Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

Pharmacophore
an International Journal
ISSN 2229-5402

EFFECT OF AROMATHERAPY WITH CITRUS AURANTIUM ON ANXIETY OF FEMALE STUDENTS OF NURSING IN TABRIZ UNIVERSITY OF MEDICAL SCIENCES: A RANDOMIZED CLINICAL TRIAL

Hossein Namdar Areshtanab[1], Mohammad Hassan Sahebihaqh[2], Hossein Ebrahimi[3], Asqar Mohammadpour[4], Sareh Shamsipour [5], Parvin Rahmani [6]

1. *Assistant professor of teaching nursing, Department of Nursing Psychology, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Iran*
2. *Assistant professor of nursing, Academic Member of Community Health Nursing Department, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Iran*
3. *Associate professor of nursing, Department of Nursing Psychology, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Iran*
4. *Associate professor of statistics and epidemiology, School of Health and Nutrition, Tabriz University of Medical Sciences, Iran*
5. *MSc student of nursing psychology, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Iran*
6. *BSc student of nursing, Nursing and Midwifery Faculty, Tabriz University of Medical Sciences, Iran*

ARTICLE INFO

Received:
03th Jun 2017
Accepted:
29th Nov 2017
Available online:
14th Dec 2017

Keywords: *Aromatherapy, citrus aurantium , anxiety, nursing students*

ABSTRACT

Introduction: Anxiety disorder is the most common mental disorder with high prevalence among nursing students, which has negative impacts on training quality and patient care among them. With respect to the constraints of the use of drugs for managing anxiety among the students, the present study is aimed to investigate the effects of aromatherapy with orange blossom on anxiety of the female nursing students in Tabriz University of Medical Sciences.
Materials and methods: The present study was a randomized clinical trial, in which 100 female students of nursing BS residing in dormitory complex of Tabriz University of Medical Sciences were selected through convenience sampling method and then randomly allocated to two groups, namely intervention (50 individuals) and control (50 individuals) groups. Anxiety of both groups was examined using Spielberger's STAI (State-Trait Anxiety Inventory) questionnaire; then, the intervention group underwent aromatherapy with orange blossom essence (extract) at nights for 2 weeks (14 nights), while no intervention was performed on the control group. After the intervention, anxiety of both groups was examined with the same questionnaire. The obtained data was analyzed by SPSS-13 software and using inferential and descriptive statistics.
Findings: Results showed that the anxiety scores of the intervention and control groups before the intervention were 46.72±3.87 and 46.86±4.77, which had no statistically significant difference (P=0.986); however, after the intervention, anxiety of the intervention group (38.38±2.26) demonstrated a significant reduction compared to the control group (47.58±4.03) (P<0.001). Furthermore, at the end, difference of the anxiety score variations between the two groups was significant (P<0.001).
Conclusion: Based on the obtained results, it can be concluded that the aromatherapy with orange blossom has significant effect on reduction of anxiety of the female student residing in dormitories.

To Cite This Article Hossein Namdar Areshtanab, Mohammad Hassan Sahebihaqh, Hossein Ebrahimi, Asqar Mohammadpour, Sareh Shamsipour , Parvin Rahmani, (2017), "effect of aromatherapy with citrus aurantium on anxiety of female students of nursing in tabriz university of medical sciences: a randomized clinical trial ",***Pharmacophore, 8(6S, e-1173022***.

Corresponding Author : Sareh Shamsipour, ***Email:*** **sarehshamsipour@gmail.com**

Introduction

Anxiety is described as conditions in which the individual feels panic along with autonomous activations of the nervous system in response to an ambiguous and unknown threat [1]. Anxiety causes some harmful physical side effects such as hypertension and tachycardia; besides, it results in declined health behaviors, disability, chronic diseases, as well as reduced interpersonal relationships [2]. Various studies have shown that out of every 4 or 5 individuals, one suffers from mental disorders [3], among which the anxiety disorder is the most common one [4]. Females and males account for 60% and 40% of the individuals with anxiety disorder, respectively; further, prevalence of such disorder is at the age of 16 to 65 years old [3]. An anxious person has an insignificant role in taking care of himself/herself and needs to be taken care by others, which leads to the increased hospitalization period as well as increased costs [2]. The individuals with anxiety refer to psychiatrists 3 to 5 times more and are hospitalized in hospitals 6 times more than healthy people [5]. A nation-wide study reported that out of every 4 American people, one has the criteria of at least one type of anxiety disorders with 12-month prevalence of 17.7% [6]; furthermore, the lifelong prevalence of such disorder among women and men is 30.5% and 19.2%, respectively [7]. On the other hand, women account for more than half of the country's population as well as the gender combination in universities; besides, entering the university is a very essential stage in life, which is associated with vital changes in the interpersonal relationships [8, 9]. Almost half of the students in Oxford University have missed a semester due to the mental problems, especially anxiety [10]. Various studies have shown that prevalence of mental disorders among the Iranian students ranges between 12.75% and 30.4% [11]; accordingly, it is vital to take into consideration the mental health of the students of paramedicine, especially students of nursing. Anxiety is known as a considerable problem experienced by nursing students during their course of study; in fact, studies have shown that the stress experienced by nursing students is higher than the stress experienced by students of non-nursing medical courses, graduated nurses, and generally the women's population [12]. High levels of stress among the nursing students can cause mental damages and, consequently, affect the patient care quality; besides, stress can affect health and educational quality [13]. Nursing students imagine their academic years in a college full of anxiety [14]. Researchers have reported that the main causes of stress among nursing students include fear of mistake in clinical environment, excessive clinical responsibility, shortage of free time, fear of academic failure, being far from family, living in dormitory, sense of responsibility for what happens to the patient, lack of skills, rudeness of nursing personnel, theoretical and practical gaps, and relationship between trainers, patients, and personnel [13]. Many of the nursing students don't feel prepared to initiate their clinical apprenticeship, and such unpreparedness changes the clinical learning to a stressful event for them [13]. Roysta's study showed that 80% of the nursing students suffer from a medium level of state anxiety within the clinical environment [15]. The students living in dormitories experience high levels of stress due to overcoming the new cultural aspects such as language, cultural, and communicational differences [16]. Various studies have indicated that frequency of anxiety among the students living in dormitories is very high. So far, various methods have been used to reduce anxiety, including the use of anti-anxiety or anxiolytic drugs that are associated with considerable side effects. Thus, the cost-effective non-pharmacological (non-medication) methods are currently being globally expanded [17]; besides, one of the newest treatment methods, which is currently used, is aromatherapy [18]. Aromatherapy is indeed the use of plant oils, which has been observed to be a harmless treatment [19]. Aromatherapy is potentially a tranquilizer (sedative) treatment, which is especially useful for reducing stress and anxiety; furthermore, it has been shown that this kind of treatment can help reducing heart rate, breathing, blood pressure, and returning the hormone balance [2]. One of the essential oils used for aromatherapy is the orange blossom oil. Regarding the fact that the students comprise a considerable part of the country's population with an increasing rate, and preventing the students' stress and anxiety plays an important role in increasing their interest in teamwork and sense of responsibility [8], and since the students can be the best help for detecting the clinical education problems through their non-mediated interaction with the training process [13], the present study is aimed to investigate the effect of aromatherapy with orange blossom on anxiety of the female students of nursing residing in dormitories of Tabriz University of Medical Sciences.

Materials and methods

The present randomized clinical trial was conducted to investigate effects of aromatherapy with orange blossom on anxiety of the female nursing students residing in dormitories of Tabriz University of Medical Sciences using Spielberger's STAI and olfactory nerve health questionnaire in two intervention (aromatherapy) and control groups. Using the statistical formula, confidence level of 95%, test power of 80%, and regarding the sample loss of 25%, the sample size was calculated as 50 individuals for each group, amounting to 100 individuals in total. Sampling was performed using convenience sampling method in females' dormitory by randomly allocating the subjects to two intervention and control groups. After obtaining the approval of the Ethics Committee of Tabriz University of Medical Sciences, receiving the code of IRCT2016070223525N5 from the Clinical Trial Registration Center, and obtaining the written informed consent of the students, the Spielberger's STAI and demographic questionnaires were filled by the students. Furthermore, the researcher tested the subjects' olfactory system (olfactory nerve) health; so that, the subjects were asked to close their eyes, then an alcohol swab was put in front of each nose hole of the subjects and they were asked to identify the smell with closed eyes. The demographic questionnaire (social-personal characteristics of the students) included some questions about age, marital status, number of children, smoking history, history of mental diseases, history of using anxiolytic drugs, academic semester, average number, number of passed units, number of selected units in that semester, and time of performing the trial, which had been devised by the researcher himself. The STAI

questionnaire was first introduced by Cattell, and then was completed and presented by Spielberger in 1970. The questionnaire was consisted of two sections, including state anxiety scale and trait anxiety scale. Stat anxiety can be considered as a section of an individual's life, while trait anxiety implies the personal differences in response to the stressful situations with different levels of state anxiety. The state anxiety scale includes 20 sentences, which evaluate the individual's feelings "at this moment and at the time of responding"; besides, for each question, there are 4 choices including "very low, low, high, and very high". On the other hand, the trait anxiety scale includes 20 questions, which assess the individual's regular and general feelings; besides, for each question, there are 4 choices, including "almost never, sometimes, frequently, and almost always". A weight of 1 to 4 is allocated to each statement of the two scales based on the given response, so that the score of 4 indicates a high level of anxiety; accordingly, 10 statements of the state anxiety scale and 10 statements of the trait anxiety scale were scored on this basis. Other statements were scored such that the high score of each statement indicated the lack of anxiety; since, scoring of the statements indicating the lack of anxiety is reverse. In order to complete each of the two scales, the students need 6 minutes; however, those with lower educational level or with emotional distress might need 10 minutes [20]. In this test, the anxiety level is scaled between 20 and 80, so that the scores of 20-40, 41-60, and 61-80 indicate mild, moderate, and severe anxiety, respectively [21]. So far, Spielberger's STAI has been widely used in clinical studies to evaluate state and trait anxiety [21], the correlation coefficient obtained for which is between 0.85-0.91 [21]. In the present research, the inclusion criteria included: female students of nursing BS living in dormitory, completing and signing the informed consent form, smelling sense health (by testing the olfactory nerve's health), achieving score of 40 and higher based on Spielberger's STAI, having no history of mental diseases, depression, and acute stress (crises such as losing a relative), and not coincidence of the research and final exams; on the other hand, the exclusion criteria included: students who didn't tend to continue their cooperation for any reason, students who were bothered by odor of the orange blossom essence, students who had used perfume or eau de cologne, students who were consecutively at night shifts in educational and treatment centers, and the use of anxiolytic drugs as well as herbal drugs during the intervention. The qualified subjects were randomly allocated to the intervention and control groups (50 subjects in each group). The procedure of random allocation was as follows: first, the subjects were asked to mention the number of their room and floor in each of the questionnaires, and then the researcher recorded the number of the qualified subjects' room and floor in a list. In order to prevent allocation of roommate subjects to the groups, the rooms with even number and the rooms with odd number were selected as the intervention and control groups, respectively. Subsequently, in the intervention group, the aromatherapy was performed using orange blossom essence at nights (due to the necessity of presence of all the female students in the dormitory from 8 pm) for two weeks (14 nights). The required orange blossom essence was prepared from Abyaz Shimi Paint & Essence Mfg Company with Arzhan® registered trademark, which has got the production license (34/1621) of the Ministry of Health & Medical Education as well as the Health Apple Statuette (Sib-e-Salamat symbol). The subjects inhaled 4-5 drops of pure orange blossom essence for 15 min at 14 consecutive nights, so that the essence was poured in a plastic bag along with some essence-mingled cotton lumps, and the plastic bag was put at the distance of 6-9 cm from the nose. Afterwards, at the 15th night, after the intervention, anxiety of the female students of nursing BS was measured by Spielberger's STAI questionnaire. However, no intervention was performed on the control group, and the subjects underwent only the pretest and posttest. In order to observe the ethical considerations, after collecting the post-intervention data, the control group was provided by the intervention protocol as well as how to use it. In the present study, after collecting the information from the subjects, the obtained data was analyzed by SPSS-13 software. At the descriptive statistics level, the mean and standard deviation were used for quantitative variables, and the frequency and percentage were used for qualitative variables; on the other hand, at the inferential statistics level, the Shapiro-Wilk, chi-squared and independent-t, Mann-Whitney, and Wilcoxon tests were used to investigate normality of the anxiety scores, to compare the qualitative and quantitative characteristics in both groups, to compare the anxiety status before the intervention as well as the anxiety scores variations in both groups, and to compare the pre & post-intervention anxiety scores in both groups, respectively. The significance level in these tests was considered equal to 0.05.

Findings

The present study was conducted on 100 female students of nursing residing in dormitories of Tabriz University of Medical Sciences, who were divided into two intervention (5o subjects) and control (50 subjects) groups. In the intervention group, the average age and grade point average were 20.98 and 16.47, respectively. Also, 84% of the subjects were single and the rest (14%) were married; besides, in terms of educational level, most of them (34%) were senior students. On the other hand, in the control group, the average age and grade point average were 21.20 and 16.66, respectively; furthermore, 82% of the subjects were single and the rest (18%) were married. Also, 32% of them were senior students. With regard to the frequency distribution, means, as well as the results of the independent-t and chi-squared tests, the two groups were identical in terms of the personal-social (demographic) characteristics, including age, grade point average, marital status, birth rank, and academic year (educational level) ($p>0.05$) (Table-1).

According to Table (2), the analysis results showed that before the intervention, anxiety of the two groups (aromatherapy and control) had no significant difference ($p>0.05$); in other words, before the intervention, the subjects in the two groups were in similar status in terms of anxiety level.

Based on Table (3), the analysis results indicated that in the aromatherapy group, the anxiety variable was significantly different before and after the intervention ($p<0.05$); while, in the control group, the anxiety variable demonstrated no significant difference before and after the intervention ($p>0.05$).

As indicated in Table (4), the results showed that the difference of the anxiety score variations between the control and aromatherapy groups was significant ($p<0.001$).

Discussion

Findings of the present research indicated that aromatherapy with orange blossom essence had significant effect on reducing the anxiety symptoms among female students of nursing living in dormitory; besides, aromatherapy caused reduction in the total anxiety score of the students after two weeks of intervention. The orange blossom essence, besides improving the temperament, has stimulant effects on the central nervous system as well as sedative, anti-spasm, anti-inflammatory, anti-emphysema, anti-hypertensive, and diuretic effects; furthermore, clinical trials have reported that it has therapeutic effects, similar to those of fluoxetine, for treating depression [22, 23]. One of the chemical compounds in the orange blossom essence is flavonoid [24], which serves as the agonist of the benzodiazepine receptors and reduces the anxiety [25]. The orange blossom essence is sent as a signal to the olfactory bulb, and stimulates the olfactory paths in the limbic system and, as a result, reduces the anxiety [18]. In a research, Late et al. (2008) showed that the use of orange blossom essence through inhalation could have anxiolytic effects on rats [26]. Results of the present research are consistent with those of Mehtab Kavurmaci's study, entitled "investigating effects of aromatherapy on reducing exam stress among sophomore students of nursing", which was conducted on 154 nursing students in Faculty of Health Sciences, Ataturk University, in 2013-2014. Similarly in this study, the mean anxiety score of the intervention group was lower than that of the control group, and the difference of the two groups was statistically significant ($p<0.05$) [27]. Moreover, in 2013, a research was conducted by Catherine E. Johnson to investigate the effect of aromatherapy on exam anxiety of nursing students, the results of which indicated that aromatherapy had positive effect on cognitive exam anxiety of ssthe nursing students ($p=0.01$) [28]. In another study in 2014, Namazi et al. conducted a clinical trial on 126 nulliparous women referring to Valiasr Hospital, Tuyserkan, in order to investigate the effect of orange blossom odor on anxiety severity in the first stage of delivery. The obtained results indicated that the anxiety score before the intervention in the two aromatherapy and control groups was 55.16 ± 1.247 and 61.86 ± 1.327, respectively, which wasn't statistically significant ($p=0.403$); however, after the intervention, the anxiety severity in the intervention group at 3-4 cm and 5-8 cm dilatations was 45.32 ± 1.216 and 43.19 ± 1.664, respectively, demonstrating significant reduction compared to the control group at 3-4 cm (56.83 ± 1.128) and 6-8 cm (59.32 ± 1.584) dilatations ($p<0.05$). In this research, in contrast to the present study, the orange blossom extract and normal saline were used for the aromatherapy and control groups, respectively [21]. Another study was conducted by Kalani et al. (2015) in order to compare effectiveness of orange blossom extract and oxazepam tablets on anxiety before the coronary arteries bypass grafting surgery. The obtained results indicated that in the orange blossom extract group, the post-intervention anxiety level exhibited a significant reduction compared to the pre-intervention anxiety ($p=0.00$); however, in the oxazepam group, although the anxiety was reduced after the intervention, but this reduction wasn't statistically significant ($p=0.29$). In this research, in contrast to the present study, aromatherapy was performed for the aromatherapy group for 3 nights; in fact, in this research, the effect of two different therapeutic methods on anxiety was evaluated [29]. In 2014, Khoshkesht et al. conducted a study on 91 nursing students in order to investigate effects of aromatherapy on the exam anxiety level of nursing students in Alborz University of Medical Sciences. The results showed that the range of exam anxiety didn't change after the intervention and had no statistically significant difference, but it was reduced compared to before the intervention, which was not consistent with results of the present study. In this study, the research population included all the nursing students (esither male or female, and either native or living in dormitory), which probably influenced insignificance of the obtained results; besides, lengthiness of the intervention period could also be effective in this regard [17]. In another study, Sahebzamani et al. (2007-2008) investigated effects of inhalational aromatherapy on anxiety and depression of female student living in dormitories of Tehran University of Medical Sciences, the results of which indicated significant reduction in anxiety and depression symptoms compared to the pretest and control group ($p<0.001$), which was consistent with results of the present study. In this research, in contrast to the present study, aromatherapy was carried out with two essences for 4 weeks; furthermore, simultaneous with investigation of the anxiety variable, the depression variable was investigated as well [30].

Moreover, Ghiasi et al. (2010) conducted a study on 130 disabled veteran students in order to investigate the effect of inhalational aromatherapy on reduction of anxiety among disabled and veteran students, the results of which indicated that the students receiving the inhalational aromatherapy exhibited significant reduction in the anxiety symptoms at the end of the second and fourth weeks compared to the pretest and control group ($p\leq0.001$). In this research, in contrast to the present study, aromatherapy was carried out with two essences for 4 weeks [5].

Based on the results of the present study, it can be concluded that aromatherapy with orange blossom has considerable effects on reduction of anxiety of the female nursing students living in dormitories; furthermore, aromatherapy can be an appropriate methods for those who have negative attitude toward the use of sedative and anxiolytic drugs and those who have problem with referring to the psychiatrics. It is evident that the present study, like other studies, had some limitations; for example, investigating the total anxiety score regardless of the students' state and trait anxiety might have led to significance of the results. Besides, this study was conducted only on female students of nursing BS living in dormitories; thus, the obtained

results cannot be generalized to all the students of the university. On this basis, it is suggested to conduct further studies in this regard on male students inside the university and simultaneous with the educational sessions in order to investigate the state and trait anxiety separately, as well as further studies on nursing students during their apprenticeship beside the patients' bed.

Acknowledgements

The present article is an MA dissertation. Hereby, the authors would like to acknowledge the Research Vice Chancellor of Tabriz University of Medical Sciences for the financial supports, authorities of the dormitories for their cooperation in conducting the study, as well as all the female student of nursing who actively participated in this project. ,

Table 1. The comparison of personal information – social Female Students in two groups

p-value Chi-square test	control group the number (percent) n=50	Intervention group the number (percent) n=50	Variable levels	Variables
P=0/790	41(82%)	42(84%)	Single	marital status
	9(18%)	8(16%)	Married	
P=0/431	26(52%)	20(40%)	First	Birth
	12(24%)	13(26%)	Second	
	12(24%)	17(34%)	Third & higher	
P=0/844	10(20%)	8(16%)	First	Academic year
	15(30%)	13(26%)	Second	
	9(18%)	12(24%)	Third	
	16(32%)	17(34%)	Fourth	
p-value Independent t-tests	Average for quantitative variables± Standard deviation			
P=0/502	21/20±1/71	20/98±1/54	-	Age
P=0/379	16/66±1/07	16/47±1/05	-	GPA

Table 2. The comparison of aromatherapy and control anxiety scores in the two groups before the intervention

statistical test*	Control Average± Standard deviation	Aromatherapy Average± Standard deviation	Variable
P=0/986	46/84±4/77	46/72±3/87	Anxiety

* Mann-Whitney test

Table 3. The comparison of anxiety scores in both groups before and after aromatherapy and control

statistical test*	Average± Standard deviation	Time	group	Variable

P<0/001	46/72±3/87	before the intervention	Aromatherapy	Anxiety
	38/38±2/26	After intervention		
P=0/106	46/84±4/77	before the intervention	Control	
	47/58±4/03	After intervention		

* Wilcoxon test

Table 4. The comparison of the mean change in anxiety scores aromatherapy and control groups

Significant*	Control Average± Standard deviation	Aromatherapy Average± Standard deviation	Variable
P<0/001	0/74±2/77	-8/34±4/42	Anxiety

* Mann-Whitney test

References

Anxiety is described as conditions in which the individual feels panic along with autonomous activations of the nervous system in response to an ambiguous and unknown threat [1]. Anxiety causes some harmful physical side effects such as hypertension and tachycardia; besides, it results in declined health behaviors, disability, chronic diseases, as well as reduced interpersonal relationships [2]. Various studies have shown that out of every 4 or 5 individuals, one suffers from mental disorders [3], among which the anxiety disorder is the most common one [4]. Females and males account for 60% and 40% of the individuals with anxiety disorder, respectively; further, prevalence of such disorder is at the age of 16 to 65 years old [3]. An anxious person has an insignificant role in taking care of himself/herself and needs to be taken care by others, which leads to the increased hospitalization period as well as increased costs [2]. The individuals with anxiety refer to psychiatrists 3 to 5 times more and are hospitalized in hospitals 6 times more than healthy people [5]. A nation-wide study reported that out of every 4 American people, one has the criteria of at least one type of anxiety disorders with 12-month prevalence of 17.7% [6]; furthermore, the lifelong prevalence of such disorder among women and men is 30.5% and 19.2%, respectively [7]. On the other hand, women account for more than half of the country's population as well as the gender combination in universities; besides, entering the university is a very essential stage in life, which is associated with vital changes in the interpersonal relationships [8, 9]. Almost half of the students in Oxford University have missed a semester due to the mental problems, especially anxiety [10]. Various studies have shown that prevalence of mental disorders among the Iranian students ranges between 12.75% and 30.4% [11]; accordingly, it is vital to take into consideration the mental health of the students of paramedicine, especially students of nursing. Anxiety is known as a considerable problem experienced by nursing students during their course of study; in fact, studies have shown that the stress experienced by nursing students is higher than the stress experienced by students of non-nursing medical courses, graduated nurses, and generally the women's population [12]. High levels of stress among the nursing students can cause mental damages and, consequently, affect the patient care quality; besides, stress can affect health and educational quality [13]. Nursing students imagine their academic years in a college full of anxiety [14]. Researchers have reported that the main causes of stress among nursing students include fear of mistake in clinical environment, excessive clinical responsibility, shortage of free time, fear of academic failure, being far from family, living in dormitory, sense of responsibility for what happens to the patient, lack of skills, rudeness of nursing personnel, theoretical and practical gaps, and relationship between trainers, patients, and personnel [13]. Many of the nursing students don't feel prepared to initiate their clinical apprenticeship, and such unpreparedness changes the clinical learning to a stressful event for them [13]. Roysta's study showed that 80% of the nursing students suffer from a medium level of state anxiety within the clinical environment [15]. The students living in dormitories experience high levels of stress due to overcoming the new cultural aspects such as language, cultural, and communicational differences [16]. Various studies have indicated that

frequency of anxiety among the students living in dormitories is very high. So far, various methods have been used to reduce anxiety, including the use of anti-anxiety or anxiolytic drugs that are associated with considerable side effects. Thus, the cost-effective non-pharmacological (non-medication) methods are currently being globally expanded [17]; besides, one of the newest treatment methods, which is currently used, is aromatherapy [18]. Aromatherapy is indeed the use of plant oils, which has been observed to be a harmless treatment [19]. Aromatherapy is potentially a tranquilizer (sedative) treatment, which is especially useful for reducing stress and anxiety; furthermore, it has been shown that this kind of treatment can help reducing heart rate, breathing, blood pressure, and returning the hormone balance [2]. One of the essential oils used for aromatherapy is the orange blossom oil. Regarding the fact that the students comprise a considerable part of the country's population with an increasing rate, and preventing the students' stress and anxiety plays an important role in increasing their interest in teamwork and sense of responsibility [8], and since the students can be the best help for detecting the clinical education problems through their non-mediated interaction with the training process [13], the present study is aimed to investigate the effect of aromatherapy with orange blossom on anxiety of the female students of nursing residing in dormitories of Tabriz University of Medical Sciences.

Materials and methods

The present randomized clinical trial was conducted to investigate effects of aromatherapy with orange blossom on anxiety of the female nursing students residing in dormitories of Tabriz University of Medical Sciences using Spielberger's STAI and olfactory nerve health questionnaire in two intervention (aromatherapy) and control groups. Using the statistical formula, confidence level of 95%, test power of 80%, and regarding the sample loss of 25%, the sample size was calculated as 50 individuals for each group, amounting to 100 individuals in total. Sampling was performed using convenience sampling method in females' dormitory by randomly allocating the subjects to two intervention and control groups. After obtaining the approval of the Ethics Committee of Tabriz University of Medical Sciences, receiving the code of IRCT2016070223525N5 from the Clinical Trial Registration Center, and obtaining the written informed consent of the students, the Spielberger's STAI and demographic questionnaires were filled by the students. Furthermore, the researcher tested the subjects' olfactory system (olfactory nerve) health; so that, the subjects were asked to close their eyes, then an alcohol swab was put in front of each nose hole of the subjects and they were asked to identify the smell with closed eyes. The demographic questionnaire (social-personal characteristics of the students) included some questions about age, marital status, number of children, smoking history, history of mental diseases, history of using anxiolytic drugs, academic semester, average number, number of passed units, number of selected units in that semester, and time of performing the trial, which had been devised by the researcher himself. The STAI questionnaire was first introduced by Cattell, and then was completed and presented by Spielberger in 1970. The questionnaire was consisted of two sections, including state anxiety scale and trait anxiety scale. Stat anxiety can be considered as a section of an individual's life, while trait anxiety implies the personal differences in response to the stressful situations with different levels of state anxiety. The state anxiety scale includes 20 sentences, which evaluate the individual's feelings "at this moment and at the time of responding"; besides, for each question, there are 4 choices including "very low, low, high, and very high". On the other hand, the trait anxiety scale includes 20 questions, which assess the individual's regular and general feelings; besides, for each question, there are 4 choices, including "almost never, sometimes, frequently, and almost always". A weight of 1 to 4 is allocated to each statement of the two scales based on the given response, so that the score of 4 indicates a high level of anxiety; accordingly, 10 statements of the state anxiety scale and 10 statements of the trait anxiety scale were scored on this basis. Other statements were scored such that the high score of each statement indicated the lack of anxiety; since, scoring of the statements indicating the lack of anxiety is reverse. In order to complete each of the two scales, the students need 6 minutes; however, those with lower educational level or with emotional distress might need 10 minutes [20]. In this test, the anxiety level is scaled between 20 and 80, so that the scores of 20-40, 41-60, and 61-80 indicate mild, moderate, and severe anxiety, respectively [21]. So far, Spielberger's STAI has been widely used in clinical studies to evaluate state and trait anxiety [21], the correlation coefficient obtained for which is between 0.85-0.91 [21]. In the present research, the inclusion criteria included: female students of nursing BS living in dormitory, completing and signing the informed consent form, smelling sense health (by testing the olfactory nerve's health), achieving score of 40 and higher based on Spielberger's STAI, having no history of mental diseases, depression, and acute stress (crises such as losing a relative), and not coincidence of the research and final exams; on the other hand, the exclusion criteria included: students who didn't tend to continue their cooperation for any reason, students who were bothered by odor of the orange blossom essence, students who had used perfume or eau de cologne, students who were consecutively at night shifts in educational and treatment centers, and the use of anxiolytic drugs as well as herbal drugs during the intervention. The qualified subjects were randomly allocated to the intervention and control groups (50 subjects in each group). The procedure of random allocation was as follows: first, the subjects were asked to mention the number of their room and floor in each of the questionnaires, and then the researcher recorded the number of the qualified subjects' room and floor in a list. In order to prevent allocation of roommate subjects to the groups, the rooms with even number and the rooms with odd number were selected as the intervention and control groups, respectively. Subsequently, in the intervention group, the aromatherapy was performed using orange blossom essence at nights (due to the necessity of presence of all the female students in the dormitory from 8 pm) for two weeks (14 nights). The required orange blossom essence was prepared from Abyaz Shimi Paint & Essence Mfg Company with Arzhan® registered trademark, which has got the production license (34/1621) of the Ministry of Health & Medical Education as well as the Health Apple

Statuette (Sib-e-Salamat symbol). The subjects inhaled 4-5 drops of pure orange blossom essence for 15 min at 14 consecutive nights, so that the essence was poured in a plastic bag along with some essence-mingled cotton lumps, and the plastic bag was put at the distance of 6-9 cm from the nose. Afterwards, at the 15th night, after the intervention, anxiety of the female students of nursing BS was measured by Spielberger's STAI questionnaire. However, no intervention was performed on the control group, and the subjects underwent only the pretest and posttest. In order to observe the ethical considerations, after collecting the post-intervention data, the control group was provided by the intervention protocol as well as how to use it. In the present study, after collecting the information from the subjects, the obtained data was analyzed by SPSS-13 software. At the descriptive statistics level, the mean and standard deviation were used for quantitative variables, and the frequency and percentage were used for qualitative variables; on the other hand, at the inferential statistics level, the Shapiro-Wilk, chi-squared and independent-t, Mann-Whitney, and Wilcoxon tests were used to investigate normality of the anxiety scores, to compare the qualitative and quantitative characteristics in both groups, to compare the anxiety status before the intervention as well as the anxiety scores variations in both groups, and to compare the pre & post-intervention anxiety scores in both groups, respectively. The significance level in these tests was considered equal to 0.05.

Findings

The present study was conducted on 100 female students of nursing residing in dormitories of Tabriz University of Medical Sciences, who were divided into two intervention (5o subjects) and control (50 subjects) groups. In the intervention group, the average age and grade point average were 20.98 and 16.47, respectively. Also, 84% of the subjects were single and the rest (14%) were married; besides, in terms of educational level, most of them (34%) were senior students. On the other hand, in the control group, the average age and grade point average were 21.20 and 16.66, respectively; furthermore, 82% of the subjects were single and the rest (18%) were married. Also, 32% of them were senior students. With regard to the frequency distribution, means, as well as the results of the independent-t and chi-squared tests, the two groups were identical in terms of the personal-social (demographic) characteristics, including age, grade point average, marital status, birth rank, and academic year (educational level) ($p>0.05$) (Table-1).

According to Table (2), the analysis results showed that before the intervention, anxiety of the two groups (aromatherapy and control) had no significant difference ($p>0.05$); in other words, before the intervention, the subjects in the two groups were in similar status in terms of anxiety level.

Based on Table (3), the analysis results indicated that in the aromatherapy group, the anxiety variable was significantly different before and after the intervention ($p<0.05$); while, in the control group, the anxiety variable demonstrated no significant difference before and after the intervention ($p>0.05$).

As indicated in Table (4), the results showed that the difference of the anxiety score variations between the control and aromatherapy groups was significant ($p<0.001$).

Discussion

Findings of the present research indicated that aromatherapy with orange blossom essence had significant effect on reducing the anxiety symptoms among female students of nursing living in dormitory; besides, aromatherapy caused reduction in the total anxiety score of the students after two weeks of intervention. The orange blossom essence, besides improving the temperament, has stimulant effects on the central nervous system as well as sedative, anti-spasm, anti-inflammatory, anti-emphysema, anti-hypertensive, and diuretic effects; furthermore, clinical trials have reported that it has therapeutic effects, similar to those of fluoxetine, for treating depression [22, 23]. One of the chemical compounds in the orange blossom essence is flavonoid [24], which serves as the agonist of the benzodiazepine receptors and reduces the anxiety [25]. The orange blossom essence is sent as a signal to the olfactory bulb, and stimulates the olfactory paths in the limbic system and, as a result, reduces the anxiety [18]. In a research, Late et al. (2008) showed that the use of orange blossom essence through inhalation could have anxiolytic effects on rats [26]. Results of the present research are consistent with those of Mehtab Kavurmaci's study, entitled "investigating effects of aromatherapy on reducing exam stress among sophomore students of nursing", which was conducted on 154 nursing students in Faculty of Health Sciences, Ataturk University, in 2013-2014. Similarly in this study, the mean anxiety score of the intervention group was lower than that of the control group, and the difference of the two groups was statistically significant ($p<0.05$) [27]. Moreover, in 2013, a research was conducted by Catherine E. Johnson to investigate the effect of aromatherapy on exam anxiety of nursing students, the results of which indicated that aromatherapy had positive effect on cognitive exam anxiety of ssthe nursing students ($p=0.01$) [28]. In another study in 2014, Namazi et al. conducted a clinical trial on 126 nulliparous women referring to Valiasr Hospital, Tuyserkan, in order to investigate the effect of orange blossom odor on anxiety severity in the first stage of delivery. The obtained results indicated that the anxiety score before the intervention in the two aromatherapy and control groups was 55.16±1.247 and 61.86±1.327, respectively, which wasn't statistically significant ($p=0.403$); however, after the intervention, the anxiety severity in the intervention group at 3-4 cm and 5-8 cm dilatations was 45.32±1.216 and 43.19±1.664, respectively, demonstrating significant reduction compared to the control group at 3-4 cm (56.83±1.128) and 6-8 cm (59.32±1.584) dilatations ($p<0.05$). In this research, in contrast to the present study, the orange blossom extract and normal saline were used for the aromatherapy and control groups, respectively [21]. Another study was conducted by Kalani et al. (2015) in order to compare effectiveness of orange blossom extract and oxazepam tablets on anxiety before the coronary arteries bypass grafting surgery. The obtained results indicated that in the orange blossom extract group, the post-intervention anxiety level exhibited a significant reduction compared to the pre-intervention

anxiety (p=0.00); however, in the oxazepam group, although the anxiety was reduced after the intervention, but this reduction wasn't statistically significant (p=0.29). In this research, in contrast to the present study, aromatherapy was performed for the aromatherapy group for 3 nights; in fact, in this research, the effect of two different therapeutic methods on anxiety was evaluated [29]. In 2014, Khoshkesht et al. conducted a study on 91 nursing students in order to investigate effects of aromatherapy on the exam anxiety level of nursing students in Alborz University of Medical Sciences. The results showed that the range of exam anxiety didn't change after the intervention and had no statistically significant difference, but it was reduced compared to before the intervention, which was not consistent with results of the present study. In this study, the research population included all the nursing students (esither male or female, and either native or living in dormitory), which probably influenced insignificance of the obtained results; besides, lengthiness of the intervention period could also be effective in this regard [17]. In another study, Sahebzamani et al. (2007-2008) investigated effects of inhalational aromatherapy on anxiety and depression of female student living in dormitories of Tehran University of Medical Sciences, the results of which indicated significant reduction in anxiety and depression symptoms compared to the pretest and control group ($p<0.001$), which was consistent with results of the present study. In this research, in contrast to the present study, aromatherapy was carried out with two essences for 4 weeks; furthermore, simultaneous with investigation of the anxiety variable, the depression variable was investigated as well [30].

Moreover, Ghiasi et al. (2010) conducted a study on 130 disabled veteran students in order to investigate the effect of inhalational aromatherapy on reduction of anxiety among disabled and veteran students, the results of which indicated that the students receiving the inhalational aromatherapy exhibited significant reduction in the anxiety symptoms at the end of the second and fourth weeks compared to the pretest and control group ($p\leq0.001$). In this research, in contrast to the present study, aromatherapy was carried out with two essences for 4 weeks [5].

Based on the results of the present study, it can be concluded that aromatherapy with orange blossom has considerable effects on reduction of anxiety of the female nursing students living in dormitories; furthermore, aromatherapy can be an appropriate methods for those who have negative attitude toward the use of sedative and anxiolytic drugs and those who have problem with referring to the psychiatrics. It is evident that the present study, like other studies, had some limitations; for example, investigating the total anxiety score regardless of the students' state and trait anxiety might have led to significance of the results. Besides, this study was conducted only on female students of nursing BS living in dormitories; thus, the obtained results cannot be generalized to all the students of the university. On this basis, it is suggested to conduct further studies in this regard on male students inside the university and simultaneous with the educational sessions in order to investigate the state and trait anxiety separately, as well as further studies on nursing students during their apprenticeship beside the patients' bed.

Acknowledgements

The present article is an MA dissertation. Hereby, the authors would like to acknowledge the Research Vice Chancellor of Tabriz University of Medical Sciences for the financial supports, authorities of the dormitories for their cooperation in conducting the study, as well as all the female student of nursing who actively participated in this project. ,

Table 1. The comparison of personal information – social Female Students in two groups

p-value Chi-square test	control group the number (percent) n=50	Intervention group the number (percent) n=50	Variable levels	Variables
P=0/790	41(82%)	42(84%)	Single	marital status
	9(18%)	8(16%)	Married	
P=0/431	26(52%)	20(40%)	First	Birth
	12(24%)	13(26%)	Second	
	12(24%)	17(34%)	Third & higher	
P=0/844	10(20%)	8(16%)	First	Academic year
	15(30%)	13(26%)	Second	
	9(18%)	12(24%)	Third	
	16(32%)	17(34%)	Fourth	

p-value Independent t-tests	Average for quantitative variables± Standard deviation			
P=0/502	21/20±1/71	20/98±1/54	-	Age
P=0/379	16/66±1/07	16/47±1/05	-	GPA

Table 2. The comparison of aromatherapy and control anxiety scores in the two groups before the intervention

statistical test*	Control Average± Standard deviation	Aromatherapy Average± Standard deviation	Variable
P=0/986	46/84±4/77	46/72±3/87	Anxiety

* Mann-Whitney test

Table 3. The comparison of anxiety scores in both groups before and after aromatherapy and control

statistical test*	Average± Standard deviation	Time	group	Variable
P<0/001	46/72±3/87	before the intervention	Aromatherapy	Anxiety
	38/38±2/26	After intervention		
P=0/106	46/84±4/77	before the intervention	Control	
	47/58±4/03	After intervention		

* Wilcoxon test

Table 4. The comparison of the mean change in anxiety scores aromatherapy and control groups

Significant*	Control Average± Standard deviation	Aromatherapy Average± Standard deviation	Variable
P<0/001	0/74±2/77	-8/34±4/42	Anxiety

* Mann-Whitney test

Reference:

1. Delewi R, et al. Anxiety levels of patients undergoing coronary procedures in the catheterization laboratory. Int J Cardiol. 2017.228(1):926-30.
2. Seyyed Rasooli A, et al. Comparing the effects of aromatherapy massage and inhalation aromatherapy on anxiety and pain in burn patients: A single-blind randomized clinical trial. Burns. 2016;42(8):1774-80.
3. Gasemnecad S, Barchordary M. Frequency of Anxiety and its relation with depression and other individual characterIistics in Nursing Students. J Holist Nurs Midw. 2012;22(2):40-7.
4. Labbafinejad Y, Bossaghzade A. Assessment of anxiety prevalence and its contributing factors in female medical students of Tehran University of Medical Sciences in 2010-2011. IOH. 2012;9(3):32-8.
5. Ghiasi M, Ehsani E, Mahbubi M. Is aromatherapy affect on veteran students' anxiety?. Tebe-E-JANBAZ. 2012;14(4):32-6.
6. Sadock BJ. Kaplan and Sadocks synopsis of psychiatry: behavioral sciences.11th ed. London: Wolters Kluwer; 2015.p.1002-46.
7. Sadock B.J, Sadock VA. Kaplan and Sadock's synopsis of psychiatry: Behavioral sciences/clinical psychiatry. London: Lippincott Williamsand Wilkins; 2011.p.950-62.
8. Najafi Kalyani M, et al. Survey of stress, anxiety, depression and self-concept of students of Fasa University of medical sciences, 2010. J Fasa Univ Med Sci. 2013;3(3):235-40.
9. Erfani N. The Effect of Hypiran on College Student's Anxiety Settling in Dormitories of Shahre Karaj. Karaj: Nursing and Midwifery Facualty, Azad University, Medical Branch; 2008.p.79-88.
10. Perczek R, et al. Coping, mood, and aspects of personality in Spanish translation and evidence of convergence with English versions. J Pers Assess. 2000;74(1):63-87.
11. Kh F. Frequency of anxiety in students of Emam Ali and Emam Hasan dormitories [Dissertation]. Tehran.Tehran: IUMS; 2003.p.148-57.
12. Patterson SL. The effect of emotional freedom technique on stress and anxiety in nursing students: A pilot study. Nurse Educ Today. 2016;40:104-10.
13. Rafati F, et al. Iranian Nursing Students' Experience of Stressors in Their First Clinical Experience. Journal of Professional Nursing, 2016;33(3):250-7.
14. Gomes VM, Silva MJPd, Araújo EAC. Gradual effects of therapeutic touch in reducing anxiety in university students. Rev Bras Enferm. 2008;61(6):841-6.
15. Carvalho Rd, Farah OGD, Galdeano LE. Nursing undergraduates' anxiety about the first surgical instrumentation. RLAE. 2004;12(6):918-23.
16. Mohammadi Farrokhran E, et al. Relationship between quality of sleep and mental health among students living in dormitories. Knowledge Health. 2012;7(3):112-7.
17. khosh Kasht SBT, Shiri M, Agha Barari M, Hajfiruz Abadi M, Jalili H, et all. The effect of aromatherapy on test anxiety level. Alborz Uni J. 2015;2(4):101-9.
18. Yazdkhasti M, Pirak A. The effect of aromatherapy with lavender essence on severity of labor pain and duration of labor in primiparous women. Complementary Ther Clin Pract. 2016;25:81-6.
19. Apay SE, et al. Effect of aromatherapy massage on dysmenorrhea in Turkish students. Pain management nursing. 2012;13(4):236-40.
20. Behdani F, Sargolzaei M, Ghorbani E. Study of the relationship between lifestyle and prevalence of depression and anxiety in the students of Sabzevar Universities. 2000;7(2):27-7.
21. Namazi M, et al. Effects of Citrus aurantium (bitter orange) on the Severity of First-Stage Labor Pain. IJPR. 2014;13(3):1011-8.
22. Ozgoli G, et al. A study of inhalation of peppermint aroma on the pain and anxiety of first stage of labor in Nulliparous women: a randomized clinical trial. Qom Univ Med Sci J. 2013;7(3):21-7.
23. Fugh Berman A, Myers A. Citrus aurantium, an ingredient of dietary supplements marketed for weight loss: current status of clinical and basic research. Exp Biol Med. 2004;229(8):698-704.
24. Khori V, et al. Altered levels of nodal excitability by rate-dependent inhibitory effects of essential oil of Citrus aurantium on the electrophysiological properties of isolated perfused rabbit AV-Node. Protective role in the prevention of ouabain toxicity. Int J Morphol. 2010;28(2):445-51.
25. Akhlaghi M, et al. Citrus aurantium blossom and preoperative anxiety. Rev Bras Anestesiol. 2011;61(6):702-12.
26. Leite MP, et al. Behavioral effects of essential oil of Citrus aurantium L inhalation in rats. Rev Bras Farmacog. 2008;18:661-6.

27. Kavurmacı M, Küçükoğlu S, Tan M. Effectiveness of aromatherapy in reducing test anxiety among nursing students. IJTK. 2015;1(1):52-6.
28. Johnson CE, Catherine E. The effect of diffused aromatherapy on test anxiety among baccalaureate nursing students. Minesota: School of education; 2013.p.120-26.
29. Kalani Z, et al. Comparison of Citrus Aurantium and Oxazepam Tablets Efficacy on Preoperative Anxiety in Patients Undergoing Coronary Artery Bypass Graft Surgery. SSU. 2015;23(3):1968-75.
30. Sahebalzamani M, et al. Effects of inhalation aromatherapy on female students' anxiety and depression settling in dormitory of Tehran University of Medical Sciences. Med Sci J Islamic Azad Univ Tehran Med Branch. 2010;20(3):175-81.