Published in final edited form as:

Brain Behav Immun. 2019 July ; 79: 14–15. doi:10.1016/j.bbi.2019.03.014.

The burden of being poor: Stress at the belly of the matter

Ashley E. Mason*

UCSF Department of Psychiatry, Center for Health and Community, San Francisco, CA, USA

UCSF Osher Center for Integrative Medicine, San Francisco, CA, USA

Keywords

Socioeconomic status; Abdominal fat; Cardiovascular disease; Stress recovery

Steptoe and colleagues' recent article published in *Brain, Behavior, & Immunity* (Steptoe et al., 2018) broadened our knowledge of the associations between lower socioeconomic status (SES) and a diverse array of increased cardiovascular disease (CVD) risk factors. Notably, the authors found that an association between lower SES and slower cardiovascular recovery following a laboratory mental stress task was stronger among individuals with greater central adiposity, after accounting for body mass index (BMI). Although Steptoe and colleagues reported on several CVD risk factors, here I briefly address two of them: cardiovascular recovery and central adiposity. Steptoe and colleagues' analyses suggest shifts in our approaches to CVD risk reduction in low SES groups. In particular, analyses suggest that shifts from a focus on (1) cardiovascular reactivity to cardiovascular recovery, and (2) BMI to central adiposity, warrant consideration. Such shifts hold implications for interventions targeting CVD risk reduction in low SES groups.

1. Support for shifting targets in CVD risk reduction

Cardiovascular reactivity versus recovery.

Prior work suggests that both greater cardiovascular reactivity during, and slower recovery following, laboratory mental stress tasks, are associated with greater CVD risk (Chida and Steptoe, 2010). Steptoe and colleagues (Steptoe et al., 2018) found that lower SES was more strongly associated with slower cardiovascular recovery following, and less strongly associated with reactivity during, mental stress tasks (Steptoe et al., 2018). These data contribute to a growing body of literature showing that among lower SES groups, CVD risk is more strongly associated with cardiovascular recovery following these tasks than with reactivity during these tasks (Boylan et al., 2018). Failing to recover (downregulate physiological responses) following mental stressor exposures may contribute to physiologic 'wear-and-tear' that contributes to poorer cardiovascular health in low SES groups (McEwen, 1998). Thus, improving capacity for adaptive recovery following mental stressor exposures may narrow SES disparities in CVD risk.

*Address: University of California, San Francisco, Osher Center for Integrative Medicine, 1545 Divisadero Street, Suite 301, San Francisco, CA 94115, USA. ashley.mason@ucsf.edu.

Body mass index versus central adiposity.

Central adiposity and CVD are both more common among lower than higher SES groups. Steptoe and colleagues' (Steptoe et al., 2018) finding that central adiposity exacerbates an association between lower SES and greater CVD risk highlights its importance as an intervention target in lower SES groups. Importantly, data have long suggested that central adiposity is more strongly associated with CVD risk than overall BMI (Yusuf et al., 2004), and even in the absence of absolute weight loss, reducing central adiposity confers reductions in CVD risk (Ross and Janiszewski, 2008). Thus, reducing central adiposity rather than BMI may have a larger impact on the association between lower SES and greater CVD risk.

2. Intervening to reduce CVD risk

Cardiovascular recovery. Intervening on the appraisal processes that occur during and following mental stressor exposures may hold promise in promoting adaptive cardiovascular recovery. Reappraisal interventions aim to shift perceptions of bodily (physiological, e.g., increased heart rate) responses following mental stressors from detrimental (e.g., “*I can’t cope*”) to adaptive (e.g., “*My body is reacting to stress, and I can use this to find a solution*”) (Jamieson et al., 2013). In turn, shifting towards adaptive responding lessens recovery demands. To date, reappraisal interventions have yielded improvements in stress-related CVD-related processes: Relative to control interventions, laboratory reappraisal interventions have precipitated increased cardiac efficiency, lower vascular resistance, and greater heart rate variability, following mental stressor tasks. Researchers have largely tested reappraisal interventions using mental stressor paradigms relevant to academic achievement (e.g., exam-taking) and mood disorders (e.g., cognitive distortions). Extending protocols testing these interventions using a diversity of stressors, particularly those most salient for low SES groups, is an important next step.

Psychological resources. A second promising avenue for promoting cardiovascular recovery following mental stressor exposures is building and bolstering psychological resources. These resources, such as purpose in life, positive affect, self-esteem, and self-mastery, can buffer associations between post-stressor recovery and CVD risk (Boylan et al., 2016). Psychological resources may impart this buffering effect by supporting emotion-regulation processes (e.g., reappraisal) or by promoting more effortful, yet more adaptive behavioral responses to mental stressors (e.g., choosing to go on a walk rather than drinking a beer on the couch). Additionally, common components of self-management interventions, such as decision-making, problem-solving, resource utilization, and feasible and adaptive action, may promote psychological resources.

Central adiposity

Most metabolic health interventions target weight loss, rather than central adiposity, and do so through prescriptive diet plans. Yet, such interventions often disappoint: merely one in three US adults with overweight or obesity maintains a weight loss of 5% of greater (Kraschnewski et al., 2010). Though often paired with nutrition interventions, physical activity interventions can reduce central adiposity independently of BMI. Indeed, expanding

our conceptualization of physical activity as something worth doing often and regardless of length would provide a better bench-to-bedside translation of the known dose-response association between physical activity and metabolic health. We have sufficient data to divorce physical activity interventions from outcomes relying on the bathroom scale, but have yet to optimize how to do this.

Lower SES groups are less likely to be physically active than their higher SES counterparts, hence, physical activity may be an especially important lever in reducing disparities in central adiposity and corresponding CVD risk across SES groups. To date, data suggest variability in the effectiveness of physical activity interventions in low SES groups. Specifically, physical activity interventions appear most effective among children and in the context of school-based interventions (Craike et al., 2018). Such interventions include traditional physical activity classes, classroom-based physical activities (e.g., the TAKE10! program), or “exercise snack breaks” taken between classes or at periodic times throughout the day. Physical activity interventions among low SES adults have been less effective; however, group-based physical activity interventions and interventions that focus solely on physical activity (in the absence of dietary intervention) (Craike et al., 2018), may be among the more effective strategies. These findings highlight the importance of capitalizing on structured education settings to cultivate exercise habits in children, and on focusing on physical activity interventions in the absence of dietary intervention.

3. Conclusion

Steptoe and colleagues (Steptoe et al., 2018) further clarified the importance of cardiovascular recovery and central adiposity in the association between SES and CVD risk. There are several avenues for advancing these findings toward impactful interventions targeting CVD risk reduction in low SES groups, in particular, developing and testing theoretical models for intervening on cardiovascular recovery following mental stress, and designing physical activity interventions that leave the bathroom scale behind.

Funding

The preparation of this article was supported by an award from the National Institutes of Health (NIH), National Heart, Lung, and Blood Institute (NHLBI) to Ashley E. Mason (K23HL133442).

References

- Boylan JM, Jennings JR, Matthews KA, 2016 Childhood socioeconomic status and cardiovascular reactivity and recovery among Black and White men: mitigating effects of psychological resources. *Health Psychol. Off. J. Div. Health Psychol. Am. Psychol. Assoc* 35 (9), 957–966.
- Boylan JM, Cundiff JM, Matthews KA, 2018 Socioeconomic status and cardiovascular responses to standardized stressors: a systematic review and meta-analysis. *Psychosom. Med* 80 (3), 278–293. [PubMed: 29381657]
- Chida Y, Steptoe A, 2010 Greater cardiovascular responses to laboratory mental stress are associated with poor subsequent cardiovascular risk status a meta-analysis of prospective evidence. *Hypertension* 55 (4), 1026–1032. [PubMed: 20194301]
- Craike M, Wiesner G, Hilland TA, Bengoechea EG, 2018 Interventions to improve physical activity among socioeconomically disadvantaged groups: an umbrella review. *Int. J. Behav. Nutr. Phys. Act* 15 (1), 43. [PubMed: 29764488]

- Jamieson JP, Mendes WB, Nock MK, 2013 Improving acute stress responses: the power of reappraisal. *Curr. Dir. Psychol. Sci* 22 (1), 51–56.
- Kraschnewski JL, Boan J, Esposito J, et al., 2010 Long-term weight loss maintenance in the United States. *Int. J. Obes* 34 (11), 1644–1654.
- McEwen BS, 1998 Protective and damaging effects of stress mediators. *N. Engl. J. Med* 338 (3), 171–179. [PubMed: 9428819]
- Ross R, Janiszewski PM, 2008 Is weight loss the optimal target for obesity-related cardiovascular disease risk reduction? *Can. J. Cardiol* 24, 25D–31D.
- Steptoe A, Hiltl T-J, Dowd JB, Hamer M, 2018 Socioeconomic status and central adiposity as determinants of stress-related biological responses relevant to cardiovascular disease risk. *Brain Behav. Immun.*
- Yusuf S, Hawken S, Ôunpuu S, et al., 2004 Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 364 (9438), 937–952. [PubMed: 15364185]