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Mini Review

Childhood Bullying: Long-Term Health Effects

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Abstract

Early and chronic stress can profoundly and negatively affect, neuro-endocrine, inflammatory and metabolic processes via epigenetic programming to increase the risk for obesity, cardiovascular diseases, cognitive impairment and accelerated cellular aging [1-6]. Stress due to bullying harms both physical and mental health of the individual. The physiological mechanisms through which early life stress affect endocrine and inflammatory processes, also contribute to adverse physical and mental health outcomes associated with bullying [7]. Early intervention is needed to minimize long-term negative health implications.

Keywords: *Childhood Bullying; Chronic Stress; Long-Term Health*

Bullying as Chronic Stress

Acute stress may facilitate the body's capacity respond to the demands of the environment. The immediate reaction of "flight or fight" is activated in order to cope with the situation, and once the stress has subsided homeostasis returns. In chronic stress homeostatic mechanisms fail and the individual experiences a state of allostatic overload [8]. Chronic stress induces deleterious health consequences that stem from elevation of inflammatory mechanism deficits in neurotrophic factors and metabolic adaptation that facilitate insulin desensitization and lipid storage and work together to alter stress reactivity [9].

Childhood is the periods of developmental vulnerability in which the experience of bully victimization can become biologically embedded to modify the individual's long-term health trajectory [10].

Bullying, a form of chronic social stress is defined as a systematic abuse of power, with aggressive behavior or intentional harm-doing by peers that is carried out repeatedly [11]. Bullying can be physical (hitting, pushing), verbal (insulting), indirect and virtual (cyber-bullying) [12]. Studies report that 25% children in the community suffer bullying by their peer groups and 10-14% of these children suffer from chronic victimization. Chronic peer victims suffer greater long-term psychological impact than those who experience briefer episodes of bullying [13,14].

Bullying a risk for mental illness

The effect of being bullied is as severe as being maltreated during childhood [15]. Long-term studies have shown that those who bully others have behavioural, emotional and motor problems and experience family-break up during their pre-school years, whereas parenting behavior and factors in pregnancy increase the risk of becoming the target of bullying in children [16] possibly through the effects of stress response at the physiological and behavioural levels. Vulnerability to bullying may thus arise from risk factors inherently associated with later development of psychiatric illness, and the presence of psychiatric illness is itself associated with increased incidence of bully-

ing victimization in children [17]. Stress of bullying can exacerbate the presentation of pre-existing or early presentation of psychiatric illness. In a study of 145 monozygotic twins bullying victimization was found to be an environmental risk factor for psychiatric disturbances including anxiety and suicidal ideation and behavior. Another study demonstrated that being bullied had a significant environmental impact on childhood social anxiety [18]. These studies establish a clear role for exposure to bullying victimization in later development of mental illness.

Retrospective and cross-sectional studies only help to identify the relationship between being bullied and psychopathology, the directionality cannot be ascertained without longitudinal follow-up post-victimization – these studies cannot determine whether individuals who developed depression or anxiety were pre-morbidly more sensitive to criticism and rejection, and thus were more inclined to interpret earlier interpersonal experiences as bullying victimization.

Prospective studies reveal that the men who were victims of bullying during their childhood are at 18 times more risk of suicidality than the non-bullied counterparts, while female victims have nearly 27 times more risk for panic disorder [19,20].

Bullying and somatic symptoms

A recent meta-analysis [21] shows that bullied children and adolescents have a significantly higher risk for psychosomatic problems than non-bullied peers. Commonly reported health problems are – poor subjective health status, poor appetite, sleep disturbances, headache, abdominal pain, breathing difficulties, and fatigue [22,23]. This association between bullying victimization and somatization is observed in children as early as four years old [24].

Personal resources such as self-efficacy, and social support can mitigate the impact of bullying on development of psychological and somatic complaints [25] indicating that the deleterious effects of bullying do not impact all individuals equally [26]. Peer victimization in late childhood and early adolescence impairs adaptive stress responses [27].

Stress responses and allostatic load

Stress, if continued unabated, contributes to allostatic load on the brain and the body. Allostatic load provides an index of biological 'wear and tear' from cumulative exposure to stress [28]. Under chronic stress, over time, the increasing allostatic load accelerates wear and tear on the body as a result of chronic exposure to heightened neuro-endocrine responses to stress. There is accumulation of health related risk factors which increase the chances of development of a disease [29]. Allostatic load is also implicated in the acceleration of psychiatric illness progression and poor treatment outcome. Last two decades of research have demonstrated how physiological stress burden and allostatic load can accelerate aging and neurodegenerative and disease processes [30-40].

The process of increasing allostatic load is one in which the body accrues damage over time, impairing its capacity to maintain and restore homeostasis in the face of future challenges. Through the process of allostatic load, the early adverse experiences like chaotic family environment, low socio-economic status, experiences of abuse and other forms of interpersonal aggression have been associated with poor health outcomes in adolescence and childhood [41]. Inflammation and increased blood pressure during adulthood are linked with adverse stressful experiences in childhood [42].

The long-term health impact of early life stress is further mediated by the potential for early adversity to impair children's development of skill that foster resilience. Early life stresses increase the likelihood of reducing the capacity to cope with stress in future. The cumulative direct and indirect effects of early life stress work together, over time, to enhance negative impacts through increased biological vulnerability [43].

Bullying, inflammation and metabolic dysfunction

Studies demonstrate a link between early life stress and inflammation [43]. Acute inflammatory responses are important for fighting infection and healing process and the chronic stress contributes to the development of and progression of various serious diseases includ-

ing cardiovascular diseases [44]. Chronic inflammatory states are activated and maintained by environmental stressors and health risk behaviours like poor diet, lack of exercise, and sleep disturbances [45]. Childhood bullying predicts low grade systemic inflammation with increase in C-Reactive protein (CRP) levels which is a marker for inflammation.

The link between bullying, stress and inflammation is supported by various studies demonstrating that childhood bully victims had increased levels of CRP at mid-life. These findings are important in controlling variables such as body-mass index and psychopathology in children, and smoking, diet and exercise in adults. Central distribution of fat is found to be more prevalent in individuals who had been bullied during their childhood [46].

Conclusion

Chronic peer victimization during childhood has significant physiological and mental health consequences and the cascading processes of the physiological stress response, including chronically elevated levels of inflammation, play an important role in development of psychopathology during the adult life. However, more data is needed to determine whether a direct cause-and-effect relationship exists between childhood bullying and poor long-term health outcome.

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