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# Child Maltreatment's Heavy Toll: The Need for Trauma-Informed Obesity Prevention

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## Child Maltreatment's Heavy Toll:

### The Need for Trauma-Informed Obesity Prevention

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## Introduction

This paper is the product of a workshop on the topic of child maltreatment and obesity at the Radcliffe Institute for Advanced Study at Harvard that brought together the listed authors, who are experts across a number of relevant fields.

Emerging research has highlighted childhood maltreatment and other psychological traumas as risk factors for obesity and related comorbidities.<sup>1–3</sup> Although the high rate of obesity in the U.S. affects the entire population, those with histories of maltreatment—making up at least 30% of the population<sup>4,5</sup>—appear to be at greater risk. Unfortunately, childhood maltreatment is often overlooked as a risk factor for adult obesity, and efforts to prevent and

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treat obesity underutilize promising trauma-informed approaches. Likewise, clinical care for psychological trauma has unrealized potential as an opportunity for obesity prevention. The aims of this paper are to:

1. raise awareness of the prevalence of childhood maltreatment;
2. present current evidence of the child maltreatment–obesity association;
3. highlight existing research on mechanisms; and
4. suggest areas for additional research, including trauma-informed obesity interventions that warrant testing.

Although this paper focuses on childhood maltreatment, particularly physical and sexual abuse, the presented information is potentially relevant to other types of early trauma, such as community violence and peer bullying.

## Prevalence of Childhood Maltreatment

Childhood maltreatment is common, affecting 30% or more of the U.S. population.<sup>4,5</sup> In a U.S. national survey of violent victimization, for example, 40% of women and 54% of men reported experiencing physical assault by a parent or adult caretaker.<sup>4</sup> The same study found that 18% of women and 3% of men reported a lifetime history of sexual assault, with more than half of victims reporting that the assault occurred before they were aged 18 years.<sup>4</sup> The high prevalence of maltreatment in these retrospective reports is corroborated by the 2011 National Survey of Children's Exposure to Violence, which reported that 38% of children aged 14–17 years had experienced maltreatment in their lifetime.<sup>5</sup> These statistics focus on maltreatment and omit many other adverse childhood experiences such as living with a family member suffering from severe mental illness or addiction, witnessing domestic or community violence, and peer bullying.

## Child Maltreatment and Weight Status

The Adverse Childhood Experiences Study was the first to demonstrate the maltreatment–obesity association in a large community-based sample.<sup>2</sup> The study found that severe physical, sexual, and emotional abuse in childhood were associated with 28%–45% greater risks of adult obesity; moreover, 8% of obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) and 17% of class III obesity (BMI  $\geq 40$  kg/m<sup>2</sup>) were estimated to be linked to child abuse.<sup>2</sup> Numerous other large studies have now demonstrated similar associations, and a recent meta-analysis of 41 studies found that child maltreatment—whether physical, sexual, or emotional abuse or physical neglect—was associated with a 36% higher risk of adult obesity, with stronger associations with class III obesity.<sup>1</sup> These results were unaffected by the method through which the maltreatment was assessed, whether retrospective or prospective, self-report or objectively measured.<sup>1</sup> Moreover, adjustment for a wide range of socioeconomic and health behavior covariates made little substantive difference to the estimates, although adjustment for depression significantly attenuated maltreatment–obesity estimates.<sup>1</sup> A temporal order from maltreatment to obesity is supported by prospective work showing that weight trajectories of sexually abused versus non-abused girls diverge in early adulthood.<sup>6</sup> A handful of other studies suggest that maltreatment may also have more immediate effects on weight in

childhood and adolescence.<sup>7,8</sup> Although causality is difficult to establish, the consistency of epidemiologic findings and plausible biological and behavioral mechanisms (discussed below) provide strong suggestive support for a causal association between maltreatment and obesity.

## Maltreatment–Obesity Pathways and the Need for Etiologic Research

The mechanisms linking maltreatment to obesity are not well understood, but research highlights several plausible and likely intersecting pathways involving stress-related changes to neurobiology, physiology, affect, and behavior. A greater understanding of these pathways is important for identifying targets for prevention and treatment of maltreatment-related obesity.

### Neurobiology and Physiology

Data from a number of species indicate that chronic or severe stress exposure, particularly during development, alters neuroendocrine and metabolic function in ways that may contribute to obesity, in part through changes to feeding behavior.<sup>9</sup> Rodent and nonhuman primate models suggest that chronic stress, particularly social stress, can provoke overeating of highly caloric and palatable “comfort foods”—generally accompanied by increases in both body weight and adiposity<sup>10</sup> (though the impacts of stress are complex and in some circumstances also include reductions in food intake and body weight). Changes to reward and regulatory neural circuits may drive these stress-related overfeeding behaviors. For example, preclinical evidence suggests that stress can affect reward circuits and brain dopaminergic function, leading to anhedonia (reduced ability to experience pleasure), and the diminished responsiveness of dopaminergic reward circuits can in turn elevate risk for addictions, including compulsive eating.<sup>11</sup>

Links between neurobiologic changes and feeding behaviors during stress are likely further mediated through endocrine processes controlling appetite, such as increases in the hunger-stimulating hormone ghrelin.<sup>12</sup> For example, in rodents, chronic social defeat stress elevates ghrelin levels, resulting in a preference for high-fat diet.<sup>10</sup> In humans, acute psychosocial stress is also associated with an enhanced ghrelin response<sup>13</sup> and emergence of anhedonia. Greater understanding of these mechanisms may yield targets for pharmacologic treatment of trauma-related obesity.

Alterations to the gut microbiome offer another intriguing class of mechanisms, with evidence that adversity in early life and across the life span, negative affect, dysregulated eating, inflammation, and obesity are each linked to compromise of the human gut microbiota.<sup>14–16</sup> However, these findings have yet to be integrated into a comprehensive, testable, causal model of how maltreatment becomes embodied. Microbiota restorative therapies suggest novel avenues for intervention for those with maltreatment histories, but tremendous conceptual development and empirical research remains before the role(s) of gut microbiota in the maltreatment–obesity pathway can be established.

## Affect and Psychology

Childhood maltreatment is known to elevate risks for psychological disorders, including depression and post-traumatic stress disorder (PTSD), which are potentially important predictors of weight status. These affective outcomes may be driven in part by the stress-induced effects on the dopaminergic system.

Depression is common in individuals with a history of maltreatment, with 12-month prevalence estimates up to 32%<sup>17</sup> in those with histories of adverse childhood experiences including maltreatment. Evidence on the link between depression and weight gain is mixed, with some question of causal direction.<sup>18</sup> Nonetheless, adjustment for depression appears to substantially attenuate the maltreatment–obesity association,<sup>1</sup> suggesting a mediating role. More research focusing on specific depression phenotypes and their associations with eating behaviors and weight in maltreated populations may clarify the extent to which targeting depression may mitigate maltreatment-related weight gain.

Childhood maltreatment also appears to elevate risks for PTSD, with lifetime prevalence estimates up to 26% among those with physical abuse histories.<sup>19</sup> Several recent studies have documented associations between PTSD and obesity, including a recent paper demonstrating that onset of PTSD was associated with changes in weight status trajectories,<sup>20</sup> which is suggestive of a causal impact. Importantly, traumatic experiences alone were not associated with elevated BMI in this study, suggesting that PTSD symptoms, rather than trauma exposure itself, may drive the pathologic mechanism leading to weight gain.<sup>20</sup>

Both depression and PTSD are highly prevalent in obese and eating-disordered populations, suggesting important inter-relationships and shared risk factors. Notably, both are also treatable. Screening for, and treatment of, these disorders as part of an integrated weight loss or excess weight gain prevention strategy may improve short- and long-term weight-loss outcomes. Additional research on such an approach is critically needed.

Another psychological pathway may involve perceived protective benefits of obesity that lead those with maltreatment, either consciously or unconsciously, to gain and retain weight. For example, some victims of sexual abuse report that weight gain makes them feel less vulnerable to future assaults. If obesity is indeed a protective mechanism, then weight loss may feel threatening to those with abuse histories, and weight-loss treatments will need to address this barrier.

## Behavior

Maltreatment in childhood is associated with significantly elevated risks for disordered eating—particularly binge eating and related phenotypes.<sup>3</sup> Clinically diagnosed eating disorders likely represent the extreme end of a range of problematic eating behaviors associated with maltreatment. Little research has explicitly examined the mediating role of disordered eating in the link between maltreatment and obesity. Further, it is not clear what eating phenotypes might be most relevant to the maltreatment–obesity association. There is an urgent need to better characterize the range of obesity-relevant behaviors triggered by maltreatment and clarify their potential as intervention targets.

## Potential Intervention Opportunities

### Prevention

Though preventing maltreatment itself is the most desirable approach for reducing maltreatment-related obesity, current maltreatment prevention strategies have limited reach. Thus, development and testing of strategies to mitigate the psychological, behavioral, and physiologic sequelae of maltreatment—that is, secondary prevention—is critical. Pediatricians are currently tasked with detecting and reporting maltreatment, but they can also play a role in reducing the impacts of traumatic experiences by screening for past and ongoing adversities and connecting families to social services and community resources that reduce future trauma risk and aid in psychological recovery. Primary care providers might, likewise, screen for histories of childhood trauma in adult patients and provide a link to mental health services where needed. Knowledge of the trauma–obesity connection can help pediatricians and other primary care providers as they consider potential influences on patients' weight and weight trajectories, and may lead to more sensitive and tailored weight-related counseling than nutrition and physical activity guidance alone. Asking about the timing of weight gain may additionally help to identify triggering factors. Educators and child care providers, who are especially well positioned to identify early signs of trauma, may also benefit from understanding the maltreatment–obesity connection. Public health programs aimed at obesity prevention should develop programming that considers pathways beyond diet and activity.

In cases of substantiated maltreatment, the first priority is to secure the child's physical safety. Once this is accomplished, a care approach that extends beyond the immediate crisis could yield long-term prevention of a variety of poor mental and physical health outcomes, including obesity. Such an approach might be considered chronic disease–informed trauma care and would screen for and target risk factors for chronic disease as a part of the treatment of trauma. The targeted risk factors may change as understanding of the mechanisms linking trauma to chronic disease evolves but based on current knowledge could include depression, PTSD, and disordered eating. Government agencies responsible for child welfare could consider ways to incorporate chronic disease–informed trauma care into service plans. Because most children investigated for maltreatment remain with their families, identifying ways to incorporate the family into strategies for preventing weight-related problems is critical.

### Treatment

Among those with disordered eating, overweight, and obesity, treatment programs might be more effective if tailored to individuals with a history of childhood trauma. Such programs might assess trauma histories to identify individuals who could benefit from cognitive behavioral therapy, interpersonal psychotherapy, or other treatments for depression or PTSD. A trauma-informed approach to weight-related problems could also be incorporated into primary care. This approach may be useful for adults and, assuming any immediate threat to their safety has been addressed, for children and adolescents with disordered eating or obesity. Currently, screening for domestic violence is accepted as a standard of care; the addition of routine screening for a history of childhood adversity may yield a more

comprehensive understanding of a patient's specific needs, enabling more sensitive and tailored counseling for weight-related health. These and other trauma-informed obesity treatment approaches warrant rigorous testing to assess their comparative effectiveness against traditional treatments for weight-related problems.

## Conclusions

Although trauma alone is unlikely to account for the recent increase in obesity risk, those who have suffered trauma are an important but overlooked high-risk population. The repercussions of trauma may lurk below the surface of the clinical encounter, yet for some patients, trauma history may be a significant factor driving the development of obesity and a barrier to its treatment. Efforts to uncover and address underlying trauma may yield increased effectiveness of obesity interventions, and preventing weight-related sequelae may improve life-long health after traumatic exposures. There is now two decades of evidence supporting the trauma–obesity connection. It is time to translate this evidence into action.

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