Effects of socioeconomic status on social support, perceived stress, and inflammation in the aftermath of a petrochemical accident

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INTRODUCTION

Low socioeconomic status (SES) has been consistently linked to a variety of poor physical health outcomes. One of the potential mechanisms contributing to SES disparities to health, as suggested by the Reserve Capacity Model (Gallo & Matthews, 2003), is that individuals with low SES not only are confronted with more stressors, but also have less tangible, interpersonal, and intrapersonal resources at their disposal to deal with such stressors. In turn, a depleted pool of resources, caused by the continual strain imposed by stressful situations, translates in maladaptive patterns of psychosocial and biological reactivity to stress and ultimately poor health outcomes. Leveraging data collected before and after a petrochemical explosion, the current study aimed to investigate how individuals from different SES backgrounds responded to this unexpected and acute stressor in terms of perceived social support, perceived stress, and systemic inflammation.

PARTICIPANTS & PROCEDURE

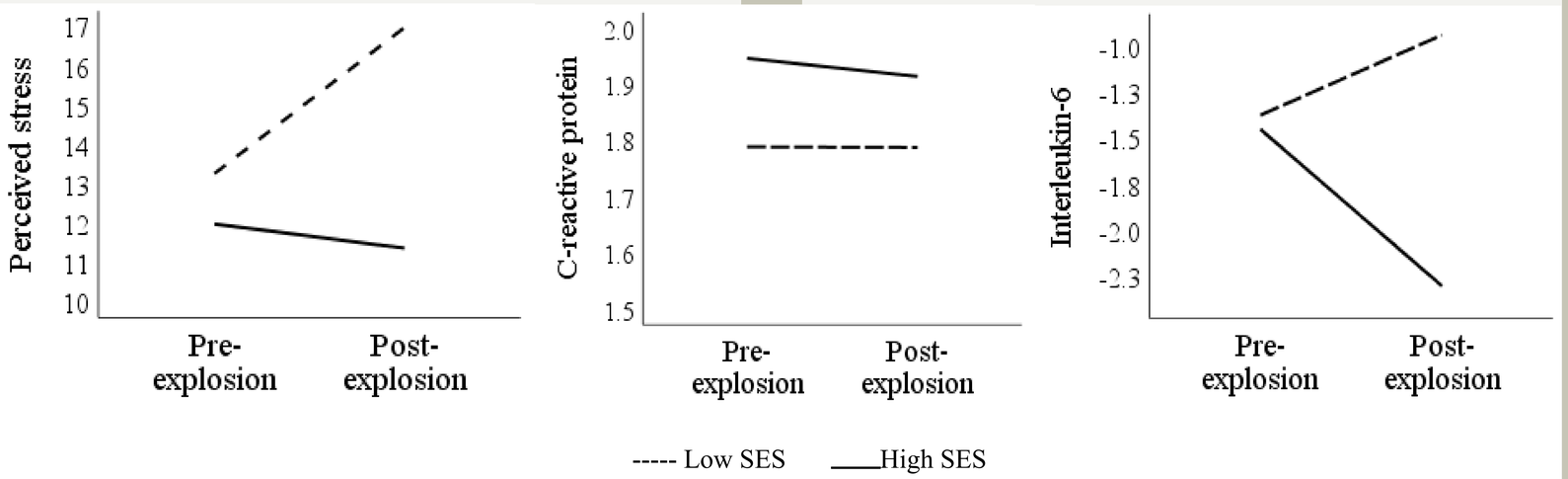
- 124 participants (69.4% female, 25-86 years of age, 47.3% White, 41.1% Hispanic, 11.3% African American) who were living close to a refinery in which a petrochemical explosion occurred on March 23, 2005 in Texas City, Texas.
- The explosion killed 15 oil workers and injured over 170 others.
- All participants completed an interview at their homes and provided a blood sample at both baseline (i.e., average 3.6 months prior to the explosion) and the follow-up visits (i.e., average 2.3 months after the explosion).

MEASURES

- ***Socioeconomic status*** *(SES)* was assessed using participants' self-reports of years of education and annual household income at baseline.
- ***Pre- and post-explosion perceived stress*** was assessed using the 10-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988); $\alpha = 0.77$ at baseline; the range of possible score was 0-40.
- ***Post-explosion perceived social support*** was assessed using a four-item scale developed for this study (e.g., there always has been someone to ask and rely on for advice if in trouble); $\alpha = 0.83$; the range of possible score was 0-4.
- ***Pre- and post-explosion systemic inflammation*****:** C-reactive protein (CRP) and interleukin-6 (IL-6) were assessed using the enzyme-linked immunosorbent assays; an average coefficient of variation < 5% for CRP and < 10% for IL-6; CRP and IL-6 were log-transformed to correct for positive skewness.

RESULTS

- Participants at follow-up reported higher levels of perceived stress than at baseline (Cohen's $d = 0.23$).
- There were no differences in CRP or IL-6 between baseline and follow-up visits.
- Lower SES predicted a lower level of post-explosion perceived social support ($\beta = .21$, $p = .033$), a larger increase in perceived stress ($\beta = -.27$, $p = .001$), and a higher level of post-explosion IL-6 ($\beta = -.29$, $p < .001$), but not CRP ($\beta = .03$, $p = .73$, see Figure below).
- The association between SES and IL-6 was not explained by perceived stress or perceived social support.
- The effects of SES on these post-explosion outcomes were independent of demographic characteristics and indicators of objective exposure to the explosion (i.e., distance from home to the explosion, heard/felt/saw the explosion).



CONCLUSION

- SES plays a key role in shaping stress cognitive appraisal (e.g., perceived stress) and coping resources (e.g., perceived social support), as well as influencing systemic inflammation (e.g., IL-6) following an unexpected, acute disaster.
- Differences in these biobehavioral responses to acute stressors associated with SES may be a novel mechanism contributing to health disparities across SES groups.

PUBLIC HEALTH IMPLICATIONS

SES is one of the fundamental causes of health and illnesses in nearly every society. Understanding the complex mechanisms through which SES is associated with health may provide important implications for alleviating health disparities across SES groups. This study suggests that elevated biobehavioral reactivity to stressors associated with low SES may be a risk factor leading to poor health among socioeconomically disadvantaged groups.