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Proposed Beneficial Effects of Cardiac Coherence Training on Gestational Hypertension Stress and Anxiety in African Americans

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Abstract

Gestational hypertension (or pregnancy-induced hypertension) is the development of new hypertension in a pregnant woman after 20 weeks of gestation without the presence of protein in the urine or other signs of preeclampsia. Gestational hypertension is one of the most common disorders diagnosed during pregnancy. Though relatively benign on its own, gestational hypertension progresses into preeclampsia in approximately half of women diagnosed with this disorder. A severe complication of preeclampsia is eclampsia which usually follows preeclampsia. Eclampsia is a rare but serious condition where high blood pressure results in seizures during pregnancy. Women who suffer from either of these pregnancy complications are at increased risk for experiencing symptoms of stress and anxiety that might prove detrimental to both mother and baby. Consequently, a great deal of research has been conducted on the relationship between gestational hypertension, preeclampsia, eclampsia, and stress. Further, a direct link between stress and anxiety has been well-established in research published on this topic. These studies typically involve samples of predominantly European or Caucasian Americans. However, little research has been designed to examine the relationship between gestational hypertension, stress and anxiety in African Americans. Moreover, few studies have focused on the beneficial effects of heart rate variability (HRV) biofeedback (also called cardiac coherence training) on symptoms of gestational hypertension, stress and anxiety in this diverse patient population. Finally, results of research involving this understudied, diverse group of women could help fill the gap in literature published on the beneficial effects of cardiac coherence training in alleviating physical, mental, and emotional symptoms experienced during pregnancy.

Keywords: Gestational hypertension; Preeclampsia; Allostasis; HRV; Cardiac coherence

Statement of the Problem

Hypertension is defined as having a blood pressure reading equal to or greater than 140/90mm Hg. Gestational hypertension (also called pregnancy-induced hypertension) is the development of new hypertension in a pregnant woman after 20 weeks of gestation without the presence of protein in the urine or other signs of preeclampsia [1]. Gestational hypertension is one of the most common disorders diagnosed during pregnancy [2]. Though relatively benign on its own, gestational hypertension progresses into preeclampsia in approximately 50% of women diagnosed with this disorder. Pre-eclampsia is gestational hypertension plus proteinuria (>300 mg of protein in a 24-hour urine sample). Severe preeclampsia involves a blood pressure greater than 160/110mmHg, with additional medical signs and symptoms. This disorder can lead to eclampsia which occurs when tonic-clonic seizures appear in a pregnant woman with high blood pressure and proteinuria. Preeclampsia and eclampsia are sometimes treated as components of a common syndrome. Both conditions are dangerous and can prove fatal to expectant mothers and unborn children [3]. Thus, the coexistence of gestational hypertension and either aforementioned disorder are the most frequent causes of maternal, prenatal, perinatal, and postnatal morbidity and mortality in the United States (US). This is a major public health concern and the impact has the potential to lead to a huge economic burden on the US government and American healthcare system.

Review of the Literature

A great deal of research has been conducted on the relationship between gestational hypertension, preeclampsia or eclampsia, and stress. Zhang et al. [4] concluded that mental stress during life or pregnancy may be a risk factor for gestational hypertension and preeclampsia among pregnant women. Results of their meta-analysis that included 13 studies and a total of 668,005 pregnant women in the final data pool indicated that mental stress was associated with an increased risk of gestational hypertension (Odds Ratio, or OR= .26; 95% confidence interval, or CI=1.00-1.59; p=0.047) and preeclampsia (OR=1.49; 95% CI=1.27-1.74; p< 0.001). The authors also found that work stress (OR=1.50; 95% CI=1.15-1.97; p=0.003) and anxiety or depression (OR=1.88; 95% CI=1.08-

3.25; p=0.02) were positively associated with risk of preeclampsia as indicated by results of analyses performed on data included in their study. Similarly, a direct link between prenatal maternal mood and fetal behavior also has been well-established in the literature published on studies in which ultrasound technology was used by researchers to collect data from women 27 or more weeks pregnant. Findings provide evidence to support the assumption that anxiety and depression are common illnesses experienced during and after pregnancy. Symptoms of these psychological disorders can facilitate and potentially exacerbate gestational hypertension and the outcome may negatively influence both mother and fetus [5,6].

Why might gestational hypertension be associated with stress and anxiety? One possibility involves allostatic load, a concept of comprehensive and cumulative risk across multiple physiological, cognitive, and emotional regulatory systems resulting from long-term exposure to challenging life events or stressors such as pregnancy that influence health outcomes [7]. Allostasis is the body's ability to maintain homeostasis (equilibrium) and adapt to chronically or acutely stressful events; therefore, allostatic load is challenged in situations of long-term, short-term, or frequent stress, especially when there is an excessive demand on any of the body's regulatory systems [8]. Parameters used to measure allostatic load include indexes of cardiovascular activity, sympathetic and parasympathetic tone, metabolic actions, andneuroendocrine function. High allostatic load, or reduced allostasis, has been shown to predict mortality, incidence of cardiovascular disease, and decline in cognitive, emotional, and physical functioning [9].

Concerns about the effect of pharmacological interventions on pregnant women coupled with the risk of potential adverse drug effects on embryonic as well as fetal development serve as motivation for this patient population to seek safe and effective complementary and alternative approaches for the treatment of physiological, psychological, and emotional maladies, despite the fact that these non-traditional strategies are less rigorously studied in the US. Heart rate variability (HRV) biofeedback (also referred to as cardiac coherence training) is considered an innovative technique that can be used to reduce allostatic load, thereby potentially increasing allostasis, noticeably reducing blood pressure, and significantly attenuating symptoms of stress and anxiety. HRV refers to a change in the time intervals between adjacent heartbeats. McCraty & Shaffer [10] noted that HRV biofeedback is directly related to functioning of the autonomic nervous system comprised of the sympathetic and parasympathetic nervous systems, the body's interdependent regulatory systems and indicators of the organism's efficiency and health. Trousselard et al. [11] suggested that an optimal level of HRV within an organism reflects efficiency, healthy function and an inherent self-regulatory capacity, adaptability, and resilience. Cardiac coherence training is a mechanism with the potential to help women maintain well-being along with efficient and healthy function during pregnancy.

Keeney [12] studied the capacity of HRV biofeedback-assisted stress management training to reduce anxiety and stress in pregnant women. Moreover, the researcher examined the effect of maternal stress management skills practice on fetal heart rate measures recorded in real time. Seven pregnant women who were employed at the time of this pilot study served as volunteers for her research. Respondents were recruited through announcements and invitations delivered by cooperating midwives. After reading and signing a consent form, each participant completed a State-Trait Anxiety Inventory. Pregnancy specific stress also was measured using bibliotherapy, a complementary intervention strategy that integrates literature and other selected reading materials into the therapeutic process to support positive mental health. Data were collected during five 45- to 50-minute onsite training sessions which included instruction on the use of emotion-focused stress management techniques and HRV biofeedback. For practice at home, participants used portable biofeedback units, and they were encouraged to practice the skills for 20 minutes a day as well as for short periods of time during stressful life events. In addition to data collected from mothers included in the present study, fetal heart rate was monitored and concurrent maternal HRV measures were recorded at the end of training. Results of a repeated measures analysis of variance (ANOVA) and paired samples t-test revealed no statistically significant reductions in State or Trait Anxiety subscale scores or in pregnancy specific stress measures. Findings obtained using partial eta squared (η2) and Cohen's d indicated a small to medium effect size on the various test score results. Friedman's ANOVA of biofeedback measures showed a statistically significant decrease in low HRV coherence scores ($\chi 2$= 10.53, p= .03) and medium HRV coherence scores ($\chi 2$= 11.58, p= .02). The researcher also found a statistically significant increase in high HRV coherence scores ($\chi 2$= 18.16, p=.001). She interpreted this change in outcomes over time as an indication of improved autonomic nervous system function.

Conclusion

Although many studies examining obstetric effects of prenatal stress have included exclusively or predominantly European American samples, the few studies of African American pregnant women confirm that stress is a risk factor in this group. It is possible that preexisting ethnic differences in social status and barriers to healthcare access might contribute to increased risk of stress in this diverse population. Cardiac coherence training may be useful in attenuating stress and anxiety, lowering blood pressure as well as relieving symptoms of preeclampsia or eclampsia, and providing an optimal degree of well-being in African American women throughout their pregnancy. Further, results of research involving this understudied, underrepresented group of women could help fill the gap in published literature focused on the beneficial effects of a unique strategy for alleviating physical, mental, and emotional symptoms experienced during pregnancy.

References

1. Lo JO, Mission JF, Caughey AB (2013) Hypertensive disease of pregnancy and maternal mortality. Curr Opinion Obstet Gynecol 25(2): 124-132.
2. Garg AX (2015) Gestational hypertension and preeclampsia in living kidney donors. NEJM 372: 124-133.

3. Barton J (2001) Mild gestational hypertension remote from term: progression and outcome. Amer J Obstet Gynecol 184(5): 979-983.

4. Zhang S (2013) Association between mental stress and gestational hypertension/preeclampsia: a meta-analysis. Obstet Gynecol Surv 68(12): 825-834.

5. Abedian Z, Soltani N, Mokhber N, Esmaily (2015) Depression and anxiety in pregnancy and postpartum in women with mild and severe preeclampsia. Iran J Nurs Midwifery Res 20(4): 454-459.

6. Nasreen HE, Kabir ZN, Forsell Y, Edhborg M (2011) Prevalence and associated factors of depressive and anxiety symptoms during pregnancy: a population based study in rural Bangladesh. BMC Womens Health 11: 22.

7. McEwen BS, Stellar E (1993) Stress and the individual mechanisms leading to disease. Arch Internal Med. 153: 2093-2101.

8. Sterling P (2012) Allostasis: a model of predictive regulation. Physiol Behav 106(1): 5-15.

9. Seeman TE, McEwen BS, Rowe JW, Singer BH (2001) Allostatic load as a marker of cumulative biological risk: MacArthur studies of successful aging. PNAS 98(8): 4770-4775.

10. McCraty R, Shaffer F (2015) Heart rate variability: new perspectives on physiological mechanisms, assessment of self-regulatory capacity, and health risk. Global Adv Health Medicine 4(1): 46-61.

11. Trousselard M, Canini F, Claverie D, Cungin C, Putois B, et al. (2016) Cardiac coherence training to reduce anxiety in remitted schizophrenia: a pilot study. Appl Psychophysiol Biofeedback 41: 61-69.

12. Keeney JE (2008) The effects of heart rate variability biofeedback-assisted stress management training on pregnant women and fetal heart rate measures (Doctoral dissertation, University of North Texas), USA.