

THE ASSOCIATION BETWEEN BLOOD LEAD AND BLOOD PRESSURE VARIES BY RACE AND DEPRESSIVE SYMPTOMS

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Background and Aims: Previous work has documented that US Blacks exhibit a stronger positive association between blood lead (BL) and blood pressure (BP) than Whites. The reason for this disparity is unclear, but might be due to effect modification. We examine psychological factors as a potential modifier.

Methods: With data from the National Health and Nutrition Examination Survey 2005-2008, we use race-by-lead interactions with linear regression to estimate Black-White differences in the associations between BL and BP, adjusting for age, hypertension risk factors, and SES. To account for any differences in lead effect due to disparities in lead level, we employ Oaxaca-Blinder decomposition techniques. To examine the role of mood, as reflected by depressive symptoms (DS), we employ race-by-DS-by-lead interactions. We calculate BL-BP associations for each race-DS group. All analyses are stratified by gender.

Results: Black men show a 2.4mmHg (se=1.0, $p<0.05$) increase in systolic BP (SBP) for each doubling of BL while White men show no increase. Women show similar disparity patterns. Decomposition analyses indicate that Black-White disparities in mean BL levels do not explain the greater BL effect shown by Blacks compared to Whites. Black men with high DS experience an 8.0mmHg increase in SBP with each doubling of BL (se=3.4, $p<0.05$) while those with low DS show no association (b=1.0, se=0.7). Black women with high DS experience a 3.8mmHg increase in SBP (se=1.6, $p<0.05$) while those with low DS show no association. Whites show no association in either DS group.

Conclusions: Our analyses suggest a mechanism for the stronger relationship between BL and BP among Blacks than Whites observed in prior studies. The BL-SBP association appears limited to those Blacks who report high DS. Our results suggest that mood, a psychological factor potentially related to psychosocial stress, may enhance susceptibility to the harmful health effects of environmental hazards experienced by socially disadvantaged populations.

References: Vupputuri S, He J, Muntner P, Bazzano LA, Whelton PK, Batuman V. Blood lead level is associated with elevated blood pressure in blacks. *Hypertension*. 2003 Mar;41(3):463-8.