

Nurses' Performance Regarding Care of Patients with Burns During The Acute Phase

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Abstract

Background: Nurses are the frontline of care and possess many roles within the care of patients with burn. Nursing roles in burn care can be organized including acute evaluation, rehabilitative and psychological care and their role can make a difference in the long- term quality of life of the patient with burn. **Aim:** The current study aimed to assess nurses' performance regarding care of patients with burn during acute phase **Design:** A descriptive exploratory research design was used. **Sample** A convenient sample of all available nurses (80) caring for patients with burn and purposive sample of (60) patients with burn injury. **Setting:** The study was conducted at burn department and intensive care unit affiliated to Al-Hussein university hospital. **Tools** Tool I: Structured interview questionnaire included 3 parts. Part I: Personal and work related characteristics of the nurses, part II: Demographic and clinical characteristics of the patients. part III: Nurses' knowledge assessment questionnaire. Tool (II): Nurses' practices observational checklist. **Results:** about one third of the studied nurses had satisfactory level of knowledge regarding burn and burn management, more than half of nurses had competent level of practices regarding burn management during acute phase. **Conclusion:** current study concluded that, there was a statistically significant positive correlation between total knowledge and practices scores of the studied nurses **Recommendation:** Continued nursing education and in service training programs about burn management should be regularly organized by hospital administration.

Key words : Acute phase , Burn , Nurses' performance.

Introduction

Intact human skin surface is vital to the preservation of body fluid homeostasis, thermoregulation and the host's protection against infection. The skin also has immunological, neurosensory, and metabolic functions such as vitamin D metabolism. Thermal injury creates a breach in the surface of the skin. Burns are one of the most common and devastating forms of trauma. Patients with serious thermal injury require immediate specialized care in order to minimize morbidity and mortality (Yao *et al.*, 2021).

Burn is an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals Burn injuries are among the most devastating of all injuries and a major global public health crisis. Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls and interpersonal violence. Approximately 90 percent of burns occur in low to middle income countries, regions that generally lack the necessary infrastructure to reduce the incidence and severity of burns (Bresesti *et al.*, 2020).

Burn symptoms vary depending on the depth of the skin damage. It can take a day or two for the signs and symptoms of a severe burn to develop. First degree burn, is a minor burn that affects only the outer layer of the skin

(epidermis). It may cause redness and pain. Second degree burn, is a type of burn that affects both the epidermis and the second layer of skin (dermis). It may cause swelling and red, white or splotchy skin. Blisters may develop, and pain can be severe. Deep second-degree burns can cause scarring. Third degree burn reaches to the fat layer beneath the skin. Burned areas may be black, brown or white. The skin may look leathery. Third-degree burns can destroy nerves, causing numbness (*Markiewicz-Gospodarek et al., 2022*).

Nurses are the frontline of care and possess many roles within the care of patients with burn. Nursing roles in burn care can be organized including acute evaluation, rehabilitative and psychological care. Nurse's role can make a difference in the long- term quality of life of the patient with burn. The nurse who cares for patients with burn injury should be educated about the physiologic changes that happen after a burn, in addition, need critical care skills and a willingness to identify subtle changes in the patient's condition and to care for patients with painful wounds (*Carrougner et al., 2020*).

Caring for a patient with burn represents a unique challenge even to the most experienced nursing staff because mild injuries pose a greater threat to the patient's physical and emotional wellbeing. In addition, the nurse provides sensitive, compassionate care to patients who are critically ill and initiates rehabilitation early in course of care. The nurse must be able to communicate effectively with patient, family members and management team, this ensure improved patient's outcomes and optimal quality of care (*Khajehgoodari et al., 2020*).

Significance of the study

Burn is a global public health problem, accounting for an estimated 180 000 deaths annually. The majority of burn injuries occur in low and middle-income countries and are among the leading causes of disability, nearly 11 million people worldwide were burned severely enough to require medical attention. Mortality, pain, physical, mental and economic problems are considered as the effects caused by the burning. Providing high quality care is the right of the patient that depends on the proper management and caring (*Peck et al., 2020*).

The American Burn Association (ABA) National Burn Repository 2019 reported that, flame burns are still the majority of injuries in the USA (41%), with scalds second at 31%. Chemical (3.5%) and electrical burn injuries (3.6%) occur much less commonly. Burns in children less than 5 years of age tend to be scald injuries, with increasing flame-related burns as age increases. Around the world, burns in the elderly population are increasing, and are predominantly flame-related. However, scald injuries are increasing substantially as well. Finally, depending on the environment, burn injuries are more frequent in some vulnerable populations, such as those with epilepsy (*El Ayadi et al., 2020*).

According to the Ahl Masr Foundation, 100,000 people get burned yearly in Egypt with about 300 burns suffers per day, 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. Moreover, the majority of patients who survive find it hard to carry out their daily activities due to their physical disfigurement and physiological trauma (*Abu Ibaid et al., 2022*).

Nursing care of burn is one of the most challenging specialties in nursing. It calls for sharp clinical skills including triage, pain management, fluid balance, critical care, the stabilization of acutely burned patients, trauma recovery and rehabilitation. The nurse working at the burn unit must be knowledgeable in using several different types of equipment and techniques to observe, treat, monitor and ventilate patients when necessary (*Subrata et al., 2021*).

Aim of the study:

The aim of the current study was to assess nurses' performance regarding care of patients with burn during acute phase; this aim was achieved through the following objectives:

- 1-Assess nurses' level of knowledge regarding care of patients with burn during acute phase.
- 2-Assess nurses' level of practices regarding care of patients with burn during acute phase.

Research questions:

- 1- What is the nurses' level of knowledge regarding care of patients with burn during acute phase?



2-What is the nurses' level of practices regarding care of patients with burn during acute phase?

3-Is there a relation between nurses' knowledge and practices regarding care of patients with burn?

Operational definition:

Performance: nurse's knowledge and practices regarding care of patients with burn during acute phase.

Subject and methods:

The subject and methods for this study were portrayed under the four main items as follows:

- I. Technical item.
- II. Operational item.
- III. Administrative item.
- IV. Statistical item.

Technical item:

The technical items included research design, setting, subjects and tools for data collection.

Research design:

A descriptive exploratory research design will be used to carry out this study.

Exploratory research is usually conducted when researcher has just begun an investigation and wishes to understand the topic generally. Descriptive research aims to describe or define the topic at hand (Williams et al., 2020).

Setting:

The study was conducted at burn department and intensive care unit affiliated to Al-Hussein university hospital.

Subjects:

A convenient sample of all available nurses (80) caring for patients with burn at the previously mentioned setting.

A purposive sample of (60) adult patients with burn injury during the acute phase who were admitted to the previously mentioned setting,

Tools for data collection:

Data will be collected by three tools:

Tool I: Structured interview questionnaire:

Part I: Personal and work related characteristics of the nurses:

This tool was used to assess personal and work related characteristics of the nurses as age, gender, level of education, nurses' position, attending training courses related to burn management, duration after training and years of experience.

Part II: demographic and clinical characteristic of patients:

This part was used to assess demographic characteristics of studied patients as age and gender and clinical characteristic of burn injury as burn degree, cause, complication, length of stay, total body surface area and site of burn.

Part III: Nurse s' Knowledge assessment questionnaire:

This questionnaire was adapted from (*mohammed, 2017*) to assess nurses' level of knowledge regarding burn and burn management during acute phase. It contained 22 items, which cover 4 domains: Skin anatomy and burn (4 items)

Risk factors, classification and complication of burn (6 items)

Assessment of patient with burn (4 items)

Nursing management of patients with burn (8 items)

Scoring system of nurse s' knowledge assessment questionnaire:

Each correct answer had score 1 and the incorrect answer had score zero. Total scores of knowledge ranged from 0 to 22 degrees and were categorized as:

- Satisfactory if the total score is 60% or more. (14-22)
- Unsatisfactory if the total score less than 60%. (0-13)

(*Mohammed et al., 2021*)

Tool II -: Nurses' practices observational checklist

This tool was adapted from (*European practice guidelines, 2017*) to assess nurses' level of practices during care of patients with burn during acute phase of burn management. It included 46 items covering 7 domains fluid resuscitation (4 items) , maintaining skin integrity through wound cleaning (12 items) ,maintaining skin integrity through wound dressing (7items) , pain management (7 items) ,promoting physical mobility (4 items) , nutrition (5 items) , prevention of infection (6 items) emotional support (4items) .

Scoring system of nurses' practices observational checklists:

Each step that was done had score 1 and the step that wasn't done had score zero. Total scores of practices ranged from 0 to 46 degrees and were categorized as:

- Satisfactory if the total score is 70% or more. (33-46)
- Unsatisfactory if the total score less than 70%. (0-32)

(*Mohammed et al., 2021*)

Validity:

The developed tool was formulated and submitted to five experts in medical surgical health nursing to assess the content validity, needed modifications were done.

**Reliability:**

Cronbach's Alpha was used to determine the internal reliability of the developed tool. Reliability of the tools was tested to determine the extent to which the tools items are related to each other. Reliability score for nurses' knowledge questionnaire was 0.742 and for nurses' practices observational checklist was 0.880.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee. Participation in the study is voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it won't be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected

II-Operational Item:**Preparatory phase:**

It included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection. During preparatory phase, the investigator visited the selected place to get acquainted with the personnel and the study settings. Development of the tools was under supervisors' guidance and experts' opinions were considered.

Pilot study:

The pilot study was done on 10% of the sample (5 nurses) to test the applicability, feasibility clarity of questions and time needed to complete the study tools. Based on the results, modifications were done. The pilot has also served to estimate the time needed for each subject to fill in the questionnaire. According to the results of the pilot, simple modification of items were performed, so the nurses were included in the study sample.

Field work:**Field work included the following:**

- Data collection of this study was started and completed within six months from the beginning October (2023) to the end of March (2024).
- First, the investigator introduced herself to the nurses and gave a brief explanation about the study and its purpose before any data collection.
- Each nurse was interviewed individually to gather the necessary data of the study.
- Data collected by the investigator over three days per week at burn department and intensive care unit affiliated to AL-Hussein university hospital. The days were Sunday, Monday, Thursday in the morning shift (8Am-2Pm).
- The required time to collect data from each nurse for about 30-40 minutes. – for self-administered questionnaire for assessment of nurses' demographic and work related data and nurses' knowledge regarding caring of patients with burn.
- Observational checklist for assessment of nurses' practice regarding care of patients with burn during acute phase was being filled by the investigator for about 60 minutes through indirect observation for three times and the mean scores were obtained.

III- Administrative item:

After explanation of the study aim and objectives, an official permission was obtained from the dean of faculty of nursing and the general manager of Al Hussein hospital asking for cooperation and permission to conduct the study.

IV-Statistical Item:

Upon completion of data collection, collected data were organized, tabulated and analyzed using Statistical Package for Social Science (SPSS), version 24 for analysis. For quantitative data, numbers, percentage, mean, and standard deviation (SD) were used to describe results. For qualitative data which describe a categorical set of data, frequency and percentage of each category were calculated.

Appropriate significance was adopted at $P \leq 0.05$ for interpretation of results (Siregar, 2021). The observed associated differences were considered as not significant if $p > 0.05$ and significant if $p \leq 0.05$. Appropriate inferential statistics such as chi square test was used as well.

Results

Table (1): Frequency and percentage distribution of the studied nurses according to their demographic and work-related characteristics (n=80).

Nurses' characteristics		No	%
Age (in years)	20 - < 30	59	73.7
	30 - < 40	16	20.0
	40 - < 50	3	3.8
	50 – 60	2	2.5
Mean \pm SD	27.53 \pm 6.746		
Gender	Male	10	12.5
	Female	70	87.5
Educational level	Diploma nurse	14	17.5
	Technical nursing institute	46	57.5
	Bachelor of nursing	20	25.0
	Post graduate studies	0	0.0
Position	Staff nurse	75	93.7
	Charge nurse	3	3.8
	Head nurse	2	2.5
Attended training course related to burn care	Yes	15	18.8
	No	65	81.2
If yes: when attend the training course (n=15)	Since 1- < 5 years	11	73.3
	Since 5 years or more	4	26.7

Table 1: shows that 73.7 % of the studied nurses aged from 20 to less than 30 years with a mean age 27.53 ± 6.746 , 87.5% of them were females. Regarding nurses' educational level; 57.5% of the nurses had technical nursing institute qualification. As well, 93.7% of them were staff nurses. 81.2% of the studied nurses didn't attend training course related to burn care, while, 18.8% of them attended training course with 73.3% of them attended since 1-< 5 years.

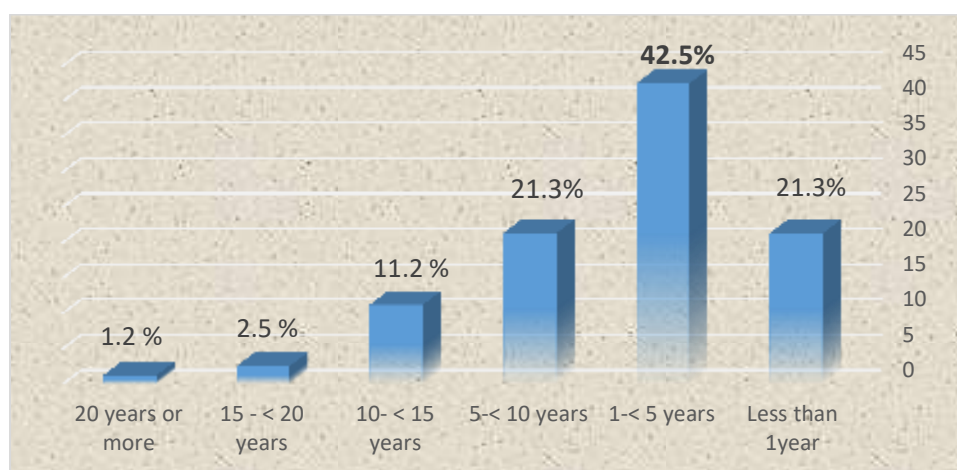


Figure (1): Percentage distribution of the studied nurses according to their years of experience (n=80).

Fig (1): illustrates that 42.5% of the studied nurses had 1- 5years of experience in nursing and 21.3% of them had experience of less than one year or 5 – 10 years.

Table (2): Frequency & percentage distribution of the studied patients according to their demographic and clinical characteristics of burn injury (n=60).

Items		N	%
Age	< 10 years	7	11.7
	10- <20 years	11	18.3
	20- <30 years	6	10.0
	30- <40 years	12	20.0
	40-<50 years	9	15.0
	50-<60 years	11	18.3
	60- <70 years	4	6.7
Mean \pm SD	35.91 \pm 15.734		
Gender	Male	18	30.0
	Female	42	70.0
Burn degree	1 st degree	0	0.0
	2 nd degree	60	100.0
	3 rd degree	0	0.0
Cause of burn	Thermal	48	80.0
	Electrical	12	20.0
	Chemical	0	0.0
	Radiational	0	0.0
Site of burn (*)	Face	0	0.0
	Hand	12	20.0
	Abdomen	17	28.3
	Back	15	25.0
	Thigh	10	16.7
	Leg	24	40.0
Total body surface area of burn	< 5%	18	30.0
	5- <10%	6	10.0
	10- <15%	6	20.0
	15 - 30%	30	50.0
Complications of burn	Fever (infection)	40	66.7
	Dehydration	20	33.3

Length of hospital stay	< 5 days	14	23.3
	5-<10 days	18	30.0
	10 days or more	28	46.7
Mean \pm SD	9.571 \pm 4.810		

* This variable isn't mutually exclusive

Table (2): shows that 20% of the studied patients aged 30 to less than 40 years with a mean age of 35.91 ± 15.734 and 70% of them were female. Regarding clinical characteristics of burn injury, 100% of the studied patients had 2nd degree burn and 80% of them had thermal burn. 40.0% of the patients had leg burn with a total body surface area of 15 - 30% among 50% of them. Additionally, 66.7% of the patients had fever (infection) as complications of burn and 46.7% of them stayed for 10 days or more with a mean length of hospital stay of 9.571 ± 4.810 .

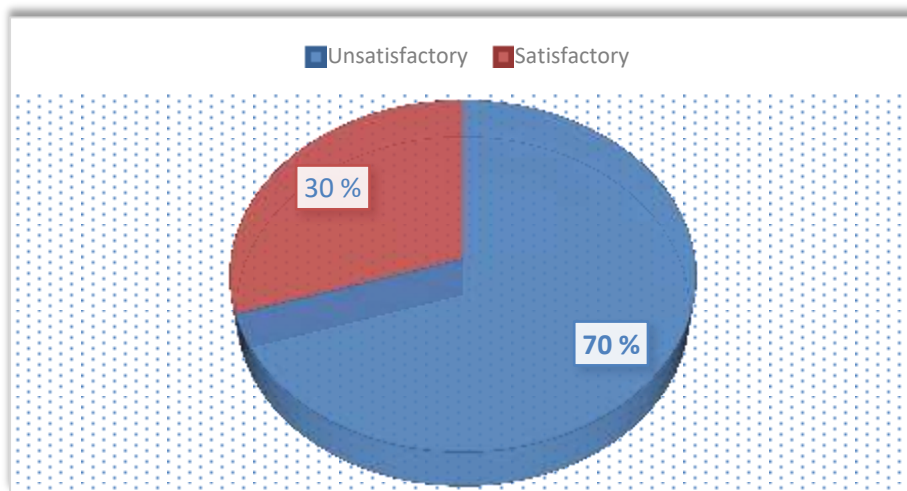


Figure (2): Percentage distribution of the studied nurses according to total knowledge scores (n=80).

Fig (2) illustrates that 30% of the studied nurses had satisfactory level of knowledge regarding burn and burn management, while, 70% of them had unsatisfactory level of knowledge.

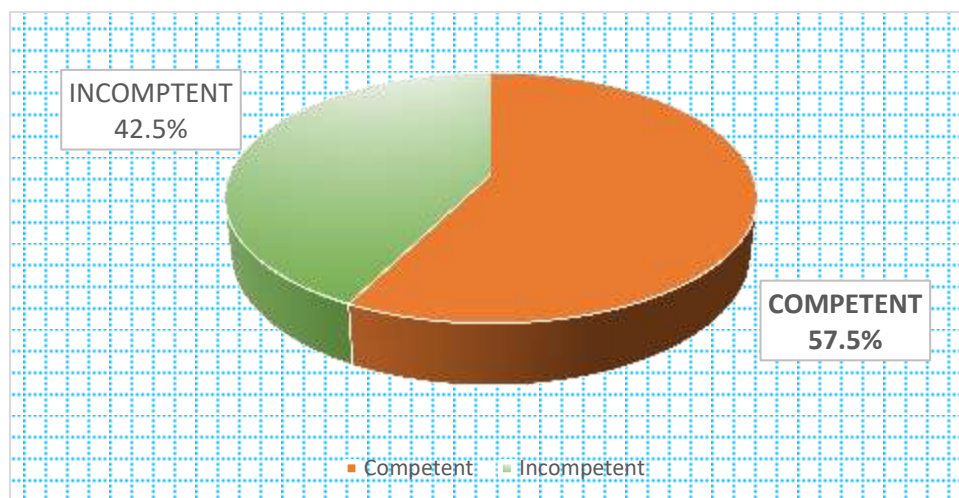


Figure (3): Percentage distribution of the studied nurses according to total practices scores (n=80).

Fig (3) illustrates that 57.5% of the studied nurses had competent level of practices regarding burn management during acute phase, while, 42.5% of them had incompetent practices.

Table (3): Correlations between total knowledge and practices scores of the studied nurses (n=80).

Items	Total knowledge scores	
	Correlation coefficient (r)	P value
Total practices scores	0.631	0.055 *

* Significant (S) $p \leq 0.05$

** Highly significant (S) $p \leq 0.001$

Table (17): reveals that there was a statistically significant positive correlations between total knowledge and practices scores of the studied nurses with (p value= 0.055).

Discussion

As regard to demographic characteristics of the studied nurses, current study illustrated that more than two thirds of the studied nurses aged between twenty to thirty years old. As well as the majority of the studied nurses were female. This can be interpreted by the nature of nursing profession in Egypt as a feminine job. In relation to qualification, more than half of the studied nurses were holding technical nursing institute degree. Additionally, the most of them were staff nurses. less than half of them had experience from one to five years in nursing and less. The majority of the studied nurses didn't attend training courses related to burn care.

These findings were supported by **Ghany et al ., (2022)** who assessed “Effect of nursing intervention program on management of burn in children in Egypt” and mentioned that more than half of the studied nurses aged 25< 30 years old and the majority of them were females. Meanwhile, about half of the studied nurses had technical nursing institute, the majority of them had less than 5 years of experience in management of burn in children. On contrast, **Mohammed et al., (2021)(a)**who applied his study in Egypt “Effect of an educational nursing program on nurses' performance regarding burn injury management” and showed that more than half of studied nurses attended training course .

According to study showed that less than one quarter of the studied patients aged 30 to less than 40 years with a mean age of 35.91 ± 15.734 and more than two thirds of them were female. In agreement with this finding, a study is applied in China by (**Chen et al., 2020**), titled “Clinical characteristics and risk factors for severe burns complicated by early acute kidney injury” and showed that the median age of critically ill burned patients was 44.9 ± 16.8 years and more than two thirds of the patients were male.

Regarding the present study according to clinical characteristics of burn injury, all of the studied patients had 2nd degree burn and the majority of them had thermal burn. More than one third of the patients had leg burn with a total body surface area of 15 - 30% among half of them. Additionally, about two thirds of the patients had fever (infection) as complications of burn and about half of them stayed for 10 days or more with a mean length of hospital stay of 9.571 ± 4.810 . This was supported by (**Huang et al., 2020**), who applied a study, titled, “Trends in microbial profile of burn patients following an event of dust explosion at a tertiary medical center” and showed that length of stay in hospital ranged from 9-220 day and total body surface area ranged from 2.5 %-16.5%.

This study is in agreement with (**Sang et al., 2021**), a study was applied in china about “Epidemiology and outcomes of bloodstream infections in severe burn patients **and** showed that most patients had flame injuries, and the median length of hospitalization was 35 days. While, the study findings are in disagreement with study (Bourgi .**et al.,**



2021) which was applied in Lebanon, titled, “predictors among patients admitted to a burn care center” and showed that more than half of patients contracted at least one infection during their hospitalization.

The current study described total knowledge regarding burn and burn management among the studied nurses. It clarified that less than one third of the studied nurses had a satisfactory level of total knowledge, while , more than two thirds had unsatisfactory level of knowledge. These findings could be due to more than half of them holding a nursing technical degree and didn't have training provided by hospital.

Similar to this study results, **Buksh et al ., (2019)** who performed his study in Pakistan , showed that less number of nurses have satisfactory level of knowledge about burn.

The current study illustrated that more than half of the studied nurses had competent level of practices regarding burn management during acute phase.

In disagreement with **Mohamed et al ., (2021)** whose study about total performance regarding burn wound care , and showed that all of nurses had unsatisfactory practice regarding to management for patients with burn. this study disagreed with **Utsunomiya, et al., (2020)** who conducted a study entitled "Mobilization practices for patients with burn injury in critical care" and found that majority of nurses had unsatisfactory practice about burn.

According to this study correlations between total knowledge and practices scores of the studied nurses, there was a statistically significant positive correlations between total knowledge and practices scores of the studied nurses .this finding is in agreement with **Ibrahim et al., (2018)** who applied a study in Egypt the study illustrated that, there was a statistically significant correlation between total scores of the studied nurses' knowledge and their total scores of practices.

Conclusion

Based on the finding of the present study, it can be concluded that:

one third of the studied nurses had satisfactory level of knowledge regarding burn and burn management, and also about half of the studied nurses had competent level of practices regarding burn management during acute phase, On the same line, there was a highly statistically positive correlation between total knowledge and practice regarding burn management during acute phase among the studied nurses.

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Recommendations

Based on the result findings of the study, the following recommendations were suggested:

- Continued nursing education and in service training programs about burn management should be regularly organized by hospital administration for staff nurses in order to equip them with adequate knowledge and practice related to care of patients.

- Evidence based guidelines regarding burn management should be revised periodically and be available in all hospitals in both Arabic and English languages.

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