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Effectiveness of Aromatherapy on Pain and Anxiety among Burns Patients at Public Hospital of Karachi

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ABSTRACT

Aromatherapy is a safe supplement to reduce the pain and anxiety among burn patients. **Objective:** To determine the effectiveness of aromatherapy on pain and anxiety among burn patients at a public tertiary care teaching Hospital, Karachi, Pakistan. **Methods:** A quasi-experimental design was employed, on participants of both genders aged between 18-54 years and had burns that were less than 40% Total Body Surface Area. The sample size for this study was calculated through Open Epi version 3.0 with a proportion formula and the calculated sample size was 88. Two open accessed questionnaires Pain and Anxiety Symptom Scale (PASS-20) and Visual Analogue Scale (VAS) was used to collect the data. Wilcoxon signed-rank test was used to test the effect of the intervention (8.00 to 5.75). **Results:** The results showed that aromatherapy significantly reduced post-intervention pain (p-value0.001).The sub-scale "cognitive", "escape avoidance", and the global PASS score was significant after intervention with P-values <0.0001, 0.039, and 0.025 respectively. The mean scores of PASS in all sub-scales and the global score was significantly decreased after the intervention with a large effect size (r>0.5) using Cohen's (1988) criteria. **Conclusions:** The findings suggested that aromatherapy was a safe supplement to reduce the pain and anxiety among burn patients. Nurses can use at the clinical practice to enhance the use of aromatherapy by which the pain and anxiety can reduce among burn patients.

INTRODUCTION

Burn injuries result in excruciating agony, which is made worse by a number of variables including wound healing, physical therapy, and other invasive procedures [1]. Burn pain is an intense pain that follows an injury and is regarded by sufferers as one of the worst types of pain. Throughout the course of treatment, burn pain persists at varying intensities and, in certain situations, may develop into chronic pain. While the size and severity of the burn injury at the outset are directly associated to pain, other treatment modalities, the presence of infection, rehabilitation techniques, and the psychosocial milieu in which the patient is located all influence pain to differing degrees [2]. An anxious patient is not capable of caring of them and therefore relies on others (nurses and medical staff) to do so, which could also extend hospitalization and increase costs of care [3]. Analgesic drugs and sedatives are commonly used to treat pain and anxiety in patients who have complications such as bleeding, nausea, drowsiness, or respiratory problems [4]. Non-pharmaceutical intervention is also beneficial for the patients who do not respond well to pharmacological intervention or who had an experience regarding the side effects of medication and are cautious to take medicine [5]. Aromatherapy is a simple, safe and easy way to incorporate it into nursing practice for pain and anxiety management [6]. Aromatherapy combined with massage has been shown to decrease anxiety and pain, with some positive consequences identified for the normal mood and reducing stress [7]. An exploratory study, case analysis, and anecdotal reports support the advantages for patients

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and lay the groundwork for future studies. There are countless chances for aromatherapy research in whole-person care to promote well-being, healing possible uses for infection control, wound healing, menopause, and inflammation are particularly promising [8]. It is regarded as a holistic nursing intervention that can assist nurses in reducing pain and anxiety [9]. Aromatherapy also has effect on parasympathetic nervous system to alleviate the symptoms of pain and anxiety [10].

Therefore, this study was designed to evaluate the effectiveness of aromatherapy on pain and anxiety among burn patients.

METHODS

Quasi experimental design was utilized and the study was carried out at the Dr. Ruth K.M Pfau Civil Hospital Karachi. The study was completed in two months (August to October 2021) after the approval from Ethical Review Committee (ERC) and institutional permission with ERC reference number: 4290921AHNUR. The target population was all burn patients with the burn percentage of mild to moderate with low Body surface area, < 40% Total Body Surface Area (TBSA) or less as per "rule of nine". Burns patients who were affected from any type of burn like by Fire or flame, heat or radiation, radioactivity, electricity, friction or contact with chemicals were selected. The sample size was estimated using (OpenEpi info program version 3.0), using the Confidence Interval (CI) 95% power of study 1-β=80% and sample size was 88. Participants were divided into two groups, aromatherapy was administered exclusively to the interventional group, the control group received comprehensive standard care. The control group received standard care, which included routine medical treatment, medications, and analgesics as per hospital policy, while the interventional group received aromatherapy. The computed sample size for both groups was 44/44, based on a mean difference of 6.43, before and after aromatherapy intervention for lowering pain and anxiety among burn patients. The percentage of burns and the location of burns were obtained from hospital records and confirmed through patient reports during the initial assessment. This data was collected as part of the demographic and clinical information recorded for each participant at the start of the study. A Consecutive sampling technique was used to recruit the participants in the study. As a research instrument, a two-part questionnaire was used to collect data. The first section contained demographic information about patients, as well as disease information, such as the proportion of burns, history of burns, location, and cause of burns. The second sections contain Visual Analog Scale (VAS) and Pain and Anxiety Symptom Scale (PASS-20) to calculate patients' pain and anxiety levels [11]. The highest core indicates the severe level of anxiety experienced by the target group. The VAS score questionnaire employs numbers that correspond to the severity of pain they were experiencing. Participants were divided into two groups: the intervention group and the control group, based on their assigned wards in the burn unit. The control group received routine care, including wound care and standard analgesics per hospital policy. The intervention group received the same care along with aromatherapy using lavender oil, applied twice daily for 15 minutes over two days. Aromatherapy involved placing seven drops of lavender oil on a cotton ball positioned 20 cm from the patient's nose. This intervention duration was limited due to COVID-19 restrictions, reducing hospital stays. Data on pain and anxiety levels were collected before and two days after the intervention. Patients on regular analgesics were included, but those requiring high-dose pain medications were excluded. The Statistical Package for Social Sciences (SPSS) version 23.0 was used to analyze data. The numeric variables were expressed as mean ± standard deviation; the categorical variables were represented as frequencies and percentages. Wilcoxon signed-rank test was used to compare pain and anxiety scores in each group before and after the intervention was implemented. For all tests, the P-value of ≤ 0.05 was considered statistically significant.

RESULTS

Table 1 showed that most of the participants in both groups were aged between 18 to 30 years. The majority of participants were married, had matriculation level education, and was laborers by profession. Burn locations among participants were: Intervention group - lower trunk + multiple areas (6.81%), lower trunk (2.27%), upper trunk + multiple areas (65.90%), upper trunk (25%); Control group - lower trunk + multiple areas (15.90%), lower trunk (2.27%), upper trunk + multiple areas (54.54%), upper trunk (27.27%). All the participants did not document any type of allergy (Table 1).

Table 1: Demographic Characteristics of the Study Participants in Control and Interventional Groups

Groups	Control N (%)	Intervention N (%)
Age		
18 to 30 Years	25 (56.8%)	30 (68.2)
31 to 42 Years	9 (20.5%)	9 (20.5)
43 to 54 Years	10 (22.7%)	5 (11.4)
Gender		
Male	26 (59.1%)	30 (68.2)
Female	18 (40.9%)	14 (31.8)
Marital Status		
Married	29 (65.9%)	24 (54.5)
Un-Married	15 (34.1%)	20 (45.5)
Participants Education		
Illiterate	10 (22.7%)	0 (0.0%)
Primary	15 (34.1%)	15 (34.1%)
Matric	19 (43.2%)	27 (61.4%)

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Graduate	0 (0.0%)	2 (4.5%)
Participants Profession		
Laborer	20 (45.5%)	18 (40.9%)
House Wife	17 (38.6%)	5 (11.4%)
Student	4 (9.1%)	12 (27.3%)
Retired From Job	1 (2.3%)	4 (9.1%)
Others	2 (4.5%)	5 (11.4%)
Participants Allergy		
No	44 (100.0%)	44 (100.0%)
Yes	0 (0.0%)	0 (0.0%)
Location of Burns		
Lower Trunk + Multiple Areas	3 (6.81%)	7 (15.90%)
Lower Trunk	1 (2.27%)	1 (2.27%)
Upper Trunk + Multiple Areas	29 (65.90%)	24 (54.54%)
Upper Trunk	11 (25.00%)	12 (27.27%)

The Figure 1 showed burn locations in the intervention and control groups. Most burns were in the *Upper Trunk + Multiple Areas* (29 interventions, 24 control), followed by the *Upper Trunk* (11 interventions, 12 control). The *Lower Trunk + Multiple Areas* had 3 intervention and 7 control cases, while the *Lower Trunk* had only 1 case in the intervention group and none in the control group.

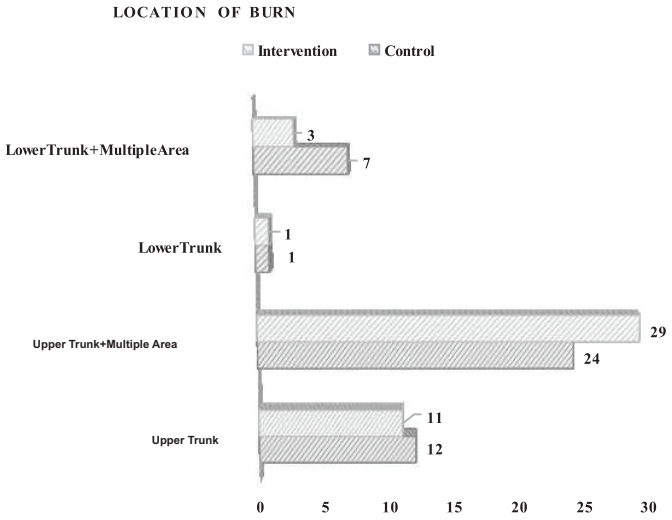

Figure 1: Distribution of Location of Burns between the Participants from Control and Intervention Group

Table 2 illustrated the causes of burns in study participants. 5 (11.36%) participant had burnt from electric, 36 (81.81%) participants had burnt from fire, 3 (6.81%) participant had burnt from scald and no any participant had burnt from acid, while in the control group 11 (25%) participant had burnt from electric, 29 (65.90%) participants had burnt from fire, 1 (2.27%) participant had burnt from scald and 3 (6.81%) participant had burnt from acid.

Table 2: Causes of Burns among Study Participants

Cause of Burn	Intervention Group N (%)	Control Group N (%)
Electric	5 (11.36%)	11 (25%)
Fire	36 (81.81%)	29 (65.90%)
Scald	3 (6.81%)	1 (2.27%)
Acid	0 (0%)	3 (6.81%)

Table 3 presented the severity of pain among study participants in both groups, measured using the Visual Analog Scale (VAS). All participants reported some level of pain. In the control group, 19 (43.2%) experienced severe pain, while in the interventional group, 24 (54.5%) reported very severe pain and 16 (36.4%) reported unbearable pain. Overall, the interventional group had a higher pain score compared to the control group. After the intervention, the median pain score was 6 for both groups. Most participants in each group experienced severe pain, often following very severe pain.

Table 3: Severity of Pain among Participants (VAS Scale)

Severity of Pain	Intervention Group N (%)	Control Group N (%)
Severe	0	19 (43.2%)
Very Severe	24 (54.5%)	0
Unbearable	16 (36.4%)	0
Median Pain Score	6	6

Table 4 expressed the Wilcoxon signed-rank test to evaluate the changes in the intensity of pain before and after intervention in both the control and interventional group. The results exhibited that the post-intervention mean score of pain has significantly decreased after aromatherapy (p-value <0.001*) with a large effect size (r = 0.61) using Cohen's (1988) criteria.

Table 4: Comparing the Changes in the Mean Scores before and after the Aromatherapy in Control and Intervention group by Wilcoxon Signed-Rank Test

Groups	VAS-Score	Mean	Mean Rank	Z	R	p-Value
Control	Vas Score Pre-Intervention	6.16	305.00	-1.793	0.19	0.073
	Vas Score Post-Intervention	5.84	-	-	-	-
Intervention	Vas Score Pre-Intervention	8.00	4.50	-5.805	0.61	<0.001*
	Vas Score Post-Intervention	5.75	-	-	-	-

Table-5 compared the changes in anxiety mean scores before and after the intervention in the control group of burn patients using the Wilcoxon signed-rank test. The results showed significant changes in the Cognitive sub-scale ($p < 0.0001$), Escape/Avoidance sub-scale ($p = 0.039$), and Global Score ($p = 0.025$). However, no significant changes were observed in the Fear sub-scale ($p = 0.286$) and Physiological Anxiety sub-scale ($p = 0.330$).

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Table 5: Comparison in Anxiety Mean Scores before and after the Intervention in the Control Group

Pain and Anxiety Symptom Scale	Pre-Intervention Mean Score	Post-Intervention Mean Score	Z	R	p-Value
Cognitive	19.7727	18.8409	-3.493	0.37	<0.0001*
Escape/Avoidance	19.3409	18.7500	-2.061	0.22	0.039*
Fear	19.8636	19.4773	-1.068	0.11	0.286
Physiological Anxiety	19.4545	19.1591	-0.974	0.10	0.330
Global Score	78.4318	76.2273	-2.248[b]	0.24	0.025*

Table 6 presented the changes in anxiety mean scores before and after the intervention in the interventional group of burn patients. The results, analyzed using the Wilcoxon signed-rank test, show significant reductions in anxiety across all sub-scales and the global score (all p-values < 0.001). The anxiety scores for Cognitive, Escape/Avoidance, Fear, Physiological Anxiety, and the Global Score all decreased notably after the intervention, indicating a significant improvement in anxiety levels among the participants.

Table 6: Comparison in Anxiety Mean Scores Before and After the Intervention in Interventional Group

Pain and Anxiety Symptom Scale	Pre-Intervention Mean Score	Post-Intervention Mean Score	Z	R	p-Value
Cognitive	22.2273	17.6136	-5.365	0.57	<0.0001*
Escape/Avoidance	21.5227	16.8182	-5.573	0.59	<0.0001*
Fear	22.5227	17.8864	-5.313	0.57	<0.0001*
Physiological Anxiety	21.4318	17.1364	-5.239	0.56	<0.0001*
Global Score	87.7045	69.4545	-5.374	0.57	<0.0001*

DISCUSSION

This study was conducted to determine the effectiveness of aromatherapy on pain and anxiety among burns patients. In the current study, males as (68.2% -31.8%) had a higher prevalence of burn. Another research study conducted in Pakistan found similar results [11]. Similarly, the American Burns Association (ABA) reported that male has the higher prevalence of burns compared with females (68% vs. 32%) in the United States [12]. In the current study, more than half of the participants, 24 (54.5 %) in the control group and 29 (65.9 %) in the intervention group, had the upper trunk and multiple areas burn injuries. However earlier studies showed differed burn injury location i.e. the extremities, particularly the upper extremities, were the most potential sites for suffering burn injuries [13]. Another study found that the trunk and lower limbs were mostly affected by burn injuries [14]. Although pain and anxiety scores decreased in both groups in the current study, the decrease was more prominent in the intervention group than in the control group. This difference could be attributed to the aromatherapy program, which was provided to the intervention group. The pain score on VAS has significantly reduced from 8.00 to 5.75 after the intervention in experimental group with significant p-value (<0.001). The mean global anxiety scores of (Cognitive anxiety, Escape/Avoidance, Fear of pain, Physiological anxiety) subscales on PASS has significantly decreased in the interventional group (all has p-value < 0.001). These findings were congruent with another study, indicating the effectiveness of aromatherapy to reduce pain and anxiety [15]. A meta-analysis on effectiveness of the aromatherapy also reported similar findings [8]. Moreover, another study exhibited remarkable effectiveness of aromatherapy for pain management but not anxiety [16]. Furthermore, another study found that burn victims' subjective pain intensity and anxiety levels were reduced when they inhale aromatherapy with Damask rose essence [1]. However, other studies supported the remarkable effectiveness of aromatherapy for the reduction of anxiety [17, 18]. While another meta-analysis found that patients with burns may experience less anxiety while using aromatherapy [19]. Another study also found that anxiety was reduced by using Rose Damascene inhalation aromatherapy [20].

CONCLUSIONS

In conclusion, the intervention led to significant reductions in anxiety levels across all sub-scales and the global score in the interventional group of burn patients, with all p-values being less than 0.001. This indicates that the intervention was effective in reducing cognitive, escape/avoidance, fear, physiological anxiety, and overall anxiety.

Authors Contribution

Conceptualization: SM, AM
Methodology: R, SM
Formal analysis: AUK, AH
Writing, review and editing: AH, SK, AB

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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