EAS Journal of Nursing and Midwifery
Abbreviated Key Title: EAS J Nurs Midwifery
ISSN: 2663-0966 (Print) & ISSN: 2663-6735 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-4 | Issue-4 | July-Aug -2022 | DOI: 10.36349/easjnm.2022.v04i04.003

Original Research Article

Effect of Nursing Intervention Program on Management of Burn in Children

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Article History
Received: 08.06.2022
Accepted: 13.07.2022
Published: 19.07.2022

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Background:*** Burn in children is immediately and potentially life-threating injury. Providing adequate care for burn in children properly is the most important contribution to the successful management**. Aim:** The present study aimed to evaluate the effect of nursing intervention program on management of burn in children. ***Design:*** A quasi- experimental design was used in the current study. ***Setting:*** The study was carried out at Burn Units affiliated to Suez Canal University and Ismalia General Hospitals. ***Sample:*** A convenience sample of nurses (35) was working at the previous settings and 20 children were suffering from burn injury during the study period. ***Tools:*** A structured interview questionnaire and observational checklists to assess nurses' knowledge and practice regarding management of burn in children pre/post nursing intervention program. ***Results:*** revealed that, there was a statistically significant improvement in nurses' knowledge and practices post program intervention compared to pre program intervention regarding management of burn in children. ***Conclusion****:* The study concluded that, the nursing intervention program improved positively the studied nurses' knowledge and practices regarding management of burn in children. ***Recommendation:*** The study suggested continuous educational program for nurses to update their knowledge and practice regarding management of burn in children.

Keywords: Burn- Children- Educational intervention program – Nurses' knowledge - Practices.

INTRODUCTION

Burn is a global health problem associated with a significant morbidity and mortality that occur more frequently in low and middle-income countries (Marcdante and Kliegman, 2016). Burn is the most serious injuries, burn has a great impact on children physically, physiologically and psychologically, which are accompanied by intense pain and long lasting illness, which not only bring suffering to children but for the wider family and community, burn continue to be one of the main causes of death and disability (Jahnke *et al*., 2018).

Burn injuries are usually attributed to extreme heat sources, thermal, chemicals, electricity, or radiation (Beevi, 2019). The severity and prognosis of burn injury depending on estimating the total body surface area burned the depth of burn and the presence or absence of inhalation injury. Burn depth is classified as superficial, partial thickness and full thickness burn (Hgberg *et al*., 2018).

Burn is the fourth most common type of trauma worldwide, accounting for an estimated 180,000 death. Annually in the United Stated, nearly 40,000 burn patients may require hospitalization, and the rate of deaths from the burn is currently over 7 times higher in low and middle-income countries than in high-income countries (Murray, 2020). Burn was reported as the 11th leading cause of death in children aged 1-9 years, and children less than five years in the WHO African Region. This region has almost three times the incidence of burn deaths in infants compared to global average (WHO, 2016).

Nursing care of burn in children can be organized into three ranges of care including emergent, acute and rehabilitation phase. Nurses are the frontline of care, since nurses carry out care that makes a

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difference in the long-term quality of life in burned children. The nurse should be educated about the physiologic changes that happen after a burn and must be able to communicate effectively with children. Nurses have a key role in helping burned children to adapt and cope with their new body image and provide children with information about treatment and complications of burn (Harding, 2020).

Nursing intervention in a rehabilitation phase focus on the child's and family's adaptation to the burn injury and their ability to reintegrate to the community; Planning for return to school and home often requires a school reentry program that should be appropriate to child development and changing educational need (Hockenberry *et al*., 2019).

Significance of the study

Burn is one of the most serious injuries and has a great impact on children. Burn is the third leading cause of accidental death in children. About 80% of all burn injury occurs within the home (Abdelrahman *et al*., 2021). Worldwide, around 96,000 children under the age of 20 are estimated to have been mortally injured as a result of burn due to fire in 2014. The mortality rate in low-income countries was 4.3 per 100,000 compared to 0.4 per 100.000 in higher income countries (Kazis *et al*., 2016). In Egypt burn in children is a significant problem, especially in families of low socioeconomic status. Most burned children presented to burn unit of Assuit University were among the age groups of toddler and preschool (Ebrahem *et al*., 2022). Therefore, this study has been carried out to evaluate the effect of nursing intervention program on management of burn in children.

Aim of the study

This study aimed to evaluate the effect of nursing intervention program on management of burn in children.

Research Hypothesis

Applying nursing intervention program would positively affect the nurses' knowledge and practices regarding management of burn in children.

SUBJECTS AND METHODS

Technical Design

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

Research Design

Quasi-experimental (pre-post test) research design was used in this study.

Study Setting

The study was carried out at Burn Units affiliated to Suez Canal University and Ismailia General Hospitals**.**

Sample

A convenient sample of nurses (35) working at the above-mentioned settings regardless their age, academic qualification and years of experience. In addition to (20) burned children who had 2nd or 3rd degree of burn or both admitted for treatment in the previously mentioned settings during the study period.

Tools of Data Collection

Two tools were utilized for data collection pre/post nursing intervention program:

Tool I: structured interviewing questionnaire:

This tool was designed by the researcher based on scientific literature review. It was composed of the following parts:

Part 1: Characteristics of the studied nurses namely age, qualification, years of experience, previous training programs.

Part 2: Assessing of nurses' knowledge regarding burn in children this part included questions about anatomy and physiology of the skin, types, degree and complications of burn.

Part 3: Assessing of nurses' knowledge regarding burn management in children at emergent, acute and rehabilitation phases.

Part 4: Child assessment for burn area that concerned with characteristics of the studied children (children' age and gender) and characteristics of burn (total body surface area affected by %, causes, site of burn, recurrence and duration of hospital stay/week).

Scoring system of nurses' knowledge

The total number of questions that assessed the studied nurses' knowledge was 52 questions. Regarding the knowledge scores, the correct answer was given one while; the incorrect answer was given zero. The scores were summed up and converted into percent score. Total nurses' knowledge was considered to be good (≥75%), average (60 %< 75%) and poor (<60%).

Tool (II): Observational checklists

Adapted from Andrew *et al*., (2010) and Abdallah, (2013), to assess the nurses' practices regarding management of 2nd and 3rd degree of burn in children. Certain modification was done by the researcher to suit the nature of the study. Observational checklists used to assess the studied nurses' practices in burn management of children regarding maintaining oxygenation, ventilation and circulation, care of second and third degree of burn, application of splints, dressing change and infection control.

Scoring system of nurses' practices

Studied nurses' practices score was classified as done and not done, each correct step done by the nurse was given (1) score and not done was given (0) score. The total practice scores were 84. The scores were summed up and converted into percent score. Practices were considered to be satisfactory if the

studied nurses' total score of practices percent was ≥ 75% or unsatisfactory if the studied nurses' total score of practices percent was < 75%.

Reliability of the study tools:

Tools reliability was tested by using a Cronbach's Alpha test for questionnaire (0.863) and for observation checklists (0.785).

Operational Design

The operational design of this study included the preparatory phase, pilot study, and field work.

Preparatory Phase

A review of the past and current related literature regarding the different aspects of the research problem was carried out by the researcher using books, periodicals, articles and websites to be acquatinted with the research problem and design the study tools.

Pilot Study

It was conducted over a period of one month. The pilot study comprised 10% of the total studied sample (4) nurses, to evaluate data collection tools for its applicability, clarity and to estimate the time needed for filling the tools. Based on the results of the pilot study, the necessary modifications were done namely, ambiguous items were omitted, other items were added and others were modified and the final form was developed according to the subjects' responses. The nurses included in the pilot study were excluded later from the study.

Field of work

The purpose of the study was explained briefly by the researcher to nurses who were willing to participate. The actual field work was carried out over a period of six months, starting from the 1st of May 2019 to the end of November 2019. The average time needed to fill the structured interviewing questionnaire was about 20-25 minutes to assess nurses' knowledge. The nurses' practices regarding management of burn in children were assessed using observational checklists. The average time required for the completion of each checklist was ranged from 5-10 minutes. The researcher observed the studied nurses during their actual practice in care of children suffering from burn.

Implementation Phase

The program was implemented over 10 weeks. The program involved 7 sessions (4 for theoretical and 3 for practical).

The program was implemented for a group of nurses composed of 4- 5 nurses according to the working circumstances and the nurses' physical and mental readiness. The duration of each session ranged from 45- 60 minutes including the time for discussion. The researcher was available by rotation 4 days (Sunday till Wednesday) weekly.

At the beginning of the first session an introduction about the program and its aim was explained. Feedback was given at the beginning of each session regarding the previous one. Various teaching methods were utilized (modified lecture, group discussion, demonstration and re-demonstration) and media (handout, PowerPoint presentation, posters, videos and real objects).

Program Evaluation

Evaluation of the nursing intervention program was done through using the same tools used in the pre nursing intervention program phase. The program evaluation was applied immediately upon completion of the program.

Ethical Consideration

Verbal consent was taken from each nurse prior to participation in the study after simple explanation of the aim and the expected outcomes. The researcher assured voluntary participation, anonymity and confidentiality of the information.

IV. Statistical Design

Upon completion of data collection, the gathered data were organized and coded prior to computer entry. The data were imported into statistical package for social sciences (SPSS version 20) software for statistical analysis.

Descriptive statistics including, frequency and percentage for qualitative variables means and standard deviations for quantitative variables. Wilcoxon test and Chi-square test and Fisher's exact test was used to compare between two groups. Pearson correlation coefficient was used to assess relationship between various study variables. P-value < 0.05 was considered statistically significant (*), p-value < 0.001 was considered highly statistically significant (**), and p-value ≥ 0.05 was considered statistically insignificant (NS).

RESULTS

Table 1 illustrates that 51.4% of the studied nurses aged 25< 30 years old and the majority (91.4) of them females. Meanwhile 45.7% of the studied nurses had diploma of technical nursing institute, 88.6% of them had less than 5 years of experience in management of burn in children, 71.4% working at Suez Canal University hospitals and 51.4% of them attended training courses about management of burn in children.

Table 2 illustrates that $\bar{x}$ ±SD of children' age was 5.5±4.06 years and more than one half (55%) of them were females.

Table 3 presents statistically significant difference was observed pre/post nursing intervention program implementation phases (p<0.00); where 48.6%

of the studied nurses had poor knowledge pre nursing intervention program, while all of them (100%) had good knowledge post nursing intervention program regarding management of burn in children.

Table 4 clarifies statistically significant difference was observed among pre/post nursing intervention program implementation phases ($p<0.0001$); where 82.9% of the studied nurses had unsatisfactory practices pre nursing intervention program, while all of them (100%) had satisfactory practices post nursing intervention program regarding management of burn in children.

Table 5 illustrates that, there was a statistically significant correlation between total scores of the studied nurses' knowledge and their total scores of practices post nursing intervention program ($p<0.05$) regarding burn and its management in children.

Table 1: Distribution of the studied nurses according to their characteristics (n = 35)

Studied nurses' characteristics	Number (No)	Percentage (%)
Age in years:		
20<25	8	22.9
25<30	18	**51.4**
30<35	5	14.3
35≤ 40	4	11.4
x̄ ± SD	31.2±3.6	
Range	20-40	
Gender		
Male	3	8.6
Female	**32**	**91.4**
Qualification:		
Diploma of nursing school	14	40.0
Diploma of technical nursing institute	16	**45.7**
Bachelor in nursing science	5	14.3
Nurses' experience in years:		
< 5	31	**88.6**
≥ 5	4	11.4
x̄ ± SD	2.77±1.78	
Range	1-5	
Work place:		
Suez Canal University hospitals	25	**71.4**
Ismailia General hospital	10	28.6
Attendance of training courses about burn:		
Yes	18	**51.4**
No	17	48.6

Table 2: Distribution of the studied children with burn according to their characteristics (n = 20)

Items	No.	%
Children's age/years:		
1<5	**12**	**60.0**
5<10	5	25.0
10<15	1	5.0
15 ≤ 18	2	5.0
x̄ ±SD	**5.5±4.06**	
Range	**1 – 18**	
Gender:		
Male	9	45.0
Female	**11**	**55.0**

Table 3: Distribution of the studied nurses' total scores of knowledge regarding burn in children pre/post nursing intervention program (n = 35)

Studied nurses' total knowledge	Pre-test		Post-test		*t-test*	*P-value*
	No.	%	No.	%		
Poor (< 60%)	17	**48.6**	0	0.0		
Average (60% < 75%)	15	42.8	0	0.0		
Good	3	8.6	35	**100.0**	**25.75**	**0.0001****
x̄± SD	61.69±9.3		92.83±5.82			

Table 4: Distribution of the studied nurses' total scores of practices regarding management of burn in children pre/post nursing intervention program (n = 35)

Studied nurses' total practice	Pre-test		Post-test		*t-test*	*P-value*
	No.	%	No.	%		
Unsatisfactory	29	**82.9**	0	0	**15.55**	**0.0001****
Satisfactory	6	17.1	35	**100**		
x̄± SD	99.97±20.56		150.57±9.59			

Table 5: Correlation between the studied nurses' total scores of knowledge and their total scores of practices at post nursing intervention program (n=35)

Items	Total score of the studied nurses' knowledge	
	Post test	
	r	*P-value*
Total scores of nurses' practices	0.38	0.023

DISCUSSION

Burn in pediatric patients is among the most distressful trauma and considerable public health issue all over the world. Burns are the major cause of hospitalization and usually associated with significant morbidity and mortality (Buksh *et al*., 2019). The nursing interventions for child burn care need to be precise and effective to maintain proper outcomes, which included promoting gas exchange and airway clearance, restoring fluid and electrolyte balance, maintaining normal body temperature, minimize pain and anxiety, preventing infection, maintaining an adequate nutrition and promoting skin integrity (Belleza, 2021).

Regarding characteristics of the studied nurses, the results of the present study showed that, more than half of the studied nurses were in age group of 25< 30 years, most of them were females. Nearly half of the studied nurses were having diploma of technical nursing institute. Most of the studied nurses had experience < 5 years and more than half of the studied nurses attended training courses regarding care of burn in children. This finding was in an agreement with a study carried out by Melo and Lima, (2017) which entitled "Cost of Nursing most Frequent Procedures Performed on Severely Burned Patient" who found that half of the studied nurses had 20<30 years old, the majority of them were females and more than half of them were graduated from technical nursing institute.

The results of present study revealed that, more than half of burn children were females. This finding was on the same line with a study done by Abd Elalem *et al.*, (2018), which entitled "The Effect of Self-Care Nursing Intervention Model on Self-Esteem and Quality of Life among Burn Patients" who found that the majority of the studied children were females. Also, Abdel-Khalek, (2015), study which entitled "Prediction of Risk Factor for Infection Occurrence in Patient with Burn Injury" found that, two thirds of the studied children were females. While these result disagreed with Rashid *et al*., (2017), study which entitled "Characteristics of burn Injury and Factors in Relation to Infection among Pediatric Patients" who revealed that, more than half of the studied children were males. This may be due to that female children usually spend most of their time in close contact with their mothers at home and prefer to play with kitchen cooking equipment's.

Concerning total score of nurses' knowledge regarding management of burn in children, nearly half of the studied nurses had total poor knowledge pre nursing intervention program, while all of the studied nurses had good knowledge post nursing intervention program regarding management of burn in children. This result was on the same line with Alkassar and Kadhim, (2020), study which entitled "Effectiveness of an Educational Program on Nurses' Knowledge toward Burn Management" who found that, nurses' knowledge has been improved regarding nursing management for patient with burn injury in the study group after exposure to educational program. Also, this result was supported by Mohammed *et al*., (2021), a study which entitled "Nurses' Knowledge, Practices, and Attitude regarding Burn Injury Management" who found that the majority of the studied nurses had unsatisfactory knowledge regarding burn injury. This result emphasize on the importance of in-service educational program to improve nurses' total level of knowledge regarding management of burn in children.

Concerning the total score of nurses' practice regarding management of burn in children, most of the studied nurses had unsatisfactory practice pre nursing intervention program. While all the studied nurses had satisfactory practices post nursing intervention program. This finding was supported by Asmat and Ashraf, (2019) who assessed nurses' knowledge and practice for prevention of infection in burn patients and found that, unsatisfactory score of knowledge and practice. Also, this result was supported by Mohammed *et al*., (2021), who found that, all the studied nurses had unsatisfactory practices regarding burn care in children. This result assured the positive effect of management intervention program on the studied nurses' practices and emphasized the importance of on job training program for them.

A statistical significant correlation was found between total nurses' knowledge and their practice post nursing intervention program compared to pre nursing intervention program. This finding was supported by Abdelrahman *et al*., (2021), in study entitled "Effect of Instructional Guidelines on Nurses' Performance Regarding Care of Children Suffering from Burn Injuries" who found that, positive correlation between total knowledge and total practices regarding care of burn throughout the intervention.

Also, this result was supported by Mohammed *et al*., (2019), a study which entitled "Effect of Educational Program on Nurses Knowledge and Practice related to Care for Children with Moderate Burn Degree" who found that there was positive correlation between nurses' total knowledge, practice scores. This reflects the importance of integration between theory and practice and may be attributed to effectiveness of the nursing intervention program for management of burn in children.

CONCLUSION

In the light of the current study findings, it can be concluded that, the nursing intervention program had a positive effect on nurses' knowledge and practices regarding management of burn in children.

RECOMMENDATIONS

In the light of the findings of this study, the following recommendations are proposed for nurses:

- Support system and services should be available to burn children and their family.
- Pre-service training programs for newly recruited nurses to update their knowledge and improve their practice for management of pediatric burn.
- Results of current study should be shared with the decision makers of health care providers of burn children to shed light on needs and problems of burn children and their family.
- Further studies regarding burn care with emphasis on psychological complications among burned children.

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Cite This Article: Sheren Kattab Abdel Ghany, Wafaa El Sayed Ouda, Manal Farouk Mohamed, Rehab Hassan Kafl (2022). Effect of Nursing Intervention Program on Management of Burn in Children. *EAS J Nurs Midwifery*, *4*(4), 105-111.