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File: ■ Aromatherapy
■ Stress
■ Immune Function
■ Pregnancy

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RE: Aromatherapy Massage Treatment Improves Biomarkers of Stress and Immune Function

Chen PJ, Chou CC, Yang L, Tsai YL, Chang YC, Liaw JJ. Effects of aromatherapy massage on pregnant women's stress and immune function: A longitudinal, prospective, randomized controlled trial. *J Altern Complement Med.* October 2017;23(10):778-786.

Pregnancy has been shown to increase stress hormones, such as cortisol. Pregnant women with high cortisol levels have reduced cellular immunity and are at a higher risk for infection. As aromatherapy is used to reduce stress, the possibility exists that it may have beneficial effects on the immune system as well. The aim of this prospective, randomized, controlled trial with a longitudinal, repeated design was to assess the effects of aromatherapy massage on women's stress and immune function during pregnancy.

Pregnant women around 16 weeks gestational age (GA) were recruited from a prenatal clinic in Taipei, Taiwan (February 2014-January 2015). Women were included in the study if they were 20-45 years of age, agreed to follow-up collections of saliva samples, and could read and write Chinese. Women were excluded if they were taking steroids, had a history of severe illness, had depression, consumed drugs, or had a high-risk pregnancy.

A total of 52 pregnant women (aged 20-45 years) were included in the study and randomly assigned to either the aromatherapy intervention group (n=24) or the control group (n=28). The women in the control group were provided only with routine prenatal care, whereas the intervention group had routine prenatal care and aromatherapy massage during the study. In particular, the subjects in the aromatherapy group underwent 60 min of aromatherapy massage every other week (from 16 to 36 weeks GA; 10 weeks in total).

The oil used in the aromatherapy massage sessions consisted of 2% lavender (*Lavandula angustifolia*, Lamiaceae) oil blended in almond (*Prunus dulcis*, Rosaceae) oil. The aroma of the oil was either inhaled or absorbed into the skin. Aromatherapy massage, with an approximate total of 30 mL of massage oil, was performed in a quiet

room (25-26°C; humidity, 50-60%) using moderate pressure tolerated by pregnant women either in the form of effleurage (circular stroking movements), friction, petrissage (kneading), or vibration of the body parts (back, posterior legs, anterior legs, arms, and shoulders) for 1 hour in duration.

Saliva samples were taken 10 min before and after the massage treatment. A total of 200 mL of warm water was provided to the subjects at the end of the study. All massage sessions occurred in the afternoon (between 15:00 and 17:00) to avoid circadian variations. Salivary sample collections were done at the same time for both groups. Salivary cortisol levels and salivary immunoglobulin A (IgA) were measured to assess stress and immune function, respectively.

There were no significant differences found between the intervention and the control groups in terms of education level, income level, age, or other subject characteristics. The number of subjects who dropped out or did not complete the study was not significantly different between the groups. All subjects in the study had singleton births.

The pretest salivary cortisol levels were not significantly different between the groups at 16 weeks GA. In the control group, the pretest cortisol levels at 36 weeks GA were significantly higher than at 16 weeks GA ($P < 0.001$). The change from pretest to post-test (immediate effect) at 16 weeks GA was not significantly different in the control group but was significantly changed in the aromatherapy massage oil group ($P < 0.001$). The aromatherapy massage group had markedly decreased post-test cortisol levels and similar immediate effects at all time points. None of the immediate effects were significantly different from 16 weeks GA. The post-test and pretest cortisol levels were similar at each time point in the control group. The immediate effects at 16 weeks GA were significantly different than at 24 weeks GA ($P = 0.035$) and 36 weeks GA ($P = 0.049$), which was due to lower post-test values than pretest values at these times.

At 16 weeks GA (baseline), salivary IgA levels were not significantly different between the groups. The change in IgA levels was not significantly different in the control group at 16 weeks GA, but was significantly different in the aromatherapy intervention group ($P < 0.001$). Salivary IgA levels increased after aromatherapy massage at all time points in the same manner as the immediate effect at 16 weeks GA (no significant effects at the different time points). In terms of long-term effects, it was found that pretest salivary IgA levels in the aromatherapy massage group were significantly higher at 32 weeks ($P = 0.002$) and 36 weeks ($P < 0.001$) compared to the control group. The only time point in the control group when pretest salivary IgA levels were significantly higher than at 16 weeks GA was at 24 weeks GA ($P = 0.005$). The change in salivary IgA levels was similar at each time point in the control group, and the immediate effect was significantly different only at 32 weeks GA compared to 16 weeks GA ($P = 0.026$).

Overall, the authors conclude that aromatherapy massage with 2% lavender oil in pregnant women had significant immediate effects on a biomarker of stress, as well as significant immediate and long-term effects on a biomarker of immune function. One of the major strengths of this study is that it evaluated how effective aromatherapy massage was on pregnant subjects over time. While not mentioned explicitly in the study, one potential weakness is that neither the safety profile regarding the use of essential oils in pregnant women nor its effects on the liver were explored. As suggested by the authors, future trials should also assess the effects of massage treatments and

essential oil treatments used alone, as well as evaluate other biomarkers of stress and immune function.

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—*Laura M. Bystrom, PhD*

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