Long working hours can be toxic

There are complex interconnections of variables such as work hours, occupation type, and socioeconomic status with physiology that can affect the risk of diabetes. Results of investigations into associations between long working hours and incident type 2 diabetes have been inconsistent. In The Lancet Diabetes & Endocrinology, Mika Kivimäki and colleagues combine published and unpublished data in a meta-analysis (n=222 120) to show that working long hours is associated with increased risk of incident diabetes in people with low socioeconomic status.1

Their study design and methods have several advantages: large sample size, consistent exposure definition, control for health behaviours and other potential confounders, and analysis to test for bias due to the method used to determine diabetes incidence. Importantly, the investigators enable clear comparisons with previous reports by presenting serially adjusted analyses largely replicating previous findings.

However, the investigators’ discussions of residual confounders focused primarily on the possibility that confounding might explain the higher diabetes risk in the low socioeconomic groups; whereas, residual confounding by protective factors could lead to an underestimation of the effect of the exposure in the workers in the high socioeconomic status group. Workers in this group have additional capital, social, or other resources at their disposal that might mitigate the effects of long working hours. For example, they are able to contract out activities such as child care and household chores, thereby buying more weekly hours.

Unresolved issues of measurement and residual confounding make us guarded about the study’s conclusions, especially the assertion that the lack of an association in workers in the high socioeconomic status group negates the possibility that working long hours per se is toxic. In occupational health studies, work hours are an essential component of exposure assessments. Fundamentally, the acuity of the work exposure above and beyond the duration of habitual paid work hours (eg, intensity of physical or mental work, schedule flexibility, and commute burden) is often not measured in epidemiological studies.2 Unmeasured differences in how workers of different socioeconomic groupings achieve total weekly hours might affect the risk of diabetes. Reviews with national samples show that workers in the high socioeconomic status group have greater schedule control, meaning that they are able to spread their hours throughout the week.3 Meanwhile, workers in lower socioeconomic status groups might achieve the same number of hours by working overtime,4 a form of long working hours in hourly paid employees and with potential health consequences. For example, injury rates associated with working overtime (61%) are higher than for working 12 h a day (37%) or 60 h a week (23%).4 Longer daily schedules or schedules that are disruptive, such as early morning arrival, late night departure, and non-continuous hours might involve far less control in workers in the low socioeconomic status group, and involve disruptions of circadian rhythms or sleep and other health behaviors.

Kivimaki and colleagues’ finding of an association only in the low socioeconomic status group suggests a possible role of sleep as a mediator; both inadequate sleep quality and quantity are strongly predictive of incident type 2 diabetes.5 A recent study showed that the association between short sleep duration and diabetes can be partly attenuated by inclusion of socioeconomic status.6 Working more consistent and less disruptive hours might explain the lack of associations for the individuals in the high socioeconomic status group. A related idea is the role of social jet lag—long working hours and short sleep during the weekdays combined with delayed sleep times on the weekend—that disrupts the circadian timing system and adversely affects metabolism.7 Laboratory studies have identified mechanisms by which disruption of the circadian system increases the risk of diabetes.8 Night work, a cause of circadian disruption, is also associated with higher risks of type 2 diabetes. In a prospective 5-year follow-up of workers with prediabetes, night workers had a five times greater rate of conversion to frank diabetes. Of note, stress and an administrative role were associated with a greater risk of diabetes, whereas being an office worker and non-smoker, among other factors, were protective in the same sample.9

Kivimäki and colleagues’ elegantly designed study provides a solid foundation for both epidemiological and intervention work on diabetes risks. The results remained robust even after controlling for obesity...
and physical activity, which are often the focus of diabetes risk prevention, suggesting that work factors affecting health behaviours and stress might need to be addressed as part of diabetes prevention.

*Orfeu M Buxton, Cassandra A Okechukwu

Division of Sleep Medicine, Harvard Medical School, Boston, MA, USA (OMB); Department of Medicine, Brigham and Women’s Hospital, Boston, MA, USA (OMB); Department of Social and Behavioral Sciences, Harvard School of Public Health, Kresge Building, Boston, MA, USA (OMB, CAO); and Department of Biobehavioral Health, Pennsylvania State University, 219 Biobehavioral Health Bldg, University Park, PA 16802, USA (OMB)

Orfeu@PSU.edu

OMB reports grants from Sepracor (now Sunovion) and Cephalon (now Teva); personal fees from Takeda Pharmaceuticals North America, Dinsmore, Matsutani America, Wake Forest University Medical Center, American Academy of Craniofacial Pain, National Institute of Heart, Lung and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases, National Postdoctoral Association, Oklahoma State University, Oregon Health Sciences University, SUNY Downstate Medical Center, American Diabetes Association, and New York University outside of the submitted work. CAO declares no competing interests.

Support was provided by grants from the National Institutes of Health (R01HL107240, OMB) and National Institute for Occupational Safety and Health and Centers for Disease Control and Prevention (U19OH008861, CAO).

Copyright © Buxton et al. Open Access article distributed under the terms of CC BY-NC-SA.


