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Original Research - Quantitative

Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomised controlled trial

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ABSTRACT

Problem: Low prenatal well-being has adverse outcomes for mother and infant but few interventions currently exist to promote and maintain prenatal well-being.
Background: Mindfulness and gratitude based interventions consistently demonstrate benefits in diverse populations. Interventions integrating these constructs have potential to improve psychological and physiological health during pregnancy.
Aim: The aim of this pilot study is to examine the effect of a novel gratitude and mindfulness based intervention on prenatal stress, cortisol levels, and well-being.
Methods: A pilot randomised controlled trial was conducted with 46 pregnant women. Participants used an online mindfulness and gratitude intervention 4 times a week for 3 weeks. Measures of prenatal stress, salivary cortisol, gratitude, mindfulness, and satisfaction with life were completed at baseline, 1.5 weeks later, and 3 weeks later.
Findings: Intervention participants demonstrated significant reductions in prenatal stress in comparison to the control condition ($p = .04$). Within subjects reductions in waking ($p = .004$) and evening cortisol ($p > .001$) measures were observed for intervention participants. Significant effects were not observed for other well-being outcomes.
Discussion: Reducing self-report and physiological stress in pregnancy can improve maternal and infant outcomes. The findings of this pilot study indicate potential direct effects of the intervention on self-reported stress in comparison to a treatment-as-usual control. Effects on a biomarker of stress, cortisol, were also observed within the intervention group.
Conclusion: A brief mindfulness and gratitude based intervention has the potential to reduce stress in pregnancy. Future research is needed to further explore mechanisms and potential benefits of such interventions.

Summary of relevance

Problem or issue

Prenatal stress is a significant contributor to adverse maternal and infant outcomes. Few positive protective interventions exist to promote and maintain well-being during pregnancy.

What is already known

Interventions based on mindfulness and gratitude have demonstrated significant benefits for psychological and physical health in diverse populations. Preliminary evidence demonstrates beneficial effects in pregnancy also. Little work has been done on both subjective and objective markers of prenatal stress.

What this paper adds

A brief at-home well-being intervention has the potential to reduce psychological stress and levels of cortisol, a biomarker of stress, during pregnancy.

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1. Introduction

Low prenatal well-being and its subsequent negative effects have been extensively examined and documented.[1] It can have significant negative physical and psychological outcomes including pre and post-natal depression,[2] pregnancy complications,[3] preterm delivery and low birth weight.[4] Low maternal well-being is typically characterised by low levels of positive affect, self-esteem and life satisfaction; it is also characterised by high levels of depression, anxiety and stress. These factors can occur in isolation or in tandem with other indicators of low prenatal well-being; they are not therefore separate constructs but can be viewed in the context of multidimensional facets of well-being.

A commonly reported and examined facet of low well-being during pregnancy is prenatal stress. It is suggested that 25% of all pregnant women experience prenatal stress.[5] Prenatal stress can be caused by numerous psychological, biomedical, environmental, psychosocial and socioeconomic factors.[1] It can occur as a result of physical symptoms and changes,[5] family stressors, current health, socio-economic status, work strain, and inadequate psychosocial resources.[1]

While a broad range of factors contribute to stress during pregnancy, given the number of pregnancy-related concerns that characterise it, prenatal stress must be conceptualised as a pregnancy-specific construct. Such a conceptualisation is supported by the fact that pregnancy presents unique challenges and changes, thus representing a unique contextually specific stressor in and of itself.[6] Examinations of prenatal stress have shown it to be consistently associated with adverse effects for the expectant woman and developing foetus.[2,6,7] Prenatal stress is a precursor for prenatal and postpartum depression.[2] It is associated with an increased risk of engaging in adverse health behaviours, such as cigarette smoking during pregnancy,[6] and early cessation of breastfeeding postpartum.[6] Prenatal stress is also associated with an increased risk of caesarean section, as well as labour and birth complications.[4] It is consistently associated with poor obstetric outcomes, including low infant birth weight,[1] shorter length of gestation,[9] and risk of preterm labour or birth.[1,9]

1.1. Cortisol

One mechanism suggested to contribute to these latter outcomes is cortisol. Cortisol is an important mediator between psychological states and health related outcomes. It is an end product of hypothalamic pituitary adrenal (HPA) axis functioning, and helps to regulate the stress response. During pregnancy, the circadian rhythm and cortisol awakening response (CAR), which is a morning peak in cortisol levels, are preserved.[10] However, prenatal maternal cortisol levels progressively increase during pregnancy from 25 weeks gestation.[11,12] During pregnancy both the maternal HPA axis and the placenta produce cortisol; it is an important factor for foetal maturation and labour.[1] However, increases in maternal cortisol, due to prenatal maternal stressors, can adversely effect production of placental cortisol. These increased cortisol levels can lead to adverse foetal outcomes, including increased risk of low birth weight and birth complications.[11] Thus, reducing sub-optimally elevated cortisol levels and maintaining optimal cortisol functioning during pregnancy has the potential to benefit both mother and developing infant.

1.2. Positive well-being in pregnancy

Research examining potential benefits of positive aspects and protective factors of well-being on prenatal mental health and cortisol outcomes during pregnancy is scarce. In one study of 41 women in late pregnancy,[12] prenatal CAR was significantly correlated with prenatal happiness but not with prenatal stress or depression. In a thorough investigation of prenatal well-being with 60 pregnant women,[13] positive life events significantly predicted lower morning cortisol in the 3rd trimester; negative life events were not associated with cortisol. A number of recent studies examining the effects of mindfulness interventions on well-being during pregnancy have also been conducted. Mindfulness is defined as non-judgmental observation of all thoughts, feelings and sensations in the present moment.[14] Recent reviews of the effects of mindfulness during pregnancy have highlighted some potential benefits for depression, anxiety, negative affect and stress but a need for significantly improved methodological approaches to prenatal mindfulness examinations.[15,16,17] The need for inclusion of pregnancy specific measures and biomarkers of prenatal stress is also highlighted.[17]

Given the initial promising findings of mindfulness interventions on prenatal outcomes, as well as the demonstrated effects of protective factors, such as positive life events, it is expected that other positive factors could demonstrate similar positive effects during pregnancy. For instance, gratitude consistently demonstrates benefits for well-being in diverse populations.[21] Gratitude can be defined as a worldview towards noticing or appreciating the positive in life.[16] Benefits of gratitude include increased life satisfaction and social support[22] and health behaviours.[23] It has also been associated with reduced stress,[21] depression,[21] anxiety,[23] and physical symptoms.[24] To the authors' knowledge, only one study has examined gratitude in a pregnancy-related context.[25] In a content analysis of the subjective, retrospective gratitude of 799 Swedish women, for care provided by medical staff after a stillbirth, the researchers found mothers experienced gratitude for health professionals' emotional, practical and informative support. No research has yet been published on the effects of gratitude during pregnancy however. This is despite the potential benefits of gratitude for prenatal well-being.

Combining a well-established gratitude intervention that has consistently demonstrated beneficial effects[20] with a well-established element of mindfulness practice therefore allows for a robust investigation of a novel approach to prenatal well-being improvement. The detrimental effects of low prenatal well-being have been extensively studied but positive interventions that aim to improve well-being through fostering and maintaining prenatal psychological resources are in their infancy. The current study will therefore examine the effect of a novel gratitude and mindfulness based intervention on prenatal stress, cortisol levels and well-being factors, in comparison to a treatment as usual control group.

2. Method

2.1. Participants

Participants ($n = 46$) were pregnant women aged 27–40 years ($M = 33.87$, $SD = 3.04$). Participants were required to be over 18 years of age and to be between 10 and 22 weeks pregnant at recruitment; the latter criterion was to control for the natural progressive rise in cortisol levels from 25 weeks gestation.[26] Participants were also required to not currently be taking asthma or thyroid medication as this can impact on cortisol levels. Participants must also not have received a diagnosis of depression, anxiety or other well-being issues in the last 2 years; participants who previously received such a diagnosis self-selected not to participate. Sample size was determined using power calculations with G*Power 3. Calculations were conducted for a mixed between-within subjects design. Estimates of effects were derived from the findings of previous pilot work (unpublished), while maintaining a conservative approach to power analysis. Results of this analysis indicated that a total sample size of 141 participants is sufficient to detect a

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