

## THE IMPACT OF ROSE ON THE DIMENSIONS OF CHRONIC MUSCULOSKELETAL PAIN IN ELDERLY WOMEN AND MEN IN RETIREMENT CENTERS

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### ABSTRACT

**Aim:** One of the main health problems during aging period is chronic pain. Aromatherapy is one of the ways to reduce the pains of this period. The objective of this study was to investigate the effect of inhaling rose extract on chronic musculoskeletal pain in the elderly people.

**Material and Method:** This is a single-blind clinical trial. Sampling was carried out in a convenient way with random allocation on 60 elderly patients with chronic musculoskeletal pain in Retirement Centres of Sabzevar in 2016. The elderly people were randomly assigned to two groups of intervention (31 persons) and control (29 people) using permutation blocks method. Pain was measured by combined numerical and visual pain assessment instrument and McGill pain questionnaire, which its validity and reliability were confirmed in other studies, before and after the intervention by interviewing and twice a week on Monday (combined pain assessment tool) and Thursday (McGill pain questionnaire) by phone in two groups during the intervention. In the intervention group, the inhalation of the rose extract was performed by linen handkerchief impregnated with three drops of extract from 9 pm to 6 am at 25 cm intervals, one time a day for three weeks. In the control group, sweet almond oil was used with the same method. Data were analyzed by SPSS version 20 and with a significant level of  $p < 0.05$ .

**Results:** The results showed that pain intensity score at baseline was high in two groups and there was no significant difference between the two groups. However, after intervention and with the passage of time to the end of three weeks, a decrease in both groups was observed and this decrease was more in the intervention group.

**Discussion:** this study showed that inhalation of rose extract has no impact on the emotional and sensory dimension of pain in women and men, while the inhalation of rose extract in sensory dimension was significantly different between men and women. There was no difference in emotional dimension between women and men.

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### Introduction

Aging is one of the phenomena discussed in global health. With the rapid growth of elderly people population, it is estimated that over the next 40 years, the population aged over 65 to be doubled. In Iran, according to the census of 2011, 8.24% of the population is elderly people. It is estimated that by the year 1400, 10% of the population of the country to be elderly people [1]. Aging is a critical period of human life [2]. One of the most common problems that medical staff is faced with it is chronic pain in the elderly people [3]. Chronic pain is a common experience and a serious problem in old age. According to the International Association for the Study of Pain, the pain is an unpleasant sensory or emotional experience associated with

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actual or potential injury, and it has two dimensions, including sensory and emotional dimensions. Sensory dimension refers to severe pain, and emotional dimension refers to a degree of discomfort experienced by an individual. It is also divided into two classes in terms of duration: acute pain and chronic pain. Acute pain is usually the result of a disease or injury that lasts less than three months, but chronic pain lasts for at least three months, which can be accompanied by tissue damage [4]. The prevalence of chronic pain is high in the elderly people and increases as age goes up [5]. The prevalence of chronic pain in the elderly people in different societies is estimated to be between 54% and 70% [6]. In Iran, a six-month prevalence of continuous chronic pain in the elderly population (60-90 years) has been reported to be around 67%. Statistics show that the prevalence of chronic pain and its consequences, in addition to age variable, is associated with gender variable. The pain disorder in females is twice compared to that in males [7]. Chronic pain reduces mobility, avoidance of activity, fall, depression, anxiety, sleep disorders, isolation and loneliness in an individual and subsequently leads to disability. Individual and family communications are impaired and a high cost will be imposed on the community. It can also reduce the person's ability to work and earn a living [3]. Musculoskeletal pain is the main cause of disability in elderly people [8]. Research has shown that chronic musculoskeletal pain is a major risk factor for falling [9]. Drug therapies involve the use of analgesics, opiates, nonsteroidal anti-inflammatory drugs, muscle relaxants, and sometimes the use of steroidal compounds [10]. Because of the side effects of these drugs, some of the methods with the least complications are used for pain relief as nursing skills [11]. In recent years, complementary therapies have found a special place in this regard. One of the complementary therapies is aromatherapy [12]. Aromatherapy is the therapeutic application of aromatic oils of plants to improve the sense of physical, spiritual goodness [13]. Aromatherapy means using the unique olfactory sense of different essential oils and their effects on the endocrine system, the autonomic nervous system, and the stem of the brain. Using sense of smell, essences can affect the health of mind, feeling and also the health of the body [12]. The inhalation of these oils stimulates the receptors in the olfactory bulb and transmits the olfactory message to the limbic system, and it causes releasing endorphins, enoxazine, and serotonin from the system, resulting in a sense of relaxation and reduced stress [15, 14]. This system has been well known as an area with pain-related processes. Entering smell data into limbic areas can contribute to pain moderation. Other factors in the analgesic effects of aromatherapy are changes in the pattern of respiration with olfactory stimulation. The sense of smell is dependent on inhale. Each inhale transmits olfactory molecules to the olfactory nerve receptors and activates the limbic olfactory areas. The unconscious breathing pattern changes by stimulating the limbic system. The pleasant smells increase the current volume and reduce the rate of breathing; therefore, the production of a deep breathing pattern can be a mechanism for reducing the sense of pain [16]. Rosa damascene is one of the varieties of medicinal plants [17]. Studies have shown that the main components of the rose are fentyl alcohol, citronelol, linalool and geranium, which have medicinal effects such as anti-inflammatory, analgesic, anti-oxidant, anticancer and antimicrobial effects. Additionally, linalool available in this plant can stimulate the parasympathetic system and act as a sedative [18]. Studies in the area medicinal plants have shown that flavonoid in the rose can have effects such as sleeping, anti-anxiety and anti-depression effects. On the other hand, flavonoids, like benzodiazepines, bind to the ABAG receptors found in the neuronal membrane of the central nervous system, open the chlorine channels, and thus apply their sedative and muscle relaxant effect [17]. Recent research has shown that antioxidants reduce pain. It has also been reported that flavonoids have antioxidant properties [19]. In a study conducted in 2014, Maroufi et al concluded that aromatherapy with rose and geranium can be effective in relieving postoperative pain [20]. Sadeghi Avval Shahr et al in a study showed that massage with rose oil reduced the intensity of dysmenorrhea pain [17]. Ham et al in 2006 also found that aromatherapy with a mixture of essential oils such as lavender, rose and seaweed reduced the intensity of primary dysmenorrhea pain [21]. Regarding the fact that pain control is one of the main duties of the nurse and considering the prevalence of chronic pain in the elderly people and its effects on their lives and limited studies conducted in this regard and especially in the elderly people, the choice of appropriate therapeutic approaches is very worthy. Therefore, the researcher tried to measure the effect of rose extract on chronic musculoskeletal pain in the elderly people.

### Methodology

This research is a randomized clinical trial that was conducted on 60 elderly people with chronic musculoskeletal pain who was a member of the retirement centers of Sabzevar in 2016. After receiving the approval of the Ethics Committee of Sabzevar University of Medical Sciences and obtaining permission from the authorities of retirement centers, researcher referred to these centers and after obtaining written informed consent, the elderly people were randomly allocated into two groups of intervention and control using permutation blocks method. In the control group, sweet almond oil was used and in the intervention group, rose extract was used. In this research, the extract of rose and sweet almond oil of Barij Essence Company was used. The formula for comparing means was used to determine the sample size with 95% confidence interval and 90% test power. For this reason, in each age group, 30 elderly people were determined as sample size. Inclusion criteria included elderly people with chronic musculoskeletal pain, age 60 and above, lack of mental illness, lack of Alzheimer, lack of addiction to drugs, lack of allergy to any perfume or fragrance, lack of sense in olfactory sensation, obtaining a minimum score of 3 from the pain assessment instrument, not using the other fragrance during the study, not using a medicinal or food product that interacts with the rose flower, lack of obstruction and nasal congestion, able to communicate and lack of blindness. Exit criteria included allergy, lack of cooperation of elderly people, acute pain during the study, and elderly people death. In this research, three questionnaires were used to collect data. The questionnaires included demographic information forms for the elderly, McGill's Short Pain Scale and combined numerical and visual pain assessment tool. The Modified Pain Questionnaire consists

of three parts: the first part consists of 15 verbal descriptions in the two main groups (sensory, emotional), which description has specific rating in the range (painless = 0, mild = 1, moderate = 2 and severe = 3). The second part consists of visual pain scale, and the third part is present pain intensity (PPI) in the range (0 = painless, 1 = mild, 2 = painful, 3 = torturous, 4 = horrible, 5 = excruciating), and the patient's total pain is equal to the total score obtained from all sections in different dimensions of pain [22]. The scientific validity of this questionnaire has been evaluated in various studies within the country. In the Tanhaei study in 2011, its validity and reliability were evaluated in patients with irritable bowel syndrome. The questionnaire was evaluated in terms of different dimensions and evidence was provided along with the criterion validity of the tool. The reliability of the questionnaire was evaluated using Cronbach's alpha and split-half methods. The value of the obtained coefficient by split-half method was 0.89 [23]. The reliability of the McGill Short Pain Questionnaire has been reported with Cronbach's alpha coefficient ( $\alpha = 0.75$ ) and ( $r = 0.89$ ) [24]. This tool was also used in Iran by Valiani et al. [25]. In this research, Cronbach's alpha method was used to examine the reliability of the tool. Cronbach's alpha coefficient was calculated 0.94 and the reliability coefficient was calculated higher than 0.91 in all areas (sensory and emotional). The combined numerical and visual pain assessment tool is composed of combining two numerical tools from zero means no pain to 10 means intense pain and visual tool of the Wang Baker's faces. The Wang Baker Face Tool is a range of facial images from happy to sad that the patient chooses one of them according to intensity of the pain. These images are suitable for children and adults. This scale may be helpful in older people, those who have difficulty in speaking, or children or people who are less literate [26]. Each of numerical and visual pain assessment has been used separately in domestic and foreign articles. The scientific validity of the visual pain scale in Iran has been evaluated several times in various studies. In this study, Cronbach's alpha method was used to determine the reliability of the pain combined tool, which cronbach's alpha coefficient was 0.96. After referring to the centers, the informed consent was taken by researcher from subjects after describing the advantages and disadvantages of this method. The selection of research subjects form and pain questionnaires were provided to the elderly people. Elderly people completed the forms themselves with a researcher's description. In the illiterate elderly, the researcher completed the questionnaires. Individuals who obtained the minimum score of 3 from the pain assessment tool were included in the study. The training the way to use extracts was given to each of the research subjects. Accordingly, three drops of rose extract purchased from Barij Essence Company were poured by a researcher by a dropper on a linen handkerchief and pinched with his pin at a distance of 25 cm from the elderly nose and he was asked to breathe normally. Then, they were asked to explain the procedure and implement correctly. After sampling and coordination with elderly people, the extracts along with a dropper and a sheet of explanation of the work and the date of starting to work were provided for them. We used a single day to start the intervention for the concurrent use of extracts, and the elderly people was informed to begin using the extracts since that date. We asked the elderly people to do this once a day (9 pm to 6 am) for three weeks. Once per week (Monday), combined pain assessment scales and once per week (Thursday), McGill pain questionnaire were completed by phone in two groups. The same intervention was performed in the control group, but instead of the rose extract, placebo (sweet almond oil) was used in this group.

### Findings

The results of the study showed that the mean age in the two groups did not have a significant difference. The mean age of the group was  $65.2 \pm 5.1$  in the rose group and  $64.8 \pm 5.4$  in the control group. Chi-square test also showed that there was no significant difference in the distribution of gender in two groups. Based on the results of McGill questionnaire and pain combined tool, the mean chronic pain in the elderly people was moderate. In this regard, the results of Shirazi et al (2015) in Ahwaz showed that the mean intensity of chronic pain was moderate in research subjects [3]. The results of a study conducted by Pereira et al (2011) on 101 elderly people living in the nursing home in Brazil showed that the elderly people had moderate pain intensity [27]. However, in a study conducted in southern Sweden by Bernforta et al (2015), results showed that most elderly people had mild pain [28]. This difference can be due to better welfare facilities provided for Sweden citizens, especially the elderly people. Findings showed that the pain level in the control and intervention groups decreased over time. This reduction in level of pain reduction was higher in the intervention group, but the mean of pain was not statistically significant in the groups studied (Table 1). In other words, this difference was not significant in two groups.

| Pain | Group   | Measurement stages                   |                              |                               |                             | Inter-group variations | Time effect | Group and time interaction | Inter-group variations |
|------|---------|--------------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------|-------------|----------------------------|------------------------|
|      |         | Before intervention<br>Mean $\pm$ SD | First group<br>Mean $\pm$ SD | Second group<br>Mean $\pm$ SD | Third week<br>Mean $\pm$ SD |                        |             |                            |                        |
| Pain | Control | 5.655 $\pm$ 0.349                    | 5.069 $\pm$ 0.316            | 5.069 $\pm$ 0.316             | 4.448 $\pm$ 0.370           | 0.000                  | 0.000       | 0.381                      | 0.360                  |

|  |              |            |            |            |            |  |  |  |  |
|--|--------------|------------|------------|------------|------------|--|--|--|--|
|  | Intervention | 6.258±0.33 | 5.484±0.30 | 5.484±0.30 | 4.677±0.35 |  |  |  |  |
|  | n            | 7          | 5          | 5          | 8          |  |  |  |  |

### Discussion

Based on the results of McGill questionnaire and pain combined tool, the mean chronic pain in the elderly people was moderate. In this regard, the results of Shirazi et al (2015) in Ahwaz showed that the mean intensity of chronic pain was moderate in research subjects [3]. The results of a study conducted by Pereira et al (2011) on 101 elderly people living in the nursing home in Brazil showed that the elderly people had moderate pain intensity [26]. However, in a study conducted in southern Sweden by Bernforta et al (2015), results showed that most elderly people had mild pain [27]. This difference can be due to better welfare facilities provided for Sweden citizens, especially the elderly people

According to the results, the pain intensity score before intervention was higher, while pain intensity score of the pain was different significantly at different times, that is, in first, second and third weeks after aromatherapy, so that the level of pain reduced in elderly people after the intervention significantly, and this reduction was significantly associated with time ( $p = 0.00 < 0.005$ ). The results of this study are consistent with the research conducted by Gharabaghi et al in 2011 with the aim of investigating the healing effect of rose extract on pain after elective cesarean surgery. Their study showed that pain intensity score in the group of rose not only changed and decreased at 3, 6, 12 and 24 hours after surgery [29], but also this reduction had significant relationship with time. However, the present study used inhaling rose was used as aromatherapy, while in the study conducted by Gharabaghi, oral capsules containing rose powder were used before anesthesia. Additionally, the results of this study are consistent with the results of research conducted by Maroufi et al in 2015 with the aim of investigating the effect of rose and aromatic geranium plant aromatherapy on the intensity of postoperative pain in children. Their study showed that the pain intensity score in the group receiving the rose not only changed and decreased at 6.3, 12 and 24 hours after surgery, but also this reduction had a significant relationship with the passage of time [20]. However, the present study was conducted to examine the effect of inhaling the rose extract on chronic pain in the elderly people. However, the study conducted by Maroufi emphasized on the effect of the combined rose and geranium aromatherapy on acute pain in children. In addition, in the present study, pain was reduced in both intervention and control groups over time and there is no significant difference was found between the two groups, which may be due to the effect of the researcher's attention and the good relationship between the elderly people and the researcher. In addition, in relation to aromatherapy with sweet almond oil (the placebo group), the results show that mean score of pain intensity at the baseline (before intervention) was high, which after aromatherapy with sweet almond, the mean score of pain intensity at different times and interventions decreased, and the decrease in pain intensity also had a significant relationship with passage of time. The results of this study were also consistent with the study conducted by Maroufi, in a way that reduced pain was observed in each of the intervention and control groups, but the pain reduction was higher in the intervention group. Sadeghi Avval Shar et al (2014) conducted a study aimed at investigating the effect of aromatherapy with rose oil on primary dysmenorrhea. The results showed that in the first cycle, the reduction in pain intensity was significant in rose oil and massage groups alone. However, pain reduction in rose and almond oil groups was not different significantly. In the second cycle, there was a significant difference in the reduction of pain intensity in rose and almond oil groups and rose oil and massage alone groups [17]. However, in the present study, inhaling aromatherapy was used and in the considered study, massage aromatherapy was used. The intensity of pain in the first cycle decreased in rose almond and groups, but there was no significant difference between the two groups, which is consistent with the present study.

The results of statistical tests on the emotional and sensory dimensions of pain showed that the inhaling rose extract on emotional and sensory dimension was not statistically significant in men and women, but in comparison with the women and men groups in sensory dimension, the results of tests were significant. This means that the sensory dimension of the chronic pain is different between the female and the male group. In other words, the mean sensory dimension of pain in females is more than that of males. However, the inhalation of rose extract on the emotional dimension of chronic musculoskeletal pain in the female and male elderly people was not significant. In other words, the mean emotional dimension of chronic pain in was not significantly different in males and females. In other words, the emotional dimension of chronic pain is not different between the female and the male groups.

As defined by the International Association for the Study of Pain, the sensory dimension refers to pain severely [4]. It seems that the reason for the difference in the sensory dimension of pain between males and females is due to changes in the hormones that occur in women after menopause. These changes will lead to connective tissue weakness, which is muscle weakness and osteoporosis are its clinical complications. It also causes pressure on musculoskeletal structures and stimulates the mechanical and chemical receptors of the pain, and the person will feel pain. Additionally, the psychological changes after menopause can be considered as one of the reasons for the higher prevalence of pain in elderly women than that in elderly men. These changes lead to a reduction in the capacity and threshold of irritability [30]. The study conducted by Shirazi et al (2015) in order to determine the prevalence and characteristics of chronic pain in the elderly people of Ahwaz showed that the intensity of chronic pain in women is more than that of men, which is consistent with our study. This can be explained by Kraft vulnerability theory, since, according to this theory, women are more vulnerable to musculoskeletal and musculoskeletal pain than men [3]. Chen et al (2010) also concluded in their study that the prevalence of chronic pain was higher in older women in the United

States that [31]. In this regard, new studies have shown that sex hormones play a role in pain feeling, as the testosterone hormone increases the threshold for pain stimulation and vice versa, and the estrogen hormone increases the feeling of pain. At the same time, studies have shown that women's ability to overcome pain and manage it is higher compared to men [32]. The study of Fania Cristina et al (2015) was conducted to investigate chronic pain in the elderly people (over 80 years old). The results showed that chronic pain among elderly women is more prevalent than that in men, which is consistent with the present study [33].

As defined by the International Association for the Study of Pain, the emotional dimension of pain is defined as the level of pain experienced by an individual [4]. It seems that lack of difference in the emotional dimension of pain between males and females is due to the same mental experience and a similar degree of dissatisfaction among men and women. It seems that the amount of dissatisfaction that causes pain in people is dependent from same gender differences. The manifestation of pain and expressing pain intensity are different between the two genders. Men have the level of dissatisfaction as women have, but they express it less compared to women because of reasons such as a greater sense of strength and a less sense of weakness. However, women report the pain more to draw the attention and receive greater support.

### Conclusion

Findings of this study suggest the effectiveness of aromatherapy with rose and sweet almond oil as a placebo in reducing chronic musculoskeletal pain in elderly people during three weeks. This effectiveness has been largely close in intervention group received rose and control group received sweet almond oil. Lack of significance of results of comparing the pain intensity in these two groups might be due to similarity of substances in these two fragrances in terms of medicinal plant and same attention of researcher to elderly people in both groups. One of the effective and almost uncontrollable factors in this research is the researcher's relationship with research subjects. Everyone needs to be supported by their relatives, and this need is more pronounced in the elderly people. As research has shown, the presence or absence of supporters and the empathy of care providers can affect the level of pain. This study also received positive responses from the elderly people due to paying attention and ongoing contacts with the elderly people from the beginning of the study that started with delivery of extracts to the homes of the elderly people, and it seems that this factor was effective reporting the level of pain in providing information to the researcher. In addition, elderly people often fail to express their pain due to poor communication with others. Additionally, elderly people are a group of people who view the view from another angle. These people might report the pain more to draw the attention of others or report it less as they consider it as natural phenomenon of the old age.

According to the results of this study, it can be said that using aromatherapy with rose as a non-drug strategy along with other therapeutic methods reduces the intensity of pain and causes relaxation in the elderly people. As it is a simple, non-risky, and cost-effective method, its use is recommended.

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