Cardiac Vagal Control as a Predictor of Outcome in a Stress Reduction Intervention During Pregnancy

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Abstract

Thirty-two moderately anxious pregnant women participated in a study examining whether relaxation training could improve mood and reduce the incidence of complications over the course of pregnancy and during labor and delivery. Women were between 14 and 20 weeks gestation when they completed a battery of baseline laboratory questionnaires and psychophysiological assessment (Time 1). They were randomized to receive six weeks of relaxation training or to a wait list control condition (Time 2) and again between 34 and 36 weeks gestation (Time 3). Higher baseline respiratory sinus arrhythmia predicted lower levels of trait anxiety and reduced levels of stress during pregnancy but not for those in the control condition. For all subjects, higher baseline respiratory sinus arrhythmia predicted lower Time 3 levels of depression, anxiety, and trait anxiety. At Time 3, participants in the relaxation group had higher respiratory sinus arrhythmia than those in the control group. More frequent relaxation practice among those in the relaxation group predicted lower levels of self-reported stress post-treatment and at Time 3, and lower salivary cortisol upon awakening at Time 3. Findings are interpreted in light of Polyvagal Theory (Porges, 2007) and the Neurovisceral Integration Model (Friedman, 2007).

Introduction

While complications during pregnancy, labor, and delivery occur in approximately 48% of pregnancies, high levels of stress during pregnancy appears to increase the incidence of such complications to 60%.

Complications during pregnancy: hypertension, preeclampsia, eclampsia, gestational diabetes, and placenta previa

Intrapartum complications: prolonged interval between water breaking and delivery, induced labor, prolonged labor, mode of delivery (i.e. use of forceps, cesarean)

Infant outcome: premature birth, low birthweight for gestational age

Proposed mediators to explain these findings include cardiovascular, neuroendocrine, and immune inflammatory responses.

Respiratory sinus arrhythmia has been found to moderate treatment of uncomplicated bereavement and moderate health outcomes after a disclosure task (O’Connor et al., 2005; Sloan & Epstein, 2005)

Two studies have reduced stress during pregnancy through relaxation methods with pregnant adolescents and mothers (de Anda, Darroch, Davidson, Gi旅行社, & Morejon, 1990; Liebman & MacLaren, 1991)

Hypothetical relaxation in addition to medication prolonged pregnancies in women who were hospitalized for premature contractions and resulted in a clear increase in the gestation rate compared to women who only received medication (Omer, Friedlander, & Pals, 1986)

No study to date has examined whether relaxation methods can reduce stress during pregnancy and thereby reduce associated complications.

The following hypotheses were tested:

HYPOTHESIS 1: Relaxation training would reduce levels of negative mood (i.e., anxiety, and depression) in comparison to a psychoeducational intervention

HYPOTHESIS 2: Relaxation training would reduce levels of negative mood would reduce rates of complications during pregnancy, labor, and delivery as well as negative infant outcome

HYPOTHESIS 3: Relaxation would reduce arousal at 3rd trimesters as measured by muscle tension, resting heart rate, skin conductance, and cortisol upon awakening, and would increase resting levels of respiratory sinus arrhythmia.

HYPOTHESIS 4: Resting levels of respiratory sinus arrhythmia would moderate treatment outcome, such that those with higher resting levels of RSA at baseline would have greater symptom reduction.

Methods

Subjects

1) pregnant women between 14 and 36 weeks gestation
2) Women under 35 years of age
3) ≤ 8 BMI at the State of Trait Anxiety Inventory
4) No current or previous psychiatric illness
5) ≤ 1 previous miscarriage
6) No current psychotropic medications or use of CNS drugs

Study Design

Random assignment to the Relax group involving 6 weeks of relaxation training or to the Control group involving 6 weeks of no intervention.

Subjects assessed at baseline (Time 1), post-treatment (Time 2), and between 34 and 36 weeks gestation (Time 3).

Structured Clinical Interview based on the DSM-IV at baseline

Marital Status: 93.8% Married or Co-habiting, 3.1% Living Apart, 3.1% Single

Reactive State Anxiety Inventory at Time 3

Measures

Perceived Stress Scale at Time 2

Hypothetical analysis at Time 3

Maternal smoking

The women in the present study with greater baseline respiratory sinus arrhythmia might have entered into the study with greater systemic inflammation, more inflammation, and chronic stress.

The flexibility might have provided a buffer to the accumulating stressors over time.

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Summary & Discussion

Regular relaxation practice during pregnancy was related to:

1) reduced self-reported stress and distress experienced in response to prenatal life stressors
2) lower salivary cortisol
3) higher levels of respiratory sinus arrhythmia
4) less self-rated anxiety in response to perceived stress during pregnancy at Time 2

Within the relaxation group, greater frequency of practice (at least 4 times per week) was associated with lower Stress at Time 2 and Time 3 (as measured with the Perceived Stress Scale and the Stroop Subtraction from the DAS) and with less distress in response to stressful life events after symptom scores were first residualized for baseline levels of each measure.

For all participants, those who began the study with higher levels of RSA had a greater reduction in state and trait anxiety and depression by Time 3.

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