



Review

Aromatherapy for stress reduction in healthy adults: a systematic review and meta-analysis of randomized clinical trials



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ABSTRACT

The aim of this review was to systematically assess the effectiveness of aromatherapy for stress management. Seven databases were searched from their inception through April 2014. RCTs testing aromatherapy against any type of controls in healthy human person that assessed stress level and cortisol level were considered. Two reviewers independently performed the selection of the studies, data abstraction and validations. The risk of bias was assessed using Cochrane criteria. Five RCTs met our inclusion criteria, and most of them had high risk of bias. Four RCTs tested the effects of aroma inhalation compared with no treatment, no aroma, and no odour oil. The meta-analysis suggested that aroma inhalation has favourable effects on stress management ($n=80$; standard mean difference (SMD), -0.96 ; 95% CI, -1.44 to -0.48 ; $P<0.0001$; $I^2=0\%$). Three of included RCTs tested aroma inhalation on saliva or serum cortisol level compared with control and meta-analysis failed to show significant difference between two groups ($n=88$, SMDs -0.62 ; 95% CIs -1.26 to 0.02 , $P=0.06$, $I^2=46\%$). In conclusion, there is limited evidence suggesting that aroma inhalation may be effective in controlling stress. However, the number, size and quality of the RCTs are too low to draw firm conclusions.

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1. Introduction

Stress refers to the state of psychological, physiological and physical strain that is felt when one is faced with an environment that is difficult to adapt to [1]. Chronically, it may lead to physical diseases such as heart disease, stomach ulcers, hypertension, etc. and psychological maladaptation including insomnia, neurosis, depression, etc [1–5]. Acutely, psychological changes such as anxiety may appear or physiological changes such as release of catecholamine, increase in blood pressure due to the activation of the sympathetic nervous system, and increase in pulse rate may appear [1,6,7]. Particularly from a medical perspective, stress can be the cause of many diseases, and relieving stress is one of the most basic responsibilities of the medical staff since hospitalizations and surgeries may induce stress [1]. Particularly in the medical field, efforts to relieve stress are in progress as the number of diseases caused by stress increases while diseases and treatment may be a source of stress themselves [1,8].

Aromatherapy is the therapeutic use of essential oils from plants. Essential oils can be absorbed into the body via the skin or the olfactory system [9]. Recent systematic review showed that aromatherapy is one of popular complementary and alternative medicine in UK [10]. Several textbooks have also asserted the favourable therapeutic effects of aromatherapy for psychological health including stress management [9,11,12]. One overview suggested that aromatherapy, which generally delivered with massage therapy, may induce relaxation which, in turn, might improve pain and psychological health [13]. There are three systematic reviews of aromatherapy for psychological health including anxiety and depression [14–16]. One of them includes 16 RCTs and suggested beneficial effects on reducing anxiety [14]. The other systematic review that was based on 13 RCTs showed limited evidence of anxiolytic effects of lavender [15]. Third systematic review included six studies of aromatherapy for depression and suggested beneficial effects [16]. However, no systematic reviews for stress reduction are currently available.

The aim of this systematic review was to summarise and critically assess the evidence from randomised clinical trials for or against the effectiveness of aromatherapy as an anti-stress treatment.

2. Methods

2.1. Criteria for including studies in this review

2.1.1. Types of studies

Randomized controlled trials (RCTs) and quasi-RCTs were included. Trials that did not provide detailed results will also be excluded. Dissertations and abstracts will be included if these

contain sufficient details for critical evaluation. No language restriction will be imposed.

2.1.2. Types of participants

The studies evaluated healthy participants were included. The studies conducted with subjects with chronic or psychological diseases; pregnant subjects, children, or animals were excluded.

2.1.3. Types of interventions

We included those trials using the aroma inhalation, aromatherapy massage with any types of essential oil alone or as a combined therapy of the aroma inhalation, aromatherapy massage with a conventional therapy versus the same conventional therapy. Aromatherapy is defined as the therapeutic use of essential oils from plants. There were no limitations on the number of essential oils used, the dosage, the forms of aromatherapy or the duration of the treatment.

2.1.4. Types of outcome measures

The following outcome measures will be assessed based on analyses of the data obtained in the included trials:

2.1.4.1. *Primary outcome.* Subjective stress level with visual analogue scale, numerical rating scale or verified questionnaire for measuring stress level was determined.

2.1.4.2. *Secondary outcomes.*

- (1) Cortisol level (saliva or plasma or serum);
- (2) Adverse effects likely to be related to treatment.

2.2. Search methods for identifying the studies

2.2.1. Electronic searches

The electronic searches were performed using Pubmed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, and the Cochrane Central Register of Controlled Trials (CENTRAL). We also searched three Korean databases (the Research Information Service System (RISS), DBPIA, and the Korean Studies Information Service System (KISS)). Languages were limited to English and Korean. In addition to electronic databases, grey journals such as dissertations, news articles, presentation materials, etc. were searched manually.

2.2.2. Search strategy

The searching term was (aromatherapy OR aroma* OR (essential oil)) AND (stress).

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