



USING THE DEEP BREATHING TECHNIQUE TO DECREASE PAIN INTENSITY DURING WOUND CARE FOR BURNED PATIENTS

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ABSTRACT: *Background:* Burn is the worst tragedy among modern societies that individuals may experience. One of the most important problems of burns is pain; particularly at the time of treatment which includes burn dressings, debridement, surgical incisions and physiotherapy. **The aim of this study** was to assess the effect of using the deep breathing technique to decrease pain intensity during wound care for burned patients. **Design:** A quasi-experimental design was utilised. **Setting:** The study was conducted in the burn unit at El Minia general hospital. **Sample:** A purposive sample of (60) adult patients from both genders who were randomly and alternatively divided into two equal groups study and control (30 patients in each group). **Tools:** data were collected by three tools: **tool I**, Structured interview questionnaire, **tool II**, patient observational checklist and **tool III**, pain assessment scale. **Results:** The study revealed that there was a statistically significant difference in decreasing pain intensity among the study group after implementing the deep breathing technique. **Conclusion:** the application of the deep breathing technique for burned patients was effective in decreasing pain intensity. **Recommendations:** Apply the deep breathing technique for burned patients by teaching technique before wound care and apply it during and after wound care as routine and regular care to decrease pain intensity associated with wound care.

KEYWORDS: Burn, Deep Breathing Technique, Pain.



INTRODUCTION

Burn lesions are usually associated with severe pain and they pose many physical and mental problems for patients. Dressing change causes unbearable pain in burned patients such that they describe this treatment process much more painful than burning itself. This pain requires high levels of opioids while sometimes there is a resistance to these analgesic drugs. If uncontrolled, the pain may entail many physiological and psychosocial consequences such as sleep deprivation, fear, anxiety, depression, anger, low-quality life, prolonged stress after burn injury, delayed recovery, and extended hospitalisation (Hoseinzadeh-Karimkoshteh, Firouzkouhi & Abdollahimohammad, 2019).

Pain is a sensing and emotional experience of someone which does not provide comfort accompanied by potential and actual tissue damage. The International Association for the Study of Pain (IASP), according to a previous study, is explained to be an uncomfortable sensation in someone which cannot be transmitted to others. One of the recommended non-pharmacological actions is to use deep breathing relaxation techniques. The technique of breathing relaxation in itself is an act of nursing care, which in this case the nurse teaches patients how to do deep breathing techniques, slow breathing (hold inspiration to the maximum) and how to exhale slowly. In addition to reducing pain intensity, deep breathing relaxation techniques can also improve lung ventilation and increase blood oxygenation. (Asman & Maifita, 2019).

The deep breathing technique can be defined as the most frequent method used from non-pharmacological interventions during the painful procedures and the therapeutic intervention by which purpose full alteration of a given breathing pattern is categorised as breathing exercises. Outcomes have ranged from relaxed to calm due to influence on the parasympathetic nervous system, reducing and preventing the build-up of toxins in the lungs by encouraging the clearing of the small air sacs (alveoli), increasing lung volume, clearing secretions, to improve gas exchange, to control breathlessness, to increase exercise capacity, to reduce blood pressure, to reduce obesity, relaxation response for stress reduction and to control pain (Hany, Ali & Mostafa, 2019).

Inadequate burn pain management still exists despite advances in burn care. Burn pain management is usually based on institutional preference, tradition and personal bias rather than evidence-based practices which reduce anxiety and pain. Pain management is a priority in the acute stage of burn and requires frequent assessment and pharmacological treatment. High doses of morphine increase complications such as respiratory failure. Therefore, Non-pharmacological interventions can be used to change the patient's perceptions and responses to pain. Non-pharmacological interventions are inexpensive, non-invasive, easily administered, and lack chemical side effects. It includes distraction, music therapy and relaxation techniques. Several studies revealed that relaxation techniques are important for pain reduction as it reduces pain, anxiety, stress, muscle tension, and decreases sympathetic nervous activity (Sallam, Henedy & El Gamasy, 2019).

Burn pain varies greatly from patient to patient, shows substantial fluctuation over the hospitalisation course, and can be unpredictable due to the complex interaction of anatomic, physiologic, psychosocial, and premorbid behaviour issues. Burn patients typically report pain as being severe or excruciating, despite receiving opioid analgesics. Nurses must also be skilled in pain assessment and employing strategies to minimise the pain experience of the patient



because some patients may experience both physiologic and/or psychological pain related to dressing changes and wound care (Abo El Ata, et al. 2021).

Significance of study

Burn injuries are the leading cause of unintentional injury, mortality, and morbidity. Globally, scalds account for the highly treated burns that generally result in less severe injuries. Burn injuries are very common in developing countries, burn victims typically come from poor families in rural regions, where fires are necessary for daily living and primary care is practically nonexistent. Death by burn injury in low- and middle-income countries is estimated to be eleven times higher than in high-income countries as the World Health Organisation estimated that 43,000 people die of burns in Africa every year with a rate of 6.1 per 100,000 (Alemayehu, et al, 2020).

According to the World Health Organisation, more than 11 million people worldwide suffer from burn injuries each year and require medical treatment, including hospitalisation. Hospitalised burn patients not only suffer from physical and psychological distress from the burn accident itself, but are exposed to stressful medical procedures throughout the day such as wound cleansing and dressing, physiotherapy, and surgery. This can cause pain and anxiety. Pain and anxiety are the worst experiences of hospitalised burn patients (Fardin, Rezaei & Maslakkpak, (2020).

There are 300 burns patients a day in Egypt, with death rates of 38% as a result of dealing in the wrong ways with burns (National Research Center, 2019). Effective nursing care has a distinct influence on the overall satisfaction and experience of the patient. Communication is said to be indispensable in the delivery of quality healthcare. Effective communication between nurses and patients has proven to yield better results with pain control and improved the psychological status of patients. Good nurse-patient communication can produce positive outcomes in the assessment and management of burns pain. Lack of nurse-patient communication can lead to a decreased level of cooperation during caregiving and result in the endurance of pain by the patient. There is a need to train nurses further in communication with an emphasis on patient-centred communication within the clinical care setting (Tetteh, et al. 2021).

So, the current research will be designed to shed light on the effect of using the deep breathing technique to decrease pain intensity during wound care for burned patients.

Aim of the study

This study was aimed to assess the effect of using the deep breathing technique to decrease pain intensity during wound care for burned patients through:

- 1- Assessing patients' practice regarding the deep breathing technique.
- 2- Implementing the deep breathing technique to decrease pain intensity during wound care for burned patients.
- 3- Evaluating the effect of implementing the deep breathing technique to decrease pain intensity during wound care for burned patients.



Subjects and Methods

Technical item:

Research design: A Quasi-experimental design was used in carrying out the study at ElMinia general hospital.

Subjects: A purposive sample of (60 adult patients) from both genders undergoing wound dressing of burn divided to control and study group was involved in this study from the above-mentioned setting.

Inclusion criteria: Adult patients from both genders, Second degrees of burn, fully conscious.

Exclusion criteria: First and third-degree burn, Excessive use of opioids and sedatives before entering the dressing room.

Tool of data collection:

Data for this study were collected by using the following tools:

1st tool: - Structured interview questionnaire: this tool is an interview administered questionnaire that was adapted from (Delfani, Zakerimoghadam & Mohammadaliha. 2016) and it was modified by the investigator after reviewing the relevant literature to be suitable for the present study. It consisted of two parts that were filled by the investigator:

Part (I): to assess the patient's demographic characteristics such as: patient's age, gender, marital status, educational level, occupation.

Part (II): to assess the Patient's medical history of a burned patient as: burn type and causes, burn site, degree of burn, percentage of burn, infection from a wound, chronic disease, hospital stay.

2nd tool: - Observational checklist: - to assess using the deep breathing technique to decrease pain intensity during wound care. It was developed by the investigator based on the literature review (Hinkle & Cheever, 2018) and was used to teach & train patients how to perform deep breathing techniques. It consists of six items each item was checked regarding (Done - Not done).

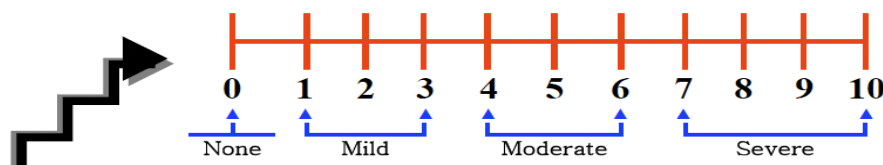
Scoring system: - the total items of the checklist are six items, the correct response (done) was given one score and (Not done) was given zero. The total score of checklist calculated with maximum 6 and minimum zero than categorised as following:

- satisfactory practice level $\geq 80\%$
- Unsatisfactory practice level $\leq 80\%$

3rd tool:-Pain assessment scale:- it was utilised pain assessment pre and post deep breathing technique, it was used Numerical pain rating scale (Mccaffery & Beebe, 1993) two time to assess pain intensity as followed:- It is one of the standardised tools for quantifying pain intensity which consists of a scale with values ranging from(0-10).



Scoring system: -the total pain score 10 mean score for the different levels of pain will be calculated as follows (0) no pain, (1-3) mild pain, (4-6) moderate pain, (7-10) severe pain.



Operational item

The Preparatory phase:

It included the review of related literature and theoretical knowledge of various aspects of the study using books, articles, the internet, periodicals and magazines to develop tools for data collection. During this phase, the investigator also visited the selected places to get acquainted with the personal and the study settings. The development of the tool was under supervision guidance and experts' opinions were considered.

Validity & Reliability

It was to be used to modify the tools and ascertained by a jury of 5 experts from medical and nursing education staff, to review the tools for clarity, relevance, comprehensiveness, understanding and applicability.

Reliability was used to assess the tools to produce stable and consistent results. Reliability of the tools was measured through (10%) of the subject using the established questionnaire and retested after one week on the same subject and the results were the same each time. The internal consistency of the reliability of the tool whether all of the items of the tool measure the same variable were done through Cronbach Alpha. Cronbach Alpha is a model of internal consistency, based on the average inter-item correlation. The correlation test was used to compare the means of two variables.

Pilot study

The pilot study was done on 10% of the sample to examine the clarity of questions and time needed to complete the study tools. Based on the results of the pilot study, necessary modifications were done prior to data collection. Subjects included in the pilot study were excluded from the study and replaced by other patients.

Field Work:

Fieldwork includes the following:

- An approval was obtained from the Scientific Ethical Committee of the faculty of nursing at Helwan University.
- Official permission to conduct the proposed study was obtained from the director of ElMinia general hospital in which the study was conducted.



- The Purpose of the study was simply explained to the patients who agree to participate in the study prior to any data collection.
- Oral informed consent was obtained from each participant and from his family prior to data collection after explaining the aim of the study.
- Sampling was started and completed within six months from October (2020) to the end of March (2021).

Sampling technique:

- To assure equity of groups at the beginning of the study. An attempt was made to match subjects based on gender, age-range and inclusion criteria and after that assign them to either a study group or control group randomly. Once it was determined that a multiple of two (i.e., two, four, and six...) Similar patients qualified for inclusion, each patient was assigned a number.
- These numbers were put in a hat and a number was drawn randomly from the hat. The first number drawn was assigned to the study group, the second number drawn was assigned to the control group, the third number drawn was assigned to the study group, the fourth number drawn was assigned to the control group until all patients were assigned to either study or control group.
- The initial determination that the first draw would be assigned to the study group was decided by a flip of a coin with heads being the study and tails being the control group. Thus, the assignment to the study or control group was established prior to approaching the family or patient informed consent.
- The investigator visited the selected setting regularly, three days per week in the morning and afternoon shifts to every patient and the concerning observational checklist for patients was used to assess patient practice regarding deep breathing techniques.

Fieldwork: This includes three phases:

Assessment phase:

It was established through the following:

- 1- Interview with available patients before the procedure to explain the aim of the study and take their approval to participate in the study prior to any data collection then basic assessment was done and data was collected from patients by using the tool I; Structured interview questionnaire was filled for the study and control group by the investigator before practice the deep breathing technique.
- 2- Assess the patient's medical history regarding burn and the importance of using deep breathing techniques to decrease pain intensity during wound care.

Implementation phase:

- Based on the basic assessment, the deep breathing technique was implemented for each patient in 5 sessions (was carried out for at least 20 minutes) by using tool II: patients



were observed while performing deep breathing using an observational checklist that was filled for the study group during wound care for burned patients.

- The deep breathing technique was individually and orally trained to the study group patients. But training continued to ensure learning and doing right by patients and at the end, the participants were asked to complete the procedure till the investigator ensured the patient's mastery by exact observation.
- The study group was given a written guide, the content was written in a simple Arabic language and consistent with the related literature. Moreover, it met the patient's needs and their level of understanding. In addition, they taught how to use the tools on the day of training. The control group received only routine care which contained painkiller medication at the beginning of dressing.
- Pain intensity was measured using tool III, pain numerical scale (before practising deep breathing technique) for control and study group. Then the study group patients were asked to do deep breathing during the dressing care that took 10 minutes. Then a maximum of 5 minutes after leaving the dressing room, the pain was measured (after practising deep breathing technique).

Evaluation phase:

The evaluation occurred through the assessment phase (before practice deep breathing technique) and implementation phase (after practice deep breathing technique) to evaluate the effect of using the deep breathing technique on pain intensity during wound dressing for burned patients. The pain intensity was evaluated 3 times with three dressings.

Administrative item:

Ethical considerations: The study protocol was approved by the Ethics Committee at the Faculty of Nursing in Helwan University. Verbal informed consent was obtained from each participant after explaining the purpose of the study and informing him/her about the rights to refuse or withdraw from the study at any time. The confidentiality of the data collected was ascertained. The questionnaires were anonymous and self-administered.

Statistical item:

Statistical analysis: Data entry and analysis were performed using (SPSS) the Statistically Package for Social Sciences version 22. The quantitative data were presented as numbers and percentages. The chi-square (χ^2) was used to find the association between variables of qualitative data. The p-value of ≤ 0.05 indicates a statistically significant result while the p-value of < 0.01 indicates a highly statistically significant result.

RESULTS

Table (1): Comparison between the two studied subjects regarding demographic characteristics: presents that 53.3% of both the study and control groups, their age between 31 – 40 years with mean age 36.4 ± 7.7 years old of the study group, while the mean age of the control group is 35.7 ± 7.8 years old. Regarding the place of residence, 56.7%, 60.0% of the



study and control groups live in urban places respectively. As regards educational level, the majority of the study group (23.3%) could read, write and had technical education while the majority of the control group (33.3%) were illiterate. In relation to occupation, the majority of the study group (46.7%) and of the control group (56.6%) were not working. From the above data, there were no statistically significant differences regarding demographic data among both study and control groups.

Figure (1): Comparison between gender of the study and control groups (n = 30 of each group): Regarding gender, **Figure (1):** illustrated that 43.3% of the study group were males compared to 36.7% of the control group. While 56.7% of the study group were females, compared to 63.3% of the control group

Figure (2): Comparison between the marital status of the study and control group (n =30 of each group): demonstrated that the majority of the studied subjects 60.0% in the study group and 56.7% of the control group were married.

Figure (3): Comparison between the type of burn among the study and control groups (n =30 of each group): showed that half of the studied subjects (50.0%) of each group had their type of burn because of boiling fluids.

Figure (4): Comparison between study and control groups regarding their hospital stay duration (n =30 of each group): illustrated that 30.0% of the study group's hospital stay was more than 5 weeks compared to 53.3% of the control group.

Figure (5): Comparison between the study group regarding the practice of deep breathing technique in the 1st, 2nd, and 3rd day of practice (n= 30): demonstrated that there is a remarkable improvement in practising of deep breathing technique of the study group in the 1st, 2nd, and 3rd day of practice (50.0%, 73.3% & 96.7%) respectively.

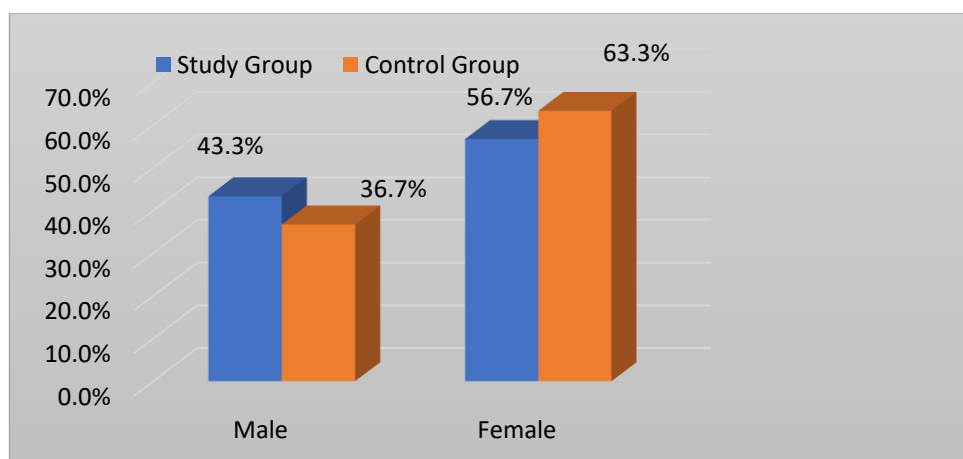
Table (2): Comparison between total pain of the study and control groups in the 1st, 2nd, and 3rd day before and after the practice of deep breathing technique (n =30 of each group): showed that the mean pain score in the study group decreased than the control group in the 2nd day after deep breathing and 3rd day before and after the practice of deep breathing technique with highly statistically significant difference which (P-value< .002, .003, and .0001) respectively.

Table (3): Table (3): Comparison between total pain levels of the study and control groups in the 1st, 2nd, and 3rd day of deep breathing technique (n =30 of each group):

Revealed that there are statistically significant differences in the 2nd and 3rd day before the practice of deep breathing technique while there are highly statistically significant differences in the 2nd and 3rd day after the practice of deep breathing technique.

**Table (1): Comparison between the two studied subjects regarding demographic characteristics (n = 30 for each group)**

Variable	Study group (n= 30)		Control group (n= 30)		X ²	P-value
	No.	%	No.	%		
Age						
20 – 30	6	20.0	7	23.3	.154	.985
31- 40	16	53.3	16	53.3		
41 - 50	7	23.3	6	20.0		
51- 60	1	3.3	1	3.3		
Mean ± SD	36.4 ± 7.7		35.7 ± 7.8			
Place of residence						
Urban	17	56.7	18	60.0	.069	.793
Rural	13	43.3	12	40.0		
Educational level						
Illiterate	4	13.4	10	33.3	4.749	.447
Read and write	7	23.3	8	26.7		
Basic education	6	20.0	4	13.3		
Secondary education	5	16.7	4	13.3		
Technical education	7	23.3	3	10.0		
University education	1	3.3	1	3.3		
Occupation						
Employee	3	10.0	2	6.7	2.127	.712
Worker	13	43.3	11	36.7		
Not work	14	46.7	17	56.6		

**Figure (1): Comparison between gender of the study and control groups (n = 30 of each group)**

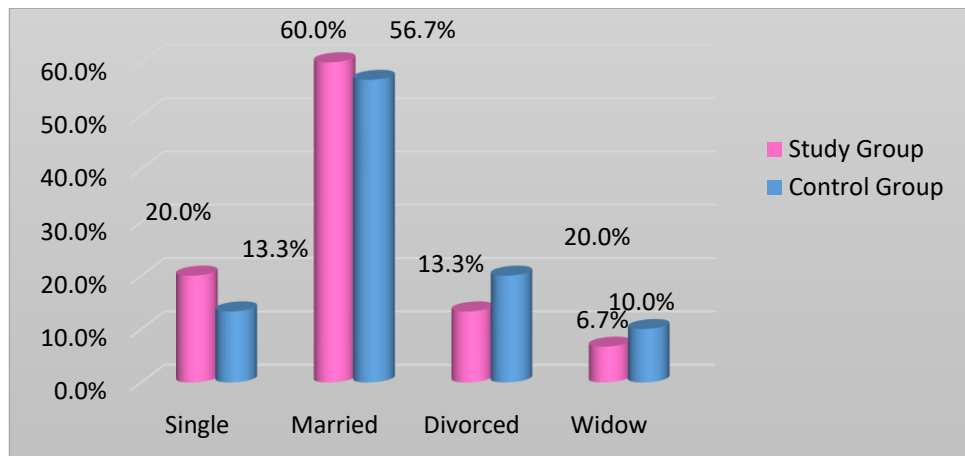


Figure (2): Comparison between the marital status of the study and control group (n =30 of each group)

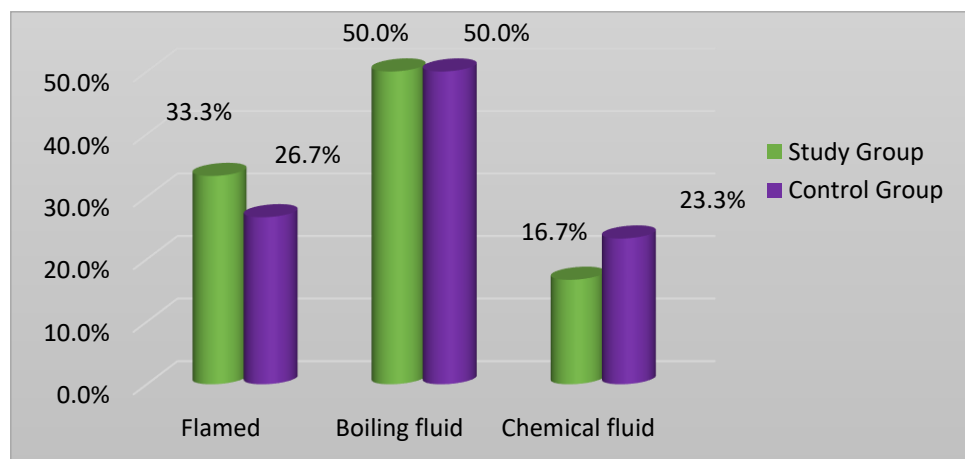


Figure (3): Comparison between the type of burn among the study and control groups (n =30 of each group)

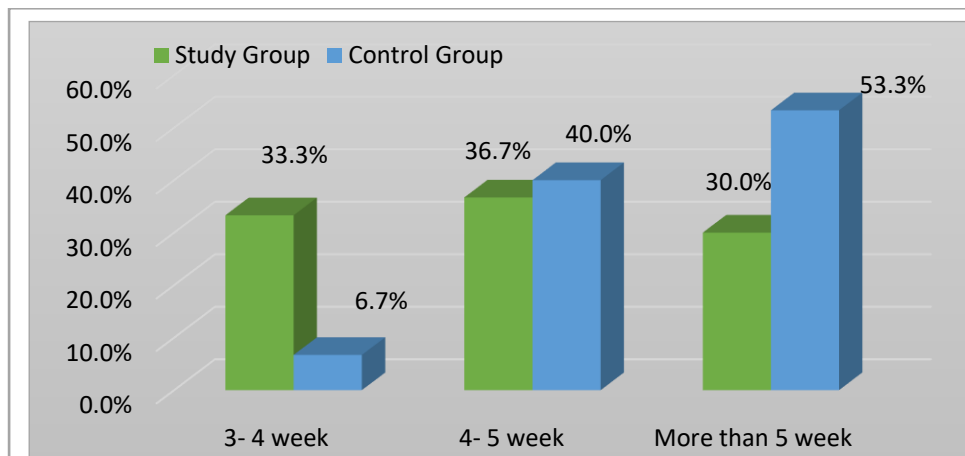


Figure (4): Comparison between study and control groups regarding their hospital stay duration (n =30 of each group)

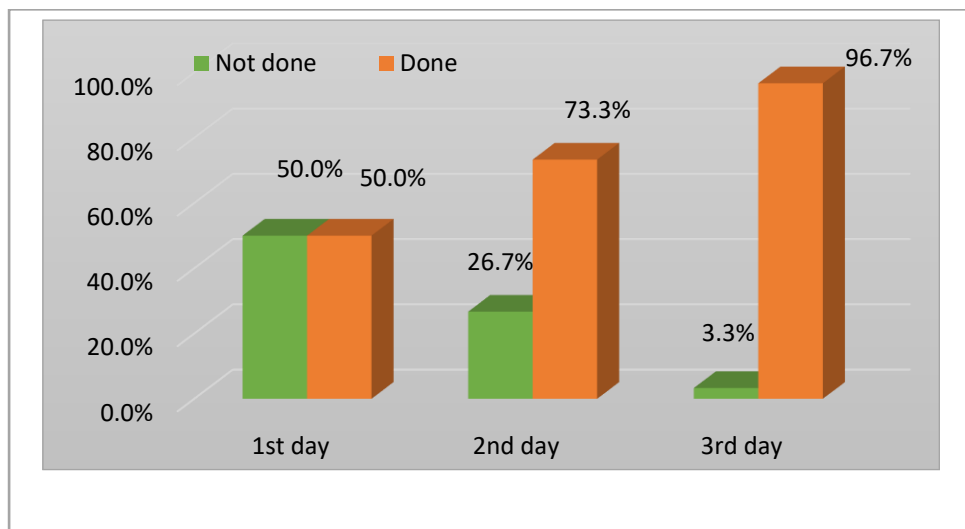


Figure (5): Comparison between the study group regarding practice of deep breathing technique in the 1st, 2nd, and 3rd day of practice (n= 30)



Table (2): Comparison between total pain of the study and control groups in the 1st, 2nd, and 3rd day before and after practice of deep breathing technique (n =30 of each group)

		Mean pain score	t-test	P- value
1 st day before	Study group	9.4 ± .6	1.031	.307
	Control group	9.2 ± .9		
1 st day after	Study group	5.9 ± 1.3	.876	.385
	Control group	6.3 ± .9		
2 nd day before	Study group	5.7 ± 1.8	.587	.559
	Control group	5.9 ± 1.3		
2 nd day after	Study group	3.9 ± 1.7	3.164	.002**
	Control group	5.1 ± 1.3		
3 rd day before	Study group	2.4 ± 1.8	3.141	.003**
	Control group	3.6 ± 1.2		
3 rd day after	Study group	1.2 ± 1.3	6.968	.0001**
	Control group	3.5 ± 1.1		

**Highly statistically significant difference

Table (3): Comparison between total pain levels of the study and control groups in the 1st, 2nd, and 3rd day of deep breathing technique (n =30 of each group)

Items	1 st day				2 nd day				3 rd day			
	Study		Control		Study		Control		Study		Control	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Before practice of deep breathing technique												
No pain	0	.0	0	.0	0	.0	0	.0	7	23.3	0	.0
Mild pain	0	.0	0	.0	8	26.7	1	3.3	12	40.0	12	40.0
Moderate pain	0	.0	0	.0	12	40.0	19	63.3	11	36.7	18	60.0
Severe pain	30	100.0	30	100.0	10	33.3	10	33.3	0	.0	0	.0
Fisher / X ² (P value)(1.00)				7.025 (.030)*				8.690 (.013)*			
After practice of deep breathing technique												
No pain	0	.0	0	.0	0	.0	0	.0	15	50.0	0	.0
Mild pain	0	.0	0	.0	16	53.3	5	16.7	15	50.0	14	46.7
Moderate pain	16	53.3	18	60.0	14	46.7	20	66.7	0	.0	16	53.3
Severe pain	14	46.7	12	40.0	0	.0	5	16.7	0	.0	0	.0
Fisher/ X ² (P value)	.271 (.602)				11.821 (.003)**				31.034 (.0001)**			

*Statistically significance differences at < .05 ** highly statistically significance differences at < .01



DISCUSSION

This study illustrated the effect of using the deep breathing technique to decrease pain intensity during wound care for burned patients. The total subjects of the current study are 60 patients, divided into control and study groups (30 of each group). In relation to gender for both study and control groups, the present study illustrated that more than half of patients in the study and control groups were female.

These results were in the same line with Bozorg-Nejad, et al., (2018) who conducted research about "The effect of rhythmic breathing on pain of dressing change in patients with burns referred to Ayatollah Mousavi Hospital" showed that the population of men and women is equal in their study.

Also, Malik & Tassadaq, (2019) on the "Effectiveness of deep breathing exercises and incentive spirometry on arterial blood gases in second-degree inhalation burned patients" found that more than half of the studied subjects were female in the control group while the same percentage were male in the control group as the same on the study group.

On the other side Abo El Ata, et al., (2021) which about "Effect of breathing exercise on reducing pain associated with dressing among hospitalised burned patients" revealed that, more than half of the studied subjects were male.

The present study showed that more than half of the patients in the studied subject (study and control groups) were aged between 31-40 years with a mean age (36.4 ± 7.7 & 35.7 ± 7.8). With no statistically significant differences between both groups regarding demographic characteristics, which indicated that the only effect that was detected was the result of the provided nursing intervention (deep breathing technique).

In the same line with Ghorbani, et al., (2019) which entitled "The effects of deep-breathing exercises on postoperative sleep duration and quality in patients undergoing coronary artery bypass graft" a Randomised Clinical Trial" showed that demographic metrics were not significantly different between the two groups.

Regarding the place of residence, the present study illustrated that most of the studied subjects lived in urban areas. These findings agreed with Ghorbani, et al., (2019) who reported that the majority of participants live in urban places,

On the contrary, Sallam, Henedy & El Gamasy (2019), in their study "Effect of Benson's relaxation technique on pain and anxiety levels among burned patients" revealed that most of the studied sample lived in rural areas.

As regards the education level of the patients in the previous study, it was found that the majority of them read and write and completed technical education.

In relation to the occupation and marital status of the studied groups in this study, a high percentage of participants weren't working and also more than half were married.

Similar to previous results, Ghorbani, et al., (2019) showed that all participants were married and had not reported any history of respiratory diseases and alcohol abuse.



In relation to the hospital stay duration for both groups, the current study illustrated that more than one-third of the study group's hospital stay ranged between 2-3 weeks and from 4-5 weeks. While one-third of the study group's hospital stay was more than 5 weeks compared to more than half of the control group.

Similar to Bikmoradi, et al., (2016) emphasised that the mean duration of hospitalisation in this study was 22.66 days.

This study showed that half of the study group did deep breathing exercises in the first day completely, increased to more than two-thirds of them on the 2nd day, then the majority of them on the third day of application, so there is a statistically significant improvement in practical score sessions at the third session among the study group.

On the same line, Unver, Kivanc & Alptekin, (2018) conducted research entitled "Deep breathing exercise education receiving and performing status of patients undergoing abdominal surgery" in Turkey, emphasised that one of the most important findings of this study was that a strong positive correlation was found between receiving education and performing exercises. This means patients' practice was improved due to following the instructions of the investigator step by step and performing practice positively.

Regarding pain assessment, the current study found that the pain score in the study group decreased more than the control group on the 2nd day after deep breathing and 3rd day before and after deep breathing techniques with a highly statistically significant difference in which P -value < .002, .003, and .0001 respectively.

These findings are confirmed by Abo El Ata, et al., (2021) who revealed the benefit of relaxation breathing technique for hospitalised burned patients during wound dressing and found that there was a highly statistically significant difference in pain level pre and post-measurement, it was clarified that the majority of patients reported a significant decrease in their pain intensity and anxiety level during the dressing of burn wound.

On the other side, Ursavas & Catakli, (2020) whose research titled "The effect of diaphragmatic breathing exercise on pain, anxiety, and depression in patients undergoing total knee replacement" showed that diaphragmatic breathing exercise did not have a significant effect on pain suggests that it alone is not sufficient for coping with the intense pain caused by musculoskeletal tissue repair and should be used with different non-pharmacological intervention (massage, guided imagery) for pain management. Also, Iyer, Mitra & Dabadghav, (2020) showed a significant change in pain and anxiety scores over time in their study.

CONCLUSION

Deep breathing technique is a safe, inexpensive and non-pharmacological nursing intervention, so; it is an effective technique to reduce the pain intensity during wound care for burned patients. After implementing the deep breathing technique, the pain intensity was improved in the studied subjects as well as there was a highly statistically significant correlation between pain and deep breathing technique on pain intensity. Therefore, the deep breathing technique is an effective method to reduce the pain intensity during wound care for burned patients that can be recommended as a pain relief technique.



RECOMMENDATIONS

Based on the results of the current study, the following recommendations were suggested.

Recommendations for better patient outcomes:

- Apply the deep breathing technique for burned patients by teaching technique before wound care and apply it during and after wound care as routine and regular care to decrease pain intensity associated with wound care.
- Explore the influence of other confounding variables, such as age, gender, educational level and prior pain experience to evaluate the effectiveness of breathing techniques as pain management intervention.
- Increasing the awareness, regarding the usage of non-pharmacological methods such as (deep breathing techniques) to reduce pain intensity.

Recommendations for further research:

- Develop a standard of care for wound pain management for patients with burn injuries.
- Examine the effect of deep breathing technique on type, location and duration of pain as well as the medications used to treat pain in burned patients.
- Replication of the study on larger probability samples selected from different geographical areas in Egypt is recommended to obtain data of more generalizability of findings.

REFERENCES

- Abo El Ata, A. B., Shaheen, E. S., Abdelgilil Khalil, A., & Yousef Saleh, A. M. N. (2021): Effect of Breathing exercise on reducing pain associated with breathing among hospitalised burned patients. *Port Said Scientific Journal of Nursing*, 8(2), 76-102.
- Alemayehu, S., Afera, B., Kidanu, K., & Belete, T. (2020): Management outcome of burn injury and associated factors among hospitalised children at ayder referral hospital, Tigray, Ethiopia. *International Journal of paediatrics*, 2020.
- Asman, A., & Maifita, Y. (2019): Effect of Deep Breathing Relaxation Techniques for Reducing Pain after Hernia Surgery in Inpatient of Regional Hospital Pariaman West. *Age (years)*, 50(64), 65.
- Bikmoradi, A., Harorani, M., Roshanaei, G., Moradkhani, S., & Falahinia, G. H. (2016): The effect of inhalation aromatherapy with damask rose (*Rosa damascena*) essence on the pain intensity after dressing in patients with burns: A clinical randomised trial. *Iranian journal of nursing and midwifery research*, 21(3), 247.
- Bozorg-Nejad, M., Azizkhani, H., Ardebili, F. M., Mousavi, S. K., Manafi, F., & Hosseini, A. F. (2018): The effect of rhythmic breathing on pain of dressing change in patients with burns referred to Ayatollah Mousavi Hospital. *World journal of plastic surgery*, 7(1), 51.



- Delfani, F., Zakerimoghadam, M., & Mohammadaliha, J. (2016): Comparative study of the effects of muscle relaxation and mental imagery techniques on pain intensity in patients with second-degree burn wounds. *Nursing Practice Today*, 3(1), 5-10.
- Fardin, A., Rezaei, S. A., & Maslakpak, M. H. (2020): Non-pharmacological interventions for anxiety in burn patients: A systematic review and meta-analysis of randomised controlled trials. *Complementary therapies in medicine*, 49, 102341.
- Ghorbani, A., Hajizadeh, F., Sheykhi, M. R., & Asl, A. M. P. (2019): The Effects of Deep-Breathing Exercises on Postoperative Sleep Duration and Quality in Patients Undergoing Coronary Artery Bypass Graft (CABG): a Randomised Clinical Trial. *Journal of caring sciences*, 8(4), 219.
- Hany, S. M., Ali, Z. H., & Mostafa, H. A. A. (2019): Effect of Deep Breathing Technique on the severity of Pain among Postoperative Coronary Artery Bypass Graft patients.
- Hinkle, J. L., & Cheever, K. H. (2018): Brunner and Suddarth's textbook of medical-surgical nursing. Wolters Kluwer India Pvt Ltd.
- Hoseinzadeh-Karimkoshteh, M., Firouzkouhi, M., & Abdollahimohammad, A. (2019): Effect of regular smooth breathing on the intensity of pain caused by dressing change in patients with second-degree burns: A Clinical Trial. *Medical-Surgical Nursing Journal*, 8(2).
- Iyer, A. R., Mitra, S., & Dabadghav, R. (2020): The effect of rhythmic deep breathing on pain and anxiety in patients with burns. *Indian Journal of Burns*, 28(1), 74.
- Malik, S. S., & Tassadaq, N. (2019): Effectiveness of Deep Breathing Exercises and Incentive Spirometry on Arterial Blood Gases in Second Degree Inhalation Burn Patients. *J. Coll. Physicians Surg. Pak*, 29, 954-957.
- Mccaffery, M., & Beebe, A. (1993): *Pain Clinical Manual for Nursing Practice*. 1993. Baltimore: VV Mosby Company.
- National Research Centre, (2019): [http:// www.dostor.org](http://www.dostor.org) |2686930 on 25 June.
- Sallam, S. A. E. G., Henedy, W. M., & El Gamasy, L. A. E. S. (2019): Effect of Benson's Relaxation Technique on Pain and Anxiety Levels among Burn Patients.
- Tetteh, L., Aziato, L., Mensah, G. P., Vehviläinen-Julkunen, K., & Kwegyir-Afful, E. (2021): Burns pain management: The role of nurse-patient communication. *Burns*, 47(6), 1416-1423.
- Ünver, S., Kivanç, G., & Alptekin, H. (2018): Deep breathing exercise education receiving and performing status of patients undergoing abdominal surgery, *International Journal of Health Sciences*, 12(4): 35-38.
- Ursavas, F. E., & Catakli, M. (2020): The effect of diaphragmatic breathing exercise on pain, anxiety, and depression in patients undergoing total knee replacement: A randomised controlled trial. *Annals of Medical Research*, 27(9), 2408-2413.