

Post Trauma Stress Disorder, Pain and Coping Strategies among Burn Patients

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Abstract

Background: Survivors of severe burns are more likely to experience post-traumatic stress disorder (PTSD), persistent pain, and depression. Failure to cope with trauma leads to psychological problems. This study *aim* was conducted to assess the relationships between Post Trauma Stress Disorder symptoms, pain, and coping strategies among burn patients. **Subjects and Methods:** This descriptive cross-sectional study was carried out in Al-Ahrar Hospital and Hehia Central Burns Hospital for burns at Al-Sharkia Governorate in Egypt on 73 burned patients. A structured interview questionnaire, the Revised Impact of Event Scale, Numeric pain rating scale, and Coping Strategy Inventory scale were used in data collection from October 2019 to April 2020. **Results:** The study findings showed that 95.9% of studied patients display symptoms of PTSD, 47.9% of them had either severe or moderate pain, 65.8% of burn patients were coping with the trauma of burn injury used disengagement coping strategies. Coping strategies are negatively correlated with post trauma stress disorder (PTSD) ($r=-0.257$) and pain ($r=-0.244$). Meanwhile, PTSD had positive correlation with pain ($r= 0.378$). Multivariate analysis revealed that engagement coping strategies and percent of total burn surface area were the statistically significant independent predictors of PTSD; while the independent negative predictor of patients' coping was pain intensity. **Conclusion:** The incidence of PTSD among burn patients is high; as well as nearly half of patients had either severe or moderate pain. Disengagement coping strategies are mostly used by burn patients. Moreover, increase pain intensity, resulting in exacerbates PTSD symptoms and decrease coping strategies in burn patients. **Recommendations:** Psychological intervention programs to improve positive coping strategies and decrease PTSD. As well as , Applying evidence based non pharmacological pain management methods besides pharmacological to reduce pain among burn patients.

Keywords: Post Trauma Stress Disorder, Pain, Coping Strategies, Burn Patients.

Introduction

Burn injuries are frequently linked to traumatic life experiences that are often unintentional and very stressful. Burn trauma is distressing not because of physical injuries and the need for long-term painful burn care, but also because of a number of psychological difficulties (Bibi et al., 2018a). Due to high prevalence of challenges as well as a lack of therapeutic and financial resources, burn is considering a major health problem in developing countries (Wang et al., 2018). The prevalence of burn injuries in adults from 20 to 50 years accounted for 34% in Cairo university hospital over a period of one year and elderly patients more than 50 years were 5.5% (Taha et al., 2018). Burns can have long-term psychological, physical, and social effects and can affect the quality of life (Smolle et al., 2017).

Post-traumatic stress disorder (PTSD) is one of the frequent concurrent mental illnesses that recently received extensive attention. Burn victims frequently experience PTSD as a result of their injuries and exhibit a variety of symptoms, including re-experiencing the burning trauma and developing repeated thoughts within one month. They also had symptoms of hyperarousal, avoidance, and emotional issues, all of which contributed to stress and poor functioning (Diagnostic & statistical manual –V, 2013). Studies showed that the prevalence of PTSD

(full-blown symptoms) among burn patients may range from 3%-58% after the burn injury (Dahl et al., 2016).

Although PTSD is fundamentally complex and individualized, it's essential to understand that two people might experience the same traumatic event, but only one of them will develop PTSD (The National Institute of Mental Health, 2016). Isolation from society is also really prevalent in conditions of untreated PTSD, which can lead to unable to continue working, self-harming, and suicide (Nina & Rinat, 2017). PTSD develops when one continues to have the symptoms for more than a month and they continue more than 6 months (Pacella, Hruska & Delahanty, 2013).

Burn victims had problems in embracing their new appearance and are unable to engage in social or professional activities (Schneider et al., 2009; Bibi et al., 2018a). Burn injuries also have an impact on an individual's capacity to cope with stressful life events and communicate with the outside world. The cognitive and behavioral methods used to master, decrease, and manage stress-related demands are referred to coping. Coping methods have an impact on the progression of PTSD symptoms (Zheng et al., 2012). Approach and avoidant coping methods are the most common coping mechanisms. Approach (Adaptive) coping include cognitive and behavioral efforts to deal with the stressor as effectively as possible. For example, it might entail

using cognitive restructuring, problem solving, or seeking social support. Avoidant (Maladaptive) coping, on the other hand, entails efforts to avoid dealing with the stressor directly. Distraction, disengagement, and emotional venting are some examples (Walker and Esterhuysen, 2013)

Cheng et al., (2015) studied the coping patterns of severely burned PTSD patients and discovered that the majority of PTSD patients with severe burn injuries utilize passive coping strategies to cope with stress. During the prolonged rehabilitation process, burn victims feel despair, pessimism, and helplessness because of the painful burn treatment. The way people cope with their symptoms and stress has an impact on their recovery process. Negative or maladaptive coping strategies (e.g., avoidant coping) have been found to be related to "poor outcomes", whereas positive or adaptive coping styles (e.g., emotional support and self-acceptance) relate not only to improved well-being but also to posttraumatic growth (Sheerin et al., 2018)

Alongside from the psychological effects, patients with burn are often subjected to physical pain, which has been demonstrated to have an influence on long-term functioning. Difficult wound dressing changes and painful physiotherapeutic activities can take a toll on the patient during the acute period (Thombs et al., 2008; Bosmans et al., 2015). All phases of burns may be present in the same person making it difficult to evaluate pain levels and increasing the risk of over- or under-treatment. Undertreated pain can lead to chronic discomfort, depression, and post-traumatic stress disorder in the long term (Richardson & Mustard, 2005; Gamst-Jensen et al., 2014).

A burn injury and its treatment are among of the most horrific things a person can experience. Little is known about the pain experiences or the awareness of burn pain (Smolle et al., 2017 & Emma Duchin et al., 2020). Pain and Post-Traumatic Stress Disorder (PTSD) are highly co-morbid diagnoses, with chronic pain patients having greater PTSD rates. Patients with PTSD are also frequently diagnosed with a variety of chronic pain problems (Moeller-Bertrama et al., 2012). Also, the burn pain has been associated with other negative outcomes and poorer adjustment or coping among burn patients (Patterson, Tininenko, and Ptacek, 2006).

Nurses are often the first to discover whether a patient has PTSD or has had it for a long period of time. As a result, nurses must be able to detect and identify PTSD symptoms in their patients (Nina & Rinat, 2017). Nurses may play an important role in providing support to those suffering from PTSD. They should understand the effects of a traumatic event on an individual and their family, be aware of key factors that influence post-trauma adjustment (such as access to appropriate social

support), and be aware of interventions that can help them cope after exposure (for example, protection from further traumatic events while they recover (Williamson 2017).

Significance of The Study

Burns are a global public health problem, accounting for an estimated 180 000 deaths annually (World Health Organization, 2018). Burns are classified as serious health issues in Egypt, with a high death and morbidity rate, the mortality rate of burn victims in Egypt is as high as 37%, compared to the average of 5% in other countries in the region (Elsherbiny, et al., 2018). As well as, the prevalence of burn injuries in adults from 20 to 50 years accounted for 34% in Cairo university hospital over a period of one year and elderly patients more than 50 years were 5.5% (Taha et al., 2018). Burn injury is considered as one of the most painful traumas. Burns can lead to severe functional, social and psychological impairment. Psychological process in burn victims is still a relatively unexplored aspect of burn care and rehabilitation in Egypt. PTSD is a significant mental health issue which has far consequences for both individuals and society. Suicidal behavior and comorbidity with mental and physical health problems (chronic pain) are increasingly being linked to PTSD. Coping skills are important in traumatic events and can help to reduce the negative impacts of mental health issues. Therefore, it was deemed important to conduct this study to assess post-traumatic stress disorder, pain and coping strategies among burn patients.

Aim of the study:

The aim of the current study was to assess the relationships between PTSD symptoms, pain, and coping strategies among burn patients through:

1. Identify the incidence of PTSD among burn patients.
2. Assess the pain intensity level among burn patients.
3. Recognize the coping strategies used by burn patients.
4. Explore the relationship between PTSD, pain, and coping strategies among burn patients.

Research questions:

To achieve the study's aim the following research questions were formulated:

1. What is the incidence of PTSD among burn patients?
2. What is the pain intensity level among burn patients?
3. What are the coping strategies used by burn patients?

4. Is there a significant relationship between PTSD, pain intensity level, and coping strategies among burn patients?

Subjects And Methods

Research Design:-

The descriptive cross-sectional design was utilized in this study.

Study Setting:-

The study was conducted in two settings, namely El Ahrar Hospital affiliated to the Ministry of Health, at Zagazig city. There is an internal department in the hospital to take care of burn patients, and Hehia Central Burns Hospital includes a reconstructive plastic burn surgery center, which receives the injured from the citizens of Al-Sharkia Governorate. It includes 3 floors. The first is for outpatient clinics and emergency departments; the second includes an inpatient section for men and women, while the third is for operations, a laser unit, and intensive and intermediate care.

Subjects:-

A purposive sample composed of 73 burn patients who accepted to participate in the study from previous settings according to *the following inclusion criteria*: (1) Age: 18 years and olders of both sexes, (2) Length of stay in the hospital of more than one month, (3) Patients with second-degree burns on $\geq 10\%$ of their body surface area or third-degree burns on $>5\%$ of the body surface area.

Exclusion criteria Patients with mental illness are excluded from the study, or had inhalation injuries that lead to intubation in the perioperative period.

Tools for data collection:-

Tool I: A structured interview questionnaire:

the researchers created it to obtain the necessary data for the study. It was divided into two parts:

Part 1: Demographic characteristics of the studied burn patients:

Data on the demographic characteristics of the study sample such as age, gender, residence educational level, current job, marital status, and income.

Part 2: Burn characteristics of the studied burn patients:

This part involved questions about burn characteristics such as; the patients' burn date, the location of the burn, degree of burn, the percentage of total body surface area of burn (%TBSA), causes of burn, burn sites, and underlying motives of burn.

Tool II: The Revised Impact of Event Scale (IES-R) Scale:

We utilized the Revised Impact of Event Scale (IES-r) to assess trauma/event-related PTSD symptoms, which

was created by (Weiss and Marmar, 1997) to meet the DSM-IV criteria for post-traumatic stress disorder (PTSD). This scale consists of 22 items on a 5-point Likert scale to assess symptom intensity (0= not at all, 1= a little bit, 2= moderately, 3= a lot, and 4= excessively). It is divided into three subscales: intrusion (8 items), avoidance (8 items), and hyperarousal (6 items). It is suggested to be used as a screening tool rather than a diagnostic test.

Scoring: The sum of the means of the three subscale scores equals the total mean IES-R score. Lower scores are preferable. The IES-R scoring scale ranges from 0 to 88. High scores have the following associations; 24 to 32 PTSD is a clinical concern (don't have full PTSD will have partial PTSD symptoms); a total IES-R score of 33 or above from a theoretical maximum of 88 indicates the existence of PTSD (proper diagnosis of PTSD); 37 or more this is severe enough to suppress immune system's functioning.

Tool III: Numeric pain rating scale (0-10):

This tool was adopted from **Mc Caffery & Beebe, (1993)** to assess the intensity of pain. The scale was used for studied patients to express their pain experience, the scale consists of a 10 cm line that was enumerated from 0 to 10 (zero mean no pain and 10 mean worst pain). The patient selects the number from (0-10) that best reflects their pain intensity where 0 indicates having "no pain",

1 – 3 indicates "mild pain" (little interfering with activities of daily living), 4 – 6 indicates "moderate pain" (interfering significantly with activities of daily living), and 7 – 10 indicates "severe pain" (disabling, unable to perform activities of daily living).

Tool IV: The Coping Strategies Inventory (CSI) scale:

It is a self-report questionnaire with 72 items designed to measure coping thoughts and actions in response to a specific stressor. (**Tobin et al., 1984**) developed a 5-item Likert scale. Includes, first: Engagement Coping Strategies (problem-solving, cognitive restructuring, emotional expression, and social support). Through these coping strategies, individuals engage in active and continuous negotiation with the stressful environment. Second: disengagement coping methods such as (problem avoidance, wishful thinking, self-criticism, and social withdrawal) are likely to result in the individual disengaging from the person/environment interaction, For instance, feelings are not shared with others. Each major subscale has nine items, making a

total of 72 items measured from (1= never , 2= rarely , 3= sometimes , 4= often , 5= very often)

Scoring: Current coping strategy inventory (CSI) scoring procedures entail giving equal weight to all items on a certain subscale. Simply add the item scores to get the raw score for a subscale. These scores were converted into a percent score .Subjects were considered coped if their percent score was 60% or above.

Preparatory phase:-

Based on a review of previous and current local and international literature on post-traumatic stress disorder, pain, and coping strategies in burn patients using textbooks, web sites, and articles in scientific periodicals and journals, the researchers developed data collection tools such as, a structured interview questionnaire, the Post-trauma Stress Scale (IES-R), the Pain Scale, and the Coping Strategies Scale (CSI). The review has also aided in the development of the study's basic framework.

Content validity:-

The tools were translated into Arabic and then assessed by specialists from the Psychiatric mental Health Nursing and Medical-Surgical Nursing departments at Zagazig University's Faculty of Nursing. The experts evaluated the tools based on their clarity, relevance, applicability, and comprehensiveness. This constituted tool face and content validation. All, of the suggested changes were implemented.

Content reliability:-

The tools' reliability was measured by calculating test-retest reliability and assessing internal consistency. The researchers assessed test-retest reliability by administering the same instruments to the same participants under identical settings on two or more times. Cronbach's alpha coefficients were used to determine the tools' internal consistency. It demonstrated a good reliability level for the Post-traumatic stress disorder scale (0.91) and (0.89) for coping strategies inventory scale.

Pilot study:-

Prior to performing the main study, a pilot study was conducted on 10% (seven patients) of the study participants. The pilot's goal was to assess the questions for ambiguity and to determine the practicability and feasibility of implementing the structured interview questionnaire sheet for patients. It also assisted the researchers in determining the amount of time required to complete the forms (30 to 40 minutes). The tools were finished after making the required changes based

on the findings of the pilot study. The pilot participants were not included in the final study sample later on.

Fieldwork:-

Once consent to proceed with the study was obtained, the researchers visited the study sites once a week according to the approval of the hospital administration and face the burn patients who met the inclusion criteria. The average number of interviewed patients was between 2-3 patients per week. The study's aim was discussed to each patient, and he or she was invited to join after being informed of all rights. Following the patient's permission to participate, the researchers began the interview with the patient separately, utilizing data collecting instruments. The researchers read the questionnaire, explained it, and recorded the responses. The time it took to complete the entire questionnaire sheet ranged between 30 and 40 minutes. The fieldwork occurred between the beginnings of October 2019 to April 2020. One of the most significant challenges encountered during data collecting was the framework's slow nature. The study included burn patients with at least a second and third degree burn damage. Because of the severity of the patients' injuries and the pain that are experiencing, they were unable to speak for an extended length of time. As a result, the researchers had to spend a large amount of time to each patient. Also, because of their pain, most patients were unwilling to participate in the study, which explains the limited sample size involved in this research.

Ethical Considerations:-

After a comprehensive explanation of the study's purpose, each of the burned patients verbally agreed to participate. They were informed that they can also withdraw at any period and that any information obtained from them would be kept secret and used specifically for research purposes. The researchers' phone numbers and all available communication options were provided to the participants, who were encouraged to contact the researchers at any time for clarification.

Administrative Design:-

Permission to conduct the study was acquired by submitting an official letter from the Dean of the Faculty of Nursing at Zagazig University to the directors of the El-Ahrar Hospital and the Hehia Central Burn Hospital. The researchers proceeded to these two places, met with the directors, described the study's purpose and methods, and requested for their collaboration.

Statistical Design:-

SPSS 20.0 for Windows was used to gather, tabulate, and statistically analyze all data (SPSS Inc., Chicago, IL, USA 2011). The mean, standard deviation, and range were used to represent quantitative data, whereas absolute frequencies (number) and relative frequencies were used to represent qualitative data (percentage). The Spearman correlation coefficient was computed to examine the link between various study variables, with(+) indicating direct correlation and(-) indicating inverse correlation, with values close to 1 indicating high correlation and values close to 0 indicating weak correlation. All of the tests were two-sided. P-values of 0.05 were deemed statistically significant, while p-values of 0.05 were considered statistically significant.

Results

Table 1 reveals that the age of the studied patients ranged from 18 to 65 years with mean 31.5 ± 11.3 years. Slightly more than half of patients were males (53.4 %), living in rural areas (65.8%). About one third of patients had primary (basic) education 32.9% and 61.6% were married. As regards patients occupation, housewives and no work are equally in their value (31.5%), while the majority of patients had middle income (79.5%)

Concerning burn characteristics of the studied patients, **Table 2** demonstrates that the underlying motives of burn was accident (52.1%) and the most common cause of burn was flames or thermal burn represents (50.7%), while the most burned area was the hands and arms (75.3%). As for the degree of burn, second degree was the highest percentages (71.2%). Regarding the percentage of body surface area of burn (TBSA) ranged from 10 to 80 percent with mean 35.5 ± 13 percent, while hospital duration stay ranged from 30 to 77 days with mean 45.34 ± 10.59 days.

Concerning post trauma stress disorder and pain intensity level among studied burn patients, **Table 3** shows that intrusion symptoms was the highest percentages among post trauma syndrome in burn patients 22.1 ± 5.9 followed by avoidant symptoms and hyper-arousal symptoms accounted for 21.4 ± 4.9 and 16.9 ± 4.1 respectively .While, total mean of post trauma syndrome represents 60.3 ± 12.4 among burn patients. Regarding pain intensity level among studied burn patients, moderate and severe pain degree is equally in the value (47.9%), while only 4.2% of studied patients had mild pain.

Figure 1 displays the total post trauma stress disorder among burn patients .It reveals that almost all patients had high post trauma stress disorder (95.9%).

As regards coping strategies among burn patients, **Figure 2** reveals that social support was the highest

mean score among engagement coping strategy used by burn patients (28 ± 5.3) followed by express emotion (27.9 ± 4.3). While, the lowest mean score was problem solving (24.2 ± 5.9). On the other hand, wishful thinking was the highest mean score among disengagement coping strategy used by burn patients 29.9 ± 5.2 followed by problem avoidance (27.5 ± 4.7). While, the lowest mean score was self-criticism (26.2 ± 7.8).

Regarding total coping strategies among studied burn patients, **Table 4** illustrates that 65.8% of studied burn patients were used disengagement coping strategies to coping with trauma of burn injury, while 56.2% of them were used engagement coping strategies. As well as, the total mean of coping strategies was 216.7 ± 19.6 .

Table 5 illustrates that there were highly statistically significant negative correlations between engagement coping strategies with Intrusion subscale ($r = -0.493$), hyper arousal subscale ($r = -0.593$), total post trauma stress disorder score ($r = -0.546$), pain intensity score ($r = -0.334$), age ($r = -0.262$), hospital duration stay ($r = -0.423$), and percentage of TBSA of burn ($r = -0.295$). Whereas there were statistically significant positive correlations of disengagement coping strategies with Intrusion subscale ($r = 0.235$), hyper arousal subscale ($r = 0.265$), total post trauma stress disorder score ($r = 0.272$), and TBSA of burn ($r = 0.253$).

Table 6 demonstrates that there were statistically significant negative correlations of burn patients' coping strategies score with Post trauma stress disorder ($r = -0.257$), pain intensity score ($r = -0.244$) and hospital duration stay per days ($r = -0.289$). Whereas there were highly statistically significant positive correlations of Post trauma stress disorder with Pain score ($r = 0.378$), patients' age per years ($r = 0.278$), duration of hospital stay per days ($r = 0.333$), and percentage of TBSA of burn ($r = 0.384$). On the same line, there were highly statistically significant positive correlations between patients' pain score with duration of hospital stay per days ($r = 0.366$) and TBSA of burn ($r = 0.448$).

Table (7) describes the best multiple linear regression model for burn patients' post trauma stress disorder score. It shows that the statistically significant independent predictors of patients' post-traumatic stress score are engagement coping strategies and percentage of total body surface area of burn (TBSA). It is noticed that post trauma stress disorder score increases with percentage of TBSA of burn and decreases with engagement coping strategies. The model explains 21 % of the post trauma stress disorder score as shown by the value of r-square.

Table 8 displays the best multiple linear regression model for burn patients' coping score. It indicates that the statistically significant independent negative

predictors of patients coping score is pain score. The model

explains 6.9 % of the coping score as shown by the value of r-square .Other burn patients' characteristics had no influence on the coping score of burn patients.

Table 1: Demographic characteristic of studied burn patients (n=73):

Socio-demographic characteristics	Frequency	Percent
Age per years:		
- ≤30	39	53.4
- >30	34	46.6
Mean ±SD	31.5±11.3	
Range	18-65	
Sex:		
- Males	39	53.4
- Females	34	46.6
Residence:		
- Rural	48	65.8
- Urban	25	34.2
Social status:		
- Single	28	38.4
- Married	45	61.6
Educational level:		
- Illiterate	14	19.2
- Basic or Primary education	24	32.9
- Secondary education	17	23.3
- University education	18	24.7
Occupation:		
- House wives	23	31.5
- Employee	13	17.8
- Farmer	2	2.7
- Skilled worker	12	16.4
- No work	23	31.5
Income:		
- Low income	15	20.5
- Middle income	58	79.5

Table 2: Burn characteristics of studied burn patients (n=73):

Burn characteristics	Frequency	Percent
Underlying Motives of Burn:		
- Accident	38	52.1
- Suicide attempt	3	4.1
- Fires	32	43.8
Causes of burn (overlapped):		
- Hot liquid	20	27.4
- Flames or thermal burn	37	50.7
- Chemical	9	12.3
- Radiation	2	2.7
- Electricity	5	6.8
Burn sites (overlapped):*		
- Hand and arm	55	75.3
- Neck and chest	38	52.1
- Back	48	65.8
- Leg and abdomen	36	49.3
Burn degree:		
- Second degree	52	71.2
- Third degree	21	28.8
Total body surface area of burn (TBSA):		
- Mean ± SD	35.5±13	
- Range	10-80	
Hospital duration stay (per days):		
- Mean ± SD	45.34±10.59	
- Range	30-77	

* Answers are not mutually exclusive

Table (3): Post-traumatic stress disorder (PTSD) and pain intensity level among studied burn patients (n=73):

Post trauma stress disorder subscales:	Mean± SD	Range
- Intrusion subscale	22.1±5.9	9-32
- Avoidance subscale	21.4±4.9	8-32
- Hyper arousal subscale	16.9±4.1	6-24
Total post trauma stress disorder (PTSD)	60.3±12.4	23-87
Pain Intensity level:	Frequency	Percent
- Mild Pain	3	4.2
- Moderate Pain	35	47.9
- Severe Pain	35	47.9

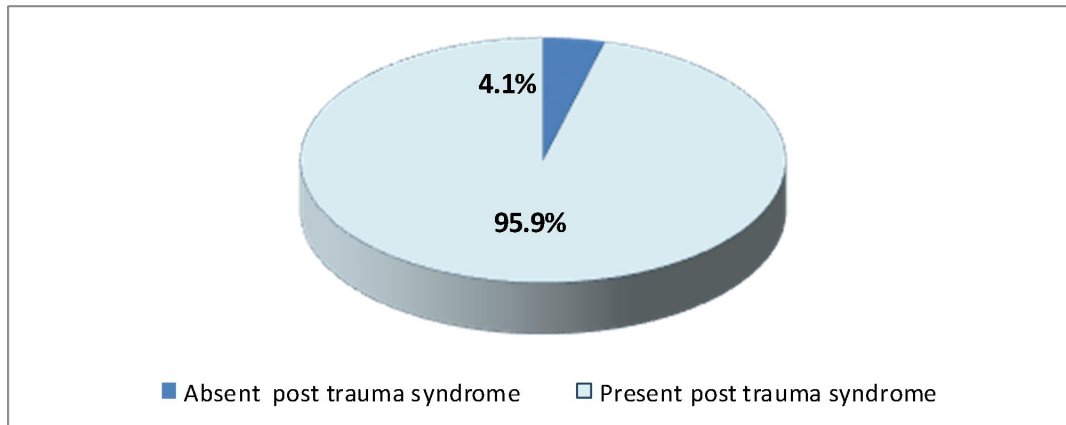


Figure (1): Total post trauma stress disorder among studied burn patients (n=73)

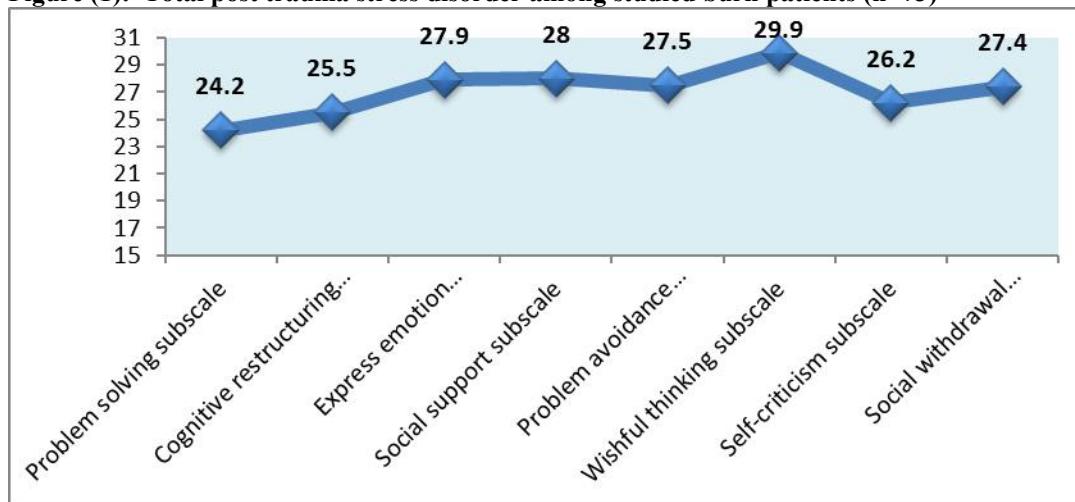


Figure (2): Total means scores of Engagement and Disengagement Coping strategies subscale among studied burn patients (n=73)

Table (4): Total Coping Strategies among studied burn patients (n=73):

Coping Strategies	Frequency	Percent
Engagement coping:		
- <60%	32	43.8
- ≥60%	41	56.2
Disengagement coping:		
- <60%	25	34.2
- ≥60%	48	65.8
Total Coping strategies:		
- Mean ± SD	216.7±19.6	
- Range	177-254	

Table (5): Correlation between Coping strategies, Post-trauma stress disorder subscales, Pain score, and Socio demographic and burn characteristics among studied burn patients (n=73):

Parameters	Engagement coping strategies		Disengagement coping strategies	
	(r)	p	(r)	P
Disengagement coping strategies	-.228	0.052	1	.
Intrusion subscale	-.493**	0.0001	.235*	0.046
Avoidance subscale	-.219	0.062	0.141	0.234
Hyper arousal subscale	-.593**	0.0001	.265*	0.024
Total Post trauma stress disorder	-.546**	0.0001	.272*	0.02
Pain intensity score	-.334 **	0.004	0.15	0.205
Age per years	-.262 *	0.025	0.191	0.105
Hospital Duration Stay (per days)	-.423 **	0.0001	0.116	0.329
Total body surface area of burn (TBSA)	-.295 *	0.011	.253*	0.031

(r) Correlation coefficient

* Significant p<0.05

**High significant p<0.01

Table (6): Correlation matrix between, Coping strategies, Post-trauma stress disorder, and Pain score among studied burn patients (n=73):

Parameters	Coping strategies inventory scale		Post trauma syndrome scale		Pain Score	
	(r)	p	(r)	p	(r)	P
Post trauma stress disorder	-.257 *	0.028				
Pain intensity score	-.244 *	0.038	.378**	0.001		
Age per years	-.0139	0.241	.278*	0.017	0.194	0.101
Hospital duration stay (per days)	-.289 *	0.013	.333**	0.004	.366**	0.001
Total body surface area of burn (TBSA)	-.095	0.426	.384**	0.001	.448**	0.0001

(r) Correlation coefficient

* Significant p<0.05

** High Significant p<0.01

Table (7): Multiple linear regression model for Post trauma stress disorder score among studied burn patients (n=73):

Model	Unstandardized Coefficients		T	Sig.	R	R ²
	B	Std. Error				
Constant	2.172					
Total body surface area of burn (TBSA)	.005	.002	2.719	.008	0.45	0.21
Engagement coping	-.004	.001	2.681	.009		

R square = 21% of predict Post trauma syndrome scale from ;Total body surface area of burn (TBSA) and Engagement coping score
 Model ANOVA: F=9.1, p=0.0001

Significant predictors of post trauma syndrome scale from Total body surface area of burn (TBSA) and engagement coping score

Table (8): Simple linear regression model for Coping strategies score among studied burn patients (n=73):

Model	Unstandardized Coefficients		T	Sig.	R	R ²
	B	Std. Error				
Constant	238.4					
Pain score	- 8.9	3.9	2.3	.024	0.26	.069

R square = 6.9% of predict Coping strategies inventory scale from pain scale

Model ANOVA: F=5.3, p=0.024

Significant predictors of post trauma syndrome scale from pain scale.

Discussion:

The study aimed to assess post-traumatic stress disorder, pain, and coping strategies among burn patients. The findings revealed that about two-thirds of burn patients were coping with trauma events by using disengagement coping strategies. However, almost all patients displayed symptoms of PTSD and nearly half of them had either severe or moderate pain. Coping strategies were negatively correlated with pain and PTSD, but pain intensity and PTSD were positively correlated in burn patients. Coping strategies and PTSD were influenced by pain intensity and burn characteristics.

The present study found that the underlying motives of burn among burn patients were an accident, the most common cause of burn was flame and the most burned area was the hands and arms. As well, second-degree burn was the highest percentages among the studied patients. This might be because the hands are the main way that helps a person accomplish his work and keeping any harm out of the body. Besides, most professions deal with flame. These results agree with **Kadam et al., (2021)**, in Iran, who noted that 62% of the patients had flame burns, and these burns were attributed to accidentally, getting burned while doing household work.

Also, our results in the same line with **Esfahlan et al., (2017)** in Iran, showed that all burns among studied patients, were accidental and the most frequent cause of the burns was flames. But, the most frequent site of burns was on the limbs. Likewise, **Ruth & Vimala (2017)** evaluated the Effectiveness of psycho-educative intervention on psychological problems among burn patients, revealed that a higher percentage of subjects had thermal burns, second-degree burns; But a higher percentage of subjects (44%) having burned in the upper extremities.

Besides, **Bikmoradi et al., (2016)** illustrated that the most common cause of burns among adults in the study was flame, the mean duration of hospitalization was 22.66 days, and the depth of the burns was mostly second degree. Additionally, the current results are in

proportion with **Abd El Aziz et al., (2015)**, who found that 55.0% of the patients were had burn-in hands, and the degree of burn wound of patients was the second degree in both groups.

The current study also found that total body surface area of burn (TBSA) ranged from 10 to 80 percent with mean 35.5 ± 13 , and the mean duration of hospital stay 45.34 ± 10.59 ranged from 30 to 77 days. The high mean of hospitalization duration in this study may be attributed to some factors such as quality of care and treatment, extent and depth of burns, and the waiting list for surgery and not being able to pay the high healthcare costs. In congruence, **Obaid et al., (2020)** revealed that the total body surface area was 59.72 ± 23.8 SD ranged (24-100%); more than two-thirds of patients present with TBSA $\geq 50\%$, the causes of the burn was flame in 81%. Too, **Ramachandran et al., (2017)** a study in India, illustrated that 68% of studied burns patients were above 50% burns, 24% were 25-50% burns and only 8% were less than 25%. Conversely, **Saad et al., (2019)** in Egypt, showed that dry heat was the highest cause of burn (50%) followed by scald burn, half of the studied patients had a percentage of burn from 10 to > 20%, and 60% of them had a second-degree burn.

The objective of the current study was to identify the incidence of post-trauma stress disorder among burn patients. The current study identified intrusion symptoms is the most common symptoms among post-trauma disorder in burn patients followed by avoidant symptoms and hyperarousal symptoms. It indicates that when patients are confronted with burn trauma, the tension and stress from the trauma increases their anxiety. Also, the memories of the traumatic events or images appear in their dreams continuously, resulting in intensive emotions and physical reactions which made them panic more. In the same context, **Cheng et al., (2015)** in Guangdong, China, stated that 25% of severely burned patients developed intrusive symptoms. While, avoidant symptoms and hyperarousal symptoms accounted for 12.5% and 23.4% of the total patients, respectively.

Furthermore, **Baral & Bhagwati (2019)** a study in Nepal, illustrated that Burn survivors with PTSD had a higher incidence of intrusive symptoms. On contrary with this, **Bibi et al., (2018b)** in Pakistan, who found no significant difference between single and married burn patients in symptoms of PTSD. Avoidance symptoms represented the highest mean score among single and married burn victims, followed by hyperarousal symptoms and re-experiencing symptoms. In the same line, **Xia et al., (2014)** in China, who reported that the average scores for dimensional symptoms of PTSD were: avoidance and numbing, 16.81 ± 6.20 points; re-experiencing, 14.89 ± 4.55 points, while hyperarousal, 14.07 ± 5.07 points.

Regarding total post-traumatic stress disorder (PTSD). The current study found almost all of the studied burned patients had post-trauma stress disorder symptoms. This may be attributed to the effect of stressful events; besides increasing the percent of total burned area and more than two-thirds of burn patients have second burn degree. Which results in increased pain intensity, tension, anxiety, and stress among burn patients. In support of this explanation, the multivariate analysis identified the percent of burned area and pain is the main positive predictor of the PTSD score. Thus, the post-trauma stress syndrome increases with pain and percent of burned area.

The foregoing present study results are in agreement with **Van Loey & Van Son (2003)**, who found that more than 90 percent of burn patients suffer stress symptoms during the first week of their injury, and more than 45 percent acquire persistent stress symptoms that can be classified as PTSD within one year. On the other hand, **Zheng et al., (2020)** indicated that less than half of respondents with burns were screened as having positive PTSD symptoms, in Chinese. Similarly, **Ramachandran et al., (2017)** a study in India, illustrated between 31 percent and 45 percent of adult burn patients had PTSD.

Also, **Dahl et al., (2016)** in Sweden, revealed that the prevalence of PTSD (full-blown symptoms) among burn patients may range from 3%-58% after the burn injury. Likewise, **Cheng et al., (2015)** reported that there were 30 out of 64 subjects (46.9%) with complicated PTSD symptoms in their study. Also, **Xia et al., (2014)** who study "the impact of acceptance of disability and psychological resilience on post-traumatic stress disorders in burn patients, in China, and found that the incidence of PTSD in burn patients was 37.8%

The second objective of the present study was to assess pain intensity among burn patients; the current study found that nearly half of them had either severe or

moderate pain. The current results are conforming with **Li et al., (2017)**, who indicated that burn patients experience chronic intense pain that can often lead to problems with compliance in treatment. Besides, **Najafi Ghezalje et al., (2017)** displayed that among the large group of patients experiencing severe pain, there are people who have suffered from burns.

Moreover, **Mohaddes Ardabili et al., (2015)** highlighted that despite pharmacological interventions, 35% of burn patients reported persistent pain, 75% pain interference with sleep, 56% interference with work, and 67% interference with their social function. Similarly, **Park, Oh & Kim (2013)**, mentioned that daily procedures of burn patients result in severe pain. In the same line, **Kursun & Kanan (2007)**, who concluded that in addition to burning pain is a severe and long-lasting pain; it is also defined as the worst pain experienced by the patients.

The third objective of the present study was to recognize the coping strategies used by burn patients. The study findings revealed that social support was the highest mean score among engagement coping strategies, followed by express emotion, while problem-solving was the lowest mean score used. This indicates that social support is a particularly important coping strategy for these patients who may consider support from others such as the family, friends, and partner can actively helping them to deal with the burn trauma. Additionally, emotional support can help burn patients to vent their feelings and strengthen their emotions by showing that they are accepted and valued.

In the same context, **Bibi et al., (2018a)** studied post-traumatic stress disorder and resilience among adult burn patients in Pakistan. Found burn victims benefit from family and peer support during rehabilitation, according to a study. In congruence with these results, **Bosmans et al., (2015)** a study in the Netherlands, suggested that emotional expressiveness may be a beneficial coping method for burn victims, assisting in their psychological rehabilitation. On the same line, **Kornhaber et al., (2014)** reported that among other types of support, peer support was important because expressing emotions and sharing feelings with other burn survivors was beneficial.

On the other hand, **Waqas et al., (2016)** who examined social support and resilience among burn damage patients in Lahore, Pakistan, discovered that resilience is positively linked to social support. However, burn victims receive low social support from family, friends, and significant others. Therefore, it's critical to engage families in the care of burn patients rather than only focusing on their wounds. Hence, increasing their resilience or the supports they obtained may help them

cope with the stressful experiences and may reduce the symptoms of PTSD.

According to the present findings, wishful thinking was the highest mean score among disengagement coping strategies used by burn patients, followed by problem avoidance. The possible explanation for that the burn patients coping with trauma and its consequences by wishing or imaging unlikely future event or situation as if it were possible and might one day happen to decrease their anxiety level and trauma. As well as, they avoid facing the problem which may be a method that is beneficial in the short term to decrease the negative emotions in their recovery period. This result agreement with, **Cheng et al., (2015)** a study in Guangdong, China, who mentioned avoidance and resignation behaviors are common coping modes adopted by severely burned patients to confront burn trauma, and suggested that their coping pattern was not a positive behavior in confronting the disease. Similarly, Prior studies among burn victims found that avoidant coping was related to negative mental health outcomes, whereas active coping and seeking social assistance were associated with higher mental health outcomes (**Amoyal et al., 2011**).

As for, total coping strategies, the findings revealed that about two-thirds of burn patients were coping with trauma events by using disengagement coping strategies. However, more than half of them used engagement coping strategies. This result agrees with **Bibi et al., (2018b)** in Pakistan, who reported that avoidant or negative coping methods are ineffective in coping with the stress and influencing their prognosis. Similarly, **Ehlers et al., (2006)** explained that avoidance may be a strategy that is helpful. However, it interferes with the event's processing and so inhibits change. In this regard, **Bosmans et al., (2015)** a study in the Netherlands, noted the early identification of individuals who can cope with the trauma is clinically important as they may require a different type of support through recovery.

The fourth objective of the present study was to explore the relationship between post-traumatic stress disorder, pain and coping strategies among burn patients, The current study revealed that post-traumatic stress disorder (PTSD) was significantly and negatively correlated with coping strategies. The possible explanation for that coped with trauma events will help to decrease the post-trauma syndrome and successfully recover from the stressful incident. In support of this explanation, the multivariate analysis explained that engagement coping strategies were the main positive predictor for PTSD score. These results congruent with, **Bibi et al., (2018a)** in Pakistan, indicated PTSD and resilience among burn victims were found to have a

strong negative relationship. A low level of resilience is linked to more symptoms of PTSD.

In the same line, **Kornhaber et al., (2016)** examined resilience in the context of burn damage and rehabilitation; they discovered that resilience significantly plays a vital role of burn patients' recovery through their lives. Similarly, **Spence Laschinger & Nosko (2015); Yu et al., (2017)** reported that resilience decreases the likelihood of PTSD, in China. Likewise, **Xia et al., (2014)** stated that PTSD was significantly and negatively correlated with the level of disability acceptance and psychological resilience, in china.

Nonetheless, the finding study also showed some correlations between certain types of coping and symptoms of PTSD. Thus, intrusion symptoms, hyperarousal symptoms, and total post-trauma syndrome were statistically and negatively correlated with engagement coping strategies. It could be because patients, who employ engage coping style as social support and express emotion experiencing fewer symptoms of PTSD. Venting and receiving emotional support reduce the possibility of re-experiencing traumatic events. In the same context, **Bosmans et al., (2015)** in the Netherlands, indicated that the coping style emotional expression was correlated with a higher recovery rate from PTSD symptoms. Also, **Lawrence & Fauerbach (2003)** showed that burn patients with severe burn injuries and minimal social support were more likely to suffer PTSD symptoms than those with minor burn injuries. In the same context, **McGarry et al., (2013)**, who illustrated that negative psychological consequences such as PTSD, depression, and anxiety were strongly linked with non-productive coping methods. However, negative correlation was shown between positive coping methods and post-traumatic stress disorder (PTSD).

This result disagrees with **Bibi et al., (2018b)** in Islamabad, Pakistan, who indicated that PTSD symptoms are positively correlated with active coping. It might be the result of a traumatic experience. Patients with PTSD exhibit greater symptoms of PTSD when confronted with trauma memories. Nevertheless, the author results also indicated PTSD symptoms such as hyperarousal and avoidance were adversely linked with coping styles (reframing and planning). further; the use of emotional support and venting was negatively linked to re-experiencing symptoms of PTSD. This could be due to the fact that adapted and solution-based techniques help individuals overcome their anxiety and actively cope with stress, which consistent with our results.

On the other hand, disengagement coping strategy was significantly and positively correlated with intrusion, hyperarousal symptoms of PTSD, and total post-trauma stress disorder. It might be due to that burn patients feeling that they are responsible for all incidents and suffering and thus avoid facing the problem and withdrawal, so they experience severe stress and post trauma symptoms. This result agrees with, **Baral & Bhagawati (2019)** in Nepal, who revealed that survivors with PTSD often employed maladaptive strategies; As a result, those who did not acquire PTSD exhibited adaptive coping, whereas those who did show PTSD exhibited maladaptive coping. In the same context, **Cheng (2015)** showed that coping behaviors of resignation can predict the severity of PTSD symptoms. Similarly, **Bosmans et al., (2015)** explained that coping style was involved in the explanation of PTSD symptoms. Avoidant coping was negatively associated with initial PTSD levels, but not with the rate of recovery.

Likewise, **Ssenyonga et al., (2013)**, who reported that resilience also improves an individual's capacity to successfully deal with a stressful experience and protect against PTSD. Inconsistent with these results, **Bibi et al., (2018b)** explained that, PTSD symptoms are not significantly linked with denial and behavioral disengagement coping mechanisms, in Pakistan. It might be because avoidant methods are a type of escape from troubles, and patients don't think about their trauma so much. Similarly, **Tuncacy et al., (2008)** found that burn patients exhibit more negative coping methods, comparable to chronic disease patients, and feel stress during the prolonged recovery period.

The present study showed that post-trauma disorder was significantly and positively correlated with pain, patients' age, hospital duration stay, and percent burned area. This result agrees with **Connor et al., (2020)** in Vermont, America, who illustrated that the low-pain class group experienced a reduction in PTSD, depression, and functional impairment, and vice versa. Besides, **Baral & Bhagawati (2019)** highlighted that PTSD was significantly correlated with the age of the respondents.

Likewise, **Ravn et al., (2018)** reported that PTSD caused by a burn injury may be due to hyperarousal, which has been linked to misperception, catastrophizing and intrusive thoughts, and pain anticipation. Similarly, **Kutlu et al., (2016)** in Turkey, explored that for burn patients, factors such as pain intensity and length of hospital stay, as well as age, gender, personal characteristics, and life experiences, result in a variety of psychological reactions such as anxiety and PTSD.

Moreover, **Australian Centre for Post Traumatic Mental Health (2013)** revealed that pain and PTSD can maintain or exacerbate each other. Meanwhile, **Bosco et al., (2013)** in South Florida, America, illustrated that PTSD symptoms become more severe with pain and its prevalence is increased in chronic pain patients.

The present study indicated that pain, hospital duration, and percent of the burned area were significantly and positively correlated with each other. It could be because when an increase in the percent of total burned area results in increased pain intensity and hospital duration stay for treatment. The current results are identical with a study by **Deniz (2017)** in Turkey, which revealed that the long stay at the hospital and applying painful procedures leading to experience severe pain in burn patients. Likewise, **Talu (2007)** mentioned while the burning pain is initially affected by the size of the total body surface area and degree of the burn, later on, treatment methods, possible infections, rehabilitation practices and psychosocial environment of the patient also become additional important factors affecting on the pain. In the same line, **Billings & Stokes (2007)**, who revealed that factors such as depth, width, and localization of the burn affect the intensity of the burning pain.

However, the present study showed that only pain was an independent negative predictor of the coping score; the coping score increasing with lower pain intensity level. The finding is in congruence with **Seymour (2019)** in Japan, who demonstrated that coping style affects the pain experienced as well as long-term outcomes in terms of both pain and stress disorders, and quality of life measures. Also, **Dauber et al., (2002)** illustrated that two-thirds (66%) of burned patients reported that pain interfered with their coping, and 55% reported that pain interfered with their daily lives.

Meanwhile, engagement coping strategies and percent of total burn surface area of the body (TBSA) were significant independent predictors of patients' post-traumatic stress score. It is noticed that post-trauma stress symptoms score increases with percent of burned area and decreases with engagement coping strategies. The current results in the same line with **Lodha et al., (2020)** in India, who indicated that some other risk factors play a crucial role in accelerating the incidence of post-traumatic stress disorder following burn injuries, are incidence of interpersonal violence, resilience recovery variables, and lack of coping strategies.

As well, **Martin et al., (2017)**, showed that there is a positive association between TBSA scores and post-traumatic growth scores. Also, the current results are

supported by **Ter Smitten et al., (2011)** who reported that severe burn injuries are more likely to trigger PTSD which can impede the long-term coping of victims. Additionally, **Giannoni-Pastor et al., (2016)** in Spain, added that people with more severe burns (high %TBSA) have greater life threats, which may result in PTSD among patients. On the contrary, **Xia et al., (2014)** indicated that multiple regression analysis showed that the depth of burn, marital status, degree of subordination, self-value, and self-improvement were factors influencing the incidence of PTSD.

Conclusion:

In conclusion, the incidence of PTSD among burn patients is high; as well as nearly half of patients had either severe or moderate pain. The mostly used coping strategies are disengagement coping strategies. PTSD is negatively correlated with coping strategies. Moreover, Increase pain intensity, resulting in exacerbates PTSD symptoms and decrease coping strategies in burn patients. Patients' age, hospital duration stay, total burn surface area and engagement coping strategies are influencing PTSD.

Recommendations:

The study recommends that psychological intervention programs to improve positive coping strategies and decrease PTSD in burn patients; Counseling clinics and helpful interventions involves support groups for burn victims; as well as, applying evidence based non pharmacological pain management methods besides pharmacological to reduce pain level among burn patients. Further research is suggested to assess physical and psychiatric comorbidities among burn patients.

References

- Abd El Aziz AE, Mohamed SM, El-Gamil AE, Kholosy HM, (2015):** Effect of Ozone Therapy Dressing Technique on the Healing Process of Recent 2nd Degree Burns. *IOSR Journal of Nursing and Health Science*; 4(4): pp. 26-49. DOI: 10.9790/1959-04412649.
- Ajoudani F, Jafarizadeh H, Kazamzadeh J, (2019):** Social support and posttraumatic growth in Iranian burn survivors: The mediating role of spirituality. *Elsevier*; 45(3): pp.732-740. DOI: 10.1016/j.burns.2018.10.013.
- Alaa Eldin SM, Mohamed HG, Ragab I, (2015):** Effect of Relaxation Breathing Technique among Patients with Moderate Burn on Their Pain and Anxiety at Wound Care. *World Journal of Nursing Sciences*; 1 (3): pp.110-123. DOI: 10.5829/idosi.wjns.2015.110.123.
- Diagnostic and Statistical Manual of Mental Disorders: DSM-5 (2013):** American Psychiatric Association, Arlington, American Psychiatric Pub.
- Amoyal, N. R., Mason, S. T., Gould, N. F., Corry, N., Mahfouz, S., Barkey, A., & Fauerbach, J. A. (2011):** Measuring coping behavior in patients with major burn injuries: A psychometric evaluation of the BCOPE. *Journal of Burn Care & Research*, 32,392–398. doi:10.1097/BCR.0b013e318217f97a
- Australian Centre for Post Traumatic Mental Health, (2013):** Australian guidelines for the treatment of acute stress disorder and posttraumatic stress disorder. Melbourne: ACPMH; p. 1–174.
- Baral IA & Bhagawati KC, (2019):** Post traumatic stress disorder and coping strategies among adult survivors of earthquake, Nepal. *BMC Psychiatry*; 19(118): p.2-8. <https://doi.org/10.1186/s12888-019-2090-y>
- Bibi A, Kalim SA, Khalid MA. (2018 a):** Post-traumatic stress disorder and resilience among adult burn patients in Pakistan: A cross-sectional study. *J Burns & Trauma*; 6:8. DOI 10.1186/s41038-018-0110-7
- Bibi A, Khalid MA, Jabeen S, Azim S, (2018b):** Symptoms of posttraumatic stress disorder and coping strategies among female burn victims: An exploratory study. *Indian J Burns*; 26(1): pp.61-65. DOI: 10.4103/ijb.ijb_10_18
- Bikmoradi A, Harorani M, Roshanaei G, Moradkhani S, Falahinia GH, (2016):** The effect of inhalation aromatherapy with damask rose (*Rosa damascena*) essence on the pain intensity after dressing in patients with burns: A clinical randomized trial; *Iran J Nurs Midwifery Res*; 21(3): pp. 247–254. DOI: 10.4103/1735-9066.180380
- Billings DM, & Stokes LG, (2007):** *Medical Surgical Nursing*. 2nd edition. Missouri: Mosby Company.
- Bosco MA, Gallinati JL, and Clark ME, (2013):** Conceptualizing and treating comorbid chronic pain and PTSD. *Pain research and treatment*; 174728. <https://doi.org/10.1155/2013/174728>
- Bosmans MW, Hofland HW, De Jong AE, Van Loey NE, (2015):** Coping with burns: The role of coping self-efficacy in the recovery from traumatic stress following burn injuries, *J Behav Med*; 38: pp.642-651. <https://doi.org/10.1007/s10865-015-9638-1>
- Cheng H, Li X, Miao H, Li R, (2015):** The Role of Coping Behavior in Severely Burned Patients with Posttraumatic Stress Disorder. *J Neuropsychiatry Clin*

Neurosci; 27(3): pp.188–192;DOI: 10.1176/appi.neuropsych.13110334

Connor JP, Brier ZMF, Price M, (2020): The Association between Pain Trajectories with Posttraumatic Stress Disorder, Depression, and Disability during the Acute Post trauma Period. *Psychosom Med*; 82(9): pp.862-868. DOI: 10.1097/PSY.0000000000000866.

Dahl O, Wickman M, Björnhagen V, Friberg M, Wengström Y, (2016): Early assessment and identification of post-traumatic stress disorder, satisfaction with appearance and coping in patients with burns. *Burns*; 42(8): 1678-1685. DOI: 10.1016/j.burns.2016.09.012

Dauber A, Osgood PF, Breslau AJ, Vernon HL, and Carr DB, (2002): Chronic Persistent Pain After Severe Burns: A Survey of 358 Burn Survivors, *Pain medicine*; 3 (1): pp.6-17. DOI: 10.1046/j.1526-4637.2002.02004.x. PMID: 15102213.

Deniz S, (2017): Pain and Anxiety in Burn Patients. *International Journal of Caring Sciences*;10 (3):p.1723

Ehlers, A., Michael, T., Chen, Y. P., Payne, E., & Shan, S. (2006): Enhanced perceptual priming for neutral stimuli in a traumatic context: A pathway to intrusive memories? *Memory*,14,316–328. doi:10.1080/09658210500305876

Elsherbiny O., El Fahar M., Weheida S., Shebl A. & Shrief W. (2018): Effect of burn rehabilitation program on improving quality of life (QoL) for hand burns patients: a randomized controlled study, *European Journal of Plastic Surgery*, 41(4), P.453.

Emma R Duchin, Megan Moore, Gretchen J Carrougher, Emily K Min, Debra B Gordon, Barclay T Stewart, Jody Sabel, Anne Jo-Nes, and Tam N Pham, (2020): Burn Patients' Pain Experiences and Perceptions at a Regional Burn Center. *Journal of Burn Care & Research*;41(1):pp.S82–S83. <https://doi.org/10.1093/jbcr/iraa>

Esfahlan AJ, Safiri S, Lotfi M, Zamanzadeh V, and Babapoor J et al.,(2017): Association Between Behavioral Responses and Burn Pain Intensity. *Trauma Monthly*; 22(3):p.39442.

Gamst-Jensen H; Vedel P N ; Lindberg-Larsen VO ; Egerod I (2014): Acute pain management in burn patients : Appraisal and thematic analysis of four clinical guidelines , *Burns*,40:1463-1469

Giannoni-Pastor A, Eiroa-Orosa FJ, Fidel Kinori SG, Arguello JM, Casas M, (2016): Prevalence and

predictors of posttraumatic stress symptomatology among burn survivors: A systematic review and Meta-analysis. *J Burn Care Res*; 37(1):pp.79 -89. DOI: 10.1097/BCR.0000000000000226.

Kadam KS, Bagal RP, Angane AY, Ghorpade GS, Anvekar AR, Unnithan VB, (2021): A cross-sectional study of quality of life, psychiatric illness, perceived social support, suicidal risk and self- esteem among patients with burns. *J Family Med Prim Care*; 10(1):pp.432-438. DOI: 10.4103/jfmpe.jfmpe_1604_20

Kornhaber R, Bridgman H, McLean L, Vandervord J(2016): The role of resilience in the recovery of the burn-injured patient: an integrative review. *Chronic Wound Care Manag Res*. 2016;3:41–50.

Kornhaber, R., Wilson, A., Abu-Qamar, M. Z., & McLean, L. (2014): Adult burn survivors' personal experiences of rehabilitation: An integrative review. *Burns*, 40, 17–29. doi:10.1016/j.burns.08.003

Kutlu R, Isiklar-Ozberk D, Gok, H & Demirbas N, (2016): Cardiology Intensive Care Unit; Cigarette; Hospital Anxiety and Depression Scale. *Turkish Journal of Thoracic and Cardiovascular*; 24(4):pp. 672-679.

Lawrence JW & Fauerbach JA, (2003): Personality, coping, chronic stress, social support and PTSD symptoms among adult burn survivors: A path analysis. *J Burn Care Rehabil*; 24(1): pp.63-72. DOI: 10.1097/00004630-200301000-00016.

Li J, Zhou L, and Wang Y, (2017): The effects of music intervention on burn patients during treatment procedures: a systematic review and meta-analysis of randomized controlled trials. *BMC Complementary and Alternative Medicine*; 17(17):p.158. Doi: 10.1186/s12906-017-1669-4.

Lodha P, Shah B, Karia S, De Sousa A,(2020): Post-Traumatic Stress Disorder (Ptd) Following Burn Injuries: A Comprehensive Clinical Review. *Ann Burns Fire Disasters*; 31; 33(4):pp.276-287. PMID: 33708016; PMCID: PMC7894845.

Martin L, Byrnes M, Bulsara MK, McGarry S, Rea S, Wood F,(2017): Quality of life and posttraumatic growth after adult burn: a prospective, longitudinal study. *Burns*; 43(7):pp.1400–1410,DOI: 10.1016/j.burns.2017.06.004.

McCaffery M & Beebe A, (1993): Pain: Clinical Manual for Nursing Practice. Baltimore: v. v. Mosby Company.

McGarry S, Girdler S, McDonald A, Valentine J, Lee Sh, Blair E, Wood F and Elliott C, (2013):

Paediatric health-care professionals: Relationships between psychological distress, resilience and coping skills, *Journal of Paediatrics and Child Health*; 49(9):pp.725–732.DOI: <https://doi.org/10.1111/jpc.12260>

Mohaddes Ardabili F, Purhajari S, Najafi Ghzeljeh T, & Haghani H, (2015): The effect of shiatsu massage on underlying anxiety in burn patients. *World journal of plastic surgery*; 4(1):pp.36–39. PMID: 25606475; PMCID: PMC4298863.

Najafi Ghezljeh T, Mohades Ardebili F, Rafii F, Manafi F,(2017): The Effect of Massage on Anticipatory Anxiety and Procedural Pain in Patients with Burn Injury. *World J Plast Surg*; 6(1):pp.40-47. PMID: 28289612; PMCID: PMC5339608.

Nina K & Rinat Sh (2017): Nursing Interventions for Posttraumatic Stress Disorder, Bachelor's Thesis in Nursing, Lahti University of Applied Sciences .

Obaid EM, Baiee HA, Ismail IS, (2020): Aspects of Fatal Burn Injury Cases Admitted to Al-Sadiq Teaching Hospital, Babylon Province/Iraq During 2020. *Medico-legal Update*;20(4):pp.661-667
DOI: <https://doi.org/10.37506/mlu.v20i4.1895>

Pacella ML, Hruska B, Delahanty DL(2013): The physical health consequences of PTSD and PTSD symptoms: a meta-analytic re- view. *J Anxiety Disord*, 27: 33-46.

Park E, Oh H, Kim T, (2013): The Effects of Relaxation Breathing on Procedural Pain and Anxiety During Burn Care. *Burns*; 39(6):pp. 1101- 1106. doi: 10.1016/j.burns.2013.01.006.

Patterson DR, Tininenko J, Ptacek JT, (2006): Pain during burn hospitalization predicts long-term outcome. *J Burn Care Res*; 27(5):pp.719–726. doi:10.1097/01.BCR.0000238080.77388.FE. PMID: 16998406.

Ramachandran M, Durairaj AR, Rao SRVM, Sundaramurthy N, (2017): Analysis of psychiatric problems in burn patients in a tertiary burn unit: a prospective study. *International Surgery Journal*; 4(12):pp.4015-4021. DOI: <http://dx.doi.org/10.18203/2349-2902.isj20175402>

Ravn SL, Hartvigsen J, Hansen M, Sterling M, Andersen TE, (2018): Do post-traumatic pain and post-traumatic stress symptomatology mutually maintain each other? A systematic review of cross-lagged studies. *Pain*; 159(11):pp.2159-2169. DOI: 10.1097/j.pain.0000000000001331.

Richardson P, Mustard L, (2009): The management of pain in the burns unit . *Burns* , 35(7):921-36

Ruth VR & Vimala G, (2017): Effectiveness of psycho educative intervention on psychological problems among burn patients admitted at pravara rural hospital, loni. *International Journal of Health Sciences & Research*; 7(12):pp.114-119.

Saad AY, Ghazi GA, Desoky GM,(2019): Relationship between Burn Scar and anxiety, Depression & Self-Esteem among Patients with Moderate Degree Burn. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*; 8(1):pp.44-54.DOI:10.9790/19590801104454.

Schneider JC, Bassi S, Ryan CM, (2009) : Barriers impacting employment after burn injury. *J Burn Care Res*;30:294-300.

Sheerin C., Chowdhury N., Lind M.,Kurtz E., Rappaport L., Berenz E. &Amstadter A. (2018): Relation between coping and post trauma cognitions on PTSD in a combattrauma population, *Military Psychology*, 30(2), P.99.

Seymour B, (2019): Pain: A Precision Signal for Reinforcement Learning and Control. *Neuron*; 20; 101(6):pp.1029-1041. DOI: 10.1016/j.neuron.2019.01.055.

Smolle C, Cambiaso-Daniel J, Forbes AA, Wurzer P, Hundeshagen G, Bran- ski LK, Huss F, and Kamolz L-P,(2017): Recent trends in burn epidemiology worldwide: a systematic review. *Burns*; 43(2):pp.249–257. doi: 10.1016/j.burns.2016.08.013. Epub 2016 Sep 3. PMID: 27600982; PMCID: PMC5616188.

Spence Laschinger HK, Nosko A ,(2015): Exposure to workplace bullying and post-traumatic stress disorder symptomology: the role of protective psychological resources. *J Nurse Manag* ;23:252–62.

Ssenyonga J, Owens V, Olema DK, (2013): Posttraumatic growth, resilience, and posttraumatic stress disorder (PTSD) among Refugees. *Procedia - Social and Behavioral Sciences*;82:pp.144–8.DOI: 10.1016/j.sbspro.2013.06.238

Taha A A ; Beshr A ;Tahseen H ;Nawar A and Darwish Y G, (2018): Pattern of burns in a population presented to Cairo University hospitals over one year; an epidemiological study; *BURN Open* , volume 2,Issue 2, pp90-93 .

Talu G, (2007): Burn Pain and Treatment. 3rd edition. Nobel Tip Publishing, İstanbul;pp.184-187

- Ter Smitten MH, de Graaf R, Van Loey NE, (2011):** Prevalence and co-morbidity of psychiatric disorders 1-4 years after burn. *Burns*. Elsevier journal; 37(5):pp.753-761. doi: 10.1016/j.burns.2010.12.018.
- The National Institute of Mental Health ,(2016) :** Post-Traumatic Stress Disorder. [Referenced 23 June 2016.] Available: http://www.nimh.nih.gov/health/topics/post-traumatic-stressdisorder-ptsd/index.shtml#part_145373
- Thombs, B. D., Notes, L. D., Lawrence, J. W., Magyar-Russell, G., Bresnick, M. G., & Fauerbach, J. A. (2008):** From survival to Socialization: A longitudinal study of body image in survivors of severe burn injury. *Journal of Psycho somatic Research*, 64,205–212. doi:10.1016/j.jpsychores.2007.09.003
- Tobin , D. L.; Holroyd , K. A. & Reynolds, R.(1984) :** Manual for the Coping Strategies Inventory .Ohio : Department of Psychology , Ohio University.
- Tuncay T, Musabak I, Gok DE, Kutlu M, (2008):** The relationship between anxiety, coping strategies and characteristics of patients with diabetes. *Health Qual Life Outcomes*; 13:pp.6-79. doi: 10.1186/1477-7525-6-79. PMID: 18851745;
- Van Loey NE, Van Son MJ, (2003):** Psychopathology and psychological problems in patients with burn scars: epidemiology and management. *Am J Clin Dermatol*; 4(4):pp.245-272. DOI: 10.2165/00128071-200304040-00004.
- Walker, S. P. & Esterhuysen, K. G. F. (2013).** Pain severity, coping and satisfaction with life in patients with chronic pain. *South Afr. J. Anaesth. Analg.*, 19(5), 252-256.
- Wang Y, Beekman J, Hew J, Jackson S, Issler-Fisher AC, Parungao R, Lajevardi SS, Li Z, Maitz PKM, (2018):** Burn injury: Challenges and advances in burn wound healing, infection, pain and scarring. *Adv Drug Deliv Rev*;1(123):pp.3-17.doi: 10.1016/j.addr.2017.09.018.
- Waqas A, Naveed S, Bhuiyan MM, Usman J, Inam-ul-Haq A, Cheema SS, (2016):** Social support and resilience among patients with burn injury in Lahore, Pakistan.*Cureus*. <https://doi.org/10.7759/cureus.867>.
- Weiss, D.S., & Marmar, C.R. ,(1997):** The Impact of Event Scale-Revised. In J.P. Wilson & T.M.Keane (Eds.), *Assessing Psychological Trauma and PTSD* (pp.399-411). New York: Guilford.
- Williamson ,V (2017):** The impact of post-traumatic stress disorder, *Nursing in practice*. Accessed on 3 April 2021. available at <https://www.nursinginpractice.com/clinical/the-impact-of-post-traumatic-stress-disorder/>
- World Health Organization (2018).** *Burns*. [Referenced 6 March 2018.] Retrieved from <https://www.who.int/news-room/fact-sheets/detail/burns> .
- Xia Z, Kong Y, Yin T, Shi S, Huang R, (2014):** The impact of acceptance of disability and psychological resilience on post-traumatic stress disorders in burn patients. *International journal of nursing sciences*; 1(4): pp.371- 375. DOI:10.1016/j.ijnss.2014.10.018
- Yu NX, Chen L, Ye Z, Li X, Lin D, (2017):** Impacts of making sense of adversity on depression, posttraumatic stress disorder, and posttraumatic growth among a sample of mainly newly diagnosed HIV-positive Chinese young homosexual men: the mediating role of resilience. *AIDS Care*; 29(1):pp.79-85. DOI: 10.1080/09540121.2016.1210073.
- Zheng H, Wu K, Zhou Y, Fu L, Zhang D, Liu Z, (2020):** Prevalence and associated factors of post-traumatic stress disorder in burned patients and their family members. *Burns*. Elsevier journal; 7:S0305-4179(20)30568-4. DOI: 10.1016/j.burns.2020.10.019.
- Zheng Y, Fan F, Liu X, Mo L. (2012):** Life events, coping, and posttraumatic stress symptoms among Chinese adolescents exposed to 2008 Wenchuan earthquake, China. *PLoS One*;7:e29404.