain unwavering lifestyle habits during the experiment, the sedentary middle-aged adults were predicted to change their habits in some way in terms of diet and exercise due to increased health awareness elicited by the study.

PURPOSE: To investigate the change in dietary nutrients and physical activity after sedentary middle-aged adults have participated in regular, consistent exergaming.

METHODS: 12 sedentary, middle-aged men and women (56±3.6 years, 162.0±10.9 cm, 79.2±19.1 kg, % fat mass 39.6±7.7 %) using interactive exercise exergaming under monitored conditions at a low to moderate intensity level with self-selected exercises for 20 minutes a day, 3 days a week for 8 weeks. A three-day diet record was used to assess dietary intake and the Yale Physical Activity Survey (YPAS) to estimate energy expenditure and to document the frequency and intensity of various activities before and after the study for each subject.

RESULTS: No significant differences were found between before the exercise intervention and after for total energy intake or any dietary nutrient. The only variable in the YPAS analysis to change was the standing score which significantly increased (5.00-7.33, p<0.05). However, total energy expenditure per day (p=0.10) as well as activity dimension index (p=0.12) did not change.

CONCLUSION: Dietary intake and physical activity did not change, indicating a strong control for confounding variables which can adversely impact final results and render invalid data analysis. The increase in standing score suggests that participation in exergaming can lead to more awareness for healthier lifestyle habits.

Background

Regular participation in physical activity is one of the most effective ways to prevent obesity, cardiovascular disease and other morbidities[1] as well as improve quality of life and increase functional independence in older adults with and without disabilities[2]. In order to implement this behavior change, alternative, innovative, long-term, economically feasible interventions and therapeutic approaches are needed. Interactive video game systems controlled through arm gestures and body motions are becoming increasingly popular and widely promoted. One such commercially-available and relatively inexpensive platform is the Nintendo Wii® originally released in 2006. The Wii introduced a novel style of active gameplay by using wireless controllers that interact with players through a motion-detection system. The potential advantages of utilizing the Wii therapeutically was first reported in 2007[3]. The proposed benefits included improving post-stroke patients' fine and gross motor co-ordination, balance, and strength. Indeed, the term "Wii-habilitation" is used in the literature to describe the benefits of the Wii system during patient rehabilitation[4]. Theoretically, if the exercise intensity reached while playing the Wii is moderate, such participation has the potential of meeting the physical activity guidelines established by the American College of Sports Medicine[5].

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Objectives

- To investigate the change in dietary intake and physical activity before and after sedentary middle-aged adults participated in regular, consistent Nintendo Wii® exergaming.

Methods

- 12 sedentary adults, 50-64 years old, recruited locally
- 24 exercise visits (20 min/visit, 3 visits/week) over 8 weeks
- Pre-study and post-study questionnaire and food record: Yale Physical Activity Survey (YPAS) and three-day diet record (analyzed via Nutritionist Pro)
- SAS Statistical Suite Version 9.4

Subject Demographics

Age (years)	56.6 ± 3.6
2 Males, 10 Females	
Height (cm)	160.0 ± 46.2
Weight (kg) pre-study	79.2 ± 19.1
Weight (kg) post-study	79.1 ± 19.2
Fat Mass (kg) pre-study	31.5 ± 10.0
Fat Mass (kg) post-study	31.6 ± 11.4
Fat Mass % pre-study	39.6 ± 7.7
Fat Mass % post-study	39.5 ± 7.9
Ethnicity	
Caucasian	10
African American	1
Asian	1

Values expressed as Mean ± SD.

Yale Physical Activity Survey

Activities

Work (i.e. shopping, housework, etc.)
Yard Work (i.e. gardening, raking, etc.)
Caretaking (i.e. pushing wheelchair, etc.)
Exercise (i.e. brisk walking, yoga, aerobics, etc.)
Recreation (i.e. dancing, golf, tennis, etc.)
Vigorous Activity Score
Leisurely Walking Score
Moving Index Score
Standing Index Score
Sitting Index Score

3-Day Diet Record

Aspects

Date, time, amount, brand, method of preparation, and comments logged to measure diet as accurately as possible.

Results

Figure 1. Diet

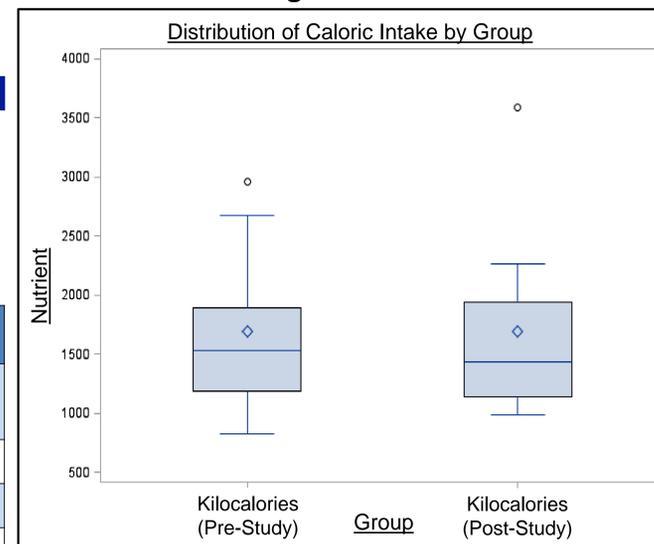


Figure 1: Total Daily Caloric Intake Before/After Study. No significant differences were found between before the exercise intervention and after the exercise intervention for total energy intake or any dietary nutrient.

Figure 2. Standing Score

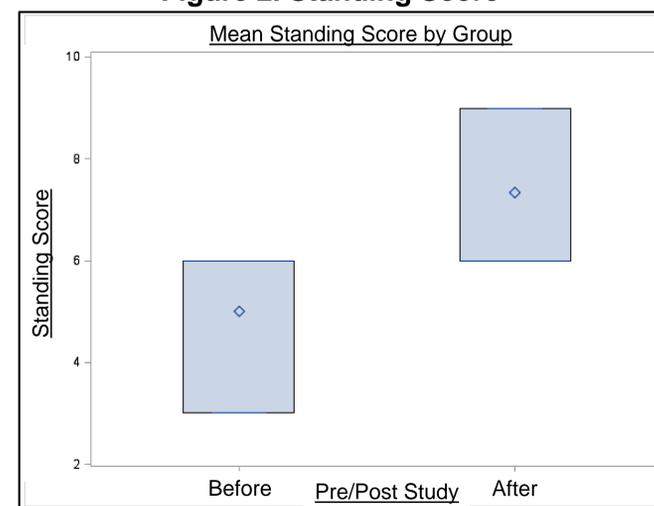


Figure 2: Standing Score Before/After Study. Standing score significantly increased (5.00-7.33, p<0.05) among the subjects.

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Results (Cont'd)

Figure 3. YPAS Mean Scores

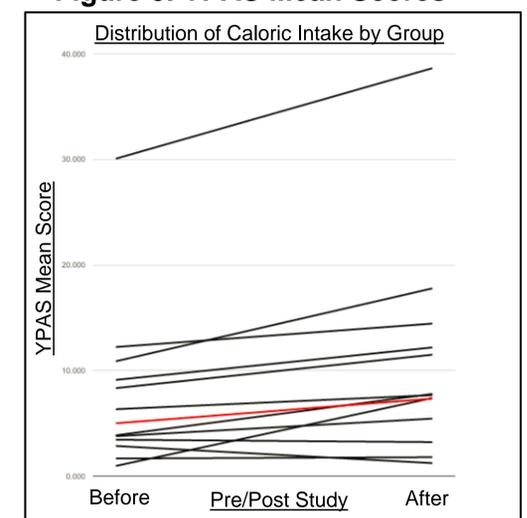


Figure 3: YPAS Scores Before/After Study. The only variable to increase significantly in YPAS analysis was the standing score.

Discussion

- No significant differences were found before and after the exergaming study in total energy intake or in any dietary nutrient.
- Total energy expenditure per day (p=0.10) as well as activity dimension index (p=0.12) did not change.
- The only variable to change within the analysis of the YPAS was the standing score, which significantly increased (5.00-7.33, p<0.05).
- The unvarying data regarding total energy expenditure per day and activity dimension index reinforces the validity of the measured variables from the study; it allows other data retrieved from the same subjects, like functional fitness and heart rate, to be analyzed without undesired effects from possible confounding variables outside of the experiment.

Conclusion

- Dietary intake and physical activity represent possible confounding variables in exercise-related studies, therefore these two factors were subject to analysis for consistency.
- Confounding variables produce unwanted variation that may unexpectedly impact final results. Dietary intake and physical activity did not change, indicating that they were not confounding variables.
- The increase in standing score suggests that participation in exergaming may lead to more awareness for healthier lifestyle habits.
- The overall study, after verifying the absence of possible confounding variables, can be followed up by examining the efficacy of in-home Nintendo Wii® exergaming amongst sedentary people.