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INVITED COMMENTARY

Evolution of Research on the Effect of Unemployment on Acute Myocardial Infarction Risk

Dupre and colleagues¹ have analyzed data from the Health and Retirement Study to explore whether job losses that occur toward the end of workers' careers are associated with an elevated risk for acute myocardial infarction (AMI) and whether repeated exposure to job loss exacerbates this risk. Several decades of research in this field, provoked by a phenomenon introduced to the US labor market with the advent of international competition in capital-intensive industries in the late 1970s, have demonstrated a fairly convincing relationship between job loss and adverse health.² Although the most robust association is arguably with mental health, evidence of the somatic effects of job loss is mounting, particularly among workers nearing normal retirement age. The findings presented by Dupre et al—which suggest that job loss raises the risk for AMI, and that risk accumulates with repeated exposure—extend this literature in the domain of physical health.

I will discuss what I believe are 3 distinguishing attributes of the study by Dupre et al in this literature. Thereafter I will offer some suggestions for the evolution of research in this field. The gist of my argument is that the report by Dupre et al should mark the end of an era in which outcomes studies of unemployment have been pursued. Plenty of compelling evidence exists to move on. Egregiously absent is research on why and how a socioeconomic exposure, such as job loss, influences health.

Explorations of these questions, however limited, should mark the beginning of the next period of research.

TEMPORAL ORDERING OF JOB LOSS AND AMI

The study by Dupre et al is one of few to explore an outcome (in this case, AMI) that can be ensured to occur after the job loss exposure, in which case appropriate causal inference can be drawn. This inference is important because temporal ordering is perhaps the most vexing matter for scientists in this field of inquiry. Job loss is classically investigated via analysis of observational panel data, which are extracted from national or regional population surveys. The typical study of job loss pairs a static outcome measure (eg, How would you rate your *current* health?) with retrospectively derived labor force information (Have you lost a job *since we last interviewed you?*), normally within a 2-period, interwave, cohort design. In this scheme, a follow-up (time 2) health outcome (eg, self-rated health) is analyzed as a function of job loss, which occurs between baseline (time 1) and follow-up, and covariates, some of which are measured at baseline and others of which capture changes between the observation points. Although this approach has numerous appealing qualities, it cannot guarantee that the job loss occurred before any decline in self-rated health. Change in self-rated health is inferred by comparing subjective health

ratings at 2 finite points in time—the dates of the baseline and follow-up surveys—whereas the job loss can happen anywhere during that interval. This point is of critical importance to the question of causal inference, for if the job loss cannot be attributed to a *subsequent* health decline, evidence of an effect of the job loss exposure is substantially weakened. Dupre et al circumvent the problem of temporal precedence by exploring an outcome whose date is reported and can therefore be compared with the date of job loss.

DATA SUFFICIENCY

Another valuable contribution of this study is that its analyses are based on substantially more data than those of 2 similar Health and Retirement Study studies that also ensured the temporal ordering of job loss and AMI (ie, data sufficiency).^{3,4} Data sufficiency is indispensable in studies of rare outcomes, particularly those that draw data from population-based surveys that are not targeted to the outcome of interest. Chief among the problems associated with small numbers is misclassification of the outcome. The earlier studies,^{3,4} which I performed with colleagues, had rather few MI events (we also investigated strokes, with even fewer events). We were, thus, ever concerned that assignment of even a few of the events to the wrong exposure category could bias the findings. Some measure of comfort has been derived from the findings by Dupre et al, which confirm our essential results.

CUMULATIVE EFFECTS OF JOB LOSS

A legitimate advance to the literature in this field is the exploration by Dupre et al of a dose response to the job loss exposure. Onerous data requirements and complex data management have precluded this form of analysis in much previous research. One exception is a study that found less severe mental health effects with repeated exposure.⁵ Although seemingly contradictory, the 2 sets of findings considered together may rule out mental health changes as a viable mechanism for the adverse cardiovascular outcomes.

PERSPECTIVE AND FUTURE DIRECTIONS

The loss of employment is undoubtedly stressful. In fact, researchers speculate that job loss occasions a range of interrelated stressors that require considerable resources to combat. These stressors are too many and too entangled to enumerate and describe, which brings us to the problem plaguing the literature and retarding its development: how best to identify some of the relevant pathways from job separation to adverse health.

Many mechanisms have been proposed. Financial difficulty, social withdrawal, behavioral changes, elevated cortisol levels, and chronic anxiety are only a few potentially modifiable factors that may afflict unemployed workers. At least 2 studies have suggested recovery of affective health with reemployment^{6,7}; yet reemployment is intertwined with many of the mechanisms described, which obfuscates the pathways at work in this reversal. Moreover, finding a new position, particularly in the current economic circumstances, is no simple task. In any

case, if we wish to intervene therapeutically rather than occupationally, we must understand some of the psychological processes that are called on after job loss. Two areas that should be considered by researchers are transactional stress⁸ models and changes in time orientation (or a discount rate).⁹ The first area, which would use psychometric tools to assess how workers evaluate and manage or cope with employment separation, could point to specific therapies to diminish the stressor's effects. The second area could identify whether job loss leads individuals to "discount" temporally the costs associated with future events, including adverse health. A change to a more present-focused perspective could be damaging, in that individuals with such an orientation might be more likely to engage in harmful behaviors, which could precipitate adverse somatic health changes.

Isolation of groups whose health is particularly vulnerable to the experience of job loss is a related step toward amelioration of the detrimental health effects. However, such groups are not easily definable, because clusters of factors likely combine to produce differential vulnerability. Classical regression methods are incapable of defining complex heterogeneity. As such, investigators must be armed with a more sophisticated set of empirical tools, among them latent mixture models.

Sufficient evidence exists of the negative influence of job loss on health. The next generation of studies should identify reasonable pathways from job separation to illness so that nonoccupational interventions may be developed and targeted to the most vulnerable individuals.

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