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## **Impact of an interventional program on nurses practices regarding initial burn management**

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**Abstract---** Background: Serious burn injuries may have lifelong impacts for individuals that experience them and require timely management in order to reduce associated morbidity and mortality. Initial management of a burn is nursing intensive and focuses primarily on stopping the burning process, maintaining homeostasis by keeping the patient warm, and replacing lost fluid and electrolytes. As healing progresses, nurses meet the critical needs of the patient and must skillfully manage pain levels, perform burn care, prevent infection, help the patient meet increased nutrient requirements, and address psychological concerns with the goal to restore health and function to the highest possible level, thus the aim of this study is evaluate nurse's practices regarding initial burns management. Methodology: A quantitative (one pre experimental) design had been adapted through the present study with the application of pre-posttest approach during the period of 17th October, 2020 to 20th March, 2022. A non-probability (convenient) sample of 24 nurses who work at burns and plastic surgery center at Azady teaching hospital. The interventional program and study instrument is designed based on of the nurse's practice assessment need, review of literature, scientific lecturer and previous study. The content of the program and instrument are evaluated by 16 experts in different field and the reliability of instrument is determined through the use of test and retest, measurement of effectiveness for nursing education program carried out through (22) items concerning clinical guidelines regarding initial burn management. The analysis of data is performed through the application of descriptive statistic as well as inferential statistic by using statistical package of social science version 22. Result: the result shows that vast majority of the sample were male, 30-39 years

old, high school graduate, less than 5 years of experience. Most of the samples participate in burn courses, one course in number, their courses inside Iraq. Comparisons significant at  $P < 0.01$  was high regarding initial survey's, secondary survey's, total body surface, initial assessment of the depth of the burn wounds, burn wounds, removing dead tissue and cleaning the burn's. Conclusion: study conclude that nurses practice regarding initial burn management improved due to applying of the proposed interventional program.

**Keywords**---burn, initial survey, skin, management, nursing care.

## **Introduction**

Burn injuries are very serious and are associated with substantial morbidity and mortality. It accompanied by powerful immune and inflammatory responses, metabolic changes, and distributive shock that can lead to multiple organ failure and death.<sup>1</sup> First aid and appropriate initial management are considered to be important steps in the progress of the management of burns, including mass burn injuries.<sup>2</sup> Initial management of minor and moderate, uncomplicated burn injury focuses on wound management and patient comfort.<sup>3</sup> Importantly, pain management must be a primary nursing consideration of burn care because it supports better wound management, sleep, participation in activities of daily living, quality of life, and long-term recovery.<sup>4</sup> Initial management of patients with major burn injury requires airway support, fluid resuscitation for burn shock, treatment for associated trauma and preexisting medical conditions, management of a dynamic ileus, and initial wound treatment.<sup>5</sup> Fluid resuscitation, based on assessment of the extent and depth of burn injury, requires administration of intravenous fluids using resuscitation formula guidelines for the initial 24 hours after injury. <sup>6</sup> Inhalation burn complicates flame burns and increases morbidity and mortality.<sup>7</sup> Electrical burn injury places patients at risk for cardiac arrest, metabolic acidosis, and myoglobinuria. <sup>8</sup>.Circumferential full-thickness burns to extremities compromise circulation and require escharotomy or fasciotomy.<sup>9</sup> Circumferential torso burns compromise air exchange and cardiac return. Loss of skin function places patients at risk for hypothermia, fluid and electrolyte imbalances, and systemic sepsis.<sup>10</sup> The first 24 hours after burn injury require aggressive medical management to assure survival and minimize complications.<sup>11</sup>Nurses caring for patients with burn injuries are faced with a multitude of challenges to effectively manage care for these patients, including acute critical care management, rehabilitation, and long-term care,<sup>12</sup> thus the this study aimed to evaluate the effectiveness' of an interventional program on nurses practices regarding initial burn management.

## **Methodology**

### **Design of the study**

A quantitative (one pre experimental) design had been adapted through the present study with the application of pre- post-test approach during the period of 17<sup>th</sup> October, 2020 to 20<sup>th</sup> March, 2022.

### **Setting of the study**

The study was conducted at Burns and Plastic Surgery Center at Azady Teaching Hospital in Kirkuk City.

### **Preliminary Steps of the Study**

Before beginning of the study, a preliminary study has been performed to assess nurses need for an interventional program through assessing their practice about burn management. To accomplish this phase of the study, the researcher used closed- ended observational checklist format which conducted through a simple observational checklist. The result of the assessment indicated that majority (65.7%) of the nurses had practice deficit towards burn wound management.

### **Samples of the study**

The overall nurses who work in the burns and plastic surgery center at Azady teaching hospital is 48 nurses, from this number a total of 24 nurses were participate in the study, 10 nurses selected as a pilot study sample, and the other remain 14 nurses does not participate in the study. The nurse staff who were selected as study samples were chosen according to educational levels as well as their gender (males and females), and taking into account educational level and gender, a non-probability (convenient) sample were selected as study sample.

### **Inclusion criteria of the study**

The study samples have been chosen according to the following criteria.

- Nurses who are working at burns and plastic surgery center at Azady teaching hospital.
- Nurses that should have at least one year of experience or more.
- Male and female nurses.
- Nurses from all educational levels (Nursing college graduate, Nursing Institute graduate. And Nursing preparatory graduate)

### **Construction of the Interventional Program**

The interventional program is designed based on of the nurse's practice assessment need, information gained from review of literature, scientific lecturer and previous study. The content of the program is evaluated by 16 experts in different field, and revision is performed on the contents of the program form based on these experts' recommendations and suggestions.

### **The Study Instrument**

The study instrument was constructed depending on literature reviews and previous studies related to the burn wound management. It is composed of three parts and these parts are: -

**Part one: Demographic Data Form**

This part consists of (4) items which include nurses age, gender, level of education, years of work in burn center

**Part two: Burn Courses**

This part consists of (4) items which include participation in burn courses, course number, duration of the course per days, and place of the course.

**Part three: Initial Burn management**

This part consists of 22 items related to who to dressing burn wound

**Rating and Scoring of the Study Instrument**

Scoring scales of three categories, such that (Not apply, Apply False, and Apply True) has an integer numbers (0, 1, and 2), respectively. In addition to that, after transmitted answering with not apply, and false apply to zero, and the true apply to one, as well as responses evaluation mechanism has been adopted by including the value zero when not applying in the three attempts, the value one when applying false in at least once time among the not applying attempts, and the value two for at least one-time true application among the attempts of either not apply or the application of being false.

**Validity of the Study**

To make the instrument more valid, it was presented to a panel of (16) experts in the different fields. They asked to review the observational checklist, and the suggested educational program on nurses' practices about clinical guideline of burns management whether they agreed or disagreed with its contents. The results of the review of the observational checklist and suggested educational program by the experts revealed that all of the experts are agreed, since it was clear and adequate for the measurement of the study. Minor changes were performed on few items, such as simple rewrite of their text. Such changes were made according to the experts' suggestions.

**Pilot study**

A convenient sample of (10) nurses were selected among staff concerning with the burns & plastic surgery center in Kirkuk city, this study was conducted for the period of 10<sup>th</sup> April up to 8 May, 2021. The pilot study sample were excluded from the original study sample.

**Data Collection Methods**

The data collection process was performed from 8th June 2021 to 16th of October 2021, the study objectives were explained to the sample by the investigator, the nurses' written consent has been taken and the pre-post data collection stage were performed through observational checklist to assess nurse's practices about clinical guideline of burns management. The pre-post data collection began at 8th June up to 8th July, 2021 and the time required for performing this stage were between 30 - 45 minutes.

## Statistical Analysis

The following statistical data analysis approaches were used in order to analyze and assess the results of the study under application of the statistical package (SPSS) version 22):

- **Descriptive data analysis which include** frequencies, and percentages, mean of score, standard Deviation, Relative Sufficiency as well as scoring scales of three categories, such that (Not Apply, apply false, Apply True)
- **Inferential data analysis:** These were used to accept or reject the statistical hypotheses, which included the following:
  - Alpha Cronbach ( $\alpha$ ) for the reliability of questionnaire (Internal consistency).
  - Chi-Square test for testing the independency distribution of the observed frequencies and there is none restricted of an expected outcome.
  - Binomial test for testing the different of distribution of the observed frequencies of two categories nominal /or ordinal scale and there is none restricted of an expected outcome at 50%.
  - The Independent-Samples t-test procedure compares means for two groups of cases. Ideally, for this test, the subjects should be randomly assigned to two groups, so that any difference in response is due to the treatment (or lack of treatment) and not to other factors.
  - Matched Paired-Samples t-test (MP t-test), compares the means of two variables for a single group. It computes the differences between values of the two variables for each case and tests whether the average differs from zero.
  - D- Analysis of Covariance (ANCOVA) testing relationships between heart failure patient's health status and their socio-demographic characteristics.

## Results

Table 1  
Distribution of Demographical Characteristics of the variables with comparisons significant

DCv.	Classes	No	%	C.S. (*) P-value
Gender	Male	15	62.5	P=0.000 (HS)
	Female	9	37.5	
Age Groups per years	< 30	8	33.3	x <sup>2</sup> = 31.200 P=0.000 (HS)
	30 _ 39	10	41.7	
	40 _ 49	6	25	
	Mean $\pm$ SD	34.5 $\pm$ 7.49		
Level of Education	Nursing preparatory graduate	7	29.2	x <sup>2</sup> = 31.200 P=0.000 (HS)
	Nursing high school graduate	12	50	
	Nursing college graduate and above	5	20.8	
Years	of < 5	11	45.8	x <sup>2</sup> = 31.200

Experience	5 _ 9	6	25	P=0.000 (HS)
Yrs.	≥ 10	7	29.2	

Table 2  
Distribution of studied Subjects according to (Burn Courses) with comparisons significant

Burn courses	Classes	No	%	C.S. (*) P-value
Participation in burn courses	No	10	41.67	P=0.000 (HS)
	Yes	14	58.33	
If the answer is yes: Course number	None	10	41.67	P=0.000 (HS)
	One course	9	64.29	
	Two and more courses	5	35.71	
Duration of the course per days	None	10	41.7	P=0.000 (HS)
	5 Days	10	71.43	
	More than 5 Days	4	28.71	
Place of the course	None	10	41.7	P=0.000 (HS)
	Inside Iraq	13	92.86	
	Outside Iraq	1	7.14	

(\*) HS: Highly Sig. at  $P < 0.01$ ; Testing based on One-Sample Chi-Square test, and Binomial test.

Table 3  
Nurses practice regarding initial burn management at pre-test phase

Pre-test	No.	Min.	Max.	PGMS	PSD	Ev.
Initial burn management	22	9.09	90.9	35.65	22.58	M

Table 4  
Nurses practice regarding initial burn management at post-test phase

Post-test	No.	Min.	Max.	PGMS	PSD	Ev.
Initial burn management	22	86.3	100	91.48	4.89	H

Table 5  
Distribution of the studied groups at pre-post interventional program regarding dressing burn wounds with comparisons significant

Main Domain	No.	Pre		Post		C.S. P-value
		PGMS	PSD	PGMS	PSD	
Initial burn management	22	35.65	22.58	91.48	4.89	P=0.000 (HS)

(\*) HS: Highly Sig. at  $P < 0.01$ ; S: Sig. at  $P < 0.05$ ; NS: Non Sig. at  $P > 0.05$ ; Testing based on: Wilcoxon Signed Ranks Test.

## Discussion

Respect to subjects of studied (SDCv.) in table 1, results shows that studied groups recorded highly significant differences at  $P < 0.01$  between the observed frequency distribution with their an expected outcomes in each variable under the assumption of the random distribution. And according to that, gender variable has vast majority with male and they are accounted 15(62.5%) of the studied sample, age groups has focusing at the first and second groups, and they are accounted 18(75%) with mean and standard deviation ( $34.5 \pm 7.49$ ) yrs., education level has focusing at the low educated levels, since premonitory and high school graduate are accounted 19(79.2%), and finally, most of studied subjects were recorded number of years working in burn center the first group, since they are accounted 11(45.8%).

Respect to subjects of studied (Burn Courses) variables in table 2, results shows that studied groups recorded highly significant differences at  $P < 0.01$  between the observed frequency's distribution with their an expected outcomes in each variable under the assumption of the random distribution. And according to that, only 14(58.3%) having participation in burn courses among the studied sample, and only 9(64.29%) of them has a one course, and their titles of that courses about burns management and plastic surgery, and 10(71.43%) of them are joining with courses of five days, and finally, most of studied subjects were joining their courses inside Iraq, since they are accounted 13(92.86%). Table 3,4,5 shows descriptive statistics concerning nurses practice regarding dressing burn wound at pre-posttest phase, such that (Percentile Grand/Global Mean of Score, and Standard deviation), as well as comparisons significant are accounted in order to be sure the effectiveness of applying an educational program on dressing burn wound. Many burned patients admitted to the specialized Burns Hospitals in Kirkuk did not receive proper first aid. Practical skills of healthcare providers play an important role in the success of a patient's care.

Improvement in the management of patients with severe burns, including fluid resuscitation, pain management, modern dressing products, nutritional support, various surgical interventions, infection control and early rehabilitation programs, the survival rate has been increasing in the last decades. But serious complications are still common among burn patients.<sup>13</sup> In 2005, a survey by Kut<sup>14</sup> and colleagues on knowledge among 510 occupational physicians in Turkey showed that only 21.8% of total participants had adequate knowledge of appropriate burn classification, and 96% had insufficient knowledge of first aid for burn injuries. The emergency phase was also referred to as resuscitative phase, which begins with the onset of burn injury and may be completely bypassed in the first 24–48 hr post burn injury. The most important themes that are noticed at this phase are initial patient and wound assessment, cooling, pain control, wound cleansing, wound dressing, physiotherapy and nutritional support.<sup>15</sup>

The key themes included in the emergency phase of burn are as follows: assessment of patients ABC, assessment of patient for any secondary traumatic injuries, keeping hands under cool water for minimizing deeper injuries and removing all foreign bodies from the wound.<sup>16</sup> It is important to debride any loose

or thin blisters and remove any foreign material from the wounds before applying dressings.<sup>17</sup> covering the hand wound with sterile gauze and bandages and elevating hands for first 48 hr.<sup>18</sup> The acute phase starts as soon as the emergency phase completely bypassed, and it will continue until wound closure. Duration of this phase may take 2 weeks or more. The most important themes that are noticed in the guideline are daily patient and wound assessment, pain control, wound cleansing, wound dressing, physiotherapy and nutritional support.<sup>19</sup> The key themes included in the acute phase are as follows: daily assessment of the patient, physical examination that should be implemented during the daily assessment, use of pain relievers to control burn-related pain as physician description, use of dressing choices as wound bed characteristics and keeping it as thin as possible, early excision and grafting that increases wound healing with better functional and aesthetic outcomes and hand rehabilitation, which is an essential principle ineffective care of burned patients.<sup>20</sup> If it is necessary, it should be coordinated by a nutritionist to evaluate the patient national requirements during the treatment period.<sup>21</sup>

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