The Rationale behind wearing strings of Jasmine flower by the lactating South Indian Women

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Abstract
Jasmine flower belonging to Oleaceae family is cultivated in temperate places across the globe which has more than 200 species. This flower has traditional, religious, social, spiritual and medicinal benefits. It is considered as symbol of beauty, deep affection, happiness and elegance. It is the National flower of many countries. Due to its charming fragrance, it is extensively used in perfume industry. The vital ingredient of jasmine aroma is due to the amalgamation of phytochemicals and alcoholic compounds. In India these flower strings have special importance among the fairer gender. In South India, strings of Jasmine flower are worn by lactating women. It is believed to produce increased lactopoiesis and prolong the lactational amenorrhoea. The mechanisms can be the activation of olfactory area by olfactory nerve or stimulants crossing blood brain barrier triggering a neuroendocrine response.

Keywords
Jasmine, Fragrance, Lactation, Ovulation, Hormones

Introduction
Jasmine is an important fragrant flower that is cultivated predominantly in temperate climate (1). The history of jasmine goes back to Egypt dynasties, Chinese emperors, Kings of Afghanistan, Nepal, Persia, and Spain. Its different varieties are recognised as the national flower for countries like Pakistan and Paraguay. It is grown for its aroma and it is extensively used in perfume industry (2). Abu'al-Qassim al-Zahrawi (936-1013 AD), a physician in his book Al-Tasreef has devoted an entire chapter on cosmetics. He has described the medicinal properties of different aromas (3). In India, Jasmine has a special position due to its social, spiritual and medicinal values in the backdrop of traditional concepts since ancient times. Different varieties of this flower are grown in many
The Hypothesis

Jasmine is believed to possess galactogogue and delaying ovulation properties. We propose that inhalation of aroma causes the activation of limbic system, hypothalamus and pituitary which can in turn lead to increased lactation and delayed ovulation.

Evaluation of Hypothesis

The constituents of Jasmine include methyl linaloate, benzyl salicylate, benzyl benzoate, farnesol (4), Skatole, indole, terpinol, linalool (9) and benzyl acetate (8) and many other phytochemicals.

The typical characteristic aroma of Jasmine is due to linalool (10). The experiments on rats concluded that stress-elevated levels of immune cells fell to almost normal levels compared with the controls inhaling linalool. It also reduced the expression of more than 100 genes that "go into overdrive" in stressful situations (9). The indole of linalool is a precursor of serotonin synthesis containing tryptophan. The calming, mood elevation and alleviation of stress is brought about by the neurotransmitter serotonin (11).

Serotonin is the precursor for the GABA synthesis and the presence of GABA receptors in hypothalamus has been shown previously (12). The effects of Jasmine fragrance on hypothalamus has been well documented indicating the effect of Jasmine extract on the relation between the level of sebum secretion and the activity of the hypothalamo-pituitary-adrenal axis (HPA) (13). HPA axis may be the underlying neurophysiological mechanism of olfactory effects on systemic response to mental stress. Studies on rats have documented that drug induced sleep duration is shortened due to inhalation of jasmine aroma by activation of reticular activating system (14).

Experiments on humans demonstrated the effects of aromatic inhalation on autonomic functions. Hongratanaworakit recorded their pulse rate, respiratory rate, blood pressure, oxygen saturation and body temperature who were subjected to aroma therapy. After analysis he found marked increase in the above parameters which indicated an elevated autonomic response (15).

The physio-psychological effects of Jasmine odour has been studied (16). The gene expression pattern in hypothalamus showed significant expression changes in the odorant-inhaling rats. It included the up regulation of genes related to neuron differentiation, bringing restraint-regulated genes to a normal condition and further up-regulation of genes encoding for heat shock proteins. Thus hypothalamus is activated by inhaled pleasant odour like jasmine (9). Functional MRI scans in humans have shown the activation of hypothalamus on inhalation of jasmine fragrance (17).

Discussion

The physiological effects of aroma are studied on heart rate, blood pressure, electro dermal activity, electroencephalogram (EEG) demonstrating slowed potential brain waves and eye blink rate. The EEG showed increased alpha, beta and theta waves. Inhalation of Jasmine odour resulted in increased activity of slow potential brain waves, the observations were similar to that of inhalation of caffeine (16). The above observations confirm the activation of brain. Hypothalamus thus activated, regulates the gonadotrophin releasing hormone (GnRH). Hormones acting on gonads (FSH, LH) and mammary gland (prolactin, and oxytocin) are modulated via the pituitary by GnRH. This change in hormonal milieu will produce the effect of increased lactation and delayed ovulation.

The alternate mechanism could be: the activation of pituitary is brought about by the absorption of the odorants into the blood stream via the respiratory membrane. These chemicals cross the blood brain barrier and stimulate the olfactory areas, producing the above physiological effects (18).

Conclusion

The rationale behind wearing strings of Jasmine flower by the lactating South Indian women to cause increased lactopoiesis and prolonged lactational amenorrhoea has a physiological relevance. This hypothesis requires animal experiments to confirm...
these effects. Clinical correlation should be done to conclusively prove the physiological findings.

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**Overview Box**

First Question: What do we already know about the subject?
A. Jasmine aroma has calming, soothing, aphrodisiac, mood uplifting, antidepressant and various other medicinal uses.
B. Essential oils of jasmine extract are used in manufacturing perfumes and in aromatherapy.

Second Question: What does your proposed theory add to the current knowledge available, and what benefits does it have?
A. Wearing of strings of jasmine flower by lactating women gives the benefit of increased lactation and prolongation of lactational amenorrhea.
B. Jasmine aroma could be beneficial for nursing mothers.

Third question: Among numerous available studies, what special further study is proposed for testing the idea?
The above physiological effects of Jasmine can be tested by animal experiments correlating Jasmine aroma, hormonal assays and physiological effects. These studies should have statistical power and exclusion criteria which alter lactopoiesis and ovulation.

**References**

Figure 1: Evaluation of hypothesis can be done at multiple levels shown by red arrow.