The Effect of Standing-Desks on Productivity in Obese Populations

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Hypothesis: The researcher hypothesized that standing desks will have no significant effects on motor skills and a positive effect on cognitive functions.

Abstract

Sedentary behaviors can have negative health effects even if suggested activity recommendations have been met. Many people sit for a majority of the day, especially at work. Several studies have been conducted on the effects of the standing desk on cognitive function and motor skills in a healthy population, but none on the obese population. This study was designed to understand how the use of a standing desk would affect the cognitive function and motor skills of obese subjects. As the obesity epidemic is increasing, many people in the workforce fall into the obesity category. The subjects were asked to stand for 1.5 hours before testing began to mimic the suggested time to use a standing desk during the day. The results were compared to the results when the subjects were sitting. They were then analyzed to see how standing affected cognitive function and motor skills.

Review of Lit

Study 1: Finch, Tomiyama & Ward (2017)
- How standing-desks affect reading comprehension and creativity
- No improvement or impairment in reading comprehension or creativity
- Participants felt more interested, enthusiastic & alert when standing as oppose to sitting
- Limitations: Duration & participants were healthy college aged students

Study 2: Reiff, Marlatt & Dengel (2012)
- If staning-desks have a greator caloric expenditure than sitting desks
- Standing desks increased caloric expenditure from 1.02 kcals/min when sitting to 1.36 kcals/min when standing
- Limitation: Duration (45 min)

Study 3: John et al. (2009)
- If walking as opposed to sitting affects the ability to perfrom office simulated tasks
- Used the Stroop Color & Word Test & GRE to test cognitive function
- Used a typing test and mouse profficiency test to determine motor skills
- No significant changes
- Limitation: Duration (60 min)

Study 4: Chau et al. (2016)
- First known study to analyze the affects of standing desks in an office settting with real employees
- Studied office workers and productivity of their tasks when using a standing desks
- Not only did the study show no difference objectively in performance but there was no significant change in subjective perceptions of productivity or energy levels
- Small convenience sample & some non-compliance

Methods

1. Preliminary meeting: BMI is measured; Participants are cleared; PAR-Q is submitted
2. Informational meeting: Participants are briefed of study purpose, risks and procedure. Assigned to sit or stand on first day, and then given specific dates to attend the study.
3. Study, Day 1: Participants get in proper position (sit or stand) and are allowed to adjust desk to comfortable height.
4. Participants are allowed to communicate to eachother for the first 1.5 hours while they either work on a soduku or word search
5. Participants are randomly given the one of the 5 tests and told to remain quiet for the remainder of the study.
6. After each test, Participants are asked to answer a short 4 question survey. Once it is completed. the next randmly assigned test will be given.
7. Once all tests have been completed, participants are asked to return in 48 hours.
8. Study, Day 2: Participants are asked to take the position opposite to what they did on the first day.
9. The study was then completed the exact same way as the first day, with all tests being randomly assigned.

Operational Definitions

Obesity:
- Sedentary individuals with a body mass index (BMI) of 30 - 35 kg/m^2
- Two-thirds of Americans are either overweight or obese
- Occurs when the body does not regulate energy intake, energy expenditure and energy storage correctly

Physical Activity:
- Produces a decline in energy expended, but also declines resting metabolic rate and the thermic effect of food

Sedentary Behavior:
- Any waking behavior that involves less than 1.5 METS while in a sitting or reclining position

Motor Skills:
- Movements of bone structures
- Was tested by assessing mouse proficiency and typing speed

Cognitive function:
- Means of acquiring information
- Was tested by assessing the performance on a practice GRE as well as the Stroop Color and Word Test

Potential Implications

The largest limitation found in prior research was the amount of time the study was conducted. The present study will analyze if standing for the recommended 2-4 hours (John et al., 2009), has an effect on cognitive function and motor skills. If the hypothesis is supported, this study can be used to formulate a plan to integrate standing-desks into everyday work. By doing so, the risks involved with sitting can be minimized and cognitive function will improve. This research will be beneficial to employers and employees, as health will be increased which will decrease the cost of health insurance.

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