The Effects of Psychological Intervention on Pregnant Women with Elevated Cortisol Levels and Adverse Birth Events

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Introduction

Elevated levels of stress, anxiety, and depression during pregnancy are thought influence cortisol levels. Dysregulations in cortisol, as a byproduct of the hypothalamic-pituitary axis (HPA), have been associated with preterm birth and adverse birth outcomes. Studies have also demonstrated poorer long-term effects of antenatal stress on child neurodevelopment, temperament, and cognition. Psychological interventions of cognitive behavioral therapy (CBT), mindfulness, and gratitude have shown to have a positive effect on psychological wellbeing across various populations.

The purpose of this literature review was to analyze a collection of randomized-controlled trials to conclude if psychological interventions during pregnancy for women with elevated levels of stress, may lead to fewer adverse birth events.

Methods

Literature Search

- PubMed and Google Scholar Searches
- Conducted in October and November 2019
- 10 research articles were accessed based on sample population, intervention type, inclusion criteria, and relevance to the research topic.

Variable Measures

Cortisol

- **CAR** (Cortisol Awakening Response)
- **Salivary cortisol**
- Serum cortisol

Stress Questionnaires

- **PSS** (Perceived Stress Scale)
- **STAI** (Spielberg State-Trait Anxiety Inventory)
- **EPDS** (The Edinburgh Postnatal Depression Scale)
- **BDI** (Beck Depression Inventory)
- Additional questionnaires about prenatal anxiety, life satisfaction, gratitude, perception of racism, depression, anger, affect, attitude, and relationship quality

Adverse Birth Outcomes

- **Low Birth Weight**
- **Gestational Age**
- Length at Birth
- Birth Complications

Methods (Cont.)

Table 1. Comparison of study designs.

Study	Total (N =)	Population	Psychological Therapy Intervention	Intervention Length	Variables Measured
Bittner	84	German, married or relationship, high school education, employed, median income	CBT Group Program vs Control Group	8 sessions	M-CIDI, PDQ, **BDI, EPDS, STAI**, ASI, DAS, SSS, QMIRS
Entringer	25	Non-Hispanic White, married, college educated	No treatment – Control Study		**Salivary cortisol, CAR,** serum cortisol, negative affect journal, GA
Field	44	Hispanic or African American, low income, high school education	Interpersonal Psychotherapy vs Peer Support Group	12 weeks	**Salivary cortisol**, SCID, CES-D, **STAI,** STAXI
Matvienko -Sikar	46	Irish women, highly educated, married, planned, low-risk pregnancy, 1st pregnancy	Mindfulness & Gratitude intervention	3 weeks	**Salivary cortisol, CAR**, PDS, EPDS, GDP, MAAS, SwL
Osborne	87	English/UK, White, highly educated, employed, married or cohabitating	No treatment – Control Study		**Maternal & Infant Salivary cortisol**, Inflammatory markers, BDI-V, STAI, IMD, NBAS, BSID
Richter	61	German, married, college educated, 1st pregnancy, employed, high income	CBT Group Intervention	8 sessions	**Salivary cortisol, CAR, PSS,** PDQ, **STAI, BDI,** M-CIDI
Urech	93	German and Swiss, highly educated, higher class, partnership	Internet-Based CBT Stress Management	6 weeks	**GA, BW**, Length at birth, Rate of preterm birth, **CAR**, PRAT, **STAI, PSS, EPDS**
Urizar Munoz	86	Spanish-speaking immigrants, married, low-income, middle school education, 1+ children	CBT Stress Management w/ depression vs Low-Risk Comparison w/o depression vs Usual Care	12 weeks	**Salivary cortisol**, Perceived stress rating, MMS, CES-D, PANAS, birth complications
Urizar Yim	88	Latina or Asian immigrants, unemployed, single, high school education, 1+ children	CBT Stress Management	8 weeks	**Salivary cortisol, CAR**, PAS, **PSS**
Wesley	86	Black women, unmarried, high school education, low income, 1+ children	Stress reduction sessions + Audiotape breathing and imagery	3 weeks	**Salivary cortisol, PSS,** PRS, IES, **GA, BW**, medical complications

The 10 research articles differed in study design but shared similar features. Psychotherapy interventions included cognitive behavioral therapy, interpersonal therapy, stress management, peer support, mindfulness, and gratitude. Some interventions were as short as 3 weeks, while others lasted 12 weeks. Timing of the intervention during pregnancy also differed, though most were within the 2nd trimester. The most common measures of cortisol, stress questionnaires, and adverse birth outcomes are highlighted in bold. Population samples included several races, socioeconomic levels, and history of anxiety or depression.

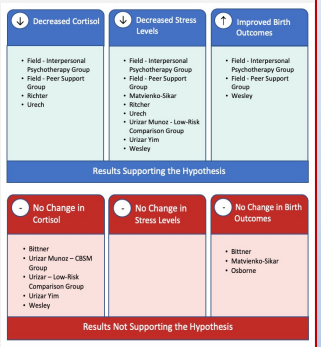
Results

Based on the literature, there is mixed evidence that psychological interventions during pregnancy for women with elevated stress levels are efficacious in reducing adverse birth events. Specific markers of cortisol levels did not display the same trends when comparing cortisol measures between groups of high stress and control groups. Though CAR levels seemed to be the most accurate indicator of stress levels. CAR levels decreased in a few studies with psychological interventions. Of those that suggested psychological intervention could decrease stress levels or produce better birth outcomes, much of the data trends were not to a statistically significant level. The efficacy of psychological interventions during pregnancy cannot be confirmed to lower stress levels in women with previously elevated stress levels. Nor can a reduction in stress levels be confirmed to lead to better birth outcomes.

Results (Cont.)

Image 1. Summary of Results

The image demonstrates the number of research articles out of 10 that support or do not support the hypothesis that psychological interventions during pregnancy in women with elevated levels of stress, leads to fewer adverse birth events.



Discussion

Several studies had evidence of at least one cortisol measurement declining with a psychological intervention. A few of the studies show promising results that psychological interventions reduced perceived stress and/or cortisol levels. Though many of these articles are limited in their ability to draw generalizable conclusions due to limited sample size, significant participant dropout rates, differing intervention strategies, and varying protocols for measuring stress and cortisol levels. Future research needs to be conducted in order to determine the more reliable measurement of stress. There is no standard measurement of stress, and no standard recommendation for a specific psychological intervention for a pregnant population, at this time.

Conclusions

There is conflicting evidence from the review of literature, and insufficient statistical power. At this time, no conclusion can be drawn about the effect of psychological interventions during pregnancy on stress levels or birth events. Patients and providers may consider psychological interventions as a method to reduce stress during pregnancy, though the evidence is lacking to support a clear reduction in stress levels or adverse birth events. Further research is needed to address the role of psychological intervention during pregnancy, impact of elevated stress levels on birth outcomes, and limitations of the current studies.