The Role of Physical Activity in the Relationship Between Sitting Time and Insulin Resistance

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ABSTRACT

PURPOSE: The primary objective of the present study was to determine the role of physical activity in the relationship between sitting time and insulin resistance in 7,092 randomly selected U.S. adults. **METHODS:** Cross-sectional data from the National Health and Nutrition Examination Survey (NHANES), 2011-2018, were used to answer the research question. NHANES data for 2019-2020 were not available because of COVID. Participants were selected using a multi-stage, random sampling strategy. Subjects reported average sitting time, quantified as the number of minutes spent per day sitting. Insulin resistance was determined using HOMA-IR (homeostatic model assessment). HOMA-IR is the most common measure of insulin resistance in the literature, calculated by multiplying fasting glucose (mg/dL) by fasting insulin (uU/mL) and dividing by 405. Low HOMA-IR scores indicate insulin sensitivity, and high scores mean increased insulin resistance. Physical activity (PA) was indexed using minutes per week of moderate PA and vigorous PA. These values were summed, resulting in a measure of total minutes of MVPA. Because of the cluster sampling technique employed by NHANES, degrees of freedom in the denominator were 62 for each statistical analysis. Multiple regression using SAS was employed to determine the linear relationship between sitting time and HOMA-IR, with both measures treated as continuous variables. Partial correlation was used to control for potential confounding factors, including minutes of PA. **RESULTS:** Average (+SE) sitting time was 376.8+4.25 minutes per day and average physical activity per week was 164.2+5.5 minutes. Mean (+SE) HOMA-IR was 3.2+0.06. After controlling for age, sex, race, and year of assessment, the relationship between sitting time and HOMA-IR was significant (F=29.64, P<.0001). After controlling for differences in these factors plus physical activity, the relationship between sitting time and HOMA remained linear and highly significant (F=24.81, P<.0001). **CONCLUSION:** In U.S. adults, minutes of daily sitting were strongly related to insulin resistance, regardless of physical activity level. In short, it appears that it does not matter whether or not U.S. adults are highly active or sedentary or somewhere in-between, time spent sitting remains a good predictor of insulin resistance.