Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

EFFECT OF A MODIFIED DRESSING TECHNIQUE ON WOUND STATUS AND PAIN PERCEPTION AMONG PATIENTS WITH BURN INJURIES

WAFAA IBRAHIM MAHMOUD*

Assistant Lecturer, Medical Surgical Nursing, Faculty of Nursing, Cairo University, Egypt.
*Corresponding Author Email: wafaa.ibrahim2014@yahoo.com

AMEL GOMAA ABD EL-NABY

Professor, Medical Surgical Nursing, Faculty of Nursing, Cairo University, Egypt.

SALWA HAGAG ABDELAZIZ

Professor, Medical Surgical Nursing, Faculty of Nursing, Cairo University affiliated with Badr University in Cairo, Egypt.

AHMED ADEL MOHAMED NAWAR

Professor, Plastic Surgery, Faculty of Medicine, Cairo University, Egypt.

Abstract

Background: Globally burns are a serious public health problem. It is a common type of traumatic injury and accounting for 96% of fatal fire-related burns occur in low and middle-income countries**. Aim:** To evaluate the effect of a modified dressing technique on wound status and pain perception among patients with burn injuries. **Design:** pre/posttest nonequivalent control group quasi experimental design was utilized. **Setting:** Burn department in one of teaching hospitals of Cairo University-Egypt. **Sample:** A convenient sample of 60 adult patients having 2nd degree of burn superficial deep partial thickness burn. **Tools:** Three tools were utilized to gather data (1) Personal and Medical Data Form, (II) Bates-Jensen Wound Assessment tool and (III) Short Form of the McGill Pain Questionnaire. **Results:** Results supported the stated research hypotheses. There were a highly statistically significant differences between the study and control groups regarding total mean scores of wound status parameters after implementing a modified dressing techniques (f =16.17;Pvalue =0.00*).In relation to pain perception: a highly statistically significant differences were found between the study and control groups after implementing a modified dressing technique regarding to pain rating index (PRI) at the end of 1st week (X^2= 11.8; P= 0.003*) and 2nd week (X^2= 17.8, P= 0.00*). As regards Visual Analogy Scale **(VAS)** at the end of the 1st and 2ndweek before and after implementing modified dressing technique (t=0,000*; P=1.000), (t=2.502; P=0.015*), (t=2.2474; P=0.016*) and (t=4.127; P=0.000*) respectively. While, there were statistically significant differences were found between the study and control groups concerning total mean of pain present index (PPI) after implementing a modified dressing technique at the end of 1st and 2nd week (t=5.3; P=0.02*) and (t=6.2; P=0.01*) respectively. **Conclusion:** The current study concluded that implementing a modified dressing technique by using normal saline0.09% in burn wound cleansing may be of great value in improving patients wound status and reducing pain perception compared with tape water. **Recommendation:** To validate and generalize the results, the study should be repeated on a larger sample in different settings. Using modified dressing techniques as a new approach for Burn dressing.

Keywords: Modified Dressing Technique – Wound Status –Pain Perception.

INTRODUCTION

Burn as damage to the skin or other organs of the body, which is mainly caused by contact with hot liquids and solids or flames in which there is partial or complete destruction of skin tissue cells. In fact, disruption of the skin can lead to increased fluid loss, infection,

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

hypothermia, scarring, compromised immunity and changes in function, appearance, and body image. On the other hand, burn that does not exceed 25% of total body surface area (TBSA) produces a primarily local response, while, burn that exceeds 25% of TBSA may produce both local and systemic response and considered major burn injuries (Carvalho, Paggiaro, Nicolosi, Gemperli, & de Carvalho, 2023). According to the World Health Organization (WHO,2023), it is estimated that each year approximately 11 million people suffer from burn wounds, 180,000 of whom die because of such injuries. the International Society of Burn Injuries at 2023.

There are four degrees for the burn wounds: The first-degree burn affects the epidermis; it is known as a superficial thickness burn and is clinically distinguished by erythema and the absence of blisters. The second-degree burn descends to affect the superficial dermis; it is called a superficial partial-thickness burn, and it is clinically characterized by blisters and severe pain. The third-degree burn descends to affect the deep dermis; it is called a "deep partial thickness burn," and it is presented clinically with a whiter appearance.

The fourth degree burn spreads to the dermis, muscles, and bones; it is referred to as a full thickness burn and is clinically manifested as hard eschar with no sensation. burn wounds are difficult to heal and can lead to disability, pain, serious emotional and psychological complications, and even death (Carvalho et al., 2023). Pain is one of the side effects of burns that burn patients experience throughout the day.

This pain can be increased by medical and nursing care such as cleaning, debridement, and wound dressing (Farzan et al., 2023). Wound dressing washing during wound care of burn patient should be an important concern.

There are several types of irrigation fluids that can be used, such as: normal saline 0.9%, sterile water, tap water (Kurnia, 2022). Burn wound cleansing is part of standard care and can be performed using different methods, like shower, immersion in bathtubs, bedside irrigation and wiping with different solution. The solution used should be carefully chosen depending on the type, grade and localization of burns (Tiglis, Peride, Neagu, Raducu& Lascar, 2022).

Nurses are an integral and vital part of the care team of patients with burn, and they should have the skills to care for patients with burn injuries. It is crucial that nurses continuously prepare the wound by, removing the dressing carefully to avoid tissue damage and bleeding, rebidding the wound and cleansing the wound as needed/prescribed.

Also, the role of the nurse is to assess wound status using different tools and monitor pain perception, perform evidence-based practice related to dressing technique for burn wound in order to minimize the pain perception, improve wound status and prevent complicated wound. Therefore, the aim of this study is to evaluate the effect of a modified dressing technique on wound status and pain perception among patients with burn injuries.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Significance of the Study

Burn injuries are one of the very important health problems that cause prolonged hospitalization and increased expenses for patients, families and societies. The burn injuries are more common in developing countries (Abazari et al., 2022). In Egypt, there are 100, 000 people who suffer from burns yearly and only a few manage to afford the care needed to survive.

In addition, 95% of deaths occur in low and middle-income countries (Fahmy et al., 2022). As in other low-income countries burns in Egypt are considered as major health problems that are associated with high mortality and morbidity (World Health Organization, (WHO), 2023.

Currently, there are very little researches conducted about how normal saline affect wound status and pain perception among patients with burn injuries in Egypt.

Therefore, the results of this study may benefit nurse practitioners, other health-care providers, researchers, nursing educators as well as health care decision makers through providing information about modified dressing technique for burn wound management by using normal saline as a cleansing solution instead of tape water among patients with burn injuries that may enhance the wound healing process, decrease pain perception, prevent the occurrence of further complications, extra costs and prolonged hospital stay.

Furthermore, the current study may provide evidence-based practice regarding burn wound care and data base for further investigations of burn wound management.

Aim of the Study

The aim of this study was to evaluate the effect of a modified dressing technique on wound status and pain perception among patients with burn injuries.

Research Hypotheses

To achieve the aim of this study the following research hypotheses were formulated:

H1: The post total mean scores of wound status parameters in patients with burn injuries who receive the modified wound dressing technique are different from the post total mean scores of wound status parameters in patients with burn injuries who receive routine wound dressing.

H2: The post total mean scores of pain perception in patients with burn injuries who receive the modified wound dressing technique are different from the post total mean scores of pain perception in patients who receive routine wound dressing

Research Design

Pre/posttest nonequivalent control group quasi experimental design was used to achieve the aim of the current study. Pre- posttest nonequivalent control group design is a sub-type of quasi-experimental in which measurements of the same variables are taken at different points in time (Rogers &Revesz, 2020).

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Setting

This study was conducted in burn department at Kaser EL-Aini Hospital-affiliated to Cairo University Hospitals, Egypt.

Sample

A convenient sample of 60 adult male and female patients admitted to the selected burn department. over six consecutive months was recruited for this study according to the following established inclusion criteria were; (a) age18 to 60 years, (b) Having 2nd degree of burn superficial –deep partial thickness burn (c) Total body surfaces area (TBSA) range between 10 and 15 percent using Wallace rule of nines (d) Controlled diabetes (e) Free from wound infection (f) Able to communicate verbally and willing to participate in the study (h) Have thermal burn injuries either fire flames or hot objects (i) not receive analgesic before dressing.

Data Collection Tools

Data relevant to the current study were collected by the following tools:

Tool I: Personal and Medical Data Form (PMDF): It is developed by the researcher and consisted of two parts as follows: Part one (personal data): It included; patient's age, gender, level of education, marital status, occupation, income, …… etc. And Part two (medical data): which included patient's medical data as diagnosis, date of admission, degree of burn, TBSE, comorbities…etc.

Tool II: Bates-Jensen Wound Assessment Tool (BWAT): It was adapted by the researcher according to the inclusion criteria of patients in this study, it is a rating tool to measure and track wound status. It provides objective numerical scores as it contains 11 parameters to assess the wound status including: size, depth, edges, undermining, granulation and epithelialization tissue, exudates type, its amount, surrounding skin color, peripheral tissue edema and induration.

Scoring System: Each item has five categories with an associated score; the scoring system for each category ranges from one to five, where one indicates the lowest severity and five is the highest severity with total score of (55). The higher the total score the more severe the wound status the total bates-Jensen wound assessment scores are divided into four severity categories as follows: from 11 to 19 means minimal severity, from 20 to 29 equals mild severity, from 30 to 39 refers to moderate severity and from 40 to 55 tied to extreme severity.

Bates-Jensen Wound Assessment Tool was evaluated and found to be valid and reliable. The reliability of this tool was confirmed with an excellent Cronbach's alpha ($\alpha = 0.97$). (Bates-Jensen et al., 1992; Harris et al., 2010; Bates-Jensen et al., 2019).

Tool III: Short-Form McGill Pain Questionnaire (SF-MPQ): It is developed by Mulzac (1987); it is considered a shorter version of the original McGill Pain Questionnaire (MPQ); however, it had a multidimensional measure of perceived pain including the Pain Rating Index (PRI), Visual Analog Scale (VAS) and Present Pain Intensity (PPI). The Pain Rating

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Index is comprised of two subscales: sensory subscale that represented by 11 words items followed by affective subscale using four affective words, which is rated on an intensity. Scale as 0 = none, 1 = mild, 2 = moderate or 3 = severe. The PRI total score was obtained by summing the item scores (range 0–45) classified as 0 = no pain, from 1 to 15 = mild pain, from 16 to 30 moderate pain and from 31 to 45 severe pain.

On other hand, VAS scales which is a 10-centimeter; 100mm horizontal line with clearly defined boundaries with descriptive anchors ranging from "no pain" to the "worst possible pain".

The intensity of pain was calculated from point zero to the point where the patient had marked in centimeters, and represented the intensity of pain at the time of completing the questionnaire. Whilst, Present Pain Intensity had six items verbal rating scale with scores ranging from 0 = no pain to 5 = excruciating pain scores indicates worse pain.

Short-Form McGill Pain Questionnaire (SF-MPQ) is valid tool with construct validity ($r = 0.36$; $P < 0.01$) and reliable tool with Cronbach's alphas $\alpha = 0.73– 0.89$ and test–retest reliability was 0.79–0.93.

It is self-report measure that takes about 2-5 min to administer (Hawker, Mian, Kendzerska& French, 2011). The reliability of this tool was confirmed with an excellent Cronbach's alpha (α =0.89,0.94).

PROCEDURE

Assessment Phase: This phase was included thorough review of literature related to dressing techniques for burn injuries, in addition, searching for appropriate data collection tools for this study. All supplies for wound dressing such as measuring tape ruler, transparent metric measuring guide … etc. were taken into consideration during this phase as well.

Planning Phases: In this phase the researcher was available daily in the burn unit to register the name of potential participants. After that the researcher was conduct an initial assessment to select the patients who met the inclusion criteria. In the first meeting with the study participants, the purpose and the significance of the study were explained to each participant individually.

Those who chosen to participate in the study were asked to sign the consent form. The first 30 patients constituted the control group who was received the routine wound care dressing. While the subsequent 30 patients were form the study group who was received the modified wound dressing technique by the researcher.

Implementation Phase: In this phase Personal and Medical Data Form (PMDF), Bates–Jensen wound assessment tool (BWAT) and Short-Form McGill Pain Questionnaire (SF-MPQ) were completed by the researcher for all participants within 24 hours from patients' admission as a baseline data for in the two groups (control and study groups).

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

The first and third tools were completed via structured interview; both look approximately 30 minutes, while tool No.2 will be completed through observation will take between 30-45 minutes.

The researcher started with the control group which received the routine care, which consisted of following steps;(a) clean the burn wound using tap water, (b) apply betadine10% (c) and adding ointment such as drama zine, Eruxol spray and (d)cover the wound with sterile gauze secured with adhesive tape.

Whereas the patients in the study group received the modified dressing technique in the dressing room which was similar to the routine wound dressing technique except the first step, which is instead of using tap water to clean the wound, the researcher used normal saline 0. 9% to clean the wound.

Modified dressing technique (The intervention for study group) was repeated /day for two consecutive weeks. This phase will took60-90minutes for each participant.

Evaluation Phase: Regarding the control group, assessment of the burn wound was carried out using Bates- Jensen wound assessment tool (tool II), while pain perception was assessed by Short-Form McGill Pain Questionnaire (SF-MPQ) (tool III) at the end of the 1st week and the 2nd week respectively.

Nevertheless, 1st and the 2nd post intervention assessment for the control group were carried out at the end of the 1st and 2nd week respectively using the same tools that is, after completing 7 and 14 days of using the modified dressing wound technique two mentions previously.

Statistical Analysis

Obtained data was tabulated, computed and analyzed using statistical package for the social science (SPSS) program version 23Descriptive statistics such as frequency, percentage, mean & standard deviation; also, inferential statistics as T-test and chi square were utilized to analyze data pertinent to the study.

Level of significance was adopted at P≤ 0.05. (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). While highly significant level was set at p≤0.001.

RESULTS

Statistical findings of the current study divided into three sections; Section I personal and medical related data of the study and control groups (Tables 1- 2). Section II: Comparison of mean differences between the study and control groups regarding to wound status parameters (tables 3-6) and figure1.

While Section III: Comparison of mean differences between the study and control groups regarding to pain perception (Tables7-9).

Section I: personal and medical related data of the study and control groups (Tables 1- 2)

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Table 1: Frequency and Percentage Distribution of Personal Data among the Study and Control Groups (n=60) (30/each).

Personal data	Study group (n=30)		Control group(n=30)		X2	p
	No.	%	No.	%		
Age					3.2	0.35
18-<30	6	20.0	9	30.0		
30-<40	9	30.0	12	40.0		
40-<50	11	36.7	5	16.7		
50-60	4	13.3	4	13.3		
Gender					0.06	0.79
Male	12	40.0	13	43.3		
Female	18	60.0	17	56.7		
Education					3.1	0.67
Illiterate	5	16.7	4	13.3		
Read and write	10	33.3	11	36.7		
Primary	1	3.3	3	10.0		
Preparatory	2	6.7	0	0.0		
Secondary	7	23.3	7	23.3		
Diploma	5	16.7	5	16.7		
University	5	16.7	4	13.3		
Marital status					4.6	0.19
Single	11	36.7	5	16.7		
Married	18	60.0	22	73.3		
Divorced	0	0.0	2	6.7		
Widow	1	3.3	1	3.3		
Living condition					1.89	0.38
Alone	7	23.3	4	13.3		
With family	23	76.7	25	83.3		
Relative	0	0.0	1	3.3		
Occupation					2.4	0.12
Employee	11	36.7	17	56.7		
Unemployed	19	63.3	13	43.3		
Residence					0.41	0.51
Rural	7	23.3	5	16.7		
Urban	23	76.7	25	83.3		
Smoking					0.08	0.77
Smoker	9	30.0	8	26.7		
Non smoker	21	70.0	22	73.3		

*Significant at P-value<0.05

Table (1) showed that, as regards age 36.7% of the study group and 40% of the control group had age ranged between 30 and less than 50 years. With a mean age ± SD 39.3±9.7and 36.3 ± 10.1 years respectively.

Regarding gender 60% of the study group and 56.7 %of the control group were female. In relation to level of education, 33.3% of the study group and 36.7% of the control group can read and write.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Regarding marital status 60% of the study and 73.3% of the control group were married. The same table showed that 76.7% of the study group and 83.3% control group living with their family.

Concerning occupation 63.3% of the study was unemployed and 56.7% of the control group was employed. In relation to residences, high percentage of the study and control groups (76.7%, 83.3%) lived in the urban areas respectively.

Concerning smoking 70 % of the study and 73.3% of the control group were non-smokers.

There were no statistically significant differences between the two groups regarding all the personal data (p>0.05).

Table 2: Frequency and percentage distribution of medical related data among the study and control groups (n= 60). (30/each).

Medical data	Study(n=30)		Control(n=30)		X2	p
	No.	%	No.	%		
Chronic illness					2.5	0.76
No Yes	22 8	73.3	18	60.0		
Hypertension	3	10.0	5	16.7		
Kidney	1	3.3	2	6.7		
Heart	1	3.3	3	10.0		
Diabetes	1	3.3	1	3.3		
Liver	2	6.7	1	3.3		
Cause of burn					1.2	0.76
Fire	10	33.3	8	26.7		
Boiling water	18	60.0	18	60.0		
Boiling oil	1	3.3	1	3.3		
Contact of hot surface	1	3.3	3	10.0		
BMI					2.9	0.57
Underweight	1	3.3	1	3.3		
Normal	21	70.0	17	56.7		
Overweight	3	10.0	5	16.7		
Class 1 obese	5	16.7	5	16.7		
Class 2 obese	0	0.0	2	6.7		

*Significant at P-value<0.05

Table (2): Showed that73.3%, of the study group and 60%of the control group had no chronic diseases. In relation to causes of burn, 60% of the study and control groups their burn caused by boiling water.

Regarding classification of Body Mass Index (BMI), 70.0% of the study group and 56.7% of the control group categorized as normal.

There were no statistically significant differences among the two groups regarding all the medical related data (p >0.05).

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Section II:

Table (3): Comparison of total mean scores of wound status parameters among patients in the study group along the study period.

(n= 60) (30/each)

Wound assessment items	Baseline Assessment	1st assessment At the end of 1st week		2nd assessment at the end of 2nd week		Difference between baseline and 1st assessment			Difference between baseline and 2nd assessment	
	Mean	SD	Mean	SD	Mean	SD	T	P	T	p
Size	3.23	0.68	2.60	0.81	1.87	0.97	3.263	0.002*	6.288	0.000*
Depth	2.00	0.00	1.97	0.18	1.97	0.18	0.913	0.365	0.913	0.365
Edges	3.30	0.70	2.67	0.88	2.10	0.88	3.069	0.003*	5.845	0.000*
Undermining	2.83	0.46	2.13	0.73	1.60	0.67	4.444	0.000*	8.290	0.000*
Exudate type	2.93	1.08	2.33	1.06	1.80	1.06	2.172	0.034	4.090	0.000*
Exudate amount	3.37	0.96	2.63	0.89	2.13	0.97	3.096	0.003*	4.977	0.000*
Skin color	2.57	0.50	2.07	0.78	1.63	0.72	2.956	0.005*	5.873	0.000*
Peripheral tissue edema	2.67	0.80	2.10	0.84	1.47	0.68	2.691	0.009*	6.260	0.000*
Peripheral tissue induration	2.73	0.52	2.10	0.80	1.60	0.67	3.616	0.001*	7.298	0.000*
Granulation tissue	2.60	0.72	2.17	0.75	1.67	0.71	2.265	0.027*	5.037	0.000*
Epithelization	2.60	0.56	1.93	0.74	1.63	0.72	3.954	0.000*	5.825	0.000*
Total	30.83	5.25	24.70	6.49	19.47	6.79	4.022	0.000*	7.249	0.000*

*Significant at P-value<0.05

Table (3): illustrated that a highly statistically significant differences were found among patients in the study group regarding total mean scores of wound status parameters before, after implementing a modified dressing techniques at the end of 1st week (t test 4.022; P value=0.000) and at the end of the 2nd week (t test = 7.249; P value =0.000).

Table (4): Comparison of total mean scores of wound status parameters among patients in the control group along study period

(n= 60) (30/each)

Wound assessment items		Baseline Assessment	1st assessment at the 1stweek end of study period		2nd assessment at the 2ndweek end of study period		Difference between baseline and 1st assessment		Difference between baseline and 2nd assessment	
	Mean	SD	Mean	SD	Mean	SD	t	P	t	p
Size	3.03	0.56	2.90	0.76	2.70	0.95	0.754	0.454	1.639	0.107
Depth	2.03	0.18	1.93	0.37	1.93	0.37	1.331	0.188	1.331	0.188
Edges	2.67	0.61	2.53	0.78	2.47	0.86	0.774	0.442	1.039	0.303
Undermining	2.57	0.50	2.47	0.73	2.43	0.77	0.619	0.538	0.835	0.407
Exudate type	3.13	1.17	3.00	1.26	2.90	1.35	0.414	0.680	0.705	0.484
Exudate amount	3.30	0.95	3.23	1.07	3.07	1.26	0.268	0.790	0.798	0.428
Skin color	2.40	0.62	2.23	0.77	2.20	0.81	0.942	0.350	1.074	0.287
Peripheral tissue edema	2.10	0.92	2.13	0.97	2.13	0.97	0.123	0.903	0.123	0.903
Peripheral tissue induration	2.07	0.83	2.00	0.87	2.00	0.87	0.319	0.751	0.319	0.751
Granulation tissue	2.17	0.70	2.00	0.83	2.00	0.83	0.858	0.395	0.858	0.395
Epithelization	2.03	0.61	1.93	0.69	1.90	0.71	0.595	0.554	0.761	0.450
Total	27.50	6.21	26.37	7.78	25.73	8.70	0.622	0.537	0.907	0.368

*Significant at P-value<0.05

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

Table (4)illustrated that no statistically significant differences were found among patients in the control group regarding total mean scores of wound status parameters of the baseline assessment at the end of 1st week (t test 0.622 ;P value=0.537) and at the end of the 2nd week (t test = 0.907 ;P value =0.368).

Table 5: comparison of total mean scores of wound status parameters between the study and control groups along the study period (n= 60) (30/each)

	Study group (n=30)		Control group (n=30)	
	Mean	**SD**	**Mean**	**SD**
Baseline	30.83	5.25	27.50	6.21
1st Assessment (End of 1stweeks)	24.70	6.49	26.37	7.78
2nd Assessment (End of 2ndtweeks)	19.47	6.79	25.73	8.70
F	16.17		0.38	
P	0.00*		0.53	

*Significant at p value<0.05

Table (5)revealed that total mean scores of burn wound status parameters there were no statistically significant differences between the study and control group before implementing a modified wound dressing techniques (f =0.38; P value =0.53). However, there were highly statistically significant differences between the study and control groups (f =16.17; P value =0.00*).

Table 6: frequency percentages distribution among the study and control groups regarding the wound status severity on total BWATassessment scores along the study period (n= 60).

Time	Levels	Study		Control		X2	p
		No.	**%**	**No.**	**%**		
Baseline	Minimal severity	0	0.0	2	6.7	3.1	0.2
	Mild severity	12	40.0	15	50.0		
	Moderate severity	18	60.0	13	43.3		
At the end1st week	Minimal severity	6	20.0	7	23.3	1.1	0.57
	Mild severity	15	50.0	11	36.7		
	Moderate severity	9	30.0	12	40.0		
At the end 2nd weeks	Minimal severity	17	56.7	6	20.0	6.3	0.04*
	Mild severity	8	26.7	10	33.3		
	Moderate severity	5	16.7	12	40.0		

*Significant at P-value<0.05

Table(6) Illustrated that there was statistically significance difference between the study and control groups after implementing a modified dressing wound care the (X^2=6.3; P =0.04).

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

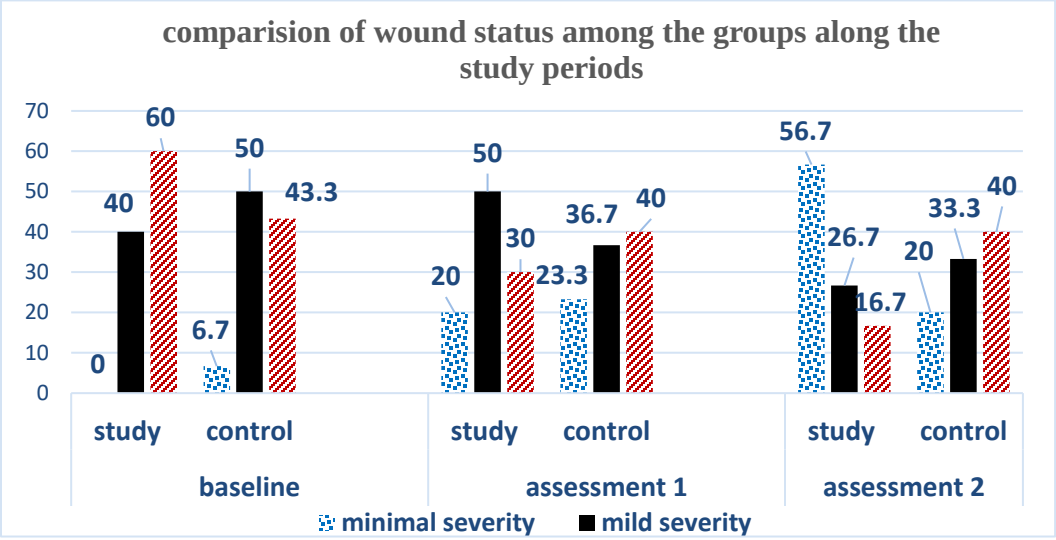

Figure (1): comparison between the study and control groups regarding the wound status severity on total BWATassessment scores along the study period(n=60) (30/each).

Figure (1) this figure revealed that the total Bates Jensen wound assessment scores, differences between the two groups regarding wound status. Regarding the baseline reading, 60% of the study group had moderate severity while 50% of the control group had mild severity. During the first assessment, 50% of the study group had mild severity while 40% of the control group had moderate severity. About the second assessment, 56.7% of the study group had minimal severity, while 40% of the control group had moderate severity.

Section III Represented to pain perception among the both groups.

Table: 7Comparison between study and control groups regarding total scores of Pain Rating Index pain quality (PRI) after implementing a modified dressing along study period (n=60) (30/each).

Pain scale	Baseline				First assessment				Second assessment			
	Study		Control		Study		Control		Study		Control	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
mild	0	0.0	0	0.0	13	43.3	3	10.0	20	66.7	7	23.3
moderate	10	33.3	13	43.3	13	43.3	13	43.3	9	30.0	9	30.0
severe	20	66.7	17	56.7	4	13.3	14	46.7	1	3.3	14	46.7
X2	0.63				11.8				17.8			
p	0.42				0.003*				0.00*			

*Significant at p-value<0.05

Table (7): illustrated that a highly statistically significant differences were found between the study and control groups after implementing a modified dressing technique for burn wound at the end of 1st week (X^2= 11.8; P= 0.003*) and2nd week (X^2= 17.8; P= 0.00*). Regarding the baseline reading, 20% of patients in the study group had severe pain while

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

17% of patients in the control group had severe pain. However, after implementing a modified dressing technique,13% of patients in the study group had mild and moderate pain while 14% of the control group had severe pain at the end of 1st week. And 20% patients in the study group had mild pain, while 14% of patients in the control group had severe pain at the end of the 2nd week.

Table (8): Comparison of total mean scores of VAS Pain intensity between the Study and control groups along the study period (n=60) *(30/each).*)

Pain intensity	Study group (n=30)		Control groups (n=30)		t	p
	Mean	SD	Mean	DS		
Baseline	4.37	0.72	4.17	0.75	1.054	0.296
1st before dressing	3.83	0.79	3.83	0.95	0.000	1.000
1st after dressing	3.17	0.95	3.80	1.00	2.502	0.015*
2nd before dressing	2.97	0.93	3.67	1.24	2.474	0.016*
2nd after dressing	2.20	1.24	3.57	1.33	4.127	0.000*

*Significant at p-value<0.05

Table (8) revealed that a highly statistically significant differences were found between the study and control groups as regards total mean scores of VAS at the end of the 1st and 2ndweek before and after implementing modified dressing technique (t=0,000; P=1.000), (t=2.502; P=0.015*), (t=2.2474; P=0.016*) and (t=4.127; P=0.000*) respectively.

Table: 9 Comparison of total mean scores of two groups present pain intensity (PPI) readings along the study (n=60) *(30/each).*

Present Pain scale	Baseline				First assessment				Second assessment			
	Study		Control		Study		Control		Study		Control	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No pain	0	0	0	0	2	6.7	0	0	2	6.7	0	0
Mild pain	0	0	0	0	7	23.3	4	13.3	7	23.3	4	13.3
Discomforting	0	0	0	0	10	33.3	2	6.7	10	33.3	2	6.7
Distressing	4	13.3	6	20	6	20	5	16.7	4	13.4	5	16.7
Horrible	11	36.7	13	43.3	4	13.4	11	36.7	6	20	8	26.6
Excoriating	15	50	11	36.7	1	3.3	8	26.6	1	3.3	11	36.7
X2	0.40				5.3				6.2			
P	0.52				0.02*				0.01*			

*Significant at P-value<0.05

Table (9): illustrated that a statistically significant differences were found between the study and control groups after implementing a modified dressing technique for burn wound at the end of 1st week (X^2= 5.3; P= 0. 02*) and2nd week (X^2= 6.2; P= 0.01*). Regarding the baseline reading, 50% of patients in the study group had excoriating pain. While43.3% of patients in the control group had horrible pain. However, after implementing a modified dressing technique, 33.3% of patients in the study group had discomforting pain while 36.7% of the control group had horrible pain at the end of 1st week. At the end of the 2nd week 23.3% and 33,3% of patients in the study group had

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

mild and discomforting pain respectively. While, 36.7% of patients in the control group had horrible.

DISCUSSION

Globally burns are a serious public health problem, burns are an important source of morbidity and mortality in the USA and worldwide (WHO, 2023). As per WHO estimation, about 1, 80,000 deaths occur due to burn injury every year throughout the world, the vast majority being in the low- and middle-income countries with almost half in South-East Asia (Qtait, &Alekel, 2023). Furthermore, wound care of burns is frequently caring procedure and accompanied by pain. (Fahmy et al., 2022). Regarding personal data, the finding of the current study revealed no statistically significant differences between the study group and control group in all personal characteristics. The current study clarified that, the majority of studied subjects their age ranged between forty to fifty years with a mean age and SD,39.3±9.7and 36.3±10.1in the respectively. This finding was virtually compatible with BagheriToolaroud, et al., (2023) who conducted research entitled with “Epidemiology of work-related burn injuries” reported that the linkage between burn injuries and age is documented by various scientific references explaining that the the majority of their studied patients their age was ranged between forty to sixty years. Incongruence with a study by (Socio-Demographic Features and Quality of Life Post Burn Injury” who reported that about half of the subjects were young adults and their mean age was 30.83 ± 11 years. As for gender the current study showed that female represented more than half of study subjects, this result supports that most of burns occur due to the hazards in kitchen and home where female mainly concerned with housework. In light of WHO burn report (2018). This study results matched with Das, Babu, & Kumar. (2023) in study entitled “study on medicolegal aspects of female burn victims” who mentioned that 84% of their study sample were females, however, the current study results contradict with Gautam, Rajouri, Sharma, and Bhatia. (2022) who document that male with burn were 60% from the study sample.

With reference to marital status, the majority of the studied subjects were married. This result coincides with the study done by Das, et al., (2023) who conduct a study entitled “study on medico legal aspects of female burn victims “who highlighted that, over whelming majority of the studied subjects were married. Fahmy et al. (2022) in a study titled “Physical Need Assessment of Recovery among Patients with Burn Injuries: Nursing Implications” which presented that 42% of admitted patient to burn unit in Beni-Suef specialized hospital affiliated to the Ministry of Health were married. The possible explanation and interpretation for these findings might be that the age between 40-50 was years is suitable time for marriage and building a family.

Concerning patients' education, the study showed that around more than one quarter of patients in the study and control group can read and write. This finding might lead to patient awareness and understanding of their disease which cause engagement in managing it and might the positive outcome of their illness. The current study result was supported by the study of Abdeltawab, Mostafa, AL sebaee, EL-sebaie, (2022) about

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

effectofvirtualrealityonwound care related among patients with burnandstated that the study subjects with can read and writerreachedadult age are factors that might significantly contribute to patient compliance with physicians' advice. Regarding occupation, most of the study participants were either unemployed or housewives (the majority were female) This result agreed with Gautam, Rajoura, Sharma and Bhatia (2022) in a study titled "Socio-Demographic Features and Quality of Life Post Burn Injury" who reported that about half of the subjects were un employed. In-contrast Fahmy et al. (2022) mentioned the fact that manual labors are exposed to risk of burn in their work and female gender at kitchen. In-addition, WHO burn report (2018) emphasized that most of burns occur at home and occupation at risk of fire.

Regarding place of residence, and living condition, the majority of study subjects were coming from urban area and living with family their finding was consistent with (Seliman, Fouad and Mohamed (2022) who conducted, research entitled of "Biopsychosocial and Educational Needs of Patients with BurnInjuriesand the reported that, 50.9%of their studied subject were coming from urban area and75%respectivelyof the studied patients lived with family While Fahmy et al. (2022)reported different with the finding when studied "Physical Need Assessment of recovery among Patients with Burn Injuries: Nursing Implications" represented that 63.3% living in rural areas, their people living in rural areas tend to form stronger connections with neighbour's and have a positive impact on a patient's social relationship, which can help the patient to adapted with any chronic disease.

Regarding cause of burn in the current study, boiling water represented the main cause of burn with approximately half of the study sample. The second cause was fire which represented more than one third of the study subjects. The current study the researcher of explain this result in light of American Burn Association (ABA) practice guideline (2022) who demonstrated that fire/flame and scald are the main causes of burn injuries, and WHO Burn Report (2022) which stated that fire and hot liquid represented the main causes of burn which is due to the use of open fire and hot liquid in cooking in homes and some occupations that lack the application of burn safety precaution. This finding linked with Amer et al. (2021) who reported that among the study sample fire predominates by more than 50% followed by hot liquids, in addition to Salama, Fayed, and Gadallah, (2024) study who submitted that the majority of admitted cases resulted from fire and hot liquid burn.

Part1: Wound Dressing Among Patients in the Study and Control Groups.

This part covers data related to dressing among study and control groups before and after applying modified dressing techniques in burn patients. The current study clarified that the study group improvement was observed in the wound regeneration after applying modified dressing techniques at the 1st and 2nd week assessment, and pain assessment this could be elaborated the effectiveness of normal saline dressing on wound healing and pain relieve. Data analysis revealed that highly statistically significant differences among study and control groups in the total mean scores regarding size, depth, edge, undermining, exudate type, exudate amount, skin colour surrounding wound, peripheral

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

tissue oedema, peripheral tissue induration, granulation tissue, epithelization and pain scores. Management of burn wound has changed significantly in the last decade; however, minimal attention has been focused on the types of solutions used for wound cleansing. Nursing guidelines for assessment and management of wound (2020) reported that the process of wound cleansing involves the application of a nontoxic fluid to remove debris, necrotic tissue, exudate and metabolic wastes from the wound to create an optimal environment for wound healing. The technique of cleansing can include irrigation using a syringe, soaking, bathing or swabbing depending on the classification and specific needs of the wound.

In the current study the researcher reported that the cleansing wound dressing in burn patient by using normal saline irrigation had excellent and safer effect for accelerates the healing process in burn patient. According to a study done by Sikka., Bargir and Garg, (2024) who conducted study in entitled “Modern developments in burn wound dressing. Highlight that in the treatment of burn, wounds healing solutions and dressing of wounds are crucial components. Burn dressings have three main goals: to stimulate re-epithelialization, lessen pain and safeguard the skin from infection and more skin injury. Additionally, numerous types of wound dressings can be used for burns, including moist dressings and dressings that maintain moisture and heat. Despite ongoing research, no one has yet developed the perfect dressing to promote a moist, humid environment for wound healing. Larger burns require more careful management to prevent fluid loss from the damaged protective layer of Modern developments in burn wound dressing skin, although minor burns can be treated adequately with a simple dressing

Moreover, the findings supported by Mickiewicz, e t al., (2023) who emphasized the fact that Cleansing the wound involves the use of a solution that is non-toxic to the tissue to remove debris, wound exudates and metabolic wastes and to promote wound healing. Additionally, Tiglis, et al., (2023) who conduct a study related to “Hydrotherapy in burn care” reported the Most clinicians recognize the benefits of normal saline (0.9%) as it is an isotonic solution, does not impede the normal healing process, damage the tissue, cause allergic reactions or alter the normal bacterial flora of the skin, which would allow the growth of more virulent organisms.

According to a study done by Kaka Khel, et al., (2022), clarified that healing of burn woundis improved after applying normal saline dressing. It had significant effect on reducing sign of inflammation, pain, isotonic solution and does not interfere with the normal healing process, damage tissue, cause sensitization or allergies or alter the normal bacterial flora of the skin which would possibly allow the growth of more virulent organisms. The key to effective treatment is to cleanse the wound as soon as possible after exposure to an external agent.

This finding moreover supported by Lockwood, (2023) who emphasized the fact that the normal saline 0.09 and betadine 10%has effects when applied to the skin. Several numerous studies have been published on the effect of normal saline and betadine in burn patient. Additionally, chelmuş-burlacu, profire and pieptu, (2023) who conduct a

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

study related to “an up-to-date on povidone-iodine with focus on wound managemnt” reported the same finding.

According to a study done by Kaka Khel, et al., (2022), clarified that healing of burn wound is improved after applying normal saline dressing. It had significant effect on reducing sign of inflammation, pain, isotonic solution and does not interfere with the normal healing process, damage tissue, cause sensitization or allergies or alter the normal bacterial flora of the skin which would possibly allow the growth of more virulent organisms. The key to effective treatment is to cleanse the wound as soon as possible after exposure to an external agent .These results are confirmed by Hasegawa, et al., (2020). On study. entitled “Wound, pressure ulcer and burn guidelines–; Guidelines for wounds in general. who found that betadine 10% that most of the bacteria are killed within approximately 30 s of application and if it is allowed to remain on skin tissue in high concentrations, not only will it cause signs of irritation and Ji, et al. (2024) on a systematic review study entitled “” Consensus on the treatment of second-degree burn wounds? Also, Hafizurrachman, Menna, &Lesmana, (2023) in study entitled “Review of traditional first aid for burn injuries in the 21st century. Who reported that Tap water is commonly used in the community for cleansing wounds because it is easily accessible, efficient and cost-effective; however, Saeg, Schoenbrunner, & Janis (2021). Emphasized that burn wounds underwent irrigation with reduces time to recovery. These results matched with Harun, et al. (2024) reported that patients the use of Betadine 10% and saline0.09 was more effective than saline alone in preventing surgical site infection (SSI). This finding further congruent with Ladhani ,Yowler, and Claridge, (2021). who conduct a study related to “Burn wound colonization, infection, and sepsis? Surgical infections,” mentioned that normal saline irrigation promotes wound healing without significant adverse events. Which revealed that patients with second degree burn had improvement in wound healing when using normal saline irrigation with dressing than the hospital routine care by using tape water on 11-items of (BJWAT).

In conclusion of this part, the study hypothesis (I) The post total mean scores of wound status parameters among patients with burn injuries who was receive the modified wound dressing technique by using normal saline 0.09% was different than the post total mean scores of wound status parameters among patients with burn injuries who was receive routine wound dressing by using tape water was accepted.

Jensen Wound Assessment Tool (BWAT) in the form of wound regeneration as (minimum, mild, moderate) at the 1st and 2nd weeks, this could be explained as majority of the studied subjects A using normal saline solution their wound regeneration improved between mild to minimum at 1st week; while at 2nd week the majority of them changed to minimum wound regeneration. In the studied subjects.

Part 11: Pain Assessment

Acute burn pain is difficult to manage, and poorly managed pain can lead to deleterious consequences such as post-traumatic stress disorder, prolonged recovery, chronic pain

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

and long-term dependence on opioids. Understanding the role of nursing in promoting will improve pain management and lessen opioid requirements in the adult burn population.

(Maitz, et.,2023).

In the current study, after the first time of applying dressing techniques by using normal saline instead tape water (1st week) with burn wound, the study subjects mostly described their pain quality as tiring -exhausting, hot- burning, tender, throbbing, aching; most of these words indicated mild and moderate degree; the majority of study subjects PRI total score was mild (0 ≤15). Pain severity decreased as on VAS subscale, less than half of the study subjects described their pain as moderate pain and about less than third describe it as severe pain, also pain intensity decreased as on PPI subscale more than one third describe their pain as discomforting and more than one third describe it as distressing. All of these finding reflects the effect of wound dressing on reducing the pain severity and intensity after first time application. These finding agreed with Tiglis, et al., (2022). In study entitled “Hydrotherapy in burn care.” who demonstrated the efficacy of wound cares in burn patient. American Burn Association (ABA) (2020) uses the term ‘pain, the fifth vital sign’ to emphasize its importance and stressed the importance to manage pain during burn wound care (Romanowski et al., 2020).

In the current study the total mean score of the PRI were 8.1±1.6 during burn wound care by using routine care compared with 5.8±1.7during the first time of wound care dressing by using normal saline, and 3.7±2.3 during the second time of wound care by using normal saline. There were high statistically significant differences between the total mean score of PRI during burn wound care and the total mean score of PRI during burn wound care after the 1st and 2nd time of wound care dressing. All of these findings supported that the use of normal saline irrigation instead tape water is effective in controlling pain quality. These findings were congruent with Yang, et al., (2024). In their meta-analysis titled ‘Effect of quality nursing care on wound pain and anxiety in burn patients: who reported that wound care is effective in pain reduction in the adult burn population, and it faster burn wound epithelialization. Also, added the use of wound dressing nursing interventions was effective in relieving the degree of wound pain in patients. Burn-induced pain is more likely to exacerbate patients' anxiety, making them reluctant to engage in wound care and rehabilitation, prolonging the length of hospitalization and even leading to chronic pain and can directly affect the healing speed and quality of burn wounds thus relieving the wound pain and helping the patient to recover the body function as soon as possible. Therefore, the study hypothesis (II) that was assessed by SF-MPQ; The post total mean scores of pain perception among patients with burn injuries who was receive the modified wound dressing technique was different than the post total mean scores of pain perception among patients who was receive routine wound dressing

Recommendations

Based on the study results, the researcher recommended the following: Transdisciplinary research should be conducted on patients with Burn patient in different settings in Egypt for faster findings validation and generalization. Furthermore, nurses should be encouraged to collaborate with other health team members to applying modified wound dressing as modality for patients with burn injury. Establishing standardized

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

instructions in order to increase knowledge among patients with burn injury about modified dressing as strategy for wound healing.

Ethical Consideration

A written initial approval was obtained from the Research Ethics Committee of Faculty of Nursing, Cairo University (**Ethics Code:** RHDIRB 2019041701, on November 2023). Also, an official permission was obtained from hospital administrators. The purpose and importance of the study were explained for each participant included in the study. Anonymity and confidentiality were assured by the researcher through coding data. The researcher explained to each participant that participation in the study is voluntary and he/she has the write to withdraw at any time. A consent form was obtained from each participant.

Study Limitation: The study used small sample size so the results cannot be generalized to whole patients with burn. In order to enhance the study`s scope and applicability, future research should also consider participatory care between academic team members at Faculty of Nursing and nurses in clinical practice.

Conflict of Interest

The authors declare that they have no conflict of interests

Acknowledgement

The author would like to express the deepest thanks and gratitude to all participants in the current study. Also, deepest thanks and appreciation for all nurses and physicians who have helped the researcher to complete the study.

References

1) Abazari, M., Ghaffari, A., Rashidzadeh, H., Badeleh, S. M., &Maleki, Y. (2022). A systematic review on classification, identification, and healing process of burn wound healing. The International Journal of Lower Extremity Wounds, 21(1), 18-30.

2) Abdeltwab, s. a. q., Mostafa, m. m., Al sebaee, h. a., El-sebaie, a. s. h. r. a. f., &Anany, w. m. effect of virtual reality on wound care related pain among patients with burn

3) American Burn Association (ABA). (2022). Clinical-practice-guideline released/and anxiety during dressing changes. Burns 42,1789–1796. doi: 10.1016/j.burns.2016.05.00

4) Bates-Jensen, B. M., McCreath, H. E., Harputlu, D., &Patlan, A. (2019). Reliability of the Bates-Jensen wound assessment tool for pressure injury assessment: The pressure ulcer detection study. *Wound Repair and Regeneration*, *27*(4), 386-395.

5) Bates-Jensen, B.M., Vredevoe, D.L&Brech,t M.L., (1992). Validity and reliability of the pressure sore status tool. Decubitus.55(6), 8- 20.

6) Amer, E. S. M., Aglan, M. A., Abdelaziz, A. E., &Abd-Rabo, A. E. M. (2021). Retrospective statistical study of thermal injury patients in Al-Azhar University Hospitals.The Egyptian Journal of Hospital Medicine, 85(1), 3152-3156.doi: 10.21608/ejhm.2021.195417

7) BagheriToolaroud, P., Attarchi, M., AfshariHaghdoust, R., Feizkhah, A., Esmailzadeh, M., Rimaz, S., ... &Mobayen, M. (2023). Epidemiology of work-related burn injuries: A ten-year retrospective study of 429 patients at a referral burn centre in the north of Iran. International wound journal, 20(9), 3599-3605

8) Carvalho, E. N., Paggiaro, A. O., Nicolosi, J. T., Gemperli, R., & de Carvalho, V. F. (2023). Retrospective Evaluation of Characteristics of Patients with Burn Injuries Treated at the Largest Reference Hospital in Brazil. Plastic and Aesthetic Nursing, 43(1), 22-28.

9) Chelmuş-burlacu, a. l. i. n. a., Profire, l., &Pieptu, d. (2023). An up-to-date on povidone-iodine with focus on wound management: current available data and new approaches. farmacia, 71(4).

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

10) Das, p. k., babu, k., &Kumar, s. (2023). a study on medico legal aspects of female burns victims brought for autopsy at darbhanga medical college, laheriasarai, darbhanga, bihar. int j acad med pharm, 5(3), 114-116

11) Eriksson, E., Liu, P. Y., Schultz, G. S., Martins-Green, M. M., Tanaka, R., Weir, D., ... &Gurtner, G. C. (2022). Chronic wounds: Treatment consensus. Wound repair and regeneration, 30(2), 156-171.

12) Fahmy, F. S., Abdelaziz, S. H., &Yahia, E. A. (2022). Physical need assessment of recovery among patients with burn injuries: nursing implications. Egyptian Nursing Journal, 19(2), 130.

13) Fernandez, R., Green, H. L., Griffiths, R., Atkinson, R. A., & Ellwood, L. J. (2022). Water for wound cleansing. Cochrane Database of Systematic Reviews, (9).

14) Gautam, R., Rajoura, O. P., Sharma, A. K., & Bhatia, M. S. (2022). Socio-demographic features and quality of life post burn injury. Journal of family medicine and primary care, 11(3), 1032-1035.

15) Hafizurrachman, M., Menna, C., &Lesmana, E. (2023). Review of traditional first aid for burn injuries in the 21st century. Annals of plastic surgery, 91(3), 337-347.

16) Harun, H., Haroen, H., Mirwanti, R., Apriani, N., &Akuoko, C. P. (2024). Uncovering the Benefits of Povidone Iodine Compared to Other Therapeutic Agents in Wound Infection Prevention and Healing Outcomes: A Scoping Review. Journal of Multidisciplinary Healthcare, 3605-3616.

17) Hasegawa, M., Inoue, Y., Kaneko, S., Kanoh, H., Shintani, Y., Tsujita, J., ... &Ihn, H. (2020). Wound, pressure ulcer and burn guidelines–1: Guidelines for wounds in general. The Journal of Dermatology, 47(8), 807-833.

18) Hawker, G. A., Mian, S., Kendzerska, T., & French, M. (2011). Measures of adult pain: Visual analog scale for pain (VAS pain), numeric rating scale for pain (NRS pain), MCGILL pain questionnaire (MPQ), short-form MCGILL pain questionnaire (SF-MPQ), chronic pain grade scale (CPGS), short form-36 bodily pain scale (SF-36 BPS), and measure of intermittent and constant osteoarthritis pain (ICOAP). Arthritis Care & Research, 63(S11), S240-S252. Retrieved from https://portalsaude.org.br/PORTAL-ALUNO/https://nursology.net/nurse theories/neumans-systems-model.2023.

19) Ji, S., Xiao, S., Xia, Z., & Chinese Burn Association Tissue Repair of Burns and Trauma Committee, Cross-Straits Medicine Exchange Association of China. (2024). Consensus on the treatment of second-degree burn wounds (2024 edition). Burns & Trauma, 12, tkad061.

20) Kakakhel, M. K., Khan, M. K., Ullah, S., Asif, M., &Shaikh, A. (2022). Comparison of Honey Versus Normal Saline in the Management of Post-Operative Infected Wounds in Pediatric Urology Patients. Pakistan Journal of Medical & Health Sciences, 16(09), 554-554.

21) Kurnia, D. (2022). Comparative Study: Use Of 0.9% Normal Saline Irrigation Liquid and 10% Povidone-Iodine in The Process of LaparatomySectio Caesarea Operation in Hospital. *KESANS: International Journal of Health and Science*, *1*(11), 944-959.

22) Maitz, J., Merlino, J., Rizzo, S., McKew, G., &Maitz, P. (2023). Burn wound infections microbiome and novel approaches using therapeutic microorganisms in burn wound infection control. Advanced Drug Delivery Reviews, 196, 114769

23) Markiewicz-Gospodarek A, Kozioł M, Tobiasz M, Baj J, Radzikowska-Büchner E, Przekora A. Burn Wound Healing: Clinical Complications, Medical Care, Treatment, and Dressing Types: The Current State of Knowledge for Clinical Practice. Int J Environ Res Public Health. 2022 Jan 25;19(3):1338. doi: 10.3390/ijerph19031338. PMID: 35162360; PMCID: PMC8834952.

24) Melzack, R. (1987). The short-form McGill pain questionnaire. Pain, 30(2), 191-197. Retrievedfromhttps://www.sciencedirect.com/science/article/abs/pii/0304395987910748

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 07:2025
DOI: 10.5281/zenodo.15826292

25) Ladhani, H. A., Yowler, C. J., &Claridge, J. A. (2021). Burn wound colonization, infection, and sepsis. Surgical infections, 22(1), 44-48.

26) Lockwood, W. (2023). Wound Management Comprehensive.

27) Nurse, K. B. T. V. GUIDELINES FOR THE ASSESSMENT & MANAGEMENT OF WOUNDS.2020.

28) Qtait, M., &Alekel, K. A. (2023). Impact of Education on Health Team Knowledge of Essential Burn Care Post Course Training: An Intervention Study. *HIV Nursing*, *23*(3), 237-242.

29) Rogers, J; Révész, A; (2020) Experimental and quasi-experimental designs. In: McKinley, J and Rose, H, (eds.) TheRoutledge Handbook of Research Methods in Applied Linguistics. (pp. 133-143). Routledge: London, UK.

30) Romanowski, K. S., Carson, J., Pape, K., Bernal, E., Sharar, S., Wiechman, S., ... & Joe, V. (2020). American Burn Association guidelines (ABA) on the management of acute pain in the adult burn patient: a review of the literature, a compilation of expert opinion, and next steps. Journal of Burn Care & Research, 41(6), 1129-1151. https://doi.org/10.1093/jbcr/iraa119

31) Saeg, F., Schoenbrunner, A. R., & Janis, J. E. (2021). Evidence-based wound irrigation: separating fact from fiction. Plastic and reconstructive surgery, 148(4), 601e-614e

32) Salama, S. M., Fayed, A. M., &Gadallah, A. (2024). Epidemiological Study about Childhood Burns in the Burn Unit of Ain Shams University Hospitals. The Egyptian Journal of Plastic and Reconstructive Surgery, 48(3), 205-209. Sanchez, M. F., Guzman, M. L., Flores-Martín, J., Del Puerto, M. C., Laino, C., Soria, E. A., ...&Olivera, M. E. (2022). Polyelectrolyte Complexes of Ciprofloxacin and Lidocaine Improve Wound Healing in Deep Second Degree Burns and Reduce in Vitro Ciprofloxacin Cytotoxicity in Fibroblasts.

33) SelimanZakeria, H., FouadAbdalla, K., & Mohamed Maarouf, D. (2022). Biosychosocial and educational needs of patients with burn injuries. Egyptian journal of health care, 13(2), 1135-1147.

34) Sikka, M. P., Bargir, J. A., &Garg, S. (2024). Modern developments in burn wound dressing. Research Journal of Textile and Apparel.

35) Tiglis, M., Peride, I., Neagu, T. P., Raducu, L., & Lascar, I. (2022). Hydrotherapy in burn care: Pros, cons and suggestions. Romanian medical JouRnal, 69(1), 15.

36) World Health Organization (2023). WHO launches new document on burn prevention and care? Available at: http://www.who.int/violence/media/burns/news.

37) World Health Organization (2023). WHO launches new document on burn prevention and care? Available at: http://www.who.int/violence/media/burns/news.

38) Yang, L., Yuan, B. Q., Ju, Y. Y., Liu, W., & Wang, Y. P. (2024). Effect of quality nursing care on wound pain and anxiety in burn patients: A meta-analysis. International Wound Journal, 21(4), e14798.