

Interventional Program on Nurses Practices Regarding Burn Wound Dressing

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ABSTRACT

Background: Wound management is a crucial aspect of patient care and the nurse often is faced with the question of which approaches to use to provide an environment that supports healing and prevents complications. Important questions include how different types of wounds should be dressed, what method of debridement to use, whether dressings should be changed using sterile versus unsterile technique, and which adjunctive therapies to select under given circumstances, thus the aim of this study is to evaluate the effect of an intervention program on nurse's practices regarding dressing burn wound.

Methodology: 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 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 (24) items concerning clinical guidelines regarding 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: 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 improvements due to applying of the proposed interventional program with relative to demographical characteristics.

The study recommends that nurses practice toward burn management should be updated periodically as well as encourage nurses to participate in sessions, conferences and seminar related to care of burn

Keywords: Burns; Hydrogels; Peptides; Wound dressings, Skin

INTRODUCTION

The skin is the most exposed to various impairments, such as injuries, scratches, and burns, among all human body organs. Injuries of the epithelium and connective structures are associated with a weakened ability of the human body to assure adequate protection against harms from the outer environment.⁽¹⁾ Burns are defined as damages of the skin caused by excessive heat or caustic chemicals, as the most common causes.^(2,3) As stated by the World Health Organization, burn injuries represent a major public health crisis, and are among the most severe injuries with over 180,000 annual deaths worldwide.^(4, 5) The most common cause of hand burn injury is the scald from hot water. Mechanism of the injury, duration of the exposure, depth and range of the burns, age, and general well-being are all important influencing factors of the disease.⁽⁶⁾ Burns can be classified by the severity of damage to the skin layers (depth of burns) and the affected surface area of the skin (usually expressed as percentage of total body surface area).⁽⁷⁾ Burn wound is a complex and evolving injury. Injury to the skin provides a unique challenge, as wound healing is a complex and intricate process. Acute wounds have the potential to move from the acute wound to chronic wounds, requiring the nurse to have a thorough understanding of outside interventions to bring these wounds back into the healing cascade.⁽⁸⁾ The installation of infection represents one of the most usual and inevitable obstacles in the process of wound healing, especially in chronic wounds.⁽⁹⁾ Although numerous dressings are already commercially available, there is an urgent need for the development of novel wound care treatment options to address the increasing number of burn injuries.⁽¹⁰⁾ Since wound healing is a considerably dynamic process, the performance requirements of dressing should be modified as healing progress.⁽¹¹⁾ Treatment of partial thickness burn wounds is directed towards promoting healing and a wide variety of dressings are currently available. Improvements in technology and advances in understanding of wound healing have driven the development of new dressings. Dressing selection should be based on their effects on healing.⁽¹²⁾

As they are capable of satisfying important dressing requirements, wound dressings based on hydrogels are one of the most promising materials applied in wound care. Such requirements include maintaining the wound moist whereas absorbing excess exudate, covering the sensitive underlying tissue without adherence, decreasing pain through cooling effects, and actively intervening in the wound healing process.⁽¹³⁾ The nurses play an important role in the overall management of a burn patient. They must be well versed with the various protocols available that can be used to rationally manage a given situation.⁽¹⁴⁾

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 17th October, 2020 to 20th March, 2022.

Setting of the study: The study were 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 has been chosen according to the following criteria.

- 1 Nurses who are working at burns and plastic surgery center at Azady teaching hospital.
- 2 Nurses that should have at least one year of experience or more.
- 3 Male and female nurses.
- 4 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: Dressing burn wound: This part consists of 24 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 were 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 10th April up to 8 May, 2021. The pilot study sample were excluded from the original study sample.

Data Collection Methods: The data collection process were 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 methods of data collection was performed by observational checklist through three stages, these stages are

A-Assessing Nurses Practices about Clinical Guideline of Burns Management (pre-post): The pre-post data collection stage were performed through observational checklist to assess nurses 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.

Limitation of the Study: The study has experienced the following limitation:

1 Inability of some nurses to complete the study due to their infection with COVID19.

2 Refuse some cases to complete posttest.

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):

1-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)

2-Inferential data analysis: These were used to accept or reject the statistical hypotheses, which included the following:

A.Alpha Cronbach (α) for the reliability of questionnaire (Internal consistency).

B.Chi-Square test for testing the independency distribution of the observed frequencies and there is none restricted of an expected outcome.

C.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%.

D.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.

E.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	$\chi^2= 31.200$ 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	$\chi^2= 31.200$ P=0.000 (HS)
	Nursing high school graduate	12	50	
	Nursing college graduate and above	5	20.8	
Years of Experience Yrs.	< 5	11	45.8	$\chi^2= 31.200$ P=0.000 (HS)
	5 _ 9	6	25	
	≥ 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	
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: Distribution of the studied groups according to (Sub and Main Domains) with comparisons significant

Main Domain	No.	Pre					Post					C.S. P-value
		Min.	Max.	PGMS	PSD	Ev.	Min	Max	PGMS	PSD	Ev	
Initial Survey	24	9.09	90.91	35.65	22.58	M	86.36	100	91.48	4.89	H	P=0.00 (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 ± 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 course's of five days, and finally, most of studied subjects were joining their courses inside Iraq, since they are accounted 13(92.86%).

Table 3 shows descriptive statistics concerning sub & main domains regarding lifestyle modification regarding lifestyle items, such that (Percentile Grand/Global Mean of Score– PGMS, and Percentile Grand/Global Standard deviation – PGSD), as well as comparisons significant are accounted in order to be sure that two independent groups are thrown from the same population at pre period of time, and the effectiveness of applying an educational program on life-style of patients with myocardial infarction along post period of time between study group in contrasts of controlled.

Healing involves numerous physiological processes. Burn dressings must have biocompatibility, biodegradability, a porous structure, and appropriate mechanical properties. (15) Numerous factors come into play when selecting suitable dressing for burn wounds. These include the cause, site, depth and extent of the burn, as well as the type of first aid administered, the patient's ability to manage the dressing, the health professionals' ability to manage the dressing, and the functional impact of the dressing on the patient's lifestyle. Others include associated pain, urgency of 'time to healing' and the cost. (16) Various factors contribute to the outcome of patients with burn injury; these include the effectiveness of resuscitation, the care of the burn wound, adequate analgesia, and prevention and control of infections. Others include the nutritional rehabilitation of the patient, physical and occupational therapy, social and emotional support, and patient rehabilitation. Each of these factors requires the balancing of skills and resources. Effective management of burn wounds contributes significantly to the overall outcome of the patient. Wound infection has been found to correlate with outcome in a number of studies. (17) Lately, various innovations and improvements have been made with regards to the options and effects of dressing agents. Recently newer preparations and formulations of silver-containing dressing materials such as nanocrystal line silver (NCS) dressing have become widely available for occlusive dressing of burn and other wounds. In most

cases, this also requires additional secondary dressing materials depending on the degree of exudates of the wound. Open wound dressings involve an initial wound cleansing with normal saline solution followed by the application of a variety of topical dressing agents such as SSD. (18) Several studies have reported new wound dressings for pre-hospital emergency treatment, and there is a large market demand for these dressings. In recent years, there has been a rapid increase in the use of alternative emergency cooling and dressings for burn patients in pre-hospital settings. In the United Kingdom, 39% of emergency medical services use burn dressings as first-aid coolant. (19) In a cohort study of 455 people, Hyland and colleagues. found that >50% of patients were treated with hydrogel products by non-professional first-aid personnel. (20) In the pre-hospital environment, the lack of skin coverage is the greatest threat to severely burned patients. To reduce fluid loss and prevent bacterial infection, hydrogel dressings are needed urgently to cover burn wounds. (21)

CONCLUSION

Conclusion the study indicates insufficiencies in nurses' knowledge of emergency burn management and mass burn injury response. Working experience does not correlate to level of knowledge. Training courses significantly contribute to an improvement in their knowledge. It is necessary to conduct continuing medical education for nurses, regardless of their working experience and place of work

REFERENCES

- Kehler J., Brandl F.P., Goepferich A.M. Hydrogel wound dressings for bioactive treatment of acute and chronic wounds. *Eur. Polym. J.* 2018;100:1–11. doi: 10.1016/j.eurpolymj.2017.12.046.
- Jeschke M.G., Gauglitz G.G. Pathophysiology of Burn Injuries. In: Jeschke M.G., Kamolz L.-P., Sjöberg F., Wolf S.E., editors. *Handbook of Burns Volume 1*. Springer; Berlin/Heidelberg, Germany: 2020. pp. 229–245
- Butko Y., Tkachova O., Ulanova V., Şahin Y.M., Levashova O., Tishakova T. Immune histochemical study of KI-67 level and ribonucleic acid in the process of healing of burn wounds after treatment with drugs containing dexpanthenol and ceramide. *Biointerface Res. Appl. Chem.* 2019;9:4586–4590.
- Dong Y, Cui M, Qu J, Wang X, Kwon SH, Barrera J, Elvassore N, Gurtner GC. Conformable hyaluronic acid hydrogel delivers adipose-derived stem cells and promotes regeneration of burn injury. *Acta Biomater.* 2020 May; 108():56-66.
- Kaddoura I, Abu-Sittah G, Ibrahim A, Karamanoukian R, Papazian N. Burn injury: review of pathophysiology and therapeutic modalities in major burns. *Ann Burns Fire Disasters.* 2017 Jun 30; 30(2):95-102.
- Juhász I. Az égések osztályozása, diagnosztikája, sürgősségi ellátása. Helyi konzervatív kezelés égésben. *Magyar Családorvosok Lapja* 2010;3:15–9. Article in Hungarian.
- Yarboro DD. A comparative study of the dressings silver sulfadiazine and Aquacel Ag in the management of superficial partial-thickness burns. *Adv Skin Wound Care* 2013;26:259–62.
- Aditya Sood,1,* Mark S. Granick,1 and Nancy L. Tomaselli2. Wound Dressings and Comparative Effectiveness Data. *Adv Wound Care (New Rochelle).* 2014 Aug 1; 3(8): 511–529. doi: 10.1089/wound.2012.0401
- Negut I, Grumezescu V, Grumezescu AM. Treatment Strategies for Infected Wounds. *Molecules.* 2018 Sep 18; 23(9)
- Wang Y, Beekman J, Hew J, Jackson S, Issler-Fisher AC, Parungao R, Lajevardi SS, Li Z, Maitz PKM. Burn injury: Challenges and advances in burn wound healing, infection, pain and scarring. *Adv Drug Deliv Rev.* 2018 Jan 1; 123():3-17.
- Rosińczuk J, Taradaj J, Dymarek R, Sopol M. Mechanoregulation of Wound Healing and Skin Homeostasis. *Biomed Res Int.* 2016; 2016():3943481.

- 12 Sahin C, Kaplan P, Ozturk S, Alpar S, Karagoz H. Treatment of partial-thickness burns with a tulle-gras dressing and a hydrophilic polyurethane membrane: a comparative study. *J Wound Care*. 2019 Jan 02;28(1):24-28.
- 13 Shi C, Wang C, Liu H, Li Q, Li R, Zhang Y, Liu Y, Shao Y, Wang J. Selection of Appropriate Wound Dressing for Various Wounds. *Front Bioeng Biotechnol*. 2020; 8():182.
- 14 Elisabeth Greenfield. The pivotal role of nursing personnel in burn care. *Indian J Plast Surg*. 2010 Sep; 43(Suppl): S94-S100. doi: 10.4103/0970-0358.70728
- 15 Selig HF, Lumenta DB, Giretzlehner M, Jeschke MG, Upton D, Kamolz LP. The properties of an "ideal" burn wound dressing--what do we need in daily clinical practice? Results of a worldwide online survey among burn care specialists. *Burns*. 2012 Nov; 38(7):960-6.
- 16 Kavanagh S, de Jung A. Care of burn patients in the hospitals: Nursing committee of the international society for burn injuries. *Burns*. 2004;30:2-6.
- 17 Odeyinde SO, Ademola SA, Oluwatosin OM. Predictors of mortality in paediatric burn at Ibadan, Nigeria. *African J of Paediatric Surgery*. 2007;4:29-32
- 18 Gosselin RA, Kuppers B. Open versus closed management of burn wounds in a low-income developing country. *Burns*. 2008 Aug; 34(5):644-7.
- 19 Walker A, Baumber R, Robson B. Pre-hospital management of burns by the UK fire service. *Emerg Med J*. 2005 Mar; 22(3):205-8.
- 20 Brassolatti P, de Andrade ALM, Bossini PS, Otterço AN, Parizotto NA. Evaluation of the low-level laser therapy application parameters for skin burn treatment in experimental model: a systematic review. *Lasers Med Sci*. 2018 Jul; 33(5):1159-1169.
- 21 Chouhan D., Lohe T. U., Samudrala P. K., Mandal B. B.. In Situ Forming Injectable Silk Fibroin Hydrogel Promotes Skin Regeneration in Full Thickness Burn Wounds. *Adv. (2018).Healthc. Mater.* 7, e1801092. 10.1002/adhm.201801092