Research Paper:

The Effect of Inhalation Aromatherapy With Damask Rose (*Rosa Damascena*) on the Pain of Elderly After Knee Arthroplasty

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Citation: Bastani, F., Samady Kia, P. & Haghani, H., 2017. The Effect of Inhalation Aromatherapy With Damask Rose (Rosa Damascena) on the Pain of Elderly After Knee Arthroplasty. *Journal of Client-Centered Nursing Care, 3*(2), pp. 153-160.

doi: https://doi.org/10.32598/jccnc.3.2.153

Article info:
Received: 09 Oct. 2016
Accepted: 11 Feb. 2017

Keywords:
Aromatherapy, Rose, Pain, Elderly, Arthroplasty

ABSTRACT

Background: Acute postoperative pain is anticipated as a common problem in orthopedic surgeries especially arthroplasty which can cause harmful effects to the body and the psyche of the person. Currently, non-pharmacological approaches such as aromatherapy are taken into account pain relief along with pharmaceutical methods. The aim of the current study was to determine the effect of the aromatherapy with the Damask Rose on pain of elderly patients after knee arthroplasty surgery.

Methods: This study is a non-randomized clinical trial, 80 elderly patients underwent knee arthroplasty surgery were selected from two hospitals (Moheb and Shafa) according to inclusion criteria and enrolled into the study by simple random sampling. Patients were divided into control and experimental groups. Interventions with Damask Rose were perfomred 24 hours after surgery and there were 4 sessions within 2 hours with 30 minutes interval. Visual Analog Scale (VAS) was used to measure pain and daya was analyzed using SPSS version 16.

Results: In the experimental group, the pain intensity was significantly different before and after the intervention ($P < 0.001$). However, there was no significant difference in the pain intensity of the control group before and after the intervention ($P = 0.66$). Comparing the difference in pain scores before and after the intervention, there was a significant decrease in this score after the intervention in the experimental group compared to the control group and before intervention ($P < 0.001$).

Conclusion: The study demonstrate that aromatherapy has a positive effect on reducing the postoperative pain of the elderly, and it can be used as a complementary medicine which is cost effective, safe, and easy to perform.

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1. Background

One of the most common diseases in the elderly is knee osteoarthritis. Increased average age of the community and the increasing prevalence of overweight caused a significant surge in the outbreak of this disease which it is expected to cause pain and related activity constraints (Allen & Golightly 2015). In the United States, 27 million patients suffer from knee osteoarthritis (Field 2016) and 267,000 knee arthroplasty are performed annually (Thomas & Sethares 2010). In arthroplasty surgery, acute postoperative pain is a common and anticipated problem. High levels of postoperative pain can cause harmful effects on the body, preventing short- and long-term recovery, increased the length of hospitalization, and delayed movement (Büyükyılmaz & Aştı 2013).

Pain management is an essential part of the clinical care that American Pain Association has spread the expression of "pain, the fifth vital sign" for more emphasis on its importance and awareness of the health team members about pain control (International Association for the Study of Pain, 2012). Also, emotional stresses, preoperative anxiety, and cognitive factors have a direct relationship with postoperative pain (Büyükyılmaz & Aştı 2013). To relieve the patient's pain, therapeutic and non-pharmaceutical approaches are usually used after the surgery. Therapeutic strategies include the use of non-opioid and opiate analgesics (Hinkle & Cheever 2013). Elderly patients are often prone to side effects of these therapeutics (Thomas & Sethares 2010).

There are several non-pharmacological or complementary therapies among which aromatherapy is one of the therapies to reduce the pain in the elderly. Aromatherapy is the therapeutic use of the fragrances to increase the health, recovery, and production of psychological and medicinal effects through the sense of smell. Aromatherapy has grown dramatically in many countries as a tool for holistic nursing. When the fragrances are attached to the olfactory receptors, the neurological message is transmitted to the brain by the limbic system and causes the secretion of neurotransmitters, such as enkephalin and endorphin. These neurotransmitters reduce the perception of pain and make sense of appeasement (Lindquist, Snyder & Tracy 2013).

The Damask Rose, an indigenous plant of Iran, is one of the 308 species of the Rose family. It is being used to improve physical and mental health since ancient times (Barati et al. 2016). This plant has soothing, sedative, anticonvulsant, antispasmodic, antibacterial, and antiviral effects and contains vitamins (A, C, B1, B2, B3, and K), citric acid, pectin, flavonoid, and carotenoid (Bikmoradi et al. 2016). Various studies have been conducted on effects of Damask Rose. In a study conducted in the Hamedan province of Iran determined the effect of the inhalation aromatherapy with the Damask Rose on the severity of pain after changing the dressing in patients with burns. It was demonstrated that patients in the experimental group felt less pain than the control group after dressing (Bikmoradi et al. 2016).

Another study determined the effect of the rose extract (Golab) aroma on the severity of first-time labor pain in women showed that each time the rose extract has inhaled the pain reduced, but there was a continuous increase in pain in both treatment and placebo groups (Roozbahani et al. 2015). Another study determined the effect of the aromatherapy with roses and aromatic geranium plant on the severity of the postoperative pain in the pediatric population in Iran and demonstrated the relief in postoperative pain along with other caring methods (Marofi & Siros Fard 2015).

Various studies have shown that aromatherapy can reduce depression, anxiety, fatigue, pain, nausea, vomiting, and improving skin ulcers following a disease. However, these effects are not precisely proven and only a few studies have been conducted, especially in the elderly population (Dimitriou et al. 2017; Hur et al. 2014; Marofi & Siros Fard 2015; Ndao et al. 2010; Stea Beraudi & De Pasquale 2014; Tang & Tse 2014). The current study was conducted to determine the effect of the aromatherapy with the Damask Rose on the severity of postoperative pain of the elderly after arthroplasty surgery. This study hypothesized that "Aromatherapy with Damask Rose is effective in reducing elderly pain after knee joint surgery".

2. Materials & Methods

Type of study

In this Quasi-experimental clinical trial, the effect of the inhalation aromatherapy with the Damask Rose on the severity of postoperative pain in the elderly after arthroplasty was investigated in Moheb Mehr and Shafa Yahyaian Hospital hospitals, Tehran, Iran (affiliated to Iran University of Medical Sciences).

Ethical considerations

This research has a code of ethics number IR.IUMS.REC1395.9411580004 from the Ethics Committee of

the Iran University of Medical Sciences. Patients participating in this study have signed written informed consent before the intervention.

Sampling

A total of 80 elderly patients were selected through available sampling and in a simple coin throwing random method on hospitals and enrolled in the study based on the inclusion criteria as mentioned below. Moheb Mehr Hospital was selected as the control group, and the Shafa Yahyaian Hospital was selected as the experimental group. Sampling was performed from September to February 2016, and there was no sample loss. To determine the required sample size at a significant level of 0.05, test power of 80%, and assuming that the effect of the aromatherapy with Damask Rose on the pain is the d = 1.5 score to consider the effect of the aromatherapy program meaningful, the sample size calculated in each group was 40. It is necessary to mention that in a similar study by Braden et al. in 2009, the standard deviation was estimated to be 2.4.

Inclusion criteria were no history of asthma and allergy, insensitivity to Mohammadi's flowers, lack of mental disorder (psychosis, dementia, and delirium), no use of alcohol and drugs, a healthy sense of smell, no history of a migraine and chronic headache. Exclusion criteria were an unwillingness to continue to collaborate in the process of this clinical practice, signs of respiratory sensitivity during the study, illness of the elderly, and patients admitted to the ICU for more than 24 hours after surgery.

Collecting data

To collect data, Visual Analog Scale (VAS) and the demographic information form were used. VAS is a valid, accurate, and sensitive self-report instrument to assess experiences such as pain and often it is used to measure pain intensity (Bikmoradi et al. 2014; Fadaizadeh, Emami & Samii 2009; Rezvani Amin et al. 2011). Visual scale of pain assessment was perfomred in two stages. In the first stage, it was used before the intervention as a pre-test, and in the second stage, it was used as the post-test after 2 hours of intervention. Demographic information form included age, gender, marital status, education level, employment status, economic situation, lifestyle (alone or with family), living in a city or village, receiving a home medicine, etc.

Formal and content validity methods were used to determine scientific validity of demographics form. To achieve this, after a careful reading of the books, scientific publications, texts, and articles about the study topic and using the opinions of the supervisor and statistics advisor professors, the researcher prepared demographic information questionnaire and presented it to 5 faculty members of the Faculty of Nursing and Midwifery in Iran University of Medical Sciences. After receiving and implementing the opinion of the professors, the necessary amendments were made. Then the research tool and proposal were presented to the Ethics Committee of the Iranian University of Medical Sciences, and instruments were used after the approval of the Ethics Committee.

Intervention

The researcher completed the demographic information form, using the patient's folder and also asked questions to the patient. Before the intervention, pre-test was given using the VAS tool for examining the severity of pain and intervention was done immediately after it. The researcher poured three-four drops of Damask Rose Essence (Barij Essence Co., 8.5 mg of citronella [active ingredient] per milliliter) plus 5cc of normal saline (0.9% on a 10 × 10 gas) and also kept the same combination in a plastic zipper bag. The patients in the experimental group inhaled for one-two minutes inside the zipper bag by holding it close to their nose (within a distance of one to two centimeters), and then they began to breathe deeply. But elderly in the control group inhaled the bags containing only 5 cc distilled water. The whole process of intervention for both control and experimental groups was conducted in two hours.

To prevent the smell to become normal for patients, the number of inhalations was divided into four times with an interval of 30 minutes. As mentioned, at each two-three minutes inhalation of the scent was done by the patients (Khalili et al. 2014; Hajibagheri et al. 2014; Setab yeshvali Pour et al. 2012; Stea et al. 2014). Post-test was given Immediately after the fourth turn using the VAS tool. The whole process of intervention was carried out by the researcher. To prevent the psychological impact of the type of intervention on the results, control group patients were said that their cooperation is needed to inhale a harmless substance for conducting study in nursing care for patients undergoing arthroplasty surgery.

Data analysis

To analyze the data central tendency indicators such as mean and standard deviation were used at the descriptive level and at the inferential level, independent T-test, paired t-test, Fisher's exact test, and Chi-Square were used at the level of significance ($P < 0.05$) in SPSS version 16.

Table 1. Percentage and frequency distribution of demographic variables and their meaningful test

Demographic Variables		Experimental Group	Control Group	P
		No. (%)	No. (%)	
	Age mean	67.8 (5.6)	67.9 (5.6)	0.936
Sex	Male	7 (17.5)	5 (12.5)	P = 0.755
	Female	33 (82.5)	33 (82.5)	
Education level	Illiterate	20 (50)	5 (12.5)	P < 0.001
	Reading and writing	19 (47.5)	23 (57.5)	
	Diploma or higher	1 (2.5)	12 (30)	
Chronic disease	Yes	26 (65)	33 (82.5)	P = 0.126
	No	14 (35)	7 (17.5)	
Economic status	Good	7 (17.5)	10 (25)	P = 0.759
	Average	23 (57.5)	20 (50)	
	Weak	10 (25)	10 (25)	
Ethnicity	Turk	12 (30)	6 (15)	P = 0.163
	Kurd	2 (5)	2 (5)	
	Lur	3 (7.5)	5 (12.5)	
	Fars	27 (67.5)	27 (67.5)	
	Gilaki	3 (7.5)	0	
Life style	Alone	13 (32.5)	10 (25)	P = 0.622
	With family	27 (67.5)	30 (75)	
	Using analgesic	7 (17.5)	22 (55)	P < 0.001
	Not using analgesic	33 (82.5)	18 (45)	
Hospitalization history	Yes	36 (90)	36 (90)	P = 0.99
	No	4 (10)	4 (10)	
Place of living	City	32 (80)	38 (95)	P = 0.087
	Village	8 (20)	2 (5)	
	Cigarette consumption	0	5 (2)	P = 0.494
	Movement limitation	24 (60)	26 (65)	P = 0.818
Style of independent activity	Independent	14 (35)	19 (47.5)	P = 0.433
	Relative dependency	25 (62.5)	19 (47.5)	
	Totally dependent	1 (2.5)	2 (5)	
	Companion during the intervention	35 (87.5)	35 (87.5)	P = 0.99
	Insurance coverage	38 (95)	40 (100)	P = 0.494

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3. Results

In the experimental group, 65% (n = 26) patients were married, and spouse of 35% (n = 14) patients had died. In the control group, 67.5% (n = 27) were married, and spouse of 32.5% (n = 13) patients had died. Both groups were homogeneous regarding marital status (P = 0.99). Out of the total, 80% (n = 32) patients were elderly housewives, and 20% (n = 8) patients were retired. In the control group, 65% (n = 2) patients of the elderly were housewives, and 35% (n = 14) patients were retired. Both control and experimental groups were homogeneous regarding employment status (P = 0.21). Among all the demographic variables, education and consumption of analgesics were significantly different between the two groups (P < 0.001) which was also determined by two-way analy-

Table 2. Comparison of the mean (SD) of elderly patients in the experimental and control group before and after the intervention and their meaningful test and the mean (SD) of the pain score before and after the intervention in the control group, compared with the experimental group and their meaningful test

Group / Stage	Experimental	Control	Independent T-Test Results
Before intervention	7.18 ± 2.27	6.36 ± 2.36	t = 1.57 df = 78 P = 0.116
After intervention	5.63 ± 1.98	6.22 ± 2.53	t = 1.154 df = 78 P = 0.252
Paired t-test results	T = 6.78 df = 39 P < 0.001	T = 0.441 df = 39 P = 0.661	
Difference of pain score before and after intervention	1.55 ± 1.42	0.13 ± 1.97	t = 3.67 df = 78 P < 0.001

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sis of variance analysis. These two variables (education level P = 0.54, drug consumption of P = 0.661) have not been intervening variables, and both groups were homogeneous regarding demographic variables (Table 1).

The mean scores of the pain intensity before and after intervention in the experimental group are significantly different, and after the intervention, this score is decreased (P < 0.001) in comparison to control (Table 2). Also, there was no significant difference between the mean scores of pain intensity in the control group before and after the intervention (P = 0.661) (Table 2). There was no statistically significant difference between the mean scores of pain severity in the two groups before (P = 0.116) and after intervention (P = 0.252). To investigate the effect of the intervention on pain intensity, the difference in pain scores in both the control and experimental groups was compared and investigated before and after the intervention. The results demonstrated that there was a statistically significant difference regarding changes in two groups (P < 0.001) and the score of pain relief in the experimental group was more than the control group. Data suggest that aromatherapy with Damask Rose has been effective in pain reduction after arthroplasty in the elderly.

4. Discussion

The findings of this study showed that aromatherapy with Damask Rose had a significant effect on pain reduction in elderly who has undergone knee arthroplasty and it reduced the overall pain of the elderly. The results of this study were consistent with the study conducted by Bikmoradi et al. (2014) to investigate the effect of aromatherapy with Damask Rose on the severity of pain after changing the dressing in patients with burns. The study by Beikmoradi et al showed that the score of the group receiving aromatherapy was more than the control group.

The findings of the current study were in line with the study conducted by Barati et al. (2016) to study the effect of the aromatherapy with Damask Rose on the anxiety of hemodialysis patients and demonstrated that the group receiving the aromatherapy had a significant reduction in anxiety score after 4 weeks of intervention, compared to the control group The result of the current study was also consistent with the study conducted by Marofi et al. (1994) conducted with the aim of comparing the effect of the rose flower, fragrant geranium, and sweet almond oil on the severity of pain after pediatric surgery. Children's pain was very intense while entering the treatment section and before the intervention in all three groups, however, after applying the intervention in the two groups of aromatherapy with the rose flower and fragrant geranium has been effective in pain relief compared to sweet almond oil (as a placebo).

Various clinical studies are ongoing on the application of the aromatherapy around the world using different herbal essences. Damask Rose, Lavender, Citrus aurantium, and Lemon are examples of commonly used essences to improve symptoms such as anxiety, stress, pain, depression, and so on. Some of these studies are referred below. This study is consistent with the study performed by Karaman et al. (2016) to assess the effect of lavender aromatherapy on pain in patients undergoing surgery at the time of vein finding. Karaman et al. found that patients' pain score in the intervention group experienced a statistically significant decrease, compared to the control group during the process of vein finding. Findings of this study are not in line with the study conducted by Tang et al. (2014) to determine the effect of

the aromatherapy with lavender and bergamot on pain and depression, anxiety and stress in the elderly. Tang et al. reported that the mean score of pain severity had not changed in both experimental and control groups before and after the intervention, and the aromatherapy did not affect the pain intensity. While in the present study, the aromatherapy has led to pain reduction. It is worth mentioning that in the study conducted by Tang et al., the aromatherapy has been investigated for the chronic pain, the intervention took place within a month, and the aroma type used was Lavender and bergamot which differs with the aroma used in the current study.

In conclusion, aromatherapy can be recommended as a non-pharmacological, low-cost, and convenient method to reduce the pain of elderly patients underwent arthroplasty. In addition, there were no complications from the test of the aromatherapy.

The limitations of this study include, it was a Quasi-experimental study and allocation of patients into two groups was not done randomly, which can affect the generalizability of the results. Another limitation of the study was that it was limited to the two hospitals; therefore, it increased the internal credibility of the study to some extent and at the same time decreased the generalizability of the results.

Acknowledgements

This article is extracted from the MSc. thesis of the seconf author in the Department of Community Health Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences of Tehran and is sponsored by Iran University of Medical Sciences. We hereby express our sincere gratitude towards dear Professors, authorities of Moheb Mehr and Shafa Yahyaian Hospitals and all the patients who participated in this study. The trial was also registered on the Iranian Registry of Clinical Trials (IRCT) website with IRCT2017030832950N1 code.

Conflict of Interest

The authors declared no conflicts of interest.

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