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A randomized controlled trial of the effects of a stress management programme during pregnancy

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Summary
Background: Prenatal maternal stress is associated with adverse birth outcomes. Relaxation techniques might be effective in reducing stress during that period. The purpose of this study was to evaluate the effects of applied relaxation in reducing anxiety and stress in pregnant women in their second trimester, as well as raising their sense of control. Also we expected to see a difference in some lifestyle factors associated with stress. A randomized control trial with a prospective pretest—posttest experimental design was used.
Methods: Sixty primigravida women in their second trimester were assigned randomly to receive a 6-week stress management programme ($N = 31$) (relaxation breathing and progressive muscle relaxation, RB-PMR, twice a day) or not ($N = 29$). Self-reported validated measures were used to evaluate perceived stress, health locus of control and anxiety at baseline and at the end of the 6-weeks follow-up.
Results: The results of the study demonstrated significant benefits from the use of the techniques in the psychological state of the pregnant women. The systematic implementation of the proposed relaxation techniques contributed in the reduction of perceived stress (mean change −3.23, 95% CI: −4.29 to −0.29) and increased the sense of control (mean change 1.99, 95% CI: 0.02—3.7).
Conclusion: The findings suggest beneficial effects of relaxation on reducing perceived stress as well as increment of sense of control in pregnant women. The results of this study support the claim that training in the proposed relaxation techniques may constitute an ideal, non-pharmaceutical, intervention that can promote well-being, at least during pregnancy. Longer studies will be necessary in the future, in order to examine the long-term effects of relaxation techniques.
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Introduction

Pregnancy for many women it may be particularly stressful, significantly affecting their quality of life, especially for the primigravida. Many factors have been associated with prenatal psychological stress. They generally include the sum of all arising demands, changes in body fitness, the shifting roles and the differentiation in interpersonal relationships with significant others.[1] Although, these changes may be stressful, pregnancy is something most women choose to experience and as a result, birth is a welcome event usually accompanied by great enthusiasm. Moreover, in contrast to other stressful life events, pregnancy is a finite event with a specific duration and outcome which, in most cases, can be predicted with great accuracy.[2]

A significant number of studies in animals and humans have demonstrated that high maternal stress and mood disorders during pregnancy are associated with a variety of negative repercussions for both mother and foetus, including premature birth,[3–7] higher risk of developing hypertension and preeclampsia,[8] problems in lactation[9] and increased vulnerability to mood disorders and autoimmune phenomena during the postpartum period.[9] Furthermore, maternal stress has been shown to adversely affect the foetus' development in the womb (brain development and neurological damage)[10–15] and it is associated with the low birth weight of the infant, the small head circumference, the low Apgar score[16–18] and with increased risk of miscarriage or stillbirth.[19] It has also been demonstrated that maternal stress may later affect the relationship between mother and child as well as the child's adult life (autism, schizophrenia, ADHD)[20–25] and predisposes a difficult childbirth and the emergence of depressive symptoms during the postpartum period.[26–29]

In physiology, increased levels of stress, anxiety and depressed mood have been shown to correlate with changes in various parameters mainly through the activation of hypothalamic—pituitary—adrenal axis (HPA axis) and the sympathetic nervous system.[30] Various hormones, including corticotropin hormone (CRH), adrenocorticotropic hormone (ACTH), cortisol and norepinephrine (NE), are released in large quantities in the bloodstream.[30] How all these changes in physiological parameters may lead to adverse effects is not yet well understood. Furthermore, although research has focused more on the correlation between stress and possible complications in pregnancy, there is no significant bibliography demonstrating the usefulness of specific relaxation techniques in reducing stress during this period.[31] It is anticipated that the systematic implementation of relaxation techniques may lead to important positive physiological changes which include a decrease in metabolism, oxygen consumption, cardiac function, blood pressure, breathing rate, and brain activity as well as to a significant increase in well-being.[32]

In the last decade, complementary-alternative treatments have been largely incorporated in routine medical practices, including pregnancy.[33] Studies on the effect of relaxation techniques during pregnancy reveal a variety of significant effects.[31] The systematic implementation of relaxation techniques has shown to reduce the likelihood of premature or delayed birth, to increase the infant's body weight and to reduce the likelihood of a Caesarean section and birth interventions.[34–38] Relaxation techniques that have been studied in pregnancy include most frequently yoga, hypnotherapy (guided hypnotherapy imagery script) and meditation with promising results in the reduction of stress, perceived stress, the reduction of various physical symptoms and the promotion of good mood and well-being.[37–40] Applied relaxation, which is a combination of diaphragmatic breathing and muscle relaxation, has also been found to reduce anxiety and perceived stress and have other positive effects.[34–36,41,42]

There are limited data to support the efficacy of applied relaxation for stress reduction during pregnancy. This is the first study in Greek women, to examine change in perceived stress, anxiety and sense of control following a six week programme of a combination of two relaxation techniques (diaphragmatic breathing and progressive muscle relaxation).

The purpose of this study was to evaluate the effects of applied relaxation (combination of diaphragmatic breathing and muscle relaxation) in reducing anxiety and stress in pregnant women during their second trimester, as well as raising their sense of control.

By implementing this low cost non-pharmaceutical randomized controlled intervention, we expected a significant reduction in state-trait anxiety levels and in perceived stress and an increase in the sense of health control by participants in the intervention group compared with the control group. Also we expected to see a difference in some lifestyle factors associated with stress.

Method

The design of the study was a randomized control trial (RCT), which included an experimental trial before and after the intervention (prospective pre-test—post-test experimental design).

The main study hypotheses were as follows: (1) state anxiety scores of the experimental group will be significantly reduced compared with the control groups scores, after applied relaxation training, (2) trait anxiety scores of the experimental group will be significantly reduced compared with the control group's scores, after applied relaxation training, (3) perceived stress scores of the experimental group will be significantly reduced compared with the control group's scores, after applied relaxation training, and (4) sense of control will be significantly increased compared with the control group's scores, after applied relaxation training.

The sample group for this study was a convenience sample. It consisted of pregnant women invited from private obstetricians practice and the Attikon maternity hospital in Attica, more specifically from the department of Foetal Medicine. The study was accredited from the medical school of Athens and the Scientific Committee of Attikon hospital (registration number: UoAMedPR-4716-180211-23). The admission criteria for the study required that participants were primigravida, in the second trimester of their pregnancy (14—28 weeks gestation), aged 20—40 years, with singleton pregnancy and no prior history of medical complications. Also, they were required to understand Greek. Exclusion criteria were the therapeutic use of drugs for

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