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Detailed assessments of childhood adversity enhance prediction of central obesity independent of gender, race, adult psychosocial risk and health behaviors

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ABSTRACT

Objective. This study examined whether a novel indicator of overall childhood adversity, incorporating number of adversities, severity, and chronicity, predicted central obesity beyond contributions of “modifiable” risk factors including psychosocial characteristics and health behaviors in a diverse sample of midlife adults. The study also examined whether the overall adversity score (number of adversities × severity × chronicity) better predicted obesity compared to cumulative adversity (number of adversities), a more traditional assessment of childhood adversity.

Materials/Methods. 210 Black/African Americans and White/European Americans, mean age = 45.8; ±3.3 years, were studied cross-sectionally. Regression analysis examined overall childhood adversity as a direct, non-modifiable risk factor for central obesity (waist-hip ratio) and body mass index (BMI), with and without adjustment for established adult psychosocial risk factors (education, employment, social functioning) and health behavior risk factors (smoking, drinking, diet, exercise).

Results. Overall childhood adversity was an independent significant predictor of central obesity, and the relations between psychosocial and health risk factors and central obesity were not significant when overall adversity was in the model. Overall adversity was not a statistically significant predictor of BMI.

Abbreviations: MetS, Metabolic Syndrome; HPA, hypothalamic–pituitary–adrenal; GC, Glucocorticoids; SES, Socioeconomic Status; ECG, electrocardiogram; BMI, body mass index; WHR, waist-hip ratio; DSM, diagnostic and statistical manual; FFQ, food frequency questionnaire; AHEI, alternative healthy eating index.

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Conclusions. Overall childhood adversity, incorporating severity and chronicity and cumulative scores, predicts central obesity beyond more contemporaneous risk factors often considered modifiable. This is consistent with early dysregulation of metabolic functioning. Findings can inform practitioners interested in the impact of childhood adversity and personalizing treatment approaches of obesity within high-risk populations. Prevention/intervention research is necessary to discover and address the underlying causes and impact of childhood adversity on metabolic functioning.

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1. Introduction

Obesity, especially central adiposity, and metabolic syndrome (MetS) place adults at high risk for other physical health problems, especially diabetes mellitus (DM), cardiovascular disease (CVD), and hypertension [1–9]. Central obesity has been associated with early stressful environments and events [10–13], including intra-uterine stresses and early illnesses [14,15], poverty [16], and specific and cumulative stresses such as physical and sexual abuse in childhood or death of a close family member [17–20], in both animal models and human studies [14,21–23]. Psychosocial factors including socioeconomic status (SES), education, and functional status (adjustment or functioning in the domains of mental health, work, leisure/interests, and close relationships) provide a mediated link between early life stressors and later health [12,16,24–27]. Impaired psychosocial functioning is associated with health risk factors [28,29], such as smoking, drinking, poor diet, and sedentary lifestyle that set the stage for poor health outcomes in general.

Many psychosocial factors and health risk factors are considered modifiable, with the potential to decrease obesity rates and costs [30], and are the focus of many prevention/intervention programs. However, it is rare for such programs to assess childhood adversity and its potential direct, non-mediated impact on metabolic functioning, central obesity versus overall obesity, and outcomes [12,23,31,32].

Examining childhood adversity. The growing literature examining associations between early adversity and adult physical health typically uses cumulative adversity scores to assess the number of adversities an individual has experienced [10–12,19]. This work addresses the concepts of severity and chronicity of stress [11,12], but severity and chronicity of experiences are often inferred from the nature of the childhood adversity (e.g., maltreatment is considered to be severe and low SES chronic), rather than assessed and incorporated into measurements of adversity. The large sample sizes of many investigations preclude more in-depth assessments of these dimensions. Nevertheless, specific information on severity and chronicity could address issues of resilience and also allow for more personalized treatment plans and outcome expectations [33–35]. Unlike a large scale study, samples in which detailed, interview-based, childhood adversity histories are obtained allow for assessments of severity and chronicity. They also provide an opportunity to compare the predictive power of a cumulative score with a potentially more clinically relevant adversity score that incorporates number of adversities with severity and chronicity information.

The current study examines the impact of childhood adversity on midlife obesity in a racially and socioeconomically diverse, moderate-risk, but non-clinical sample. We explore a novel assessment of childhood adversity (number of adversities \times severity \times chronicity) as a direct predictor of central obesity compared with overall obesity. Additionally, we examine the contributions of current psychosocial (education, employment, social functioning) and health risk factors (smoking, drinking, diet and exercise). We hypothesize that the enhanced, interview-based overall childhood adversity score is a better predictor of central obesity than the cumulative adversity score, and will contribute to the prediction of central obesity beyond the more proximal midlife psychosocial and health risk factors.

2. Methods

2.1. Sample

Participants were 210 adults (mean age = 45.8; \pm 3.3; range 35–55 years), of diverse SES backgrounds who were part of a study examining psychosocial influences on physical and mental health in midlife. The sample was generally representative of the population of Boston, MA with regard to proportion of men and women, European Americans, and those with a Bachelor's degree or higher, although it included a greater proportion of Black/African Americans [36]. The sample had an approximately equal distribution of men and women, and Black/African Americans and White/European Americans. Recruitment aimed at balancing first employment status and then educational level within groups divided by race and gender. Institutional Review Boards of all participating institutions approved the study. Participants gave written informed consent.

Forty-seven participants of predominantly European American-descent (96.5%) were recruited from a 30+ year longitudinal study that originally assessed a range of psychosocial functioning in adolescents of middle-to-high SES (mean age = 14.6; range 13–18 years). This cohort is described elsewhere [37,38]. An additional 163 participants of similar age and socioeconomic status were recruited over 20 months through advertising (radio, newspapers, flyers, health fairs, academic conferences) in the Boston area. Eligibility criteria included being between 40 and 50 years old and identification of a stable residence. Among the eligible population, those with serious medical illness, e.g., heart disease, cancer, diabetes were excluded from the study. Of 963 individuals who inquired about participation, 247 did not return calls or

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