

## Assessment of Nurses Knowledge and Practice about an Upper Limb Exercise for Burned Children

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### Abstract

**Background:** Burns are one of the most serious injuries, they have a great impact on children. Hand function is one of the most important goals of burn rehabilitation and is consequently a vital functional outcome, because it is strongly predictive of successful re-integration into life role. **Aim:** This study aimed to assess the nurses' knowledge and practice about an upper limb exercise for burned children **Design:** Descriptive research was used. **Setting:** The study was conducted at burn unit at Plastic, Reconstructive and Burn Surgery Center Mansoura and Mansoura New General Hospital at Mansoura city. **Subject:** A convenience sample of (55) nurses at the previous mentioned settings. **Tools:** Two tools were used to collect data. Tool I Structured interview sheet for nurses about upper limb Exercise. Tool II: Observational checklists for nurses about upper limb exercise. **Results:** Indicated that the majority of the studied nurses didn't receive any training program about upper limb exercise for burned children and more than three fourth of the studied nurses had an unsatisfactory levels of knowledge, as well as the minority of the studied nurses demonstrated competent level of practice regarding upper limb exercise. **Conclusion:** The present study indicated that the nurses had unsatisfactory levels of knowledge and incompetent level of practice regarding upper limb exercise. **Recommendation:** In-service training programs for nurses directed toward upper limb exercise for children with burn should be conducted.

**Keywords:** Assessment, Burned Children, knowledge, Nurse, Practice, Upper Limb Exercise.

## **Introduction**

Burns are one of the most serious injuries, they have a great impact on children physically, physiologically and psychologically, which are accompanied by intense pain and often by long-lasting illnesses, which not only bring suffering to children but for the wider family and community in general, burns continue to be one of the main causes of death and disability in the world (**Jahnke, Poston, Jitnarin and Haddock 2018**). Unfortunately, burns are relatively common, especially in childhood. After car accidents, falls and interpersonal violence, burns are the fourth most common type of trauma in the world. Young children's natural curiosity, insufficient athletic ability, and / or inability to recognize dangerous situations and their consequences make children a significant risk group for burns (**Moehrlen et al., 2018**); **Donna and Marlyn, 2019**).

Burn injuries have multiple consequences that will persist from childhood through adolescence and into adulthood, for example; Pediatric burn patients are at risk of scar contracture, which can cause discomfort and reduce flexibility in the future, because their body will grow, but the scar will not disappear. Therefore, to release this contracture, reconstructive surgery is usually necessary. prevent future difficulties in life, proper medical care and psychosocial support are essential for children with burns (**Moore, Dewey and Richard, 2019**).

The ultimate goal of burn rehabilitation is to help restore functional capacity, provide independence for burn children, maintain and increase the range of joint motion, muscle strengthening, scar management, reconstructive surgery (if necessary), emotional and

psychological support (**Duffy, McLaughlin and Eichelberger, 2016**). Combining therapeutic exercises with a comprehensive rehabilitation plan can help nurses prevent the formation of deformity contractures and maintain the strength of the affected and unaffected limbs, especially the upper limbs, because the correct treatment and rehabilitation of the upper limbs are often ignored. In the acute phase, it is conducive to the treatment or intensive care of other parts of the body (**Landolt, Buehlmann, Maag and Schiestl, 2019**). Therefore, upper limb rehabilitation should include exercise, splinting, positioning, various massage techniques and scar treatment to better function and achieve the goals of the rehabilitation plan (**Moore et al., 2019**).

The best care of burn patients requires a unique multidisciplinary approach. Whether the patient can achieve positive results depends on the composition of the burn care team and the close cooperation among its members. The center of the team is the burn nurse, who is the coordinator of all patient care activities. The complexity and multi-system involvement of burn patients require burn nurses to have extensive knowledge of multi-system organ failure, intensive care technology, diagnostic and rehabilitation research, and psychosocial skills. The nurse is responsible for overseeing the general care of the patient and coordinating activities with other disciplines, such as physical and occupational therapy, social services, nutrition services, and pharmacies. (**Serghiou, Cowan and Whitehead., 2019**).

### **Significant of the study:**

Burns are one of the most serious forms of trauma that can affect different

sites on the human body. Hands and upper extremity are considered the the foremost common areas of the body that are liable to burns in more than 50% of burn injuries among children(Druery, Brown and Muller, (2015). Upper extremities are more vulnerable parts of human body in which, hands represents 6% of burn injuries of all hand burn injuries but child without injury to other joints losses up to 54% function when he loses his hand function also, small joints of the hands are more susceptible to form contractures which are very difficult to handle during the treatment programs therefore, children with upper extremities burn need intensive medical care and life long physiotherapy rehabilitation program (Young and Burd, 2014).In Mansoura city, there were approximately (1750) reported pediatric patient suffer from burn (1000 boys and 750 girls from 2014 to 2017) (Ibrahim, Abusaad and El bilgahy, 2018).So, the aim of this study is to assess nurses' knowledge and practices about an upper limb exercise for burned children.

**Aim of the study:**

Assess nurses' knowledge and practices about an upper limb exercise for burned children.

**Research question:**

What are the nurses' knowledge and practices about an upper limb exercise for burned children?

What are the nurses' practices about an upper limb exercise for burned children?

**Subject:**

**Research Design**

Descriptive research design was used to conduct this study. Which defined as the quantitative data were described as mean  $\pm$  SD (standard deviation) for parametric data and

median for non- parametric data (Siedlecki, 2020).

**Settings**

The research was conducted at the burn unit at Mansoura New General Hospital at Mansoura city and burn unit in Plastic, Reconstructive and Burn Surgery Center affiliated to Mansoura University., which provides health services to burned children from Mansoura and the surrounding areas at Dakhliya governorate. Burn center composed of five floors and 48 beds. The building contains two floors to care for burned patients and intensive care unit. It has a special floor for operation and separate floor for plastic and reconstructive surgery. On the other hand, Mansoura International Hospital building contains seven floors the care for burn child at the first floor which consists of seven rooms; four rooms to care for burned patients. Each room consists of six beds. The other three room are hydrotherapy room, bathroom and doctors room.

**Subjects:**

A convenience sample of (55) nurses at the previous mentioned setting who were providing care for burned patients during the periods of data collection regardless their age, qualification, years of experience throughout six months was enrolled in the study.

**Tools of Data Collection:**

**Tool 1: A Structured Interview Sheet for Nurses about Upper Limb Exercise.**

It was designed by the researcher in a simple Arabic language after reviewing the related literature with the guidance of (Ibrahim et al., (2018), Fleisher and Ludwigs, (2010); El Sherbiny, (2018) and Abd El-lateef,

(2003). It composed of 32 questions and it comprised of three parts as follows:

**Part (1):** Concerned with characteristics of the studied nurses (8 items) such as age, sex, level of education, marital status, years of experience in burn unit, and previous attendance of training program about upper limb exercise in burned children.

**Part (2):** Concerned with nurse's knowledge about burn, which (10 questions) covered the following: Definition of burn, its causes, degree and types. Common type of burn affecting children, period of burns wound healing, type of burn that doesn't left and left scar, causes of absence of pain in third degree burns and calculation of total body surface area burn using Rule of Nines.

**Part (3):** Concerned with nurse's knowledge about burn of upper limb exercise in burned children, (22 questions) which covered the following: Definition of burn rehabilitation, complications that may happen after hand burn injury and how to avoid it, importance of the therapeutic exercises and instructions during doing it. The rehabilitation treatment modalities, the upper extremities correct positions after burns and its benefits, types of therapeutic exercise used after burns. Definition of goniometer scale, knowledge about massage therapy objectives, cautions and technique. Knowledge about splints objectives, technique and signs of poor splint fitness. Knowledge about pressure therapy its importance, wearing instructions and the instructions for prevention of the formation of scars.

**Scoring system:**

Based on the responses collected from the burn care nurses; the nurses' answers were checked and compared

with the responses from the predesigned model. Their knowledge is classified as: correct complete answer that was given two scores, while correct incomplete answer was given one score and zero was given for incorrect, missed or unknown answer according to (Youssef, Hassan, Abd El-Aziz and Mohammed, 2019). The total score of (41) were given for total nurses' knowledge. A higher score indicate better knowledge. All scores were transformed into score percentage as follow score percentage (the observed score / the maximum score) x 100.

**The total level of knowledge (41 grade) divided into:**

**Satisfactory:** 75% and more (equal 30.75 grade and more).

**Unsatisfactory:** less than 75% (equal less than 30.75 grades)

**Tool II: Observational Checklists for Nurses about upper limb exercise**

This tool was developed by the researcher after reviewing recent national and international literatures (Kowalske et al., 2015; Mohamed, 2014; Cho et al and El Sherbiny, 2018) to evaluate nurses' practice of upper limb exercise for the burned children on this checklist consisted of 36 steps covering upper limb exercise skills: Anti-contracture position of the burned limb (8 steps 1:8). Therapeutic exercise which divided into four exercise categories (Early ambulation and walking, Range of motion exercise, resistive or strengthen exercise and Stretching exercise) (16 steps 9:24). Massages therapy technique (12 steps 25:36).

**Scoring system:**

Scores were estimated to evaluate nurse's performance level related to upper limb exercise care for burned children. According to (Youssef, Hassan, Abd El-Aziz and Mohammed,

2019), the scoring was calculated as the following: the total scores of nurses' practice were (72) for all the nursing skill items carried out for care of burned child (36 items for care provided to burned child). The nurses' practice was classified into either completely done (2), incompletely done (1), and not done (0). A higher score indicate better knowledge. All scores were converted into percentage as follow score percentage (the observed score / the maximum score) x 100.

**The total nurses' practice level (36 items) (72 grade) divided into:**

**Competent:**  $\geq 75\%$  (equal 54 grade and more).

**Incompetent:**  $< 75\%$  (equal less than 54 grades).

**Method:-**

- **Preparatory phase**

This phase included a review of the past and current related literature and research, using available books, journals, and articles to get acquainted with the various aspects of the study research problem and develop the study tool. The researcher prepared the guiding booklet. It was specially designed to meet the needs of nurses in a simple Arabic language. A panel of 5 experts in the field of nursing has evaluated and revised the content validity of the study tools for their clarification, sequence of items and content relevance. The required modifications were done, according to their suggestions. The internal consistency of the study tools was tested by using Cronbach's alpha coefficient test;  $r = 0.776$  for tool I,  $r = 0.976$  for tool II.

**Ethical considerations:**

After describing the aim of the research, informed oral consent was obtained from each nurse for her participation. Anonymity and

confidentiality of collected data were ensured and used only for research purposes. Participants were informed that participation in the study is voluntary and they have the right to freely withdraw from the research at any time without any responsibility.

## **2 - Exploratory phase**

### **Pilot study**

A pilot study was conducted on 6 nurses (10% of the participants) to assess the clarity, feasibility and applicability of the tool. No modifications were made, consequently, therefore the pilot study were included in the study sample.

### **Fieldwork:**

The actual fieldwork started after an approval that was obtained to conduct the study from the Director of previous mentioned setting to facilitate data collection. Once the permission was obtained, to proceed in the study. The researcher introduced herself to the nursing staff and explaining the study aim in brief. The researcher attended three days per week in the study setting at morning and afternoon shift. Each nurse was interviewed individually to collect nurses' data base line, their knowledge about the upper limb exercise using tool I. Nurses' practices about upper limb exercise early ambulation and walking, Range of motion exercise, resistive or strengthen exercise and Stretching exercise using tool II.

### **Administrative design**

An official approval was achieved from the Research Commission from Faculty of Nursing, Mansoura University to hold out the study. A letter was submitted from the researcher to the Director of previous mentioned setting to obtain a permission to apply the research study.

**Statistical analysis**

The collected data was coded and inserted into a data file using the Excel program for Windows. Frequency analysis and manual review were used to detect errors. After full insertion, the raw data were introduced into the version of the Statistical Social Science Package (SPSS) by which the analysis was carried

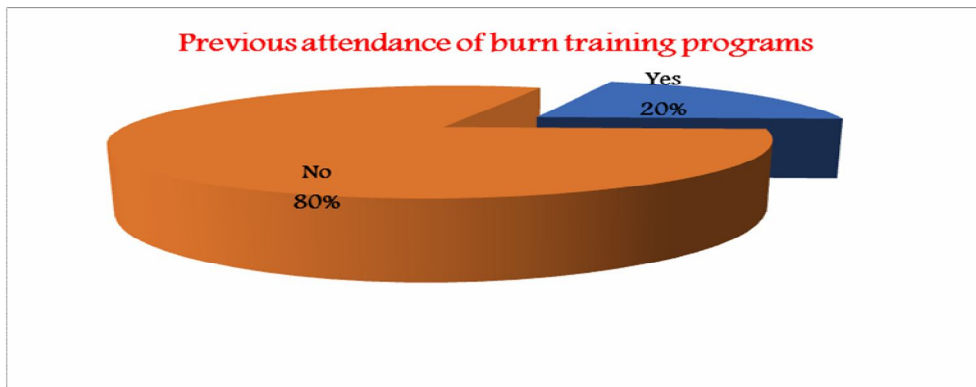
out with the application of frequency and percentage. The data has been modified, coded and analyzed. Qualitative data are expressed as percentages and quantities. Quantitative data are described as the mean ± SD (standard deviation) of the parametric data and the median of the non-parametric data.

**Results:**

**Table (1): Percentage distribution of the participating nursing staff based on their characteristics; (n=55)**

Nurses' Socio-demographic characteristics		No=55	
		No.	%
Age in year	<25	12	21.8
	-25	12	21.8
	-30	19	34.6
	35 & more	12	21.8
	<b>Mean ± SD =</b>	<b>30.54 ± 4.98</b>	
Gender	Male	4	7.3
	Female	51	92.7
Educational level	Nursing diploma	12	21.8
	Nursing technical Institute	23	41.8
	Bachelor degree	20	36.4
Marital status	Married	43	78.2
	Divorce	1	1.8
	Single	11	20
Years of experience	<5	16	29.1
	- 5	20	36.4
	- 10	11	20
	15 -	8	14.5
	<b>Mean ± SD =</b>	<b>8.61±4.73</b>	

**Figure (1):Distribution of the studied nurse about previous attendance of burn training programs.(n=55)**



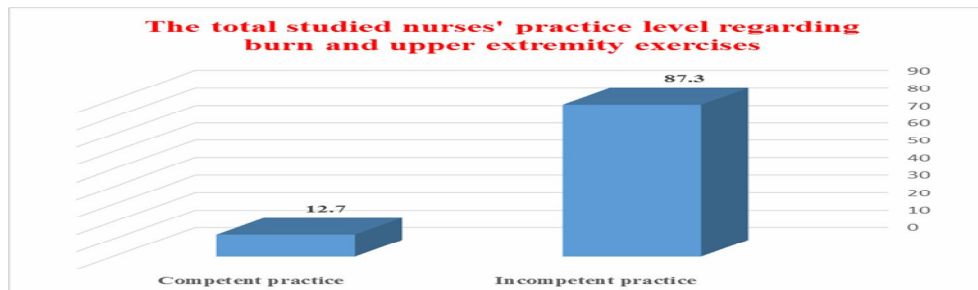
**Figure (2):** The total studied nurses' knowledge level regarding burn and upper extremity exercises



**Table (2):** Distribution of the studied nurses' observed practice regarding Stretching exercise (n=55)

Items	Completely done	Incompletely done	Notdone
	N(%)	N (%)	N (%)
• Hands stretch, stretch each finger and get the hand into a fist.	7(12.7)	10(18.2)	38(69.1)
• Claw Stretch	7(12.7)	10(18.2)	38(69.1)
• Finger Stretch	5(9.1)	12(21.8)	38(69.1)
• Thumb Stretches	6(10.9)	10(18.2)	39(70.9)
• Finger Lift	7(12.7)	9(16.4)	39(70.9)

**Figure (3):** Distribution of the total studied nurses' practice level about upper extremity exercises (n=55)



**Table (1)** illustrated that, majority of the studied nurses (92.7%) were female, 34.6% aged between 30 to less than 35 years, with a mean age  $30.54 \pm 4.98$  years old. Regarding their educational level revealed that around half of them had nursing technical institute degree and were married (41.8%, 78.2% respectively). As regards nurses' years of

experience, it was observed that about one-third of the nurses (36.4%) had 5 to less than 10 years of experience, whereas 29.1% had less than 5 years of experience, with a mean experience  $8.61 \pm 4.73$  years.

**Figure (1)** illustrated that, one-fifth of the studied nurses (20%) attended training courses about burn. While

majority of them (80%) did not attend any training courses.

**Figure (2)** it was noticed from these figure that, more than three quarters of nurses (76.4%) had “unsatisfactory” levels of knowledge about upper extremities exercise for burned children.

**Table (2) clarifies** that the minority of nurses (12.7%) completely apply hand stretch for each finger and get the hand into fist. On the other hand more than half of the studied nurses (69.1%) did not apply claw or finger stretch exercise.

**Figure (3)** revealed that, the minority of the studied nurses (12.7%) demonstrated “competent” level of overall observed practice level and more than fifth of them (87.3%) had incompetent practice about upper limb exercise.

#### **Discussion:**

Worldwide, burns are one of the main causes of disturbances in children's developmental and functional independence. Burns or skin scars can interfere with the independent performance of daily life activities, such as walking, dressing, and going to the toilet. (Abdel-Salam, Abd-El-Aziz, & Mahmoud, 2019). The current study revealed that about one-third of the nurses had 5 to less than 10 years of experience, with a mean experience  $8.61 \pm 4.73$  years (Table 1). This result was in the same line with Lam, Huong, and Tuan, 2018; Kadhim, et al., 2020; Ahmed and Mohamed, 2016, who concluded that, the large percent of the nurses had experience in burn care department ranged from 1 and 10 years. The current finding was in the same line with EL Sayed, et al., (2015) who conducted a study on "Nurses' Knowledge and Performance for

Prevention of Infection in Burn Unit at a University Hospital" and reported in his study that, " 35% of their participants experience less than 10 years.

Concerning attendance of the previous burn training courses, the present study showed that, only fifth of nurses had attended training courses about burn. While majority of them had not attend any training courses (**Figure 1**). This result could be due to high workload on nurses and shortage of staff, scarcity of training programs, and lack of specialized curriculum for nursing field. This result was in agreement with Abdallah, 2011; Lam, Huong, and Tuan, 2018; Ahmed et al., 2017, who mentioned that, less than one fifth of their participants had attended training courses about burn and its management. While, this finding conflicted with EL Sayed, et al., (2015) who cited that, three quarters of their participants attended one or two training program about burn. Concerning educational level of studied nurses the current results clarified that most of them had bachelor degree. This finding may be due to head nurse of NICU requesting large number of highly qualified nurses always and the governmental tendency for highly qualified nurses working in ICU which emphasize the fact Bachelor degree nurses recruited to care for critical care setting patients. This results contradicted with (Tilley, McMahon, and Shukalak, 2017).who found that most of the participant (60; 71%) possessed Diploma in Nursing, and 24 (29%) had Bachelor of Nursing.

The result of current study showed that more than three fourth of the studied nurses had “unsatisfactory” levels of knowledge about upper extremities exercise for burned children. **figure (2)**,this result was in agreement



with **Abd El-baset (2011)** who conducted “designing, implementing and evaluating an educational program for management of burn at Alexandria University “and reported that, the majority of studied nurses (80%) had poor knowledge score before program implementation and this percentage was improved after the program. This result could be attributed to the importance of continuing education and training for nurses and **Abd EL-lateef (2003)**, who "conducted designing, implementing and evaluating an educational program for prevention of infection in burn unit at Zagazig University" and reported that, total percent of nurses' knowledge was poor.

The current study showed that more than half of the studied nurses did not apply claw or fingerstretch exercise. (**table 3**).This finding goes in harmony with(**Diego, et al., 2013**) who studied "Exercise training after burn injury"reported that three quarter of studied nurses had unsatisfactory practice level about finger stretch exercise.This is attributed to lack of training program about upper limb exercise to nurses.

The present study showed that the majority of studied nurses had incompetent practice regarding care of burned children (**Figure 3**). This result was in harmony with **Abdel-Kawey (2011)**, who studied “early management of burn in pediatric age group Cairo University” and reported that, the majority of nurses had unsatisfactory practice about burn care in burn management. This finding may be due to absence of supervision as well as lack of training program which was documented by the fact that, the high percentage of the studied nurses did not receive training about burn management.

#### Conclusion:

Depend on the finding of the present study, it was concluded that, most studied nurses had poor knowledge regarding upper limb exercise and were incompetent level of practice regarding upper limb exercise.

#### Recommendation:

The following recommendation is suggested that

- In-service training programs for nurses directed toward upper limb exercise for children with burn should be conducted.
- Regular training courses to keep nurses updated with the evidence-based practices and carry interventions to reduce burn scar which reflect on reducing children' upper limbs disabilities.

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