The effect of aromatherapy hand massage on pain level and vital signs in elderly people with chronic non-malignant pain

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Abstract

Objective: The aim of this study is to determine the effect of aromatherapy hand massage on pain level and vital signs in elderly individuals with chronic non-malignant pain.

Background: Chronological aging accompanied by different factors exacerbate chronic pain which makes the senior population prone for various complications. Thus, the medical community is forced to seek safer and easier alternative treatments.

Material and Method: 66 elderly individuals with chronic non-malignant pain who had visited an algology outpatient polyclinic university hospital in Izmir, Turkey between 01 May 2019 - 30 August 2019 and met the sampling criteria have been randomly selected into aromatherapy, placebo and control groups. Data collection was carried out using Individual Diagnosis Form, Visual Analogue Scale and Brief Pain Inventory. Before and after intervention, data collection forms were filled and pain level and vital signs were evaluated.

Results: The mean age of the elderly individuals in the study was 73.74 ± 6.257. Participants pain severity after aromatherapy decreased by 42.24%. When comparing vital sign pre-post procedure; systolic blood pressure value for the placebo group was significantly lower. Right after intervention, pulse rate was significantly lower in aromatherapy and placebo groups while post intervention body temperature in aromatherapy group was found to be higher and statistically significant.

Conclusion: This study has shown that aromatherapy hand massage is effective on lowering pain level and positively influencing vital signs of elderly individuals with chronic non-malignant pain. Considering these beneficial effects, aromatherapy massage can be used as an independent nursing intervention in elderly individuals who are suffering from chronic pain.

Relevance to Clinical Practice

Aromatherapy massage can be considered as a safe solution to manage chronic pain for the elderly population with nurses who are fully aware of the holistic modality.

KEYWORDS: aromatherapy, elderly, massage, pain, vital signs

1. Introduction

One of the biggest changes seen in the twenty-first century is the large increasing rate of the elderly population. According to the World Health Organization's report, the number of individuals over the age of 60 is expected to reach two billion by the year 2050. In the same year, 434 million senior individuals are estimated to be over the age of 80 years old (WHO, 2018). Despite advances in modern medical science and health-oriented lifestyle changes, there is insufficient evidence that show the modern elderly society is healthier than the previous generation (WHO, 2018; Segue Technologies, 2015), since they continue to suffer age related illnesses like chronic pain (Dziechciaz, Balicka & Filip, 2013). 50% of elderly population who live in the community are suffering from chronic pain while this number rises to 80% for those who live in nursing homes. It is also reported that 48.8% of senior individuals seek medical help due to pain related complains and out of this people 19% state to experience sever pain level (Pateinakis, Amygdalas, Pateinaki & Pyrpasopoulou, 2013; Jones et al., 2016). Secondary to chronic pain elderly people are facing complications like anxiety, depression, anorexia, loss of body weight and impaired mental functions. Moreover, it negatively affects their functionality, quality of life and social activities (Pateinakis Amygdalas, Pateinaki & Pyrpasopoulou, 2013; Karp, Shega, Morone & Weiner 2008; Wahle & Schwenke, 2013). Conventionally used pharmacological methods may not always be suitable to treat elderlies' chronic pain, as serious complications and side effects such as excessive sedation and confusion can take place (IASP, 2018; Paladini, Fusco, Coaccioli, Skaper & Varrassi, 2015). For this reason, it becomes crucial for the medical world to turn towards non-pharmacological alternative treatments like aromatherapy, as these methods have the ability and capacity to alleviate chronic pain and associated syndromes without side effects (Paladini, Fusco, Coaccioli, Skaper & Varrassi, 2015; Simpson, 2015). Besides to its other countless benefits aromatherapy has many physical and psychological benefits; It reduces muscle tension and minimizes pain and decreases stress and stress-related symptoms by providing relaxation.

Combining aromatherapy with the M technique hand massage, can give satisfactory results, as this massage technique is an extremely soft, comfortable and relaxing massage type that can be applied to even the most fragile patient; which makes it the perfect choice to handle chronic pain in the elderly community (Fellowes, Barnes & Wilkinson, 2004; Buckle, 2008).

2. Background

Chronic geriatric pain is an unpleasant sensory and emotional experience due to actual or potential tissue damage seen in old (65-79 years old) or very old (80 years and over) individuals with pain complaints for more than three months (Kaye, Baluch & Scott, 2010). Among the most prominent pain origins in older adults are: lower back or neck pain (65%), musculoskeletal pain (40%), peripheral neuropathic pain (40%) and chronic joint pain (20%) (Molton & Terrill, 2014). Histological aging accompanied by physiological, psychological and environmental changes are the main factors that exacerbate persistent pain. Changes in parts of the brain necessary for pain perception occur with normal aging, especially with loss of brain volume in the prefrontal cortex and hippocampus (Boehm, Büssing & Ostermann, 2012) making older people more dependent on C fibre for the perception of morbid stimulants. The number of myelinated and non-myelinated nerve fibres decreases at such a level that the transmission of stimuli is compromised (Metin & Özdemir, 2016). Age-related differences in pain perception may also be due to reduced functioning of endogenous pain modulatory mechanisms, particularly dopaminergic neurons in the basal ganglia (Boehm, Büssing & Ostermann, 2012).

Chronic pain may also cause excessive pain sensitivity because of abnormal spinal nociceptive process secondary to repetitive activation, moreover, experiencing constant and extreme pain can lead to mood changes like reactive depression, anxiety or sleep disturbances that exacerbates severe pain perception accompanied with discomfort (Initiative, 2018).

According to epidemiological studies, with the increment of chronological age the prevalence and threshold of pain also increases, even although pain tolerance for women remains the same or decreases, they are more likely to report persistent pain compared with their counterparts (Carrion, 2012; Farlex, 2012; Boehm, Büssing & Ostermann, 2012). However, based on some evidence, an elderly person may have poor pain tolerance for an extended period of time after tissue injury (Boehm, Büssing & Ostermann, 2012). This is where aromatherapy comes, being part of an alternative medicine that involves a holistic approach using essential oils and some aromatic herbs to relives pain. The healing power of aromatherapy has been used by different civilizations for almost 6000 years (Nordqvist, 2017). This natural and gentle form of treatment can access the human body through inhaled scent molecules that activate the limbic system, an area in the brain that plays an important role for emotion and behaviour. It can also be applied as a topical massage

which gives soothing and relaxing feeling by stimulating the nervous system that regulates heart rate, blood pressure, stress and breathing patterns.

On top of all the benefits, easy application, low cost and low side effects are some of the reasons aromatherapy is accepted as complementary and integrative medicine (Louis & Kowalski, 2002).

Aromatherapy has many physical and psychological benefits; It reduces stress and stress-related symptoms by providing relaxation, reduces the side effects of treatments, muscle tension and minimizes pain (Fellowes, Barnes & Wilkinson, 2004). There are so many other studies that proved the positive effects of aromatherapy on depression, anxiety, knee and arthritis pain, abdominal pain, constipation, severity of gastrointestinal symptoms and self-confidence (Rho, Han & Kim, 2006; Yip & Tam, 2008; Kim et al., 2005; Lämås, Lindholm, Stenlund, Engström & Jacobsson, 2009).

M technique hand massage is a unique choreographed method that follows certain type of movement, pressure and pace which is custom made for the most fragile patient. That is why it has been described as "physical hypnotherapy", "spiritual dance" and "the foundation of nursing" (Buckle, 2008).

3.Material and Methods

3.1. Study design

This research study was designed as a randomized placebo-controlled clinical trial.

3.2. Population and sampling

66 elderly individuals with chronic non-malignant pain who had visited the Algology polyclinic of a university hospital in Izmir-Turkey between 01 May 2019 - 30 August 2019 and met the sampling criteria had been randomly selected into aromatherapy (n = 22), placebo (n = 22) and control (n = 22) groups. Individuals who were included in this research were age 65 and above, must have chronic non-malignant pain for at least three months, should not have cognitive impairment, must be able to answer questions independently and those who have agreed to be part of the study were

included in the sample. In the contrary, patients with dermatological problems, swelling, sign of inflammation, neuropathy or loss of sensation and deformity on their hands and/ or arms were excluded from the study. Moreover, cancer patients and those who had allergic to lavender oil were also excluded. Initial pilot study was performed with total of 6 elderly patients, 2 individuals from each group. Sample size was determined via G-power statistical analysis with 95% confidence and 80% theoretical power.

3.3. Data collection tools

Data were gathered as patient information form, visual analogue scale (VAS), brief pain inventory and vital signs which were collected by a single researcher via face-to-face interview.

3.3.1. Patient information form

The individual identification form was created by the researchers in the light of information collected from the literature. It was divided into 3 different parts; the first part contained sociodemographic characteristics such as age, gender, educational status, occupation, social security, marital status, and number of children. The second part was regarding health-related characteristics such as duration of chronic pain diagnosis whether or not it had been treated, what treatment modality was applied, how long the pain complaint had lasted, the presence of other accompanying illnesses, and general state of health. The third part vital signs; blood pressure was measured with Omron digital arm meter sphygmomanometer, pulse rate as well as respiratory rate were counted and evaluated for one whole minute, and body temperature was recorded using infrared thermometer.

3.3.2. Visual analogue scale

The visual analogue scale (VAS) is a subjective measure for the level of pain consisting of 10cm horizontal or vertical line, with "0" indicating no pain at one end while "10" indicates very severe pain at the other end. Patients mark the point that corresponds to the pain he/she was experiencing during the interview. This scale is a very sensitive method that helps to evaluate pharmacological and non-pharmacological treatments that reduce pain (Uyar & Yıldırım, 2010).

3.3.3. Brief pain inventory

Wisconsin Short Pain inventory was developed to evaluate pain status of individuals with cancer or chronic diseases. It consists of 15 items and each item takes a value between 0-10. The lowest score obtained from the brief pain inventory indicates that there is no pain in the last 24 hours, 1-3 points indicate mild pain in the last 24 hours, 4-7 points indicate moderate pain in the last 24 hours, and 8-10 points indicate severe pain in the last 24 hours (Sritoomma, Moyle, Cooke & o'Dwyer, 2014). The validity and reliability study of the brief pain inventory for patients with chronic non-malignant pain in Turkey was conducted by Yıldırım et al. (2019).

3.4. Interventions

3.4.1. Aromatherapy group

Initially all the necessary information was given to those who were willing to participate in our research, after that a written and verbal consent was obtained from the eligible elderly patients, questioners were filled followed by aromatherapy M technique hand massage prepared as 12 drops of lavender essential oil mixed in 30 ml of carrier oil (Aroma web., 2019; Denis Brown Essential Oils, 2019) was applied for 10 minutes on both hands and arms. Within 10-15 minutes post aromatherapy massage VAS and vital signs were re-assessed.

3.4.2. Placebo group

A similar procedure like the aromatherapy group was followed for the participants in this group, except that an odourless baby oil was applied instead of lavender essential oil.

3.4.3. Control group

The elderly individuals who met the inclusion criteria were informed about the study while written and verbal consent was obtained when they agreed to participate in the study. No intervention was done other than the routine hospital management. But pre-post data were collected within 10-15 minutes time interval.

3.5. Data analysis

The analysis of the data obtained from the study was carried out via Statistical Package for Social Science (SPSS) package program. In the data analysis; Descriptive statistics number and percentage measurement of data were shown with mean and standard deviation values. For the independent samples; t-test, one-way analysis of variance, Pearson correlation analysis, chi-square, Kruskal Wallis, Wilcoxon, Friedman and Mann Whitney U tests were used. The results were evaluated at 95% confidence interval and $p < 0.05$ significance level was accepted.

3.6. Ethical consideration

Approval to conduct the research was obtained(19-4.1T/26) from Ege University faculty of medicine clinical research ethics committee. Written and verbal consent were obtained from the elderly patients participating in the study after the researcher stated the intention of the study.

4. Results

The mean age of participants in the aromatherapy, placebo, and control groups was 73.14±5.540, 74.05 ±6.275, and 74.05 ±7.108 years, respectively. It was found that out of all the participants only 9.1% were illiterate: while the majority (68.2%) have middle school level education that is 77.3% in the aromatherapy group, 63.6% in the placebo and control group respectively (Table 1). No statistically significant difference was found between the aromatherapy, placebo, and control groups in terms of age, gender, marital status, educational status, duration of chronic pain diagnosis and cigarette consumption ($P > .05$, Table 1).

In our study, a statistically significant change was found in the median pain scores of patients with chronic pain in the aromatherapy and placebo groups; whereas no statistically significant change was found in the control group respectively (P=.000; P=0.011; P=0.317). Nonparametric analysis was used to evaluate the VAS measurement median values to determine pain level as it was not compatible with normal distribution. Decrease in pain intensity of elderly individuals was evident in

both the aromatherapy and placebo groups. In the experimental group post- aromatherapy M technique massage with lavender essential oil, median pain intensity level has decreased drastically from 4.5 to 2.0. In other words, participants pain severity after aromatherapy procedure decreased by 42.24%, in the contrary only 23.94% declination of median pain level was seen in the placebo group (Table2).

When it comes to the vital sign values; body temperature (p=0.003) and pulse rate (0.029) in experimental group were found to be statistically significant, even though systolic as well as diastolic blood pressure values in aromatherapy group were not statistically significant but clinically decreased medial scores were observed after the application of aromatherapy massage. Post procedural measurements of systolic blood pressure and pulse rate values for the placebo group were statistically significant respectively (P=0.035; P=0.008) (Table 3).

5. Discussion

Prior to the modern understanding and use of aromatherapy, it used to be part of the human life utilised for different purposes throughout history by various civilizations that extended for the past 5000 years (Gnatta, Kurebayashi, Turrin & Da silva, 2016; Donovan, 2018). Some of the most commonly used purposes of aromatherapy massage was, to relive muscular and joint related pain or/and for physical and/or mental stress (Yvette, 2017; Yellow Page, 2018). Therefore, combining essential oil with massage provides a high level of therapy and psychological relaxation not to mention relief from chronic persistent pain (Yvette, 2017; Yellow Page, 2018; Mevei New York, 2017). There are too many similar researches regarding the extraordinary effect as well as benefits of aromatherapy using lavender oil and other essential oils to relive different types of chronic pain for various age groups.

For instance, in a research done by Nasiria, Mahmodi & Nobakhtc (2016) assessing the effect of aromatherapy massage with lavender essential oil on pain for patients with knee osteoarthritis, lavender oil was used for the aromatherapy group. On the other hand, almond oil was applied for the placebo group while no intervention was done for the control group. Participants pain level was

evaluated using visual analogue scale at baseline, immediately after intervention, 1 and 4 weeks after the intervention respectively. The obtained result showed that pain severity has significantly declined in the aromatherapy group compared with the other two groups. In another similar study by Sritoomma, Moyle, Cooke & o'Dwyer (2014) that compared the effect of aromatic massage versus Thai massage on chronic lower back pain in older adults, with each massage sessions lasting for 30 minutes twice a week for 5 weeks. VAS was used to measure short term (6 weeks) and long term (15 weeks) pain level after the intervention. The study's outcome showed that the participants who received aromatic massage had significantly reduced pain level with a better result.

In a research that aimed to assess the efficacy of aromatherapy in relieving pain in community dwelling Chinese elder people; in the intervention group participants received 20 minutes tailor-made massage with a combination of lavender, sweet marjoram and eucalyptus oil twice a week for 4 weeks. Post Intervention visual analogue scale (VAS) of subjects in the experimental group exhibited reduced pain level though the differences were not statistically significant (Paul, Suen & Ho, 2017). In another study that evaluated the effect of aromatherapy on joint pain and depression among elderly women, to whom aromatherapy massage was given between 15-20 minutes per day for 10 consecutive days. Universal pain assessment scale was used to evaluate pre-post pain intensity, the result reviled statistically significant decreased mean score of pain level (Vanaja, 2015)

On a research conducted in Turkey that assessed the effects of aromatherapy massage on pain, functional state, and quality of life in an elderly individuals with knee osteoarthritis by Pehlivan & Karadakovan (2019), senior participants were divided into three groups. The aromatherapy group received massage with a combination of 3 essential oils (black seed oil, ginger, and rosemary) and placebo group received massage with only sunflower oil. Participants in both groups received a total of six massage sessions twice a week for 3 weeks whereas no implementation was done for the control group. Data were collected in week 0, 4, and 8 and visual analogue scale (VAS) was used to determine the level of pain as an inclusion criteria and Pain and Functional Score (WOMAC) was used to evaluate pain progress after intervention. The result showed that the aromatherapy group pain scores were lower than the placebo and control groups in week 4 and these differences were statistically significant. The findings in week 8 showed that aromatherapy massage has more favourable and longer sustained effects than just a massage without aromatherapy.

In another research that investigated the effect of black cumin oil on pain for osteoarthritis geriatric individuals, in which participants in the experimental group were instructed to rub the oil on their knees 3 times a week for 1 month. Meanwhile, patients in the control group carried out their usual hospital routine. The VAS result showed that patients in the experimental group had significantly decreased pain level after the intervention (Tuna, Babadağ, Özkaraman & Alparslan, 2018).

Typically, risen body temperature is expected after application of body massage. Moreover, the different types of aromatherapeutic oils used during massage are known to have numerous positive effects on the body (Yi, 2001; Kavitha, 2013; Eguchi et all., 2016). Some of the literatures have similar results like in our study in which increased body temperature was observed after intervention whereas in other studies no change was recorded. On a research carried out by Cinar, Eşer and Khorshid (2009) that assessed the effect of back massage on vital sign and anxiety level of elderly individuals living in nursing home, arranged the participants in a single experimental group in which they received 10 minutes of back massage with baby oil for 3 days. Vital signs were recorded right before intervention and immediately after back massage, 15 and 30 minutes afterwards. The obtained results showed significantly decreased vital signs except for body temperature. In another research that studied the effect of kyongrak massage in elderlies with chronic pain, increment of body temperature was seen while systolic blood pressure decreased significantly after the elderly participants received Kyongrak massage on their neck, spinal cord, upper and lower extremities as well as back for 25 minutes daily for a duration of 5 days (Yi, 2001).

In a study by Kim et al. (2016) that assessed the effects of hand massage with nail art on depression, self-esteem and vital signs of elderly women living in a nursing home, participants received hand massage with nail art for 10 minutes in which data were collected before, shortly after the hand massage with nail art and one week later. After comparing the pre-post test results following the intervention, statistically significant risen body temperature and decreased diastolic blood pressure were observed while systolic blood pressure and pulse rate had no significant difference as to pre-intervention values.

In a research carried out to evaluate the effect of hand and foot surface stroke massage on anxiety and vital signs in patients with acute coronary syndrome, participants in the intervention group received massage using almond oil for total of 20 minutes while participants in the control group have not had any type of intervention. Vital signs were recorded 30 minutes before intervention,

immediately after, 60 minutes and 90 minutes after the massage, statistically significant results were obtained after massage intervention regarding blood pressure, heart rate and respiratory rate (Alimohammada, Ghasemi, Shahriar, Morteza & Arsalan, 2018). Similar result was obtained in our research, as in the aromatherapy and placebo groups, pulse rate was statistically significant and decreased heart rate mean value was obtained in both the groups after massage intervention.

When it comes to the respiratory rate value of participants in our study groups, unlike some literatures none of the three groups' results were statistically significant nor there was significant difference when comparing pre-study values This result, is believed to be due to the short time interval between massage and post massage data collection as well as the short massage session can be mentioned.

A crossover randomized controlled trial research was carried out to assess the effect of aroma foot massage on blood pressure and anxiety in Japanese community-dwelling elderly individuals. After randomly dividing participants into 2 intervention groups based on age (<50years old; >50years old) as well as systolic blood pressure values (<130mmHg; >130 mmHg), participants were instructed to massage their feet for 45 minutes 3 times per week for 4 weeks using mixture of several essential oils (lavender, chamomile, sandalwood, ylang-ylang and marjoram were blended with jojoba oil). Data were collected at the base line, 4-week and 8-week follow up, the obtained results showed that aromatic foot massage has significantly decreased the mean systolic and diastolic blood pressure (Eguchi et al., 2016). The reason for the different results from our study is thought to be because participants applied the massage themselves that allowed them to avoid the stress of white coat syndrome which is known to be a source for increased blood pressure (Holland, 2017). Moreover, the fact that half of the participants were under the age of 50 and also received massage 30 minutes longer than our study might be other crucial factors.

In another similar study that assessed the effectiveness of foot massage up on the level of blood pressure among elderly patients with hypertension by Kavitha (2013), participants were divided into intervention and control groups in which blood pressure was measured before and after massage. The obtained result showed decreased systolic and diastolic blood pressures values post intervention. In this study, participants received 20 minutes of massage for two consecutive days,

whereas in our research massage was applied only once for 15 minutes this could be the main reason for the inconsistent outcome.

A research that compared the effects of two Swedish massage techniques on the vital signs and anxiety of healthy women in which first group of participants received massage on their back, neck, and chest while the second group got leg, arm, and face massage that lasted for three times per week for total of 14 weeks period. The result showed decrease systolic blood pressure, pulse rate, and respiratory rate (Motlagh, Jouzi & Soleymani, 2016). Regularly applied massage is known to increase relaxation therefore it has positive effect on the vital sign (Olney, 2005), but in our research massage session was only done once for 15 minutes, we believe that this might be the main factor for the incompatible results.

5.1. Limitations

The results are restricted by the study period and number of patients, the fact that a single researcher conducted the study in only algology unit can also be seen as a limitation. Moreover, male patients who visited the medical unit where the research too place, were very limited in number.

6. Conclusion

The low cost, non-invasive and easily applicable aromatherapy massage should be popularized to manage pain intensity level and pulse rate in elderly individuals with chronic non-malignant pain.

Similar studies based on complementary alternative therapies should be repeated with different sample groups by extending the frequency and duration of aromatherapy massage. Furthermore, health care providers need to apply and integrate aromatherapy into their policies as part of routine health service.

7. Relevance to Clinical Practice

Elderly people not only experience and suffer from non-malignant chronic pain at some point in their lives but might also get unwanted outcomes from pharmacological treatments, thus application

of aromatherapy massage can be considered a solution with nurses who are fully aware of this holistic modality. Health care facilities like nursing homes, intensive care units and palliative care centres can integrate aromatherapy massage as part of their daily treatment routine to relive chronic pain.

8. Conflict of interest

We declare that authors have no conflict of interests.

9. Founding - No founding

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What does this paper contribute to the wider global clinical community?

- This study explores chronic pain, the benefites and effects of aromatherapy massage for the eldelry community.
- Popularizing non-invasive, cheap and easily applicable aromatherapy massage to manage pain intensity for the senior population in health care facilities like nursing homes, intensive care units and palliative care centres should be considered to be included in the policy of health care provideres.

TABLE 1. Homogeneity Test of Baseline for Participants (n=66)					
Features	**Aromatherapy Group n=22**	**Placebo Group n=22**	**Control Group n=22**	**TOTAL n=66**	**P**
	$\overline{X} \pm SD$	$\overline{X} \pm SD$	$\overline{X} \pm SD$	$\overline{X} \pm SD$	
Age	73.14±5.540	74.05 ±6.275	74.05 ±7.108	73.74 ±6.257	**0.911**
Chronic pain duration	81.41 ± 9.327	63.36 ±7.495	87.82±13.22		0.832
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Age Group					
65-74 old	11(50)	11(50)	13(59.1)	35(53.0)	
75-84 old	11(50)	10(45.5)	7(31.8)	28(42.4)	0.911
≥ 85 old	-	1(4.5)	2(9.1)	3(4.5)	
Gender					
Female	12(54.5)	11(50)	10(45.5)	33(50)	0.836
Male	10(45.5)	11(50)	12(54.5)	33(50)	
Marital status					
Married	12(54.5)	17(77.3)	14(63.6)	43(65.2)	
Single	-	1(4.5)	1(4.5)	2(3.0)	0.161
widow	7(31.8)	4(18.2)	7(31.8)	18(27.3)	
Divorced	3(13.6)	-	-	3(4.5)	
Educational status					
Illtreat	1(4.5)	1(4.5)	4(18.2)	6(9.1)	
Primary-middle	17(77.3)	14(63.6)	14(63.6)	45(68.2)	0.278
Highschool	1(4.5)	3(13.6)	2(9.1)	6(9.1)	
University	3(13.6)	4(18.2)	2(9.1)	9(13.6)	
Social security					
Yes	20(90.9)	21(95)	21(95)	62(93.9)	
No	2(9.1)	1(4.5)	1(4.5)	4(6.1)	0.769
Profession					
Office worker	1(4.5)	-	-	1(1.5)	
Labourer	3(13.6)	-	1(4.5)	4(6.1)	
Farmer	-	1(4.5)	2(9.1)	3(4.5)	
Retired	8(36.4)	11(50.0)	8(36.4)	27(40.9)	0.706
Self-employed	3(13.6)	1(4.5)	3(13.6)	7(10.6)	
Housewife	6(27.3)	7(31.8)	7(31.8)	20(30.3)	
Other	1(4.5)	2(9.1)	1(4.5)	4(6.1)	
Children					
Yes	22(100)	19(86.4)	22(100)	63(95.5)	0.098
No	-	3(13.6)	-	3(4.5)	
Smoking					
Yes	3(13.6)	-	2(9.1)	5(7.6)	
No	16(72.7	19(86.4)	16(72.7)	51(77.3)	
Quitted	3(13.6)	3(13.6)	4(18.2)	10(15.2)	0.652

TABLE 2. Pain severity VAS Medians Measurement in Aromatherapy, Placebo and Control Groups

Pain Level (VAS)	Aromatherapy Group (n=22)		Placebo Group (n=22)		Control Group (n=22)	
	$\overline{X}$ (SD)	$\overline{X}'$ (Min±Max)	$\overline{X}$ (SD)	$\overline{X}'$ (Min±Max)	$\overline{X}$ (SD)	$\overline{X}'$ (Min±Max)
Pre-massage	4.64 (3.32)	4.5 (0-10)	5.68 (3.09)	5.0 (1-10)	5.36 (3.29)	5.5 (0-10)
Post-massage	2.68 (2.63)	2.0 (0-9)	4.31 (3.41)	4.0 (0-10)	5.27 (3.18)	5.5 (0-10)
Statistical Test, p	Z=-3.658 **p=0.000**		Z= -2.534 **p=0.011**		Z= -1.000 p=0.317	
	CP*=-42.24%		**CP*=-23.94%**		CP*=-1.68%	

Z: Wilcoxon Statistics Test; $p<0.05$ significance level; CP*: change in percentage; VAS: visual analogue scale

TABLE 3. Comparison of vital Sign in Aromatherapy, Placebo and Control Groups			
Vital Signs	**Aromatherapy Group(n=22)**	**Placebo Group (n=22)**	**Control Group (n=22)**
Body Temperature *Preprocedural* *Postprocedural*	36.82±0.22 36.91±0.23 Z=-2.980 **p= 0.003**	36.88±0.17 36.88±0.22 Z=0.000 p= 1.000	36.87±0.26 36.89±0.27 Z=0.835 P= 0.404
Pulse Rate *Preprocedural* *Postprocedural*	81.27±11.69 79.14±10.70 Z= -2.182 **P=0.029**	75.45±12.55 72.23 ±12.79 Z= -2.639 **P=0.008**	72.14± 10.77 71.64 ±11.16 Z= -0.956 P= 0.339
Respiratory Rate *Preprocedural* *Postprocedural*	17.64±3.19 17.50±3.17 Z= -2.75 P= 0.783	16.1± 3.47 16.27±2.91 Z= -2.75 P= 0.783	18.0±3.12 18.0±3.36 Z= -0.9122 P= 0.903
Systolic Blood Pressure *Preprocedural* *Postprocedural*	135.73±19.65 129.545±12.80 Z=-1.526 P=0.127	140.91±22, 26 135.05±22.09 Z=-2.113 **P=0.035**	136.14±23.61 131.23±22.20 Z=1.919 P=0.055
Diastolic Blood Pressure *Preprocedural* *Postprocedural*	76.36 ±10.84 75.00 ±9.16 Z= -0.54 P= 0.589	79.09±10.92 77.68±11.90 Z= -1.210 P= 0.226	75.05 ±11.12 73.64±11.06 Z= -1.322 P= 0.186
Z: Wilcoxon test; P<0.05 significance level			