

EFFECT OF *Lavandola angustifolia* AROMATHERAPY VERSUS MIDAZOLAM ON VITAL SIGNS IN CRITICALLY ILL PATIENTS

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ABSTRACT

Lavandola angustifolia is a plant from *labiateae* family that might be used against free radicals and also as tranquilizer with anti-stress and anti-anxiety. Since there are few randomized clinical trials in this era especially for admitted patients in intensive care unit (ICU); this study was performed to compare the systolic and diastolic blood pressure, pulse rate, and respiratory rate in two groups of patients in ICU who received *Lavandola angustifolia* preparation versus midazolam as a conventional sedative drug. In this randomized clinical trial, 64 patients were randomly assigned (with simple random manner) to receive either aromatherapy with *Lavandola angustifolia* drop 2% developed by Bonyan Mehr Ejaz Kaivr Shargh Iran Company in Shahroud, Iran (n=33) or midazolam (n=31). The *Lavandola angustifolia* drop was respired by a patch inside the oxygen mask 20 minutes daily. Also, the midazolam was injected intravenously with a dose of 0.05 mg/kg. The vital signs were assessed before intervention and then every 10 minutes up to one hour. The pulse rate and respiratory rates were significantly lower in Aromatherapy group and the systolic and diastolic blood pressures were significantly higher in this group in comparison with midazolam group (P=0.0001). Totally, according to the obtained results, it may be concluded that vital signs had more stability in aromatherapy with *Lavandola angustifolia* in comparison with midazolam.

Keywords: *Lavandola angustifolia*; aromatherapy; midazolam; respiratory rate.

INTRODUCTION

Nowadays herbal remedies and traditional herbal medicine are important tools to attain national and universal goals for health and mental health, and drug manufacturing independence, job development, food safety, genetic supplies

reservation, and active presence in worldwide situations (Firenzuoli and Gori, 2007; Fürst and Zündorf, 2015; Nouri et al., 2014). Millions of people are evolved in culture, preparation and development of herbal drugs worldwide with an increasing trend (Ekor, 2013; Firenzuoli et al., 2005). Iran also has a good diversity of herbal

drugs with some unique aspects (Chang et al., 2016a; Chotchoungchatchai et al., 2012; Smith-Hall et al., 2012).

There are 8000 herbal species in Iran among them 2500 types would have herbal and cosmetic usefulness and 1730 species are unique reserves (Bent, 2008). Bioenvironmental requirements and gradual attendance to natural products due to adverse effects of chemical and synthetic drugs have led to higher rate of herbal medicine use in developed countries (Marinac et al., 2007; Zimmerman and Kandiah, 2012). Herbal and traditional medicines are also two longstanding fields in Iran (Vickers et al., 2001). International and developed countries perspective about herbal medicine are not limited to local limited uses but also are interested in the preservation of therapeutic herbs and preparation and promotion of these remedies to develop higher rate and better use of these therapeutics for general usefulness (Ernst, 2005; Parisius et al., 2014). These matters have led to high cultural surface use for therapeutic herbs; but lack of knowledge about ecological needs and optimal conditions for this matter results in lower rate of use from all potential abilities in this era (Chang et al., 2016b; Louik et al., 2010; Tabassum and Ahmad, 2011).

Lavandola angustifolia is herbal species from *labiateae* family that may be used against free radicals and also as tranquilizer with anti-stress and anti-anxiety (Ghelardini et al., 1999; Ghods et al., 2014; Ghods et al., 2015). Since there are few randomized clinical trials in this era especially for admitted patients in intensive care unit (ICU); the objective of this study was performed to compare the systolic and diastolic blood pressure, pulse rate, and respiratory rate in two groups of patients in

ICU who received *Lavandola angustifolia* preparation versus midazolam as a conventional sedative drug.

MATERIALS AND METHODS

In this single-blind randomized clinical trial in ICU of a training hospital in Shahroud-Iran in 2017. This study was approved by local ethical committee (Code: IR.IAU.SHAHROOD.REC.1396.10I). Also, the code attained from Iranian registration of clinical trial (IRCT) center was IRCT2017081335666N1. The patients were excluded if they had a history of asthma, respiratory allergies, anosmia, Glasgow Coma Scale (GCS) less than 8, and intubated patients with homodynamic instability.

The patients were randomly assigned (with simple random manner) to receive either aromatherapy with *Lavandola angustifolia* drop 2% developed by Bonyan Mehr Ejaz Kaivr Shargh Iran Company in Shahroud, Iran (n=33) or midazolam (n=31). The *Lavandola angustifolia* drop was respired by a patch inside the oxygen mask 20 minutes daily. Also, the midazolam was injected intravenously with a dose of 0.05 mg/kg. Understudy variables were age, gender, body mass index (BMI), systolic and diastolic blood pressure, pulse rate, and respiratory rate. The vital signs were assessed before intervention and then every 10 minutes up to one hour.

Data analysis was performed among 64 subjects including 33 patients in aromatherapy group and 31 subjects in midazolam group. Data analysis was performed by SPSS (version 13.0) software [Statistical Procedures for Social Sciences; Chicago, Illinois, USA]. Chi-Square, Independent-Sample-T, and repeated-measured ANOVA tests were used and

were considered statistically significant at P values less than 0.05.

aromatherapy and midazolam groups, respectively ($p > 0.05$).

RESULTS

In aromatherapy and midazolam groups 13 (39.4%) and 16 (51.6%) of patients were male, respectively ($p > 0.05$). The mean (standard deviation) age was 70.55 (13.7) and 68.5 (21.4) in aromatherapy and midazolam groups, respectively ($p > 0.05$). The mean (standard deviation) BMI was 25.19 (4.6) and 26.36 (5.7) kg/m² in

Fig. 1 shows pulse rate of two study groups. The results revealed that pulse rate of aromatherapy group significantly lower than midazolam group ($p < 0.001$).

Fig. 2 represents the comparison of respiratory rate between aromatherapy and midazolam group over 70 minutes. Results showed that respiratory rate of midazolam group significantly ($p < 0.05$) higher than aromatherapy group.

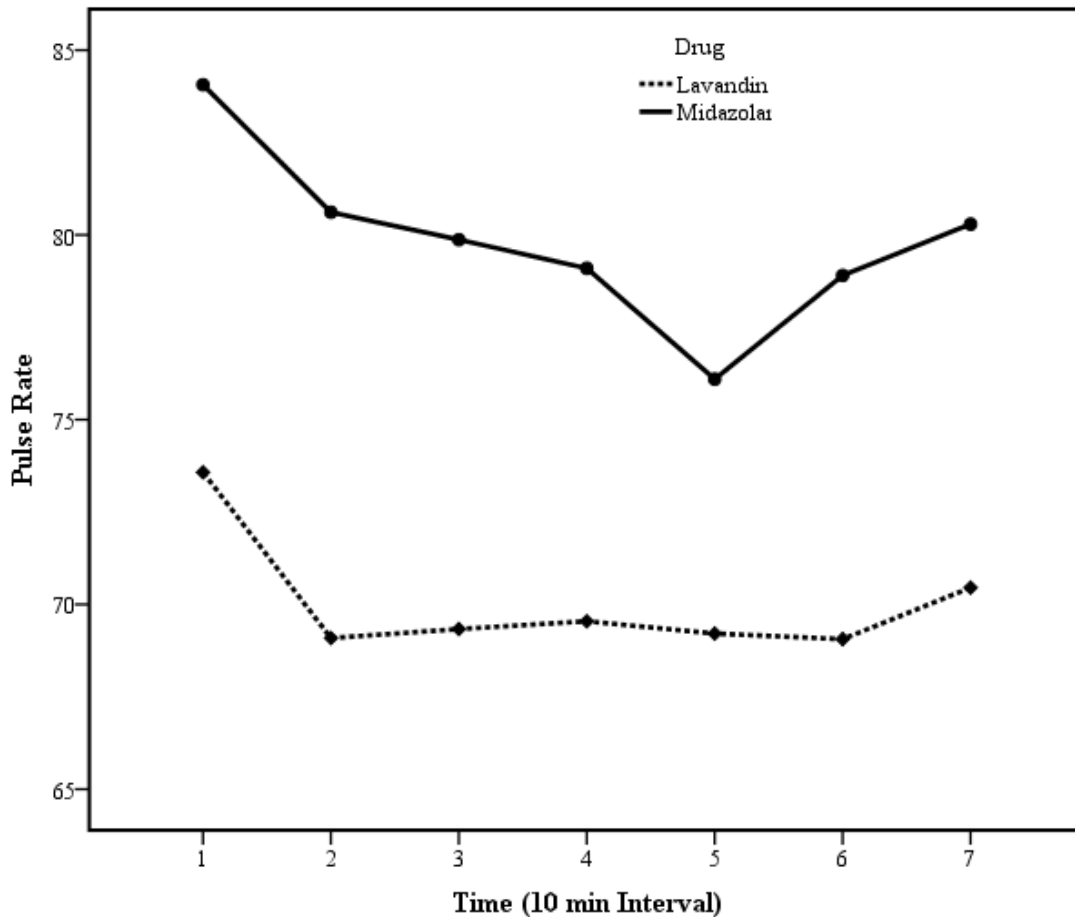


Fig. 1. Pulse rate across the study in two groups

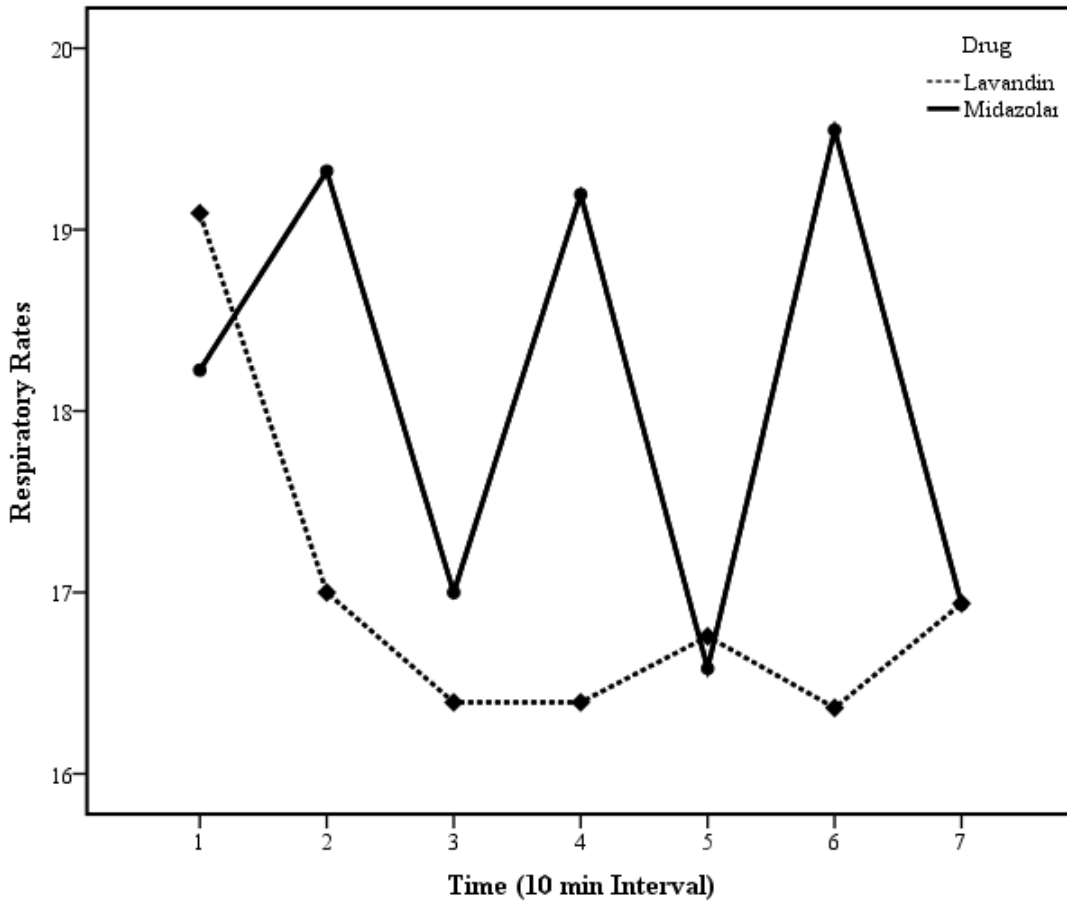


Fig. 2. Respiratory rate across the study in two groups

As shown in Figs. 3 and 4 the systolic and diastolic blood pressures were significantly higher in aromatherapy group in comparison with midazolam group ($p=0.0001$).

DISCUSSION

Aromatherapy is a clinical approach for health attainment which various essences of different parts of a plant are used to treat diseases in this method. *Lavandula angustifolia* is a plant from *labiateae* family that may be used in this era. In this study,

the effect of this drug was compared with midazolam as a conventional drug on vital signs in ICU-admitted patients. This herbal remedy has been used since many years till now for anxiety reduction, sedation, spasm reduction, and pain control (Chioca et al., 2013; Lee et al., 2012; Seifi et al., 2014). It is relatively safe and there are no reports about especial adverse effects. It has shown good somatic and physiological effects such as those on vital signs and also some effects on limbic system that may be related to contributing anti-anxiety effects (Woelk and Schläfke, 2010).

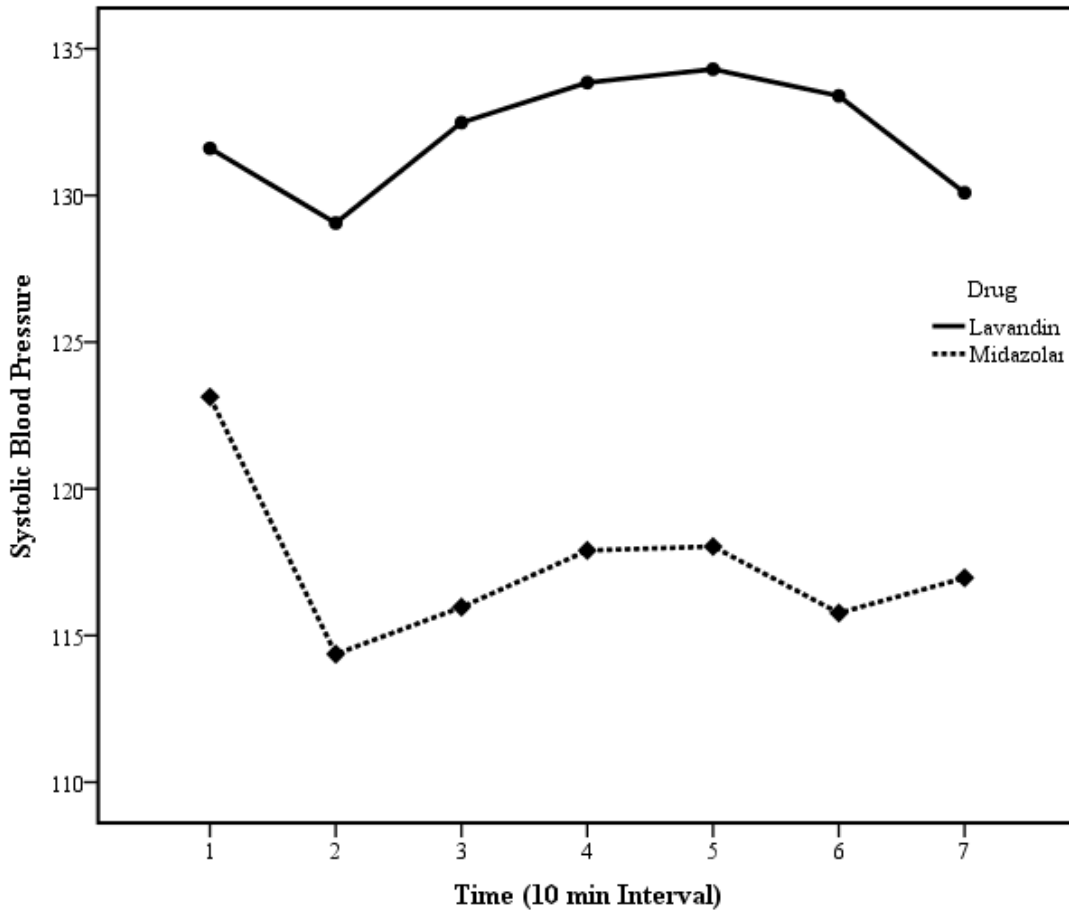


Fig. 3. Systolic blood pressure across the study in two groups

In our study, it was seen that vital signs had more stability in aromatherapy group. Among the most important specialties of essences olfactory stimulation is mentioned and this system is linked to emotion control center and also those centers contributing for memory and sexual arousal and it is also related to centers for control of heart rate, blood pressure, stress, respiration, hormonal balance, emotions, and mood (Ebrahimzadeh et al., 2011; Sun et al., 2002). Finally, these received messages from ventral nervous system would affect

the mind and the stress and anxiety and somatic complaints would be decreased. The olfactory system messages would be promoted to limbic center that is related to memory, circulation, respiration, and endocrine sectors leading to final transmission of messages to main related part (Benzie and Strain, 1996; Dapkevicius et al., 1998).

In a study about the effects of aromatherapy on postoperative pain management fifty patients under breast

biopsy were assessed in two groups of oxygen plus *Lavandola angustifolia* oil versus oxygen plus narcotic inspiration and it was seen that the pain severity was decreased in 5, 30, and 60 minutes later (Chang et al., 2002). The lower pain in their patients may be as parallel as physiological effects observed in our study. In a study on cancer patients, 50 percent reduction of anxiety and depression after use of *Lavandola angustifolia* via inspiration was seen (Ghasemi et al., 2011). Lower anxiety level is also an explanation of our results. Also, two studies in patients under cardiac

surgeries certified the anti-anxiety effects of *Lavandola angustifolia* (Johnson et al., 2014; Kanaani et al., 2010).

Mirzaei et al. (2015) reported good effects of *Lavandola angustifolia* for labour pain control. Also, Lehrner et al reported lower anxiety level and higher relaxation rate in patients who respired *Lavandola angustifolia* and orange essences (Lehrner et al., 2005) as well as our study. Also, Stevenson et al (1992) reported higher synergistic effects of massage-therapy and aromatherapy. It has been shown

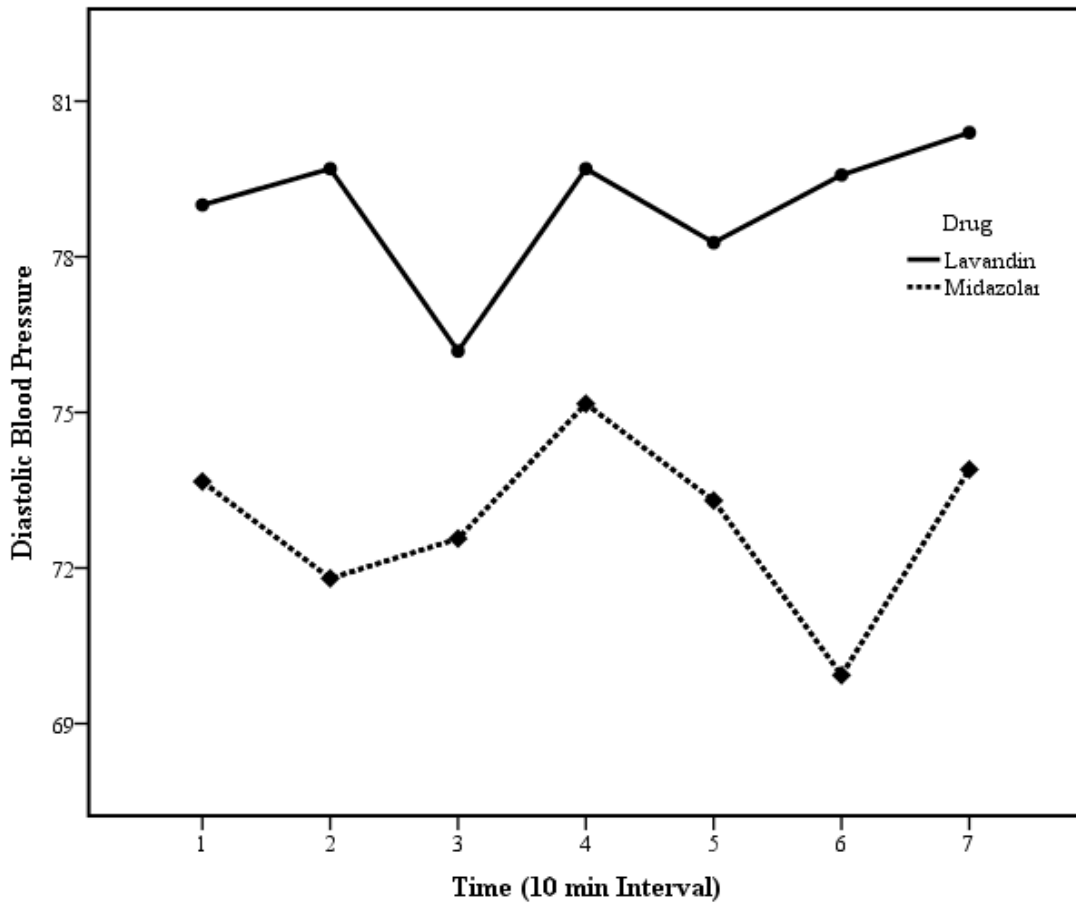


Fig. 4. Diastolic blood pressure across the study in two groups

by Fayazi et al. (2011) that *Lavandola angustifolia* results in lower inflammation and pain and edema and ulceration that demonstrate the simultaneous somatic effects. Linalool available in *Lavandola angustifolia* essence may result in some genetic variations with stress origin (Xu et al., 2017) that shows the etiology of good stable results in our study in comparison with midazolam. Linalool would result in alterations in noradrenalin and dopamine levels leading to increased release (Di Sotto et al., 2011). Also it is believed that main mechanism of action for *Lavandola angustifolia* is effected on limbic system especially the amygdale and hippocampus (Koulivand et al., 2013). As shown by Lopez et al. (2017) the Linalool available in the plant would inhibit acetylcholine release and alteration of an ion channel in the neuromuscular junction. Also, Linalyl-acetate is narcotic with sedative action that explains the cause of traditional use as sedative.

CONCLUSION

Totally, according to the obtained results, it may be concluded that vital signs had more stability in aromatherapy with *Lavandola angustifolia* in comparison with midazolam. However further studies with larger sample size and multi-center sample would develop results with further evidence and generalization ability especially if compared with other conventional anti-anxiety therapeutics.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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