

# The effects of Red rose essential oil aromatherapy on athletes' sleep quality before the competition

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**ABSTRACT:** The purpose of this study was to examine the effects of Red rose essential oil aromatherapy on athletes' sleep quality before the competition. The statistical population was all male futsal players (first division) of Islamic Azad University Tehran Branch. 20 players were selected by available sample ( $M_{age}=30$ ). The subjects were randomly divided into control and experimental groups. This study was a semi empirical research and design of it included pre-test, post test with control group. The instrument is included the Pittsburgh Sleep Quality Index (PSQI) and demographic questionnaire. Rose oil aromatherapy was performed for 4 nights in the experimental group. Three drops of Rose essential oil was dropped on subjects' pillow every night. They inhaled those for 8 hours. The control group did not inhale aromas. Subjects completed Pittsburgh Sleep Quality Index (PSQI) in the pre test on the morning of the fifth (on the morning of the competition). The collected data were classified by descriptive statistical methods and were analyzed by Mann–Whitney U test. The results showed that the intervention of 4 nights of Rose essential oil aromatherapy had no significant effects on athletes' sleep quality before the competition.

**Keywords:** Aromatherapy, sleep quality, Rose oil, athletes, competition.

## INTRODUCTION

Today, sport science believes that athletes should be in the good condition from psychological aspect to can achieve greater success in addition to regular exercise and physical improvement. In this regards, sport psychology science has taken effective steps to achieve this goal (Hosseinoon, 2001). The athletes of competition fields are under stresses from psychological internal and external different factors due to the nature of sport type in the competitions. So, they need to develop skills to decrease these pressures (Hosseinoon, 2001). Athletes' sleep is an important issue that is affected by psychological pressures. Athletes often have stress to maintain family commitments, introduction, and career life. All these can affect on athletes' sleep quality and quantity (Venter, 2012). Anxiety is known as an important cognitive stimulation before sleep and it leads to the sleep disturbance. Long- term trips often result in athletes' fatigue. This fatigue may be due to the crowded situations, dehydration as a result of the low humidity in aircraft, bad weather, lower barometric, vibration, noise, flying anxiety and body relaxes due to the inactivity during travel (Venter, 2012). Sleep is a major part of process of improvement of body function. Lack of sleep can lead to the decreasing of work capacity and increasing of the fatigue sense. Also, it can decrease the performance and efficiency of instruction programs. Thus a good sleep is important for athletes to rest very well and they do their daily work during the day at specific times (Venter, 2012). The studies have shown that sleep deprivation weakens the immune system. It decreases the hypothalamus, pituitary, and adrenal performance during the next days, blood glucose levels, maximum level of activity, individual talents, and anaerobic power (Arazi, , 2011). The results of studies have showed that athletes sleep less than non-athletes and they have sleep problems (Samuels, 2008). Sleep is important not only for the rest of the body but also has a significant effect on brain function. People

who have the sleep deprivation experience continuously high levels of depression, stress, anxiety, worry, depression, anger, sadness, low self-esteem, and problems in confronting with environmental stressful factors (Samuels, 2008). The optimal sleep is helpful for the achieving of better athletic performance. Athletes may improve the consequences of instruction and competitions through the cognition of strategies to maximize the benefit of sleep with a good perception of the relationship between total sleep time and athletic performance (Samuels, 2008). Long sleep beyond sleep habits can improve athletic performance, reaction time, sleepiness during the day and the individual morale. However sleep is a stage of the decreasing of self-awareness and poor physical performance but athletes should be aware of this fact that sleep plays an important role in rest-activity cycle of a very specific performance during sleep. The effect of sleep on individuals' sleep is a common area of sport sciences (Cummsiskey, , 2013). The learning of skills is dependent on sleep in athletes. Evidences show that memory processing during sleep is an important part in memory formation (Cummsiskey, , 2013). Athletes suffer from insomnia on the agenda for various reasons such as excitements, travel, change habits, change in sleep time, and malnutrition (Bahr al-Ulloum, 2008). The increasing of total sleep time can cause improvements among most archers and sprinters, in the reaction time, individual morale, fatigue, and vigor. These improvements can show that maximum performance can only occur when an athlete's overall sleep and sleep habits is optimal (Mah Cher, , 2011). These results highlight the importance of adequate sleep (quantity and quality) on the athletes who emphasize on the confidence of optimal performance when cognitive duties and the consciousness of motor and nervous systems are required (Cummsiskey, , 2013). Therefore, the survey of sleep improvement and case identification is essential due to the coaches, parents, and athletes' anxiety about sleep problems (Cummsiskey, , 2013). Several strategies have been proposed to improve the sleep quality for example hypnotic and sedative drugs can effectively improve sleep quality. However drug agents usually are associated with different side effects but complementary therapies such as aromatherapy, relaxation of muscle, and the use of glasses and the phone can improve sleep quality without causing serious side effects. Aromatherapy is a method that is considered for body and mind. There are a lot of index for successful and useful applying of essential oils especially for men in cases such as stress, deep disorders, back pain, nerve forehead infections, and sexual health. Aromatherapy not only improved physical symptoms but also helps the improvement of physiological signs. Also it can increase human's mental health quality (Kamble, 2014). It is known that the smell of perfumes and fragrances can cause physiological and psychological changes in humans (Hongratanaworakit, 2004). Inhaling the aromas for therapeutic purposes and then use of essential oils in whatever way they are useful in therapy became the basis of aromatherapy (Garg, 2005). The sense of smell plays an important role in our interaction with the environment. Olfactory system act not only to identify potential risks in the environment such as smoke, gas, and dust but it also affect on our nutrition, social behavior, and health (Huart, 2013). According to the studies about flowers and plants, we realized that medicinal flowers and plants have been used to treat all ailments and diseases in the past. Although many synthetic drugs were extracted from these flowers and plants and no one denied those health and healing benefits but the status and importance of plants decreased when modern medicine emerged (Naraqi, 2005). Some of the components of essential oils, such as linalool and terpineo have a great effect on the central nervous system so that those decrease animals and humans' physical activity and anxiety and make sleep easy (Prusinowska and Smigielski, 2014). The evaluation of effects of perfumes on nerve system can divided into membrane stimulation such as brain wave activity and automatic stimulation such as heart rate and skin conduction. The decreasing of membrane stimulation and automatic stimulation can be interpreted by the calming effect of perfumes. The increasing of membrane stimulation and automatic stimulation can be interpreted by the stimulatory effect of perfumes (Hongratanaworakit, 2004). Rose flower is one of the fragrances that uses in the aromatherapy. Kafi and Riazi (2002) have stated that Rose flower is a national flower of Iran. Rosa Damascene is known as Damask rose in Iran and there is a strong relationship between Iranian and this plant. Red rose has an old history and its use is at least 1500 years ago. Red rose is a prickly plant with a height of 2.5 meters and fragrant pink flowers with 6 to 12 flowers and 33 petals and it produce in May and June months. Red rose oil is an aromatic plant. It was reported several features about the effects of anti-HIV, antibacterial, antioxidant, hypnotic, anti-diabetic and relaxation were for this plant in addition the effects of its smell and aroma (Boskabady, 2011). This plant has several therapeutic and healing features such as mental relaxation, the decreasing of depression and anxiety, and therapy of digestive system problems (Nikbakht & Kafi, 2008). In this regards, Hajibagheri, , (2014) surveyed the effect of Rose oil aromatherapy on sleep quality in cardiac patients: a randomized controlled trial. 60 patients who met the inclusion criteria were conveniently sampled and randomly allocated to the experimental and control groups. The control group received routine care. The experimental group received routine care and Rose oil aromatherapy for three subsequent nights. In the both groups the sleep quality was assessed using the Pittsburgh Sleep Quality Index. The results of this study showed that the mean scores of five domains of Pittsburg Sleep Quality Index as well as the mean of total score of the index in the experimental group were significantly lower than the control group. So, Rose oil aromatherapy can significantly improve the sleep quality of patients hospitalized in CCUs. Igarashi, , (2014) examined

the effect of olfactory stimulation by fresh rose flowers on autonomic nervous activity. Nineteen female university and graduate students participated in this study ( $M_{age} = 21.6 \pm 1.5$ ).

The results of this study showed that Fresh rose flowers induced (1) a significant increase in parasympathetic nervous activities and (2) an increase in "comfortable" and "natural" feelings. Ikei, (2014) studied the physiological and psychological relaxing effects of viewing rose flowers in office workers. The results of this study supported the presence of physiological and psychological relaxing effects of being exposed to flowers on office workers. There are few studies about athletes and their sleep before competitions. Different studies have reported that the effect of Red rose can be effective as a physiology-psychological intervention. In this regard, there was no study about athletes. Therefore the conducting study was essential to examine the effect of Red rose oil on athletes' sleep quality. This study could present more complete and accurate information. Thus, the purpose of this study was to examine the effects of Red rose essential oil aromatherapy on athletes' sleep quality before the competition.

## MATERIALS AND METHODS

### **Method**

The method of research was semi empirical and design of it included pre-test, post-test with control group.

### **Participants**

The statistical population was all male futsal players (first division) of Islamic Azad University Tehran Branch. 20 players were selected by available sample ( $M_{age} = 30$ ).

### **Instruments and Tasks**

The instruments of this study were a demographic questionnaire to collect individual data (especially the history of allergy to perfumes, medicines and certain diseases, a history of problems or mental disorders) and Pittsburgh Sleep Quality Index (PSQI) (Buysse, , 1989). It assesses the sleep quality by measuring seven domains: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep mental quality, sleep medications use, and daytime dysfunction.

### **Procedure**

The purpose and the process of study were explained to subjects. The participants were assured that their data will be kept confidential and those will not be available to anyone. Then all subjects completed a consent form to participant in this study and they attended with the complete satisfaction in this study. The researchers provided the best conditions as much as possible for the experimental group to observe all moral and valuable aspects of study. The subjects were divided control and experimental groups. Rose oil aromatherapy was performed for 4 nights in the experimental group. Three drops of Rose oil was dropped on subjects' pillow every night. They inhaled those for 8 hours (From 11 pm to 7 am). The control group did not inhale aromas. The control group received the sleep routine cares including a reduction in the level of room lighting, the optimum temperature of the room, and silently holding mobile during four nights. Researchers could not control variables and confounding factors such as genetics, marital status, sleep, nutrition, and regular exercise that those probably could be effective on the results in this study.

### **Data Analysis**

The collected data were classified by descriptive statistical methods and were analyzed by Mann–Whitney U test. The SPSS software (version 20) was used for data analysis ( $\alpha \leq 0.05$ ).

## RESULTS AND DISCUSSION

### **Results**

The results of table (1) show that sleep quality and its subscales (sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep mental quality, sleep medications use, and daytime dysfunction) in the pre-test and post-test stage. The results of table (2) show the results of Kolmogorov-Smirnov Test to determine the normal description of data. The data of sleep quality was not normally distributed so were used non-parametric methods (Mann–Whitney U test) to analyze data in this study.

Table 1. The description of sleep quality variables in the pre-test and post-test and the difference between pre and post-test

| Variable              | Group        | Pre-test | Post-test      | The difference between pre and post-test |
|-----------------------|--------------|----------|----------------|--|
| Sleep quality         | Experimental | 1/9±1/7  | 1/6±1/2        | -0/30±1/0                                |
|                       | Control      | 2/2±1/5  | 2/1±1/3        | -0/10±1/3                                |
| Mental sleep quality  | Experimental | 0/3±0/4  | 0/4±0/5        | 0/1±0/5                                  |
|                       | Control      | 0/3±0/4  | 0/4±0/5        | 0/1±0/3                                  |
| Sleep latency         | Experimental | 0/8±0/7  | 0/60±0/69      | -0/2±0/6                                 |
|                       | Control      | 0/4±0/6  | 0/3±0/4        | -0/10±0/5                                |
| Sleep duration        | Experimental | 0/2±0/4  | /00±0/000<br>0 | -0/2±0/4                                 |
|                       | Control      | 0/6±0/5  | 0/4±0/5        | -0/2±0/4                                 |
| Sleep efficiency      | Experimental | 0/0±0/0  | 0/0±0/0        | 0/0±0/0                                  |
|                       | Control      | 0/0±0/0  | 0/0±0/0        | 0/0±0/0                                  |
| sleep disturbances    | Experimental | 0/5±0/5  | 0/5±0/5        | 0/0±0/4                                  |
|                       | Control      | 0/8±0/4  | 0/8±0/4        | 0/0±0/0                                  |
| Sleep medications use | Experimental | 0/0±0/0  | 0/0±0/0        | 0/0±0/0                                  |
|                       | Control      | 0/0±0/0  | 0/0±0/0        | 0/0±0/0                                  |
| Daytime dysfunction   | Experimental | 0/1±0/3  | 0/1±0/3        | 0/0±0/4                                  |
|                       | Control      | 0/1±0/3  | 0/2±0/4        | 0/1±0/5                                  |

Table 2. The results of Kolmogorov-Smirnov Test for the determining of the normal description of data

| Variable              | Group        | Statistic | df | Sig   |
|-----------------------|--------------|-----------|----|-------|
| Sleep quality         | Experimental | 0/311     | 10 | 0/007 |
|                       | Control      | 0/229     | 10 | 0/146 |
| Mental sleep quality  | Experimental | 0/370     | 10 | 0/000 |
|                       | Control      | 0/524     | 10 | 0/000 |
| Sleep latency         | Experimental | 0/324     | 10 | 0/004 |
|                       | Control      | 0/370     | 10 | 0/000 |
| Sleep duration        | Experimental | 0/482     | 10 | 0/000 |
|                       | Control      | 0/482     | 10 | 0/000 |
| sleep disturbances    | Experimental | 0/400     | 10 | 0/000 |
|                       | Control      | 0         | 10 | 0     |
| Sleep medications use | Experimental | 0/400     | 10 | 0/000 |
|                       | Control      | 0/370     | 10 | 0/000 |

Table 3. The results of Mann–Whitney U test for the determining of difference between the control and experimental groups in sleep quality subscales

| Variable              | U    | Z     | Sig   |
|-----------------------|------|-------|-------|
| Sleep quality         | 55   | 0/399 | 0/690 |
| Mental sleep quality  | 49/5 | -0/05 | 0/957 |
| Sleep latency         | 54/5 | 0/40  | 0/687 |
| Sleep duration        | 50   | 0/0   | 1/0   |
| Sleep efficiency      | 50   | 0/00  | 1/00  |
| Sleep disturbances    | 50   | 0/00  | 1/00  |
| Daytime dysfunction   | 50   | 0/00  | 1/00  |
| Sleep medications use | 54/5 | 0/44  | 0/654 |

**According to table 3, it is observed that**

- There is no significant difference between the control and experimental groups in the mean of sleep quality changes (Z=0.399, U=55, P=0.690).
- There is no significant difference between the control and experimental groups in the mean of mental sleep quality changes (Z=-0.05, U=49.5, P=0.957).
- There is no significant difference between the control and experimental groups in the mean of sleep latency changes (Z=0.40, U=54.5, P=0.687).

- There is no significant difference between the control and experimental groups in the mean of sleep duration changes ( $Z=0.0$ ,  $U=50$ ,  $P=1.0$ ).
- There is no significant difference between the control and experimental groups in the mean of sleep efficiency changes ( $Z=0.0$ ,  $U=50$ ,  $P=1.0$ ).
- There is no significant difference between the control and experimental groups in the mean of sleep disturbances changes ( $Z=0.00$ ,  $U=50$ ,  $P=1.00$ ).
- There is no significant difference between the control and experimental groups in the mean of daytime dysfunction changes ( $Z=0.00$ ,  $U=50$ ,  $P=1.00$ ).
- There is no significant difference between the control and experimental groups in the mean of sleep medications use changes ( $Z=0.44$ ,  $U=54.5$ ,  $P=0.654$ ).

### **Discussion and conclusion**

The purpose of this study was to examine the effects of Red rose essential oil aromatherapy on athletes' sleep quality before the competition. The results of this study showed that the intervention of 4 nights of Rose essential oil aromatherapy had no significant effects on athletes' sleep quality before the competition. This result is conflict with the results of Hajibagheri, (2014); Igarashi, Ikei, (2014); Goudarzi, 's (2011) study. The lack of this consistent can be due to the intervention type, non- athlete subjects, and subjects' age, gender, disease, and disease type. We can say about the lack of this intervention on athletes' sleep quality before the competition that elite athletes show poorer sleep quality than non-athletes and the sleep disturbance on the night before the competition is quite normal (Cummsiskey, 2013). Thus, athletes' sleep quality is not very good (Cummsiskey, , 2013). Athletes sleep generally less than non-athletes and they often have sleep problems (Venter, 2012). The body reconstruction theory presents that anabolism activity during sleep and catabolism can be done more in the nightlife. So a high energy that is expended for physical activities should be provided in the rest state of body due to an appropriate balance of energy and the maintaining of body balanced condition so body will be more willing to rest (Drive and Taylor, 2000). This provides the facilitate conditions of sleep quality in athletes. Therefore aromatherapy has been able to make no significant effect on subjects sleep quality in this study. Researchers have concluded that the Red rose perfume leads to a decrease in heart rate and it has the housing effect (Hongratanaworakit, 2004). Rose essential oil creates a significant reduction in respiratory rate, oxygen saturation, and blood pressure in comparison with placebo (Dobetsberger & Buchbauer, 2011). It seems that this can be due to the decreasing of heart rate and blood pressure in rest state in athletes who perform endurance and resistive exercises (Wilmore & Costill, 2004). Metabolism, heart rate, blood pressure, and body temperature during sleep are at the lowest level during delta sleep (Monnier & Gaillard, 1980). Red Rose essential oil aromatherapy leads to a decrease in heart rate and blood pressure in the rest state and it affects on sleep quality in this way. Since athletes have lower heart rate and blood pressure than non-athletes so aromatherapy has no significant effect on athletes' sleep quality. Red rose has been considered as a mild antidepressant but powerful, the increasing of sexual desire in men and women, and an essential oil for skin care in Iranian medicine (Lis-Balchin, 2006). Since REM sleep periods were associated with stimulating sexual desire and Rose essential oil is used to increase sexual desire in aromatherapy. Also athletes often have the restrictions in this area due to the sports commitment and successive travel. So we can say that athletes may affect by the increasing of sexual desire of Red rose essential oil during sleep and they have had multiple sexual stimulations. Thus, the calming effect of Red rose essential oil has been neutralized due to this. We can conclude that these factors can play a role in lack of significant effect of Red rose essential oil aromatherapy on athletes' sleep quality before the competition. Therefore, it is recommended that the further studies conduct with long-time interventions of aromatherapy and using of other plants such as lavandula that has positive effects on individuals' sleep and the decreasing of anxiety.

### **REFERENCES**

- Arazi H, Asadi A, Hoseini K, Mohammad Zade Salamat K and Piri Kord K. 2011. The Effects of a 30-hour Sleep Deprivation on Reaction Time, Neuromuscular Coordination and Aerobic Capacity in Non-athlete Male Students. *Horizon Med Sci*, 17(2):14-21.
- Bahr al-Ulloum H, Rezvani MH and Sasani Moghadam SH. 2008. The effects of sleep deprivation on the accuracy of regional basketball shooting and response time in physical education and sport sciences male students of Shahrood University. *Olympic quarterly*. 3(43): 96-103.
- Boskabady M, Shafei MN, Saberi Z and Amini S. 2011. Pharmacological Effects of Rosa Damascena. *Iranian Journal of Basic Medical Sciences*, 14(4), 295-304.
- Buysse DJ, Reynolds CF, Monk TH, Berman SR and Kupfer DJ. 1989. The Pittsburgh sleep quality index: A New Instrument for psychiatric practice and Research. *Psychiatry Res*. 28, 193-213.

- Cummiskey J, Natsis K, Papathanasiou E and Pigozzi F. 2013. Sleep and Athletic performance. *European Journal of Sports Medicine*, 1'13-20.
- Drive HS and Taylor SR. 2000. Exercise and sleep. *Sleep medicine Reviews*, 4, 387-402.
- Dobetsberger C and Buchbauer G. 2011. Actions of essential oils on the central nervous system. An updated review, *Flavour and Fragrance Journal*, 26' 300-316.
- Garg SC. 2005. Essential oils as Therapeutics. *Natural Product Radiance*. 4(1): 18-26.
- Goudarzi M, Ramazanzadeh M and Rakhshandeh H. 2011. The survey of inhalation of Rose essential oil on postmenopausal women's sleep quality referred to health centers in Kerman. MA thesis, Tehran University of Medical Sciences, School of Nursing and Midwifery.
- Hajibaghery A, Babaii A and Adib Hajbaghery M. 2014. Effect of Rosa Damascene aromatherapy on sleep quality in cardiac patients. *Complementary Therapies at practice*, 20, 159-163.
- Hongratanaworakit T. 2004. Physiological effects in aromatherapy. *Review Article*. 26(1): 117-125.
- Hosseinoon T. 2001. The description of mental preparation in elite female athletes of canoeing, basketball, fencing, shooting, volleyball, track and field, and tennis. MA thesis, Islamic Azad University Karaj Branch.
- Huart C, Rombaux P and Hummel T. 2013. Plasticity of the Human Olfactory System: The Olfactory Bulb. *Molecules*, 18: 11586-11600.
- Igarashi M, Song C, Ikei H, Ohira T and Miyazaki Y. 2014. Effect of olfactory stimulation by fresh rose flowers on autonomic nervous activity. *J Altern Complement Med*, 20(9): 31-727.
- Ikei H, Komatsu M, Song C, Himoro E and Miyazaki Y. 2014. The phsychological and psychological relaxing effects of viewing rose flowers in office workers. *Journal of Psychological Anthropology*. 33(1): 6.
- Kafi M and Riazi Y. 2002. Cultivation of Rosa Damascena mill. And Rose water production. ministry of Agricultura-I jihad pub.Tehran. Iran.
- Kamble Ravindra N, Mehta Piyush P and Shinde Vaibhav M. 2014. Aromatherapy as comolementary and alternative medicine- systematic review. 3(7):144-160.
- Lis-Balchin M. 2006. Aromatherapy science: A guide for healthcare professionals. Pharmaceutical press, 293.
- Mah Cher D, Mah Kenneth E, Kezirian Eric J and Dement WC. 2011. The Effects of Sleep Extension on the Athletic Performance of Collegiate Basketball Players. *sleep*: (vol.34(7): 943-950.
- Monnier M and Gaillard JM. 1980. Biochemical regulation of sleep. *Experientia*, 15(36): 21-4.
- Naraqi M. 2005. Medicinal plants and flowers. Publication of Amir Kabir, Tehran.
- Nikbakht A and Kafi M. 2008. A study on the Relationships between Iranian People and Damask Rose and "its Therapeutic and Healing properties. *Horticultural Sciences Dept. Faculty of Agriculture University of Tehran Karaj, I.R. Iran*.
- Prusinowska R and Smigielski KB. 2014. Composition, biological properties and therapeutic effects of lavender. *A review*. 60 (2):56-66.
- Samuels Charles MD and CCFP D. 2008. Sleep, Recovery, and Performance. *The New Frontier in High-Performance Athletics. Neurologic Clinics*, 26, 169-180.
- Venter RE. 2012. Role of sleep in performance and recovery of Athletes. *A review Article*. 34(1).167-184.
- Wilmore JH and Costill DL. 2004. *Physiology of Sport and Exercise*. Edition: 2nd, Human Kinetics, ISBN-13: 978-0736000840