Effect of Muscle Relaxation Technique on Pain, Pruritus and Vital Signs among Patients with Burns

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Abstract

This study aimed to: assess the effect of muscle relaxation technique on pain, pruritus, and vital signs among patients with burn. **Research hypothesis:** Muscle relaxation technique will have a positive effect on pain, pruritus and vital signs among patients with burn. **Design:** A quasi-experimental research design (one group pre- and post-implementation of the muscle relaxation technique) was used to achieve the aim of the study. **Setting:** This study was conducted at plastic, reconstructive and burn Surgery Center - Mansoura University. **Subjects:** A purposive sample composed of 100 adult patients. **Tools:** Tool I: Patient's interviewing questionnaire included: demographic data for patients, pain numerical rating scale and 12- items pruritus severity scale. Tool II: Patient assessment record included: patient medical data record and vital signs assessment record. **Results:** Muscle relaxation technique had a positive effect on pain, pruritus and, vital signs among patients with burn post implementation. There was a highly statistically significant difference in pain intensity between the studied patients at pre- and post-implementation phases (p value 0.000), there was a highly statistically significant difference between studied patients at pre- and post-implementation phases (p value 0.000) regarding the total pruritus severity scale. And also, there was a statistically significant difference between the mean scores of vital signs among the studied patients at the pre- and post-implementation phases (p <0.05). **Conclusion:** In the light of the current study findings, it can be concluded that, pain severity, pruritus level, vital signs in terms of pulse, respiratory rate, systolic and diastolic blood pressure were statistically significantly improved at post-implementation phase as compared to pre- implementation phase which support study hypothesis that muscle relaxation technique had a positive effect on pain, pruritus, and vital signs among the studied patients with burn. **Recommendations:** Based on the current study finding the following recommendations were proposed: future research study should be done to implement and investigate the effect of the muscle relaxation technique for patients with burn injuries on decreasing the incidence of complications after burn injuries.

Keywords: Burn, Muscle Relaxation Technique, Pain, Pruritus and Vital Signs

Introduction

One of the most prevalent medical conditions worldwide is burn. Burn injuries are one of the most dangerous and stressful injuries, affecting individuals of any age and responsible for 5–12% of all trauma cases and events worldwide. A burn is an injury to body tissue caused by direct contact with or exposure to a thermal source, produced by chemicals, electrical current, radiation, and friction (**Mehta & Tudor, 2019**).

A major burn injury can impair skin integrity and sensation and may lead to hypertrophic scarring. In addition to the changes in appearance and function brought about by scarring, deeper burns may result in damage to or the complete loss of functionally or cosmetically important body parts. Furthermore, many forms of psychological disturbance have been noted, including body image dissatisfaction, depression, and post-traumatic distress that often takes years to recover from (**Sahin et al., 2019**).

Relaxation technique is one example of a non-pharmacological treatment that is increasingly accepted as an intervention for pain reduction and pain coping. The purpose of relaxation techniques is to decrease the activity of the sympathetic nervous system by evoking the opposite reaction to the stress response, namely a relaxation response. Practicing relaxation techniques is associated with reduced blood pressure, oxygen uptake, respiratory frequency, heart frequency, and muscle tension (**Vambheim et al., 2021**).

In this regard, relaxation techniques are the most important non-pharmacological pain management methods. Relaxation can reduce muscle tension and the destructive physiological effects of stress, such as high blood pressure,

tachycardia, and muscle spasms, by balancing the anterior and posterior hypothalamus' functions and reducing the activity of the sympathetic nervous system. Relaxation is performed in various ways, such as progressive muscle relaxation, meditation, rhythmic breathing, etc **(Parizad et al., 2021).**

Many pruritus conditions have also responded well to relaxation techniques. Relaxation training can be particularly helpful for patients who report increased itch intensity during periods of stress. Relaxation training has been deemed helpful in many conditions and many itch conditions have also responded well to relaxation techniques **(Jafferany & Davari, 2019 ; Hulmani, 2021).**

Significant of the study

Burning is a leading cause of injury and one of the most dangerous conditions. There are about 2.4 million burn cases per year worldwide; 650,000 of them need treatment, 75,000 are hospitalized, and 8,000 to 12,000 are exposed to burn injuries. It is estimated that the incidence of severe burns in a person's lifetime is around 1%, and more than 300,000 deaths occur due to burns annually, worldwide **(Zakeria et al., 2022).**

About 90% of burns occur in the developing world. This has been attributed partly to overcrowding and an unsafe cooking situation. Burn injuries are one of the major health challenges in Egypt; they affect 37% of the adult population, resulting in a diminished quality of life and significant morbidity, mortality, and healthcare costs. In Egypt, there are 100 000 people who suffer from burns yearly and only a few manage to afford the care needed to survive **(Rizk & Hassan, 2018 ; Fahmy et al., 2022).**

Pruritus and pain are common complaints from patients following a burn injury. Various studies have proposed different prevalence rates for itch following burn injury, ranging from 57% to 100% of patients. Previous studies suggest that the itching following a burn injury usually peaks in the initial months following the closure of the wound before resolving in the following months. Establishing the level of pain experienced by burn patients is challenging, as pain in burn patients varies greatly from patient to patient and shows substantial variation over time **(Tracy et al., 2020).**

Many pharmacological and non-pharmacological methods are utilised to control and relieve the complications of burns. These pharmacological methods have numerous side effects and impose high healthcare costs on health systems. Non-pharmacological methods are safe and without any side effects in most cases. Progressive muscle relaxation is one of these non-pharmacological and complementary methods that does not requires no special technology or equipment. That is why this study conducted to assess the effect of the Benson relaxation technique on common complaints among patients with burn **(Harorani et al., 2020).**

Subjects and Methods

The subject and methods of the current study were designed under the following main four designs:
  I. Technical Design
  II. Operational Design
  III. Administrative Design
  IV. Statistical Design
I. Technical Design

It included research design, study settings, subject and tools of data collection.

Research Design

A quasi-experimental research design (one group pre-post assessment).

Study Settings

This study was conducted at burn unit at plastic, reconstructive and burn Surgery Center - Mansoura University.

Subject:

A purposive sample composed of 100 adult patients from both genders diagnosed with burn injuries.

Patients selected according to **inclusion criteria** as follow:

▪ Adult patients, conscious, alert, able to communicate verbally, second degree burns, free of chronic physical, psychological and mental disorders, and willing to participate in the study.

Sample size

It was calculated according to the following formula:

Stephen Thampson's equation *(Fearon et al., 2017)*:

Where:

    N= Population size is 1043

    P= Ratio provides a neutral property is equal to 0.12

    d= The error rate is equal to 0.05

    z= Class standard responding to the level of significance equal to 1.96

$$\frac{1043 \times 0.12(1-0.12)}{[1043-1 \times (0.05^2 \div 1.96^2)] + 0.12(1-0.12)}$$

n = 100

Tools for data collection:

Data was collected using the following tools:

Tool I: Patient's interviewing questionnaire:

It was developed by the investigator in an Arabic language based on reviewing related literatures and contains three parts as follows:

Part 1: Demographic data for patients under study:

Including age, gender, level of education, marital status, occupation, and residence.

Part 2: Pain numerical rating scale:

It was adapted from *Grotle et al. (2004)* to assess intensity of pain among studied patients. It was translated and retranslated into Arabic language. It was used to assess pain intensity before and after implantation of muscle relaxation technique.

Numerical Pain Rating Scale scoring system:

❖ **Scoring system**

Criteria for assessment of burn severity:

The score zero (0) indicates no pain and the top score (10) indicates the worst possible pain.

Part 3: 12- items pruritus severity scale:

It was adapted from *Reich et al. (2017)* and it was translated and retranslated into Arabic language. It was consisted of 12 items that assess different aspects of pruritus before and after implementation of muscle relaxation technique.

❖ **Scoring system**

Total scores ranged from 3 (minimal pruritus) to 12 (most severe pruritus). It was used to asses pruritus before and after implementation of muscle relaxation technique. The total score was summed up and the total score was categorized into 3 main categories: 3-6 points, which indicate minimal pruritus; 7-11 points, which indicate moderate pruritus; and 12 points, which indicate severe pruritus *(Stępień & Reich, 2020)*.

Tool II: Patient assessment record:

It was developed by the investigator after reviewing relevant and recent literatures *(Hyppönen et al., 2014; Vuokko et al., 2017; Garba & Yahaya, 2018)* and included two parts:

Part 1: Patient medical data record:

It was concerned with history and characteristics of burn including; cause, duration, site, degree/severity (it was guided by *Yasti et al., 2015*), percent, date of hospital admission and length of hospitalization.

Minor burn	**Moderate burn**	**Major burn**
1- Second degree adult burns less than 15% TBSA	1- Second degree adult burns involving 15 to 25% TBSA	1- In adults, second degree burns greater than 25% TBSA
2- Second degree ~~child~~ burns less than 10% TBSA	2- Second degree ~~child~~ burns involving 10 to 20% TBSA	2- In ~~children~~, second degree burns greater than 20% TBSA
3- Third degree ~~child~~ or adult burns less than 2% TBSA	3- Third degree ~~child~~ or adult burns involving 2 to 10% TBSA	3- Third degree burns greater than 10% in an adult
4- Can be treated as an outpatient or in a burns room.	4- Must be hospitalized and treated in a burns unit/center.	4- Must be hospitalized and treated in a burns unit/center.

Part 2: Vital signs assessment record:

It was checked immediately before implementation of muscle relaxation technique

and 20 minutes after implementation of muscle relaxation technique, it included assessment of pulse, respiratory rate, blood pressure.

❖ **Scoring system**

The normal pulse for adults ranges from 60 to 100 beats per minute. Normal respiration rates for adults at rest range from 12 to 16 breaths per minute. Normal blood pressure for most adults is a systolic pressure of less than 120 and a diastolic pressure of less than 80 (120/80).

Benson muscle relaxation technique:

It was applied including, use of smartphone music application to play a smoothing music.

II. Operational Design

The operational design of this study was include preparatory phase, content validity and reliability, pilot study, fieldwork and ethical considerations,

The preparatory Phase

It includes review of the current and past recent and related literatures and theoretical knowledge of various aspect of the study using books, articles, periodical magazines and internet to develop tools for data collection. Permission of data collection and implementation of the study was obtained from the hospital administrative personnel by the subbmission of a formal letter from the Faculty of Nursing, Ain Shams University. Meeting and discussion were held by investigator to explain the aim of the study with studied subjects. Development of the tools was under supervisors' guidance and experts' opinions were considered and final form was developed.

Validity and reliability:

The developed tools were tested and evaluated for their face and content validity.

Validity:

The tools are tested and revised for content and face validity by a Jury of seven experts in Medical Surgical Nursing. Speciality, five of them were professors and two of them were assistant professors, minimal modifications were done. The experts elicited responses regarding either by agree, disagree and agree with modification. Validity for patient's interview questionnaire and patient assessment record were ranged between 95% to 100%. Modifications were done according to their recommendations.

Reliability:

Cronbach's Alpha test was used to measure the internal consistency of the tools used in this study. Alpha tests for patient's interviewing questionnaire was 0.820 indicate good reliability. The reliability level for patient assessment record tool was 0.799 which indicate acceptable reliability.

Pilot Study

It was carried out on (10%) of the total sample of the studied patients in order to test the applicability of the constructed tools, the clarity of the questions and efficiency of the tools. According to the results of the pilot, minimal modifications were done, so the patients who included in the pilot study were included in the study sample.

Fieldwork

The actual field work and the process of data collection has consumed six months started from the beginning of March 2021 to the end of August 2021. The investigator collected data three days per week; Saturday, Monday, and Wednesday at morning and afternoon shifts. The data collection was done through two phases, pre-implementation phase (before application of Benson Muscle Relaxation Technique) and post–implementation phase (20 minutes after application of Benson Muscle Relaxation Technique).

Pre implementation phase

The patients were selected according to inclusion criteria. The investigator explained to each patient the aim of the study and general information about Benson Relaxation Technique and it's expected effect.

The patient medical data record was first assessed by investigator. Part two including assessment of vital signs were assessed two times at pre-implementation phase and post implementation phase, it tooks approximately 15_20 minutes for each patient to be fulfilled.

Then, patient interviewing questionnaire was filled by investigator through interviewing each patient. This tool was assessed two times at pre-implementation and post implementation phases, and tooks approximately 20_30 minutes for each patient.

Regarding pain numerical rating scale and pruritus severity scale, the investigator explained each statement to the studied patient and record the answer as the patient's report at the questionnaire.

Implementation phase

After explaining the technique to the patient, patient went through a twenty-minute Benson verbal and muscle relaxation technique. The relaxation technique was taught to each patient verbally in a quiet, calm room in the burn ward to minimize the effect of environmental provocations.

A smart phone was used to play a soothing music. Benson's Relaxation Technique instructions for each studied patient were performed for 20 min and required the patients to: sit in a relaxed position; close their eyes; relax all muscles starting from the feet soles, moving forward up, and relax all parts of their body; breath through their nose, pay attention to the breathing sound and say ''one'' quietly to themselves during exhalation; and continue for 20 mins.

Infection control measures regarding COVID-19 were applied during data collection process, such as the use of protective equipment, use of spacing between the investigator and the patient, the use of disinfectants and hand washing.

Evaluation phase

Assessment was done 20 minutes after implementation of Benson Relaxation Technique, the amount of pain intensity, pruritus severity and vital signs had been measured again by the investigator.

The investigator used the pre implementation data and post implementation data to assess the effect of relaxation technique on pain, pruritus and vital signs to identify the expected improvement.

III. Administrative Design

An official permission was obtained by submission of a formal letter issued from the Dean of faculty of nursing, Ain Shams University to the director of plastic, reconstructive and burn surgery center - Mansoura University. An approval was obtained from hospital director and nursing directors. An informal and oral consent was obtained from every participant of patients under study.

Ethical Considerations:

Research approval was obtained from the ethical committee of the Faculty of Nursing Ain Shams University before starting the study. The investigator clarified the objectives and aim of the study to patients included before starting. Also maintaining anonymity and confidentiality of subjects' data included in the study were assessed.

Oral consent was obtained from the patients before inclusion in the study; a clear and simple explanation was given according to their level of understanding. They secured that all the gathered data was confidential and used for research purpose only. The patients were informed that they allowed to choose to participate or not in the study and have the right to withdraw from the study at any time without any consequences.

IV. Statistical Analysis

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 24. Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test (X^2) was used for comparisons between qualitative variables. A t test compares the means of two groups, A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups. Spearman correlation "r" measures the strength and direction of association between four ranked variables.

Significance of the results:
- Highly significant at p-value < 0.01.
- Statistically significant was considered at p-value < 0.05
- Non-significant at p-value ≥ 0.05.

Results:

Table (1): shows 53% of the studied patients, their age ranged between 30 years to less than 50 years with the mean age 42.7 ± 9.64. Also 61% of studied patient were female and 63 % were married. Regarding educational level among patients under study, more than 55% of them had secondary education and 37 % of them had

sedentary work. Also, it was found that 58 % of studied patients lived at rural areas.

Table (2): shows that 45% of the studied patients had 5 to 8 days duration of burn with mean duration 6.13±2.5 days. Regarding length of hospitalization, 41% of studied patients had less than 5 days with mean duration 7.48± 2.0 days. Also, 38% of patients under study had thermal burn, 56% of them exposed to burn cause for less than 1 minute with mean duration 1.88 ± 0.97 minutes.

The table also shows distribution of the studied patients according to their present history of burn injury, it was observed that 68% of the studied patients therapeutically managed with dressing, and 21% of them had associated secondary infection.

Table (3): presents that 28% of studied patients had moderate pain at pre-implementation phase compared to 59% at post-implementation phase with highly statistically significance difference (p = 0.000). Meanwhile 63% of the studied patients had severe pain at pre-implementation phase compared to 36% of them at post-implementation phase with highly statically significance difference (p = 0.000).

Figure (1): shows that 43% of the studied patients at pre-implementation phase had moderate pruritus compared to 37% of them at post implementation phase with a high statistically significant difference (Chi-square= 11.908, p= .000).

Table (4): reflects that mean pulse rate of the studied patients is 102.67 ±6.91/min at pre-implementation phase compared to 91.44 ±7.80/min of them at post implementation phase with statistically significant difference at (t test= 6.798, p <0.05). Also mean respiratory rate of the studied patients is 28.90±3.24/min at pre-implementation phase compared to 23.77 ±2.60/min of them at post implementation phase with statistically significant difference between them (t test= 5.900, p <0.05).

In the same respect, mean systolic blood pressure of the studied patients is 100.31±9.54 mmHg at pre-implementation phase compared to 105.80 ± 8.6 mmHg of them at post implementation phase with statistically significant difference at (t test= 6.112, p <0.05), also mean diastolic blood pressure of the studied patients is 60.40 ± 4.77 mmHg at pre-implementation phase compared to 65.17 ± 6.22 mmHg of them at post implementation phase with statistically significant difference between them (t test= 5.884, p <0.05).

Table (5): shows that there were positive statistically significance correlations between pain, pruritus, vital signs, systolic and diastolic blood pressure among studied patients (p < 0.01). While, there were no statistically significant correlations between respiratory rate and systolic and diastolic blood pressure (p > 0.05).

Table (1): Distribution of the studied patients according to their demographic characteristics (n=100).

Items	N	%
Age (Year)		
18─ < 30	26	26.0
30─ < 50	53	53.0
≥50	21	21.0
Mean S.D (years) 42.7±9.64 yeas		
(Min 18 years_ Max 61years)		
Gender		
Male	39	39.0
Female	61	61.0
Level of education		
Unable to read or write	4	4.0
Basic education	7	7.0
Secondary education	55	55.0
High education	34	34.0
Marital status		
Single	37	37.0
Married	63	63.0
Occupation		
Not work	38	38.0
Manual work	25	25.0
Sedentary work	37	37.0
Residence		
Urban	42	42.0
Rural	58	58.0

Table (2): Distribution of the studied patients according to their medical clinical data (n=100).

Items	N	%
Duration of burn		
1─4 days	38	38.0
5 ─ <8 days	45	45.0
≥8 days	17	17.0
Mean S.D (days) 6.13 ±2.5 days		
(Min 1 day_ Max 15 days)		
Length of hospitalization		
<5 days	41	41.0
5 ─ <10 days	40	40.0
≥10 days	19	19.0
Mean S.D (days) 7.48±2.08 days		
(Min 1 day_ Max 17 days)		
Burn type according to its cause		
Thermal burns	38	38.0
Chemical burns	20	20.0
Smoke and inhalation injury	15	15.0
Electrical burns	19	19.0
Cold thermal injury	8	8.0
Time of exposure to burn cause		
<1 min	56	56.0
1─ < 3 min	33	33.0
≥3 min	11	11.0
Mean S.D (mins) 1.88 ±0.97 mins		
(Min <1 min_ Max 5 mins		
Therapeutic management		
Debridement of wound	23	23.0
Dressing	68	68.0
Excision and grafting	9	9.0
Associated Secondary infection		
Yes	21	21.0
No	79	79.0

Table (3): Frequency and percentage distribution of studied patients at pre and post implementation phases regarding pain intensity (n=100).

Items	Pre- implementation phase immediately before implementation		Post- implementation phase 20 minutes after implementation		T- test	
	N	%	N	%	test Chi square	p-value
None	0	0	0	0		
Mild	9	9.0	5	5.0		.000**
Moderate	28	28.0	59	59.0	34.19	HS.
Severe	63	63.0	36	36.0		

**p-value <0.001 HS
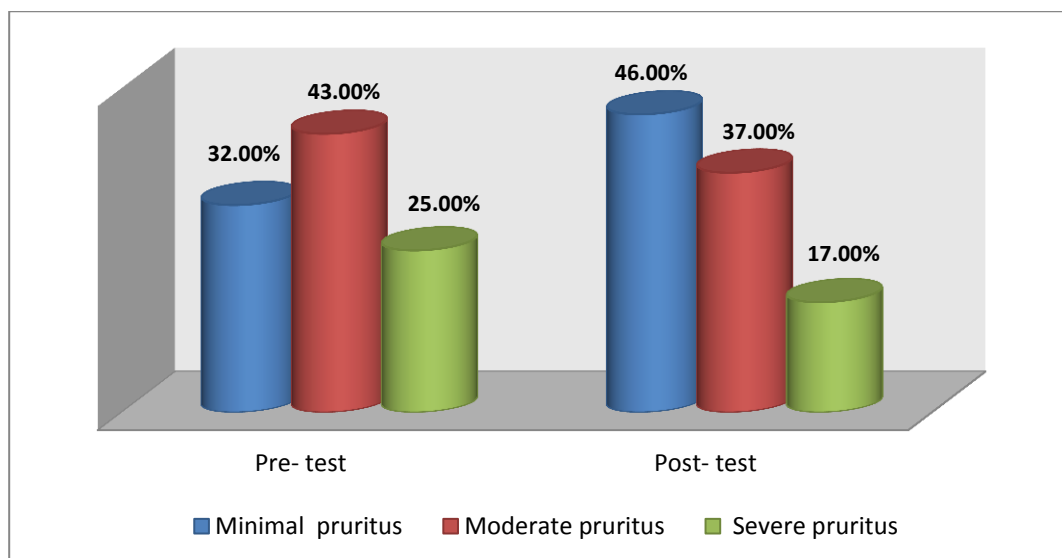
**p-value <0.001 HS

Figure (1): Frequency and percentage distribution of the studied patients according to their total pruritus severity scale (n=100).

Table (4): Frequency and percentage distribution of the studied patients at pre and post implementation phases regarding their vital signs mean scores (n=100).

Items	Pre- implementation (Immediately before implementation)			Post- implementation (20 minutes after implementation)			T- test	
	Mean SD	Max	Min	Mean SD	Max	Min	T t test	p- value
Pulse/min	102.67±6.91	119	88	91.44±7.80	98	75	**6.798**	<0.05*
Respiratory rate/min	28.90±3.24	39	24	23.77±2.60	34	22	5.900	<0.05*
Systolic BP	100.31±9.54	128	95	105.80±8.6	130	109	6.112	<0.05*
Diastolic BP	60.40±4.77	76	54	65.17±6.22	80	63	5.884	<0.05*

*p-value <0.05 S

Table (5): Correlation matrix between pain, pruritus and vital signs among the studied patients at post implementation phase (n=100).

			Total pain	Total Pruritus	Pulse	Respiratory rate	Systolic blood pressure
1.	Pain	r					
		p					
2.	Pruritus	r	.841				
		p	.000**				
3.	Pulse	r	.651	.699			
		p	.001**	.000**			
4.	Respiratory rate	r	.562	.690	.746		
		p	.000**	.000**	.000**		
5.	Systolic blood pressure	r	-.499	-.522	.407	.156	
		p	.002**	.001**	.006**	>0.05	
6.	Diastolic blood pressure	r	-.501	-.451	.411	.149	.648
		p	.002**	.003**	.005**	>0.05	.000**

(**) High statistically significant at p<0.01. r Pearson correlation
NS at p-value >0.05

Discussion:

Concerning the demographic characteristics **(Table 1),** the current study results revealed that, more than half of them, their age ranged between 30 to less than 50 years with mean age ± 42.7±9.64 years. From the investigator's point of view, this result may be due to the fact that burn injuries can affect any age group.

The present study result is in same line with ***Bourgi et al., (2020)*** who conducted study entitled "Predictors of generic and burn-specific quality of life among adult burn patients admitted to a Lebanese burn care center" and showed that the mean age of the studied patients was 44.6 years.

In terms of gender, the current study found that roughly two-thirds of the studied patients were female and married. From the researchers' point of view, the result might be due to women having more contact with fire at home, such as cooking to prepare food for their families, which might lead to a higher exposure to fire and burns. This finding agree ***with Mamashli et al., (2019)*** who applied study entitled "Investigating the psychosocial empowerment interventions through multimedia education in burn patients" and showed that the highest percentage of the studied patient were female and married.

Regarding educational level, more than half of the studied patients had completed secondary education. This could be because a large proportion of the sample studied came from rural areas. The present study result is in same line with ***Bourgi et al., (2020)*** who showed that less than half of them had secondary education. On other hand, this finding is in disagreement with ***Kargar et al., (2020)*** who showed that more than one third of the studied patients had secondary education.

Concerning the present history of burn injury **(Table 2),** the current study indicated that more than two-thirds of the studied patients were therapeutically managed with dressings, and more than three-quarters of them had no associated secondary infection. This might be due to the minor burn area and policies followed for universal infection.

This result is in line with ***Harorani et al., (2020)***, who conducted a study about "the effect of progressive muscle relaxation on anxiety and sleep quality in burn patients" and showed that less than two-thirds of the studied patients were therapeutically managed with dressing, and the majority of them had no associated secondary infection.

In terms of the cause of burns among the patients studied, the current study found that thermal injuries were common among roughly two-fifths of them; this may be due to the high percentage of female subjects exposed to thermal during cooking. The present study result is in agreement with ***Taha et al., (2018),*** who conducted study about "Pattern of burns in a population presented to Cairo University

hospitals over one year; an epidemiological study" and reported that about more than half of the sample, had burns due to flames as a result of the explosion of gas cylinders, still used in poor dwellings in Egypt.

Regarding the total pruritus severity scale **(Figure 1)**, the present study result showed that more than two fifths of the studied patients at the pre-implementation phase had moderate pruritus, compared to more than one third of them at the post-implementation phase, with a highly statistically significant difference. The current study result consistent with study performed by ***Fowler and Yosipovitch, (2019)*** who conducted study entitled " post-burn pruritus and its management current and new avenues for treatment" and showed that relaxation therapy is useful for burn patients and reported that there was a high statistically significant difference between studied patients at pre and post implementation regarding to their total pruritus assessment scale.

Regarding the assessment of effect muscle relaxation technique on vital signs among the studied subject **(Table 4)**, the present study demonstrated that there was a statistically significant difference between the mean scores of vital signs among the studied patients at the pre- and post-implementation phases. The present study finding is consistent with ***Ebraheim, (2020)*** who conducted study entitled "Benson relaxation technique: it's effectiveness regarding pain relief, vital signs, sleep quality, and anxiety among patients with burn injury" displayed that there was a statistically significant difference between mean scores of vital signs among the studied patients at pre and post implementation phases.

Regarding the correlation matrix between pain, pruritus, and vital signs among the studied patients at the post-implementation phase **(Table 5)**, the present study result showed that there was a positive statistically significant correlation between pain, pruritus, vital signs, and systolic and diastolic blood pressure among the studied patients, while there was no statistically significant correlation between respiratory rate and systolic and diastolic blood pressure. The present study result matched with ***Beecher et al., (2021)*** who conducted study entitled" The pruritus severity

scale-a novel tool to assess itch in burns patients" and found that there was a positive correlation between total pain and total pruritus.

Conclusion

In the light of the current study findings, it can be concluded that; pain severity, pruritus level, vital signs in terms of pulse, respiratory rate, systolic and diastolic blood pressure were statistically significantly improved at post-implementation phase as compared to pre- implementation phase which support study hypothesis that muscle relaxation technique had a positive effect on pain, pruritus, and vital signs among the studied patients with burn.

Recommendations:

Based on the current study's findings, the following recommendations were proposed:

➢ Instructions about burn injuries should be provided in articles, journals, and electronic resources such as computers and the internet.

➢ The study should be replicated on a large sample and in different hospital settings in order to generalise the result.

➢ Application of Benson relaxation technique should be suggested at burn units as an alternative non-pharmacological method to reduce pain, puritis and improve vital signs among patients with burn.

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