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Research Paper

Sedentary behavior in adults with visual impairments

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Abstract

Background: Specific sedentary behaviors (SB) are associated with risk factors for preventable chronic health conditions in adults, yet time participating in SB has increased over the years.

Objective: To explore the SB habits of individuals with visual impairments (VI) and the relationship with self-reported visual acuity (VA).

Methods: Individuals participated in this cross-sectional study by completing the Patient-centered Assessment & Counseling for Exercise (PACE+) Sedentary Behavior Questionnaire (SBQ) for adults to assess estimated time spent in nine SB. Means and frequencies of SB were conducted and 2 × 4 ANOVAs were used to explore differences in SB by gender and VA.

Results: Seventy-one men (36.1 ± 14.2 yrs; 28.5 ± 6.7 kg/m^2) and sixty-nine women (35.9 ± 12.3 yrs; 29 ± 8.3 kg/m^2) with VI participated in this study. Individuals reported spending most time watching television (TV), traveling, and doing paperwork/computer work. Participants spent 9.95 ± 4.78 h per day engaging in SB during the week and 8.53 ± 4.29 h per day on the weekend. Significant differences were found between VA for reading on weekdays (B1 = 1.41 ± 1.81 vs. B4 = 0.42 ± 0.60 h/day) and weekend days (B1 = 1.55 ± 1.75 vs. B4 = 0.48 ± 0.67 h/day), as well as for watching TV on the weekends (B4 = 2.69 ± 1.61 vs. B1 = 1.39 ± 1.52 h/day).

Conclusions: When reducing SB it may be important to target specific SB based upon the individual. Programs that support the reduction of SB must be encouraged.

Keywords: Visual impairment; Visual acuity; Sedentary behavior; PACE+ SBQ

Sedentary behaviors (SB) currently dominate the average American's typical day.[1] "Sedentary behavior" refers to any waking behavior characterized by an energy expenditure ⩽ 1.5 METs while sitting or reclining.[2] The greatest contributors to SB are described by the SLOTH model, incorporating **s**leep, **l**eisure, **o**ccupation, **t**ransportation, and **h**ome-based activities.[3] Common work-based sedentary activities include paperwork and/or computer work, while leisure home-based sedentary activities include watching television, socializing, and playing on the computer.[4] A current review on patterns and trends in physical activity in the United States identified specific changes in these domains since the 1950s, further contributing to Americans spending approximately 55% of their day sitting, lying, or reclining during waking hours.[1,5] For example, Americans have seen decreases in high-activity occupations, increased daily travel time, and a doubling of the hours per day of television viewing over the last 60 years.[6,7] Currently, the most common sedentary activities include watching television (TV), socializing, reading, playing games/using the computer, and relaxing.[4]

While SB are common across all ages, genders, and ethnicities, certain groups of individuals tend to accumulate more sedentary time than others.[1] Individuals with disabilities, for example, were more likely to report a sedentary lifestyle than individuals with no disability.[8–11] One study of African-American women with disabilities found that 86% and 74% of the women spent more than 10 h of their waking day inside the home on weekdays and weekends, respectively. Further, the women reported sitting, lying down, and/or sleeping for an average of 18 h per day, or 75% of their waking time, with 17% reporting sitting, lying

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and/or sleeping for 24 h per day.[12] Likewise, a study examining older adults found that those with mobility disabilities spent more time sedentary and engaged in longer bouts of SB compared to those without mobility disabilities.[11]

Very few studies have specifically examined SB among individuals with visual impairments (VI). While there is a dearth of research on the sedentary habits of adults with VI, some literature has identified trends of SB in children and adolescents with VI. One study analyzing physical activity habits of children 6–12 years old found that those with VI spent significantly greater time in SB compared to their sighted peers (81.4% vs. 78.1%).[13] With current research highlighting the increase in SB that occurs with aging, it is likely that those with VI will demonstrate similar trends, such as replacing physical activities with more SB as they age.[1]

One population that may be at risk for increased time spent in SB are individuals with VI. Engaging in excessive SB is particularly alarming as it not only contributes to weight gain over time, but may also lead to impaired glucose metabolism and cardiovascular function.[14–17] Prolonged sitting in sighted individuals, for example, was associated with increased waist circumference, body mass index (BMI), blood pressure, and blood lipid levels and was also found to contribute to impaired glucose metabolism.[17] Furthermore, a dose–response relationship exists such that greater time spent engaging in SB can contribute to an earlier onset and/or greater magnitude of these complications.[18] In older adults, for example, those with VI reported greater prevalence of stroke, osteoporosis, depression, diabetes, arthritis, hypertension, and heart disease compared to their sighted peers.[19] Engagement in excessive SB may be a substantial contributor to these health complications.

Therefore, it is of particular importance to identify SB trends in people with VI, not only to improve health, but also specifically to reduce the subsequent onset of negative health conditions commonly associated with prolonged SB. Therefore, the purpose of our study was to profile the SB of adult men and women with VI in free-living environments and examine differences in these behaviors across visual acuity (VA).

Methods

Study design

This was a cross-sectional study, designed to examine the frequency and duration of time spent in a variety of common SB in adults with varying levels of VA. Visual impairment was determined by level of visual acuity or degree of field loss as determined by each participant's optometrist. For the purpose of this paper we will use visual acuity when discussing magnitude of VI for each participant. Eligible individuals were 15–39 years old, who were visually impaired, and participants in the Wellpoint National Fitness Challenge sponsored by the United States Association of Blind Athletes (USABA). While registering for the fitness challenge, individuals were given the option to voluntarily participate in the study. Data were collected from January through April of 2014. Due to the relatively low number of individuals under the age of 18 participating in the study, only data for those 18 years of age and older were analyzed for this study. All data were collected in accordance with the World Medical Association's Declaration of Helsinki. All data were collected electronically. Participants read and signed an online informed consent document approved by the University's Institutional Review Board and the USABA. Data were collected anonymously, eliminating any potential bias. Eligible participants completed a demographics questionnaire and the Patient-centered Assessment & Counseling for Exercise Sedentary Behaviors Survey (PACE+) Sedentary Behavior Questionnaire (SBQ) for adults.

Participants

A total of 227 participants were recruited from 35 institutions/schools specifically for individuals with VI that were participating in the Wellpoint National Fitness Challenge in 21 states across the United States. One hundred and forty individuals successfully completed the present study (71 males and 69 females). Participants were approximately 36 ± 13.3 years of age, with 60% identifying as Caucasian. Additional participant characteristic information can be found in Table 1.

Visual acuity classifications are based on the recognized standards for international sport participation from the International Blind Sports Federation and the USABA guidelines, and are as follows: B1 = no light perception in either eye up to light perception, but inability to recognize the shape of a hand at any distance or in any direction; B2 = from ability to recognize the shape of a hand up to visual acuity of 20/600 and/or a visual field of less than 5° in the better eye with the best practical eye correction; B3 = from visual acuity above 20/600 and up to visual acuity of 20/200 and/or a visual field of less than 20° and more than 5° in the better eye with the best practical eye correction; B4 = from visual acuity above 20/200 and up to visual acuity of 20/70 and a visual field larger than 20° in the better eye with the best practical eye correction.[20]

Questionnaires and anthropometrics

All participants were asked to complete an online demographics questionnaire. This form inquired about age, gender, ethnicity and race, household income, VA, as well as self-reported height (inches) and body mass (pounds). The anthropometric information (Table 1) was used to estimate body size via BMI by dividing body mass (kg) by body height in meters squared (m^2).

Participants were then provided online instructions for the completion of the PACE+ SBQ survey.[21] The survey