

## Effect of inhaling the vapor of lavender oil on summative examination scores in nursing students: a controlled clinical trial

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### ABSTRACT

**Background and aims:** Examination score is important for destination of students due to educational and occupational issues. This study was conducted to investigate the effect of inhaling the vapor of lavender on summative examination scores in nursing students.

**Methods:** This single-blinded randomized controlled clinical trial was conducted on 33 nursing students at summative examination session of public health course. The intervention group (n=16) breathed vapor of lavender and the control group (n=17) breathed water vapor for 30 minutes just before the exam and after intervention, the examination scores (0-20) were compared. To analyze the findings, the SPSS software 18 and statistical tests including Spearman's correlation coefficient, Pearson correlation coefficient, Mann-Whitney U test and independent sample t-test were used.

**Results:** The demographic variables as well as the mean of examination scores were not significantly different between two groups ( $P>0.05$ ). There were no correlations between examination score and age, sleep time, gender, marital status, and parents' education level of the students.

**Conclusion:** Although aromatherapy with lavender, as administered in this study, does not affect examination score of students, regarding that the students reported aromatherapy as pleasant; It suggests it is used in examination session as an easy method to apply.

**Keywords:** Lavender, Examination score, Student, Nursing.

### INTRODUCTION

Training efficient human resource is one the most important responsibilities of universities. Since Students as potential producing resource are valuable for a country, attention to their promotion is essential.<sup>1</sup> Unfortunately about 12% of students of medical universities are put on probation at least one semester during education course in university.<sup>2</sup> Educational decline is not only an individual but also a social problem and its consequences involve

the society<sup>3</sup> so that preventive measures seem critical.

Academic performance of students is influenced by various factors such as test anxiety<sup>4</sup> that includes worry and unpleasant experiences and feelings in situations that people feel others are evaluating their functions.<sup>5</sup> Also, test anxiety refers to a condition that make people be afraid of fulfilling a duty and results in weakening the strength of dealing with conditions such as

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examination so students with test anxiety cannot remember and use their knowledge at examination session.<sup>6</sup> This debilitating anxiety involves 10-30% of university students and decline their academic performance strongly<sup>5</sup> as different studies have shown that test anxiety significantly affect academic performance of students.<sup>7</sup>

Different methods have been applied to reduce test anxiety such as cognitive-behavioral therapy, instruction of problem solving skill, religious activities and pray. Recently aromatherapy, as a method for reducing anxiety, has developed remarkably in comparison with other methods in most countries.<sup>8</sup>

The oil extracted from lavender is fragrant volatile herbal oil that is routinely used in aromatherapy. This scented plant belongs to Labiatae (mint) family and has antibacterial, antifungal, anti-flatulence, muscle-relaxing, and analgesic properties.<sup>9-11</sup>

Different studies have shown that aroma of lavender is sedative and has effects on improvement of behavioral disorders and anxiety.<sup>12, 13</sup> Some studies have shown that aroma of lavender can stimulate cognitive performance and hence increase consciousness and concentration.<sup>14</sup> Researchers believe that aroma of lavender strengthens student's ability to encounter and pass their examinations.<sup>15</sup> This aroma stimulates brain and raise psychological ability through increasing alpha waves of brain.<sup>14</sup>

Essential oil of lavender is selected due to having sedative effects without poisonous property. Lavender is the safest aroma with no contraindications and sensitivity reported to date. The effect of essence starts 10-90 minutes after smelling and lasts a few days.<sup>16</sup>

As mentioned above, lavender aroma may promote student's academic performance by two mechanisms: increasing concentration and reducing test anxiety.

To the best of our knowledge, no study has been conducted to investigate the effect of aroma of lavender on examination scores of university students. On the other hand, examination is a stressful situation for students and results of exams are determining in their life, therefore the present study is designed to assess the effect of inhaling the vapor of lavender on summative examination scores in nursing students.

## **METHODS**

The present study was a randomized single- blinded clinical trial conducted on all nursing students of third semester who had selected public health course (n= 33). All of them were studying in the nursing and midwifery faculty of Qom University of Medical Sciences<sup>16</sup>, of whom 16 comprised the study group and 17 were the controls. So, confounding factors that may affect examination score including various educational field, semester, educational course, type of exam questions and teacher were deleted in this way. Any sampling method was not used. Before the examination, demographic questionnaire was filled out. Neither the study group nor the control group was informed that the lavender aroma was being used as an intervention, but the participants were asked for verbal and written permission (informed consent). For randomized allocation, the researcher wrote "A" on 16 papers and "B" on 17 papers and put them in a box and just before entering the exam session the students were asked to take one paper. The students with paper A constituted the study group and the students with paper B constituted the control group. The two groups were placed in two separate classes with the same physical characteristics (size,

temperature and location). The doors and windows of the classrooms were closed 15 minutes before examination and students started filling out the demographic questionnaire. Then, 10 drops of lavender oil poured into one liter of water in a humidifier that spread vapor of lavender oil in the classroom of study group for 30 minutes. Simultaneously, water steam was spread by another humidifier in the classroom of control group. The doors and windows kept closed until the end of the examination, so that examination of the study group was performed in the atmosphere containing lavender aroma. After scoring the answer sheets of students (0-20), the scores of two groups were compared.

Exclusion criteria were history of allergy, pregnancy, nasal grip, and sense of discomfort due to aroma.

Lavender oil was a water-based product of Barij-Essence Company (Golkaran).

The data were evaluated by the SPSS 18. The mean examination scores of the study and control groups were compared by t test. The demographic variables were compared using independent t-test, chi-square and Mann-Whitney U tests. The relationships between examination scores and demographic variables were analyzed by Spearman's correlation coefficient and Pearson correlation coefficient.

This study was approved by Ethics Committee of Qom University of Medical Sciences and has been registered in "Iranian Registry of Clinical Trials" (IRCT138811142558N2).

## RESULTS

The present study was carried out on 33 nursing student at summative examination of the third semester. The probable confounding

variables including age, gender, marital status, mean of scores, grade point average (GPA) of previous semester, education level of parents, and sleep duration during previous 24 hours were described and analyzed. The mean age of study group was  $20.66 \pm 2.38$  years (19-26) and that of control group was  $20.76 \pm 0.86$  years (19-21). Out of the study and control groups, 50% and 45% were female respectively. 100% of study group and 92% of control group were single. The GPA of the previous semester was  $15.81 \pm 1.81$  and  $16.25 \pm 1.4$  in the study and control groups respectively. Mean of sleep duration during previous 24 hours was  $7.8 \pm 1.8$  and  $7.6 \pm 1.5$  hours in the study and control groups respectively. There were no statistically significant differences between the two groups in the confounding variables above mentioned.

The mean score of study group was  $16.02 \pm 1.5$  and that of control group was  $15.5 \pm 1.6$ . Statistical test showed no significant difference between the two groups ( $P=0.39$ ). Pearson correlation did not show significant relationships between examination score and age and duration of sleep. Also Spearman's correlation did not show significant relationships between examination score and gender, marital status, and education level of parents.

Out of the students in the study group 93% stated that the spread scent was pleasant.

## DISCUSSION

Examination is a stressful situation for student and results of exams are significant due to educational and occupational issues.

The present study indicated that inhaling the vapor of lavender oil during examination did not affect the scores of students. Dunnigan in a study on aromatherapy found no effect of *Rosmarinus*

*officinalis* on examination performance<sup>17</sup>, but some researchers believe that aroma of lavender strengthens student's ability to encounter and pass their examinations.<sup>15</sup>

Another study investigated the effect of music on test anxiety and examination score and indicated that listening to music did not affect examination score.<sup>18</sup>

Many studies including meta-analyses have demonstrated the effect of aromatherapy with lavender oil on reducing the test anxiety;<sup>19-22</sup> therefore it seems that other factors in addition to test anxiety could affect examination score.

Cheraghian et al showed no significant relationship between academic performance and test anxiety;<sup>4</sup> but finding of some other studies<sup>23</sup> are not in agreement with their findings.

In present study there were no significant relationship between gender and examination score ( $P=0.29$ ). This finding is supported by some studies;<sup>24, 25</sup> whereas some other studies showed that gender was an effective variable on academic performance.<sup>26-28</sup>

Marital status did not have relationship with examination score ( $P=0.95$ ), which is in agreement with Sadeghi Movahed et al study.<sup>25</sup> However, the relationship was demonstrated by some studies.<sup>26, 29</sup> Out of the participants 90% were single in our study, which could explain our finding.

According to the results of present study there was no relationship between age and examination score ( $P=0.15$ ), which is supported by Changizy Ashtyani et al study<sup>26</sup>, but findings of Habibzade et al were inconsistent with ours.<sup>30</sup> Range of age was not wide and 19-26 years in the present study, therefore it was not probably possible to assess the effect of age.

The present study showed no relationship between examination score and the parents' education level, but the findings of Nazari and Sharifnia and Habibzadeh et al indicated that the parents' education level was effective on academic performance of students.<sup>29, 30</sup>

## CONCLUSION

Although aromatherapy with lavender oil, as administered in this study, does not affect examination score of nursing students, regarding that the students reported aromatherapy as pleasant, we suggest it used in examination session as an easy method to apply.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

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