

Obesity linked to low endurance, increased fatigue in the workplace

July 23 2014

U.S. workplaces may need to consider innovative methods to prevent fatigue from developing in employees who are obese. Based on results from a new study published in the *Journal of Occupational and Environmental Hygiene (JOEH)*, workers who are obese may have significantly shorter endurance times when performing workplace tasks, compared with their non-obese counterparts.

The study, conducted at Virginia Tech in Blacksburg, Va., examined the endurance of 32 individuals in four categories (non-obese young, obese young, non-obese older, and obese older) who completed three distinct tasks that involved a range of upper extremity demands—hand grip, intermittent shoulder elevation, and a simulated assembly operation. Each task involved periods of work and rest, and included pacing demands similar to those experienced by workers in manufacturing settings.

"Our findings indicated that on average, approximately 40 percent shorter endurance times were found in the obese group, with the largest differences in the hand grip and simulated assembly tasks. During those tasks, individuals in the obese group also exhibited greater declines in task performance, though this difference was only evident among females," said Lora A. Cavuoto, PhD, an assistant professor in the department of industrial and systems engineering at the University at Buffalo, SUNY, in Buffalo, New York.

In addition to examining how obesity affected physical demands and

capacity, Cavuoto and her colleagues looked at the interactive effect of obesity and age on endurance times.

"Previous studies have indicated that both age and obesity lead to decreased mobility, particularly when it comes to walking and performing lower extremity tasks. However, we found no evidence of an interactive effect of obesity and age on [endurance](#) times, which is contrary to previous findings," said Maury A. Nussbaum, PhD, a professor in the department of industrial and [systems engineering](#) at Virginia Tech, who also worked on the study.

Obesity is associated with physiological changes at the muscular level, including a decrease in blood flow, thereby limiting the supply of oxygen and energy sources. When performing sustained contractions, these physiological changes may lead to a faster onset of muscle fatigue. The prevalence of obesity has doubled over the past three decades, and this increase has been associated with more healthcare costs, higher rates of workplace injury, and a greater number of lost workdays.

According to Cavuoto and Nussbaum, the results from this and related studies will contribute to a better understanding of the ergonomic impacts of [obesity](#) and age, which is important for describing the link between personal factors and the risk of workplace injury.

"Workers who are obese may need longer rest breaks to return to their initial state of muscle function. Based on the increased fatigue found among workers who are obese, workplace designers may need to consider adding fixtures and supports to minimize the amount of time that body mass segments need to be supported. We believe our results will help to develop more inclusive ergonomic guidelines," said Cavuoto.

More information: *Journal of Occupational and Environmental Hygiene* [DOI: 10.1080/15459624.2014.887848](https://doi.org/10.1080/15459624.2014.887848)

Provided by American Industrial Hygiene Association

Citation: Obesity linked to low endurance, increased fatigue in the workplace (2014, July 23)
retrieved 11 May 2024 from <https://medicalxpress.com/news/2014-07-obesity-linked-fatigue-workplace.html>

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