Impact of Maternal Childhood Adversity on the Psychological-Inflammatory Profile During Pregnancy

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Introduction

The *Inflammatory Theory of Depression* hypothesizes that elevations in inflammatory mediators access the brain to trigger a cascade of reactions that lower serotonin levels and increase glutamatergic effects. Depression is characterized by deficient serotonergic neurotransmission and enhanced glutamate receptor *N*-methyl-d-aspartate activation. During pregnancy, an increase in proinflammatory cytokines may drive central processes implicated in depression, heightening risk for perinatal depression. Recent and evolving evidence suggests that maternal exposure to childhood adversity and poverty may intensify inflammatory risk and depressive mood, contributing to disparity in birth outcomes.

Purpose

The primary aim was to examine the relationship between maternal childhood adversity and prenatal levels of stress, depression, and proinflammatory cytokines; and, secondly, to explore the relationship of these variables with neonatal birth outcomes.

Theoretical/Conceptual Framework

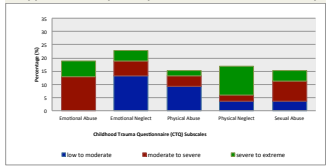
A psychoneuroimmunologic framework guided this study. According to psychoneuroimmunology, increased maternal prenatal stress and/or depressive symptoms activate neuroendocrine-immune stress response systems, resulting in the production of cytokines that lead to a proinflammatory state. Maternal exposure to childhood adversity and poverty may intensify depressive risk, predisposing to poor birth outcomes.

Research Design and Methods

A descriptive correlational design was used. Women (N=64), aged 18-39 years, with uncomplicated pregnancies were enrolled during their second trimester (16-24 weeks gestation) of pregnancy. They completed the Perceived Stress Scale (PSS), Edinburgh Depression Scale (EDS), Childhood Trauma Questionnaire (CTQ), and Social Provisions Scale (SPS), and provided a blood sample to measure plasma TNF-alpha levels (by enzyme-linked immunoabsorbent assay - ELISA). Existing poverty, per federal guidelines, was calculated. Correlations (Pearson's r) among variables was determined. In addition, moderation analysis was used to explore interaction effects among variables

Maternal Childhood Adversity, Stress and Depressive Risk

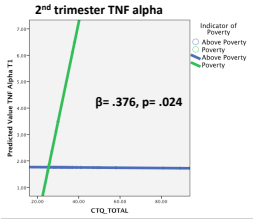
Types & Frequency of Childhood Adversity

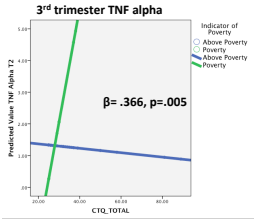


Childhood Adversity, Stress & Depressive Risk

Tool	Measure	Pearson's r	P value
PSS 2nd,3rd Trimester	Stress	.572, .459	.000, .008
CESD	Depression	.613, .654	.000, .000
EDS	Depression	.400, .389	.007, .025
SPS	Social Support	-.550, -.694	.000, .000

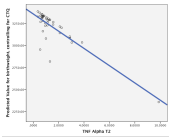
Poverty Moderated Association Between Childhood Trauma and TNF alpha





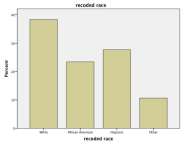
Poverty was a significant moderator of the association between childhood adversity and TNF in early and late pregnancy (R^2=.33, .28, respectively).
Women living in poverty had a positive association with maternal childhood adversity and TNF alpha in mid and late pregnancy while women living above poverty had virtually no association.

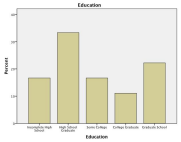
Childhood Adversity, TNF-alpha and Lower Infant Birth Weight



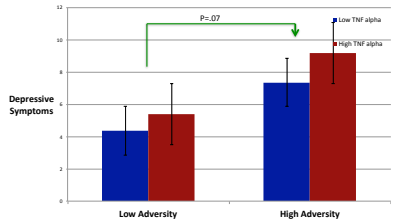
Greater TNF alpha in late pregnancy (T2) was a significant predictor of infant birth weight when controlling for childhood adversity.

Sample Demographics



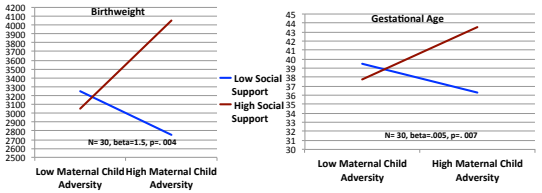


Childhood Adversity & TNF-alpha ↑ Depressive Risk



Child adversity moderated the relationship between TNF-alpha and depressive symptoms, such that high adversity coupled with high TNF alpha levels were associated with more depressive symptoms

Social Support Moderates Impact of Adversity



Women with lower social support (blue line) at late pregnancy exhibited a negative association between childhood adversity and both birth weight and gestational age; whereas, women with greater social support (red line) exhibited a positive association between childhood adversity and both birthweight and gestational age.

Conclusion and Implications

These data identify childhood adversity to be a vulnerability factor, increasing risk for greater psychological morbidity and higher TNF-alpha levels in 2nd trimester of pregnancy; a time when proinflammatory cytokines should be at low levels. Women with childhood adversity with poverty had greater TNF alpha levels in both 2nd and 3rd trimester of pregnancy. Further, women with greater childhood adversity and greater TNF α had lower birth weight infants. Exposure to childhood adversity was associated with earlier gestational age however, greater social support attenuated this relationship. These findings emphasize the importance of assessing early life stress and social support during a woman's initial prenatal evaluation. This would identify women who would most benefit from stress-reducing interventions, ultimately improving birth outcomes.

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